

# Caledonian Cables Ltd

Industrial Cables

Italian Standard



**Addison**





# Company Profile

Caledonian, established in 1978, offers one of the most complete lines of fiber and copper cabling system solutions with over hundreds of different cabling system products. Our superior products provide leading edge within every cable series and for every application.

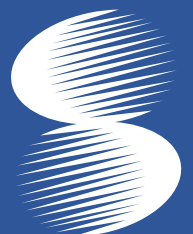
Among the national and international standards with which our cables could comply are: BS - British Standard; LPCB Fire Performance Standard, ISO Standard etc. Caledonian Cables offers a comprehensive stock of cables and cabling products through its nationwide network of resellers and distributors. Caledonian Cables has continually expanded its global presence in Europe and Asia.

Caledonian & Addison, produces a wide range of cables for communication, power and electronics in its primary plants in UK, Italy and Spain. To stay in front, we continually keep expanding our manufacturing capabilities in more low cost region such as Romania, Taiwan, Malaysia etc. This low-cost manufacturing facilities enable us provide a flexible, scalable global system that delivers superior operational performance and optimal results for our customers.

Our extensive global network of manufacturing facilities gives us significant scale and the flexibility to fulfill our customer requirements. This global presence provides design and consultancy solutions that are combined with core cable manufacturing, logistic services, and vertically integrated with our E-commerce technologies, to optimize customer operations by lowering costs and reducing time to market.

Caledonian & Addison has been respected for its high standards of quality, excellent service level, competitive pricing and a unique and innovative spirit. With our latest technologies, we are both inspired and well-positioned to meet the changing needs of our customers. We have the resources to diversify and to enhance our product lines and services. We understand the need for change and with our accurate planning, we are ready for the future and the promise of new marketing opportunities. Our tradition of growth through excellence is assured.

Our Design Centers work closely with customers to constantly improve its standard range of products and technologies and to develop customized, country and industry-specific solutions. Caledonian & Addison has established an extensive network of design, manufacturing, and logistics facilities in the world's major markets to serve the growing outsourcing needs of both multinational and regional customers.



# Our Certificate



## REGISTRATION CERTIFICATE

***This document certifies that the administration systems of  
Caledonian Cables Limited / Addison Technology Limited  
Marchants Industrial Centre, Mill Lane, Laughton, Lewes, Sussex, BN8 6AJ, United Kingdom***

***have been assessed and approved by QAS International  
to the following management systems, standards and guidelines:***

***ISO 9001 : 2008***

***With the permitted exclusion of clauses 7.3 Design and Development***

***The approved administration systems apply to the following:***

***The manufacture and supply of electrical cables and  
ancillary power equipment to customers internationally.***

Original Approval ..... **6<sup>th</sup> September 1997**.....  
Current Certificate ..... **7<sup>th</sup> February 2014**.....  
Certificate Expiry ..... **7<sup>th</sup> February 2015**.....  
Certificate Number ..... **A6211**.....

Signed: Certification Officer

  
On behalf of QAS International

This certificate remains valid while the holder maintains their quality administration systems in accordance with the standards and guidelines stated above, which will be audited annually by QAS International. The holder is entitled to display the above registration mark for the duration of this certificate, which should be returned to QAS International upon reasonable request.  
Issuing Office: QAS International, 20A Oxford Street, Malmesbury, Wiltshire SN16 9AX, UK



Registered Company



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## Italian Standard

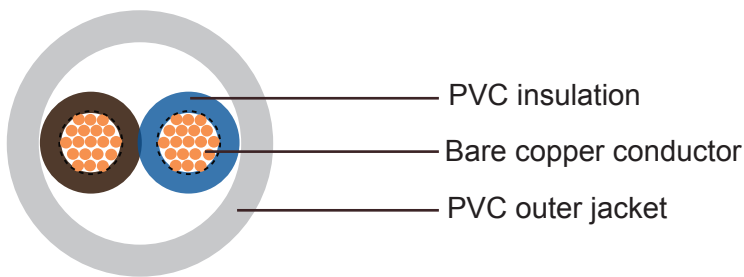
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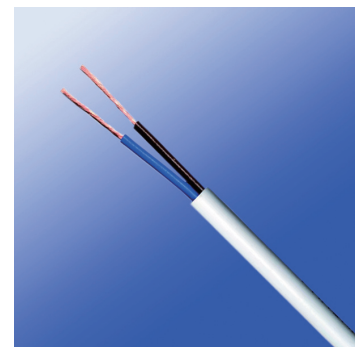
### H03VV-F/ H03VVH2-F

#### Application and Description

These cable types are especially suited for use on small appliances with low mechanical stress and for connection for light household appliances, e.g. kitchen utensils, desk lamps, floor lamps, vacuum cleaners, office machines, radios, etc. As far as these cables are admitted to the relevant specifications of the equipment, They are not permitted for use with cooking or heating apparatus. Cables with cross section 0.75 mm<sup>2</sup> are not suitable for outdoor use or use of industrial or farmer machineries. Max operating voltage in single or three phase system is U<sub>o</sub>/U 330/330 volts. In a direct current system max operating voltage is U<sub>o</sub>/U 495/495 volts.



H03VV-F



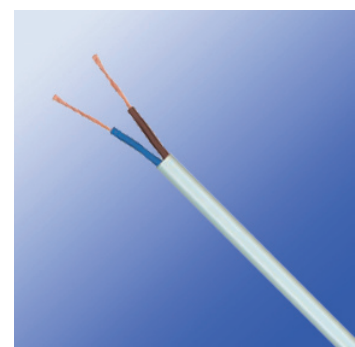
H03VV-F

#### Standard and Approval

CEI 20-20/5, CEI 20-35 (EN60332-1), CEI 20-52,



H03VVH2-F



H03VVH2-F



## Italian Standard

### Cable Construction

- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T12 to VDE-0281 Part 1
- Color coded to VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- PVC outer jacket TM2

### Technical Characteristics

- Working voltage: 300/300 volts
- Test voltage: 2000 volts
- Flexing bending radius: 7.5 x Ø
- Static bending radius: 4 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -40° C to +70° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km

### Cable Parameter

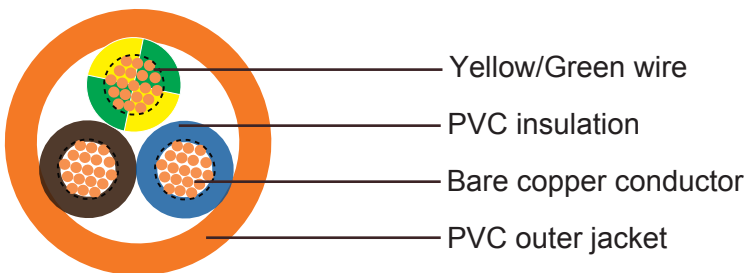
AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
<b>H03VV-F</b>						
20(16/32)	2 x 0.50	0.5	0.6	5	9.6	38
20(16/32)	3 x 0.50	0.5	0.6	5.4	14.4	45
20(16/32)	4 x 0.50	0.5	0.6	5.8	19.2	55
18(24/32)	2 x 0.75	0.5	0.6	5.5	14.4	46
18(24/32)	3 x 0.75	0.5	0.6	6	21.6	59
18(24/32)	4 x 0.75	0.5	0.6	6.5	28.8	72
18(24/32)	5 x 0.75	0.5	0.6	7.1	36.0	87
<b>H03VVH2-F</b>						
20(16/32)	2 x 0.50	0.5	0.6	3.2 x 5.2	9.7	32
18(24/32)	2 x 0.75	0.5	0.6	3.4 x 5.6	14.4	35



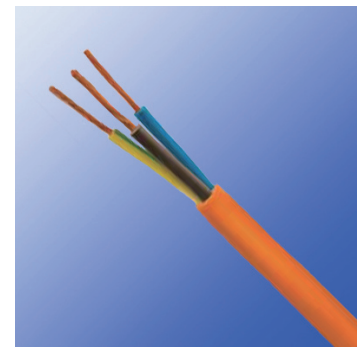
### H03V2V2-F/ H03V2V2H2-F

#### Application and Description

These cables are suitable for domestic premises, kitchen, office for light service or light portable apparatuses. With their special insulation and sheath compounds these cables are adapted for apparatus in kitchen and heating and for use in zones with high temperatures (like lighting system apparatuses) without contact with warm parts and radiations. Unsuitable for outdoor use, in industrial and agricultural buildings or non-domestic portable tools. The maximum conductor temperature in normal use: 90°C. While high temperature use, skin contact must be avoided



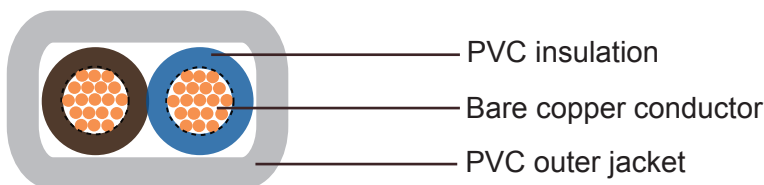
H03V2V2-F



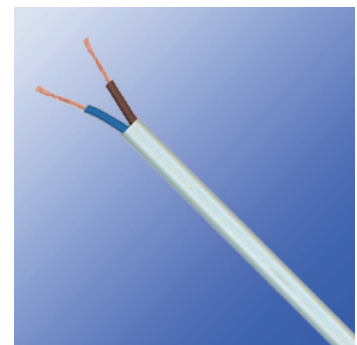
H03V2V2-F

#### Standard and Approval

CEI 20-20/12, CEI 20-35 (EN60332-1) / CEI 20-37 (EN50267), EN50265-2-1



H03V2V2H2-F



H03V2V2H2-F





## Italian Standard

### Cable Construction

- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T13 to VDE-0281 Part 1
- Color coded to VDE-0293-308
- PVC outer jacket TM3

### Technical Characteristics

- Working voltage: 300/300 volts
- Test voltage: 3000 volts
- Flexing bending radius: 15 x Ø
- Static bending radius: 4 x Ø
- Flexing temperature: +5° C to +90° C
- Static temperature: -40° C to +90° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
<b>H03V2V2-F</b>						
20(16/32)	2 x 0.50	0.5	0.6	5	9.6	38
20(16/32)	3 x 0.50	0.5	0.6	5.4	14.4	45
20(16/32)	4 x 0.50	0.5	0.6	5.8	19.2	55
18(24/32)	2 x 0.75	0.5	0.6	5.5	14.4	46
18(24/32)	3 x 0.75	0.5	0.6	6	21.6	59
18(24/32)	4 x 0.75	0.5	0.6	6.5	28.8	72
<b>H03V2V2H2-F</b>						
20(16/32)	2 x 0.50	0.5	0.6	3.2 x 5.2	9.7	32
18(24/32)	2 x 0.75	0.5	0.3	3.4 x 5.6	14.4	35



## H05VV-F/ H05VVH2-F

### Application and Description

These cables are suited for medium mechanical stress in damp and wet environments such as refrigerators, washing machines, spin dryers and other appliances, as long as it meets applicable equipment specifications. These cables are also suited for cooking and heating apparatus, provided that the cable does not come into direct contact with the hot parts of the apparatus or with any other heat source. Further applications of this cable include: Fixed installation in furniture, partition walls, decorative covering, and in the hollow spaces of prefabricated building parts. They are not suitable for outdoor use, industrial (except clothing manufacture) or farming applications. Max operating voltage in single or three phase system is  $U_0/U$  318/550 volts. In a direct system, max operating voltage is  $U_0/U$  413/825 volts.

### Standard and Approval

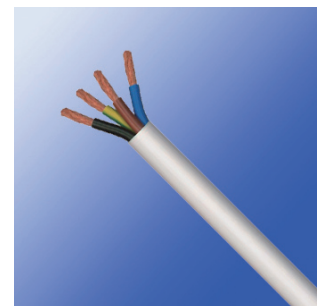
CEI 20-20/5 / 20-35 (EN60332-1) /20-52,  
0.5 - 2.5mm<sup>2</sup> to BS6500, 4.0mm<sup>2</sup> to BS7919, 6.0mm<sup>2</sup> generally to BS7919,  
CENELEC HD21.5

### Cable Construction

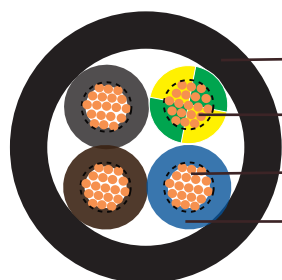
- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T12 to VDE-0281 Part 1
- Color coded to VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- PVC outer jacket TM2

### Technical Characteristics

- Working voltage: 300/500 volts
- Test voltage: 2000 volts
- Flexing bending radius:  $7.5 \times \varnothing$
- Static bending radius:  $4 \times \varnothing$
- Flexing temperature:  $-5^\circ \text{C}$  to  $+70^\circ \text{C}$
- Static temperature:  $-40^\circ \text{C}$  to  $+70^\circ \text{C}$



H05VV-F



- PVC outer jacket
- Green/Yellow wire
- Bare copper conductor
- PVC insulation

H05VV-F

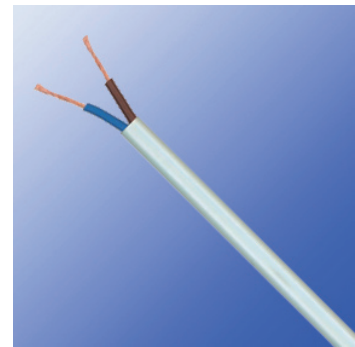


## Italian Standard

- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



H05VVH2-F



H05VVH2-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
<b>H05VV-F</b>						
18(24/32)	2 x 0.75	0.6	0.8	6.4	14.4	57
18(24/32)	3 x 0.75	0.6	0.8	6.8	21.6	68
18(24/32)	4 x 0.75	0.6	0.8	7.4	29	84
18(24/32)	5 x 0.75	0.6	0.9	8.5	36	106
17(32/32)	2 x 1.00	0.6	0.8	6.8	19	65
17(32/32)	3 x 1.00	0.6	0.8	7.2	29	79
17(32/32)	4 x 1.00	0.6	0.9	8.0	38	101
17(32/32)	5 x 1.00	0.6	0.9	8.8	48	123
16(30/30)	2 x 1.50	0.7	0.8	7.6	29	87
16(30/30)	3 x 1.50	0.7	0.9	8.2	43	111
16(30/30)	4 x 1.50	0.7	1.0	9.2	58	142
16(30/30)	5 x 1.50	0.7	1.1	10.5	72	176
14(50/30)	2 x 2.50	0.8	1.0	9.2	48	134
14(50/30)	3 x 2.50	0.8	1.1	10.1	72	169
14(50/30)	4 x 2.50	0.8	1.1	11.2	96	211
14(50/30)	5 x 2.50	0.8	1.2	12.4	120	262
12(56/28)	3 x 4.00	0.8	1.2	11.3	115	233
12(56/28)	4 x 4.00	0.8	1.2	12.5	154	292
12(56/28)	5 x 4.00	0.8	1.4	13.7	192	369
10(84/28)	3 x 6.00	0.8	1.1	13.1	181	328
10(84/28)	4 x 6.00	0.8	1.3	13.9	230	490
<b>H05VVH2-F</b>						
18(24/32)	2 x 0.75	0.6	0.8	4.2 x 6.8	14.4	48
17(32/32)	2 x 1.00	0.6	0.8	4.4 x 7.2	19.2	57



## H05V2V2-F/ H05V2V2H2-F

### Application and Description

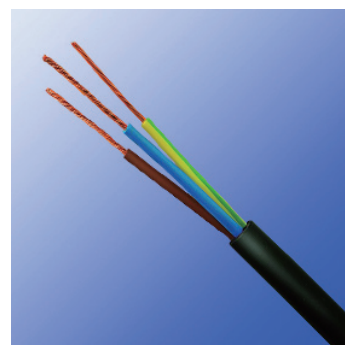
These cables are suitable for domestic premises, kitchen, office for light service or light portable apparatuses. With their special insulation and sheath compounds these cables are adapted for apparatus in kitchen and heating and for use in zones with high temperature (like lighting system apparatuses) without contact with warm parts and radiations. Unsuitable for outdoor use, in industrial and agricultural buildings or non-domestic portable tools. The maximum conductor temperature in normal use: 90°C. While high temperature use, skin contact must be avoided

### Standard and Approval

CEI 20-20/12, CEI 20-35 (EN60332-1) / CEI 20-37 (EN50267), CENELEC HD 21.12 S1 /EN50265-2-1

### Cable Construction

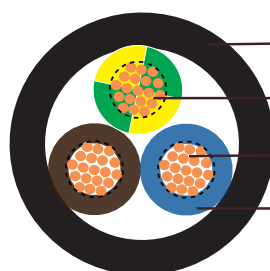
- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T13 to VDE-0281 Part 1
- Green-yellow grounding (3 conductors and above)
- Color coded to VDE-0293-308
- PVC outer jacket TM3



H05V2V2-F

### Technical Characteristics

- Working voltage: 300/500 volts
- Test voltage: 2000 volts
- Flexing bending radius: 15 x Ø
- Static bending radius: 4 x Ø
- Flexing temperature: +5° C to +90° C
- Static temperature: -40° C to +90° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



PVC outer jacket

Green/Yellow wire

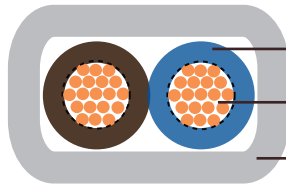
Bare copper conductor

PVC insulation

H05V2V2-F

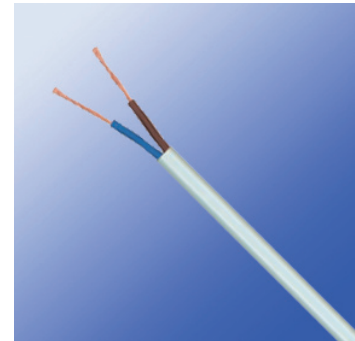


## Italian Standard



- PVC insulation
- Bare copper conductor
- PVC outer jacket

H05V2V2H2-F



H05V2V2H2-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
<b>H05V2V2-F</b>						
18(24/32)	2 x 0.75	0.6	0.8	6.2	14.4	54.2
18(24/32)	3 x 0.75	0.6	0.8	6.6	21.6	65
18(24/32)	4 x 0.75	0.6	0.8	7.1	29	77.7
18(24/32)	5 x 0.75	0.6	0.9	8	36	97.3
17(32/32)	2 x 1.00	0.6	0.8	6.4	19	60.5
17(32/32)	3 x 1.00	0.6	0.8	6.8	29	73.1
17(32/32)	4 x 1.00	0.6	0.9	7.6	38	93
17(32/32)	5 x 1.00	0.6	0.9	8.3	48	111.7
16(30/30)	2 x 1.50	0.7	0.8	7.4	29	82.3
16(30/30)	3 x 1.50	0.7	0.9	8.1	43	104.4
16(30/30)	4 x 1.50	0.7	1.0	9	58	131.7
16(30/30)	5 x 1.50	0.7	1.1	10	72	163.1
14(50/30)	2 x 2.50	0.8	1.0	9.2	48	129.1
14(50/30)	3 x 2.50	0.8	1.1	10	72	163
14(50/30)	4 x 2.50	0.8	1.1	10.9	96	199.6
14(50/30)	5 x 2.50	0.8	1.2	12.4	120	245.4
12(56/28)	3 x 4.00	0.8	1.2	11.3	115	224
12(56/28)	4 x 4.00	0.8	1.2	12.5	154	295
12(56/28)	5 x 4.00	0.8	1.4	13.7	192	361
10(84/28)	3 x 6.00	0.8	1.1	13.1	181	328
10(84/28)	4 x 6.00	0.8	1.3	13.9	230	490
<b>H05V2V2H2-F</b>						
18(24/32)	2 x 0.75	0.6	0.8	4.2 x 6.8	14.1	48
17(32/32)	2 x 1.00	0.6	0.8	4.4 x 7.2	19	57



## H05VVH6-F/ H07VVH6-F

### Application and Description

The cables are used for applications with medium mechanical stresses and sharp bending in one place. They are suitable for use in dry, damp and wet rooms as power and control cable, especially on hoisting equipment, handling systems, machine tools, etc.

### Standard and Approval

HD 359 S3, CEI 20-25, CEI 20-35, CEI 20-52

### Cable Construction

- Fine bare or tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- PVC compound insulation T12 to VDE 0207 part 4
- Color coded to VDE-0293-308
- PVC compound outer jacket TM2 to VDE 0207 part 5

### Technical Characteristics

-Working voltage:

H05VVH6-F : 300/500 V

H07VVH6-F: 450/700 V

-Test voltage:

H05VVH6-F : 2 KV

H07VVH6-F: 2.5 KV

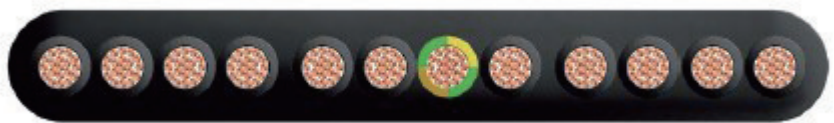
-Bending radius: 10 × cable Ø

-Flexing temperature: - 5° C to + 70° C

-Static temperature : -40° C to +70° C

-Flame retardant: test class B according to VDE 0472 part 804, IEC 60332-1

-Insulation resistance: 20 MΩ x km





### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Conductor Diameter mm	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
<b>H05VVH6-F</b>						
18(24/32)	4 x 0.75	1.2	0.6	4.2 x 12.6	29	90
18(24/32)	8x 0.75	1.2	0.6	4.2 x 23.2	58	175
18(24/32)	12x 0.75	1.2	0.6	4.2 x 33.8	86	260
18(24/32)	18x 0.75	1.2	0.6	4.2 x 50.2	130	380
18(24/32)	24x 0.75	1.2	0.6	4.2 x 65.6	172	490
17(32/32)	4 x 1.00	1.4	0.7	4.4 x 13.4	38	105
17(32/32)	5x1.00	1.4	0.7	4.4 x 15.5	48	120
17(32/32)	8 x 1.00	1.4	0.7	4.4 x 24.8	77	205
17(32/32)	12x 1.00	1.4	0.7	4.4 x 36.2	115	300
17(32/32)	18x 1.00	1.4	0.7	4.4 x 53.8	208	450
17(32/32)	24x 1.00	1.4	0.7	4.4 x 70.4	230	590
<b>H07VVH6-F</b>						
16(30/30)	4 x1.5	1.5	0.8	5.1 x 14.8	58	130
16(30/30)	5 x1.5	1.5	0.8	5.1 x 17.7	72	158
16(30/30)	7 x1.5	1.5	0.8	5.1 x 25.2	101	223
16(30/30)	8 x1.5	1.5	0.8	5.1 x 27.3	115	245
16(30/30)	10 x1.5	1.5	0.8	5.1 x 33.9	144	304
16(30/30)	12 x1.5	1.5	0.8	5.1 x 40.5	173	365
16(30/30)	18 x1.5	1.5	0.8	6.1 x 61.4	259	628
16(30/30)	24 x1.5	1.5	0.8	5.1 x 83.0	346	820
14(50/30)	4 x2.5	1.9	0.8	5.8 x 18.1	96	192
14(50/30)	5 x2.5	1.9	0.8	5.8 x 21.6	120	248
14(50/30)	7 x2.5	1.9	0.8	5.8 x 31.7	168	336
14(50/30)	8 x2.5	1.9	0.8	5.8 x 33.7	192	368
14(50/30)	10 x2.5	1.9	0.8	5.8 x 42.6	240	515
14(50/30)	12 x2.5	1.9	0.8	5.8 x 49.5	288	545
14(50/30)	24 x2.5	1.9	0.8	5.8 x 102.0	480	1220
12(56/28)	4 x4	2.5	0.8	6.7 x 20.1	154	271
12(56/28)	5 x4	2.5	0.8	6.9 x 26.0	192	280
12(56/28)	7 x4	2.5	0.8	6.7 x 35.5	269	475
10(84/28)	4 x6	3.0	0.8	7.2 x 22.4	230	359
10(84/28)	5 x6	3.0	0.8	7.4 x 31.0	288	530
10(84/28)	7 x6	3.0	0.8	7.4 x 43.0	403	750
8(80/26)	4 x10	4.0	1.0	9.2 x 28.7	384	707
8(80/26)	5 x10	4.0	1.0	11.0 x 37.5	480	1120
6(128/26)	4 x16	5.6	1.0	11.1 x 35.1	614	838
6(128/26)	5 x16	5.6	1.0	11.2 x 43.5	768	1180



## H05RN-F/H05RNH2-F

### Application and Description

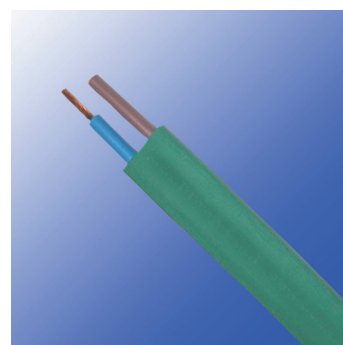
These cables are flexible, mainly recommended for use in electrical equipment under low stress in dry, damp and wet areas in indoor or outdoor environments. Commonly used for connection of electrical appliances when exposed to low mechanical strain in household, offices and for light utilities. Anywhere where there is minimal physical damage. Also suitable for fixed installation in furniture, decorative coverings, wall partitions and pre-fabricated building parts. Max operating voltage in single or three phase system is Uo/U 318/550 volts. In a direct current system max operating voltage is Uo/U 413/825 volts. They are ozone resistant, oil & fat resistant

### Standard and Approval

CEI 20-19 p.4, CEI 20-35(EN 60332-1)

### Cable Construction

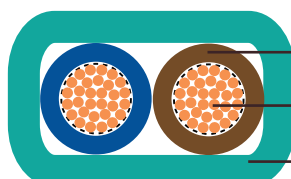
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- Color code VDE-0293-308
- Green-yellow grounding, 3 conductors and above
- Polychloroprene rubber (neoprene) jacket EM2



H05RNH2-F

### Technical Characteristics

- Working voltage: 300/500 volts
- Test voltage: 2000 volts
- Flexing bending radius: 7.5 x Ø
- Fixed bending radius: 4.0 x Ø
- Temperature Range: -30° C to +60° C
- Short circuit temperature: +200 ° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



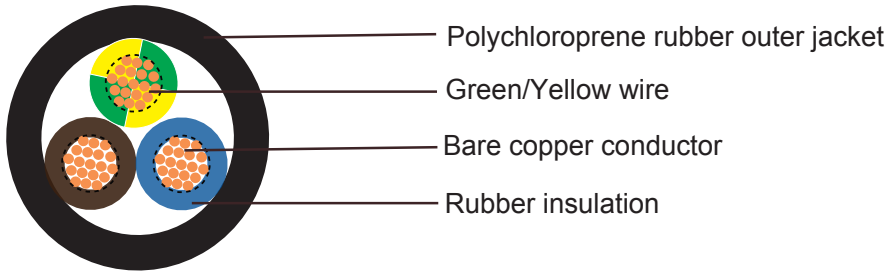
- Rubber insulation
- Bare copper conductor
- Rubber outer jacket

H05RNH2-F

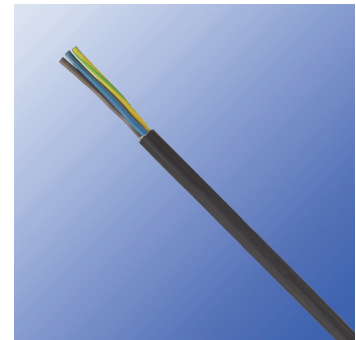




## Italian Standard



H05RN-F



H05RN-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm (min-max)	Nominal Copper Weight kg/km	Nominal Weight kg/km
<b>H05RN-F</b>						
18(24/32)	2 x 0.75	0.6	0.8	5.7 - 7.4	14.4	80
18(24/32)	3 x 0.75	0.6	0.9	6.2 - 8.1	21.6	95
18(24/32)	4 x 0.75	0.6	0.9	6.8 - 8.8	30	105
17(32/32)	2 x 1	0.6	0.9	6.1 - 8.0	19	95
17(32/32)	3 x 1	0.6	0.9	6.5 - 8.5	29	115
17(32/32)	4 x 1	0.6	0.9	7.1 - 9.2	38	142
16(30/30)	3 x 1.5	0.8	1.0	8.6 - 11.0	29	105
16(30/30)	4 x 1.5	0.8	1.1	9.5 - 12.2	39	129
16(30/30)	5 x 1.5	0.8	1.1	10.5 - 13.5	48	153
<b>H05RNH2-F</b>						
16(30/30)	2 x 1.5	0.6	0.8	5.25±0.15x13.50±0.30	14.4	80
14(50/30)	2 x 2.5	0.6	0.9	5.25±0.15x13.50±0.30	21.6	95



## H05RR-F

### Application and Description

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These cables are flexible rubber insulated; rubber jacketed harmonized cord, recommended for use in equipment, which is subject to light and medium stresses in both dry and damp environments. For use with electronics and electrical equipment such as appliances, small hand tools and office equipment They can be found in flat irons, soldering irons, kitchen aids, toasters, stoves and in connections with light commercial electric tools. Also suitable for fixed installation in furniture, decorative coverings, wall partitions and pre-fabricated building parts. Max operating voltage in single or three phase system is  $U_0/U$  300/500 volts. In a direct current system max operating voltage is  $U_0/U$  413/825 volts. Outdoor use is permitted only for a short time. They are ozone resistant, oil & fat resistant.

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### Standard and Approval

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CEI 20-19/4, CEI 20-35 (EN60332-1)

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### Cable Construction

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- Fine bare copper strands
  - Strands to VDE-0295 Class-5, IEC 60228 Class-5
  - Rubber core insulation EI4 to VDE-0282 Part-1
  - Color code VDE-0293-308 and HD 186
  - Green-yellow grounding, 3 conductors and above
  - Polychloroprene rubber (neoprene) jacket EM3
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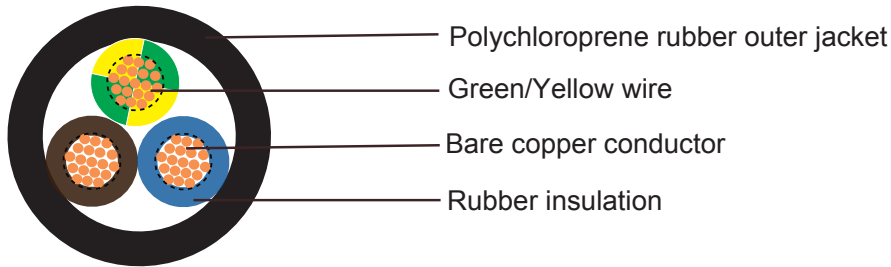
### Technical Characteristics

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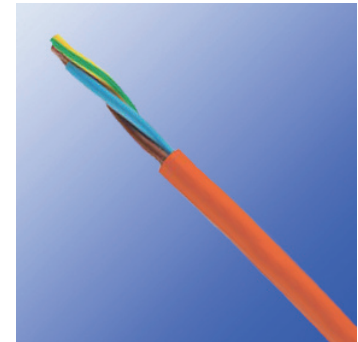
- Working voltage: 300/500 volts
  - Test voltage: 2000 volts
  - Flexing bending radius:  $8 \times \varnothing$
  - Fixed bending radius:  $6 \times \varnothing$
  - Temperature range:  $-30^\circ \text{C}$  to  $+60^\circ \text{C}$
  - Short circuit temperature:  $+200^\circ \text{C}$
  - Flame retardant: IEC 60332.1
  - Insulation resistance:  $20 \text{ M}\Omega \times \text{km}$
-



## Italian Standard



H05RR-F



H05RR-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm {min-max}	Nominal Copper Weight kg/km	Nominal Weight kg/km
18(24/32)	2 x 0.75	0.6	0.8	5.7-7.4	14.4	61
18(24/32)	3 x 0.75	0.6	0.9	6.2-8.1	21.6	75
18(24/32)	4 x 0.75	0.6	0.9	6.8-8.8	28.8	94
18(24/32)	5 x 0.75	0.6	1.0	7.6-9.9	36.0	110
17(32/32)	2 x 1	0.6	0.9	6.1-8.0	19.0	73
17(32/32)	3 x 1	0.6	0.9	6.5-8.5	29.0	86
17(32/32)	4 x 1	0.6	0.9	7.1-9.3	38.4	105
17(32/32)	5 x 1	0.6	1.0	8.0-10.3	48.0	130
16(30/30)	2 x 1.5	0.8	1.0	7.6-9.8	29.0	115
16(30/30)	3 x 1.5	0.8	1.0	8.0-10.4	43.0	135
16(30/30)	4 x 1.5	0.8	1.1	9.0-11.6	58.0	165
16(30/30)	5 x 1.5	0.8	1.1	9.8-12.7	72.0	190
14(50/30)	2 x 2.5	0.9	1.1	9.0-11.6	48.0	160
14(50/30)	3 x 2.5	0.9	1.1	9.6-12.4	72.0	191
14(50/30)	4 x 2.5	0.9	1.2	10.7-13.8	96.0	235
14(50/30)	5 x 2.5	0.9	1.3	11.9-15.3	120.0	285



## H07RN-F

### Application and Description

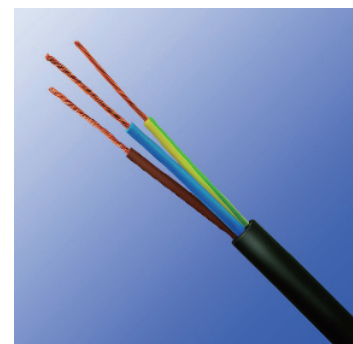
These cables are designed to provide high flexibility and have the capacity to withstand weather, oils/greases, mechanical and thermal stresses. Applications include handling equipment, mobile power supplies, worksites, stage and audio visual equipment, port areas and dams. Also suitable for fixed installations on plaster, temporary buildings and residential barracks and for use in drainage and water treatment, cold environments and severe industrial environments. Max operating voltage in single or three phase system is Uo/U 476/825 volts. In a direct current system max operating voltage is Uo/U 619/1238 volts. If in a fixed or protected installation Uo/U is 600/1000 volts. These cables are resistant to flame, acids, and oil penetration.

### Standard and Approval

CEI 20-19/4 / 20-35 (EN60332-1), IEC 60245-4

### Cable Construction

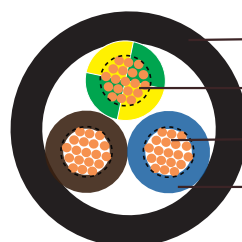
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- Color code VDE-0293-308 and HD 186
- Green-yellow grounding, 3 conductors and above
- Polychloroprene rubber (neoprene) jacket EM2



H07RN-F

### Technical Characteristics

- Working voltage: 450/750 volts
- Test voltage: 2500 volts
- Flexing bending radius: 6 x Ø
- Fixed bending radius: 4.0 x Ø
- Flexing Temperature: -25° C to +60° C
- Fixed Temperature: -40° C to +60° C
- Short circuit temperature: +200 ° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



- Polychloroprene rubber outer jacket
- Green/Yellow wire
- Bare copper conductor
- Rubber insulation

H07RN-F



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm min-max	Nominal Copper Weight kg/km	Nominal Weight kg/km
17(32/32)	2 x 1	0.8	1.3	7.7-10	19	89
17(32/32)	3 x 1	0.8	1.4	8.3-10.7	29	111
17(32/32)	4 x 1	0.8	1.5	9.2-11.9	38	146
16(30/30)	1 x 1.5	0.8	1.4	5.7-7.1	14.4	59
16(30/30)	2 x 1.5	0.8	1.5	8.5-11.0	29	135
16(30/30)	3 x 1.5	0.8	1.6	9.2-11.9	43	165
16(30/30)	4 x 1.5	0.8	1.7	10.2-13.1	58	200
16(30/30)	5 x 1.5	0.8	1.8	11.2-14.4	72	240
16(30/30)	7 x 1.5	0.8	2.6	14.5-17.5	101	385
16(30/30)	12 x 1.5	0.8	2.9	17.6-22.4	173	516
16(30/30)	19 x 1.5	0.8	3.2	20.7-26.3	274	800
16(30/30)	24 x 1.5	0.8	3.5	24.3-30.7	346	882
14(50/30)	1 x 2.5	0.9	1.4	6.3-7.9	24	72
14(50/30)	2 x 2.5	0.9	1.7	10.2-13.1	48	195
14(50/30)	3 x 2.5	0.9	1.8	10.9-14.0	72	235
14(50/30)	4 x 2.5	0.9	1.9	12.1-15.5	96	290
14(50/30)	5 x 2.5	0.9	2	13.3-17.0	120	345
14(50/30)	7 x 2.5	0.9	2.8	16.5-20.0	168	520
14(50/30)	12 x 2.5	0.9	3.1	20.6-26.2	288	810
14(50/30)	19 x 2.5	0.9	3.5	25.5-31.0	456	1200
14(50/30)	24 x 2.5	0.9	3.9	28.8-36.4	576	1650
12(56/28)	1 x 4	1	1.5	7.2-9.0	38	99
12(56/28)	2 x 4	1	1.8	11.8-15.1	77	270
12(56/28)	3 x 4	1	1.9	12.7-16.2	115	320
12(56/28)	4 x 4	1	2	14.0-17.9	154	395
12(56/28)	5 x 4	1	2.2	15.6-19.9	192	485
12(56/28)	7 x 4	1	3.1	18.2-21.8	269	681
10(84/28)	1 x 6	1	1.6	7.9-9.8	58	130
10(84/28)	3 x 6	1	2.1	14.1-18.0	173	495
10(84/28)	4 x 6	1	2.3	15.7-20.0	230	610
10(84/28)	5 x 6	1.2	2.5	17.5-22.2	288	760
8(80/26)	1 x 10	1.2	1.8	9.5-11.9	96	230
8(80/26)	3 x 10	1.2	3.3	19.1-24.2	288	880
8(80/26)	4 x 10	1.2	3.4	20.9-26.5	384	1060
8(80/26)	5 x 10	1.2	3.6	22.9-29.1	480	1300
6(128/26)	1 x 16	1.2	1.9	10.8-13.4	154	320
6(128/26)	3 x 16	1.2	3.5	21.8-27.6	461	1090
6(128/26)	4 x 16	1.2	3.6	23.8-30.1	614	1345
6(128/26)	5 x 16	1.2	3.9	26.4-33.3	768	1680



# Addison Industrial Cables

Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm min-max	Nominal Copper Weight kg/km	Nominal Weight kg/km
4(200/26)	1 x 25	1.4	2	12.7-15.8	240	450
4(200/26)	4 x 25	1.4	4.1	28.9-36.6	960	1995
4(200/26)	5 x 25	1.4	4.4	32.0-40.4	1200	2470
2(280/26)	1 x 35	1.4	2.2	14.3-17.9	336	605
2(280/26)	3 x 35	1.4	4.1	29.3-37.1	1008	1900
2(280/26)	4 x 35	1.4	4.4	32.5-41.1	1344	2645
2(280/26)	5 x 35	1.4	4.7	37.0-45.0	1680	2810
1(400/26)	1 x 50	1.6	2.4	16.5-20.6	480	825
1(400/26)	4 x 50	1.6	4.8	37.7-47.5	1920	3635
1(400/26)	5 x 50	1.6	5.1	40.0-50.8	2400	4050
2/0(356/24)	1 x 70	1.6	2.6	18.6-23.3	672	1090
2/0(356/24)	4 x 70	1.6	5.2	42.7-54.0	2688	4830
3/0(485/24)	1 x 95	1.8	2.8	20.8-26.0	912	1405
3/0(485/24)	4 x 95	1.8	5.9	48.4-61.0	3648	6320
4/0(614/24)	1x 120	1.8	3	22.8-28.6	1152	1746
4/0(614/24)	4 x 120	1.8	6	53.0-66.0	4608	6830
300MCM (765/24)	1 x 150	2	3.2	25.2-31.4	1440	1887
300MCM (765/24)	4 x 150	2	6.4	58.0-73.0	5760	8320
350MCM (944/24)	1 x 185	2.2	3.4	27.6-34.4	1776	2274
350MCM (944/24)	4 x 185	2.2	6.8	64.0-80.0	7104	9800
500MCM (1221/24)	1x 240	2.4	3.5	30.6-38.3	23.4	2956
500MCM (1221/24)	4x 240	2.4	7.0	72.0-90.0	9216	12100
-	1 x 300	2.6	3.6	33.5-41.9	2880	3479



### H07RN8-F

#### Application and Description

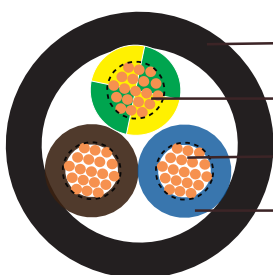
These cables particularly for use in fresh water up to 10 m depth with a maximum water temperature up to 40°C , such as the connection of submersible pumps or similar applications. Not suitable for underwater power transmission or installation in a watercourse, or where it is possible that mechanical damage might occur and cause a hazard. Indirect underground installation is allowed provided that there is mechanically protection of the cables. These cables are manufactured according to the Standard and Approval CEI 20-19/16 (CENELEC HD 22.16). It is the only cable that the installation Standard and Approval CEI 64-8 at section 702 allows for installation in swimming pools and fountains. For connections liable to moderate mechanical stresses, i.e. industrial or agricultural workshop apparatus, large boilers, heater plates, electric tools such as drills and disk saws, electric appliances, portable motors and generators on building sites; also for fixed installations along floors or shelving on temporary job sites, for connecting structural elements in lifting apparatus, machinery, etc. Suitable for applications up to 1000 V for adequately protected fixed installations ( i.e. inside pipes or equipment) as well as for rotor connections to lifting apparatus motors. They are Ozone, UV & weather resistant

#### Standard and Approval

CEI 20-19 p.16

#### Cable Construction

- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- Color code VDE-0293-308 and HD 186
- Polychloroprene rubber (neoprene) jacket EM2



H07RN8-F

- Polychloroprene rubber outer jacket
- Green/Yellow wire
- Bare copper conductor
- Rubber insulation



H07RN8-F



### Technical Characteristics

- Working voltage: 450/750 volts
- Test voltage: 2500 volts
- Flexing bending radius: 6.0 x Ø
- Fixed bending radius: 4.0 x Ø
- Flexing Temperature: -25° C to +60° C
- Fixed Temperature: -40° C to +60° C
- Max Water Temperature: +40° C
- Short circuit temperature: +250 ° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm min-max	Nominal Copper Weight kg/km	Nominal Weight kg/km
17(32/32)	2 x 1	0.8	1.3	7.7-10	19	89
17(32/32)	3 x 1	0.8	1.4	8.3-10.7	29	111
17(32/32)	4 x 1	0.8	1.5	9.2-11.9	38	146
16(30/30)	1 x 1.5	0.8	1.4	5.7-7.1	14.4	59
16(30/30)	2 x 1.5	0.8	1.5	8.5-11.0	29	135
16(30/30)	3 x 1.5	0.8	1.6	9.2-11.9	43	165
16(30/30)	4 x 1.5	0.8	1.7	10.2-13.1	58	200
16(30/30)	5 x 1.5	0.8	1.8	11.2-14.4	72	240
16(30/30)	7 x 1.5	0.8	2.6	14.5-17.5	101	385
16(30/30)	12 x 1.5	0.8	2.9	17.6-22.4	173	516
16(30/30)	19 x 1.5	0.8	3.2	20.7-26.3	274	800
16(30/30)	24 x 1.5	0.8	3.5	24.3-30.7	346	882
14(50/30)	1 x 2.5	0.9	1.4	6.3-7.9	24	72
14(50/30)	2 x 2.5	0.9	1.7	10.2-13.1	48	195
14(50/30)	3 x 2.5	0.9	1.8	10.9-14.0	72	235
14(50/30)	4 x 2.5	0.9	1.9	12.1-15.5	96	290
14(50/30)	5 x 2.5	0.9	2	13.3-17.0	120	345
14(50/30)	7 x 2.5	0.9	2.8	16.5-20.0	168	520
14(50/30)	12 x 2.5	0.9	3.1	20.6-26.2	288	810
14(50/30)	19 x 2.5	0.9	3.5	25.5-31.0	456	1200
14(50/30)	24 x 2.5	0.9	3.9	28.8-36.4	576	1650
12(56/28)	1 x 4	1	1.5	7.2-9.0	38	99
12(56/28)	2 x 4	1	1.8	11.8-15.1	77	270
12(56/28)	3 x 4	1	1.9	12.7-16.2	115	320
12(56/28)	4 x 4	1	2	14.0-17.9	154	395





## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm min-max	Nominal Copper Weight kg/km	Nominal Weight kg/km
12(56/28)	5 x 4	1	2.2	15.6-19.9	192	485
12(56/28)	7 x 4	1	3.1	18.2-21.8	269	681
10(84/28)	1 x 6	1	1.6	7.9-9.8	58	130
10(84/28)	3 x 6	1	2.1	14.1-18.0	173	495
10(84/28)	4 x 6	1	2.3	15.7-20.0	230	610
10(84/28)	5 x 6	1.2	3.6	17.5-22.2	288	760
8(80/26)	1 x 10	1.2	1.8	9.5-11.9	96	230
8(80/26)	3 x 10	1.2	3.3	19.1-24.2	288	880
8(80/26)	4 x 10	1.2	3.4	20.9-26.5	384	1060
8(80/26)	5 x 10	1.2	3.6	22.9-29.1	480	1300
6(128/26)	1 x 16	1.2	1.9	10.8-13.4	154	320
6(128/26)	3 x 16	1.2	3.5	21.8-27.6	461	1090
6(128/26)	4 x 16	1.2	3.6	23.8-30.1	614	1345
6(128/26)	5 x 16	1.2	3.9	26.4-33.3	768	1680
4(200/26)	1 x 25	1.4	2	12.7-15.8	240	450
4(200/26)	4 x 25	1.4	4.1	28.9-36.6	960	1995
4(200/26)	5 x 25	1.4	4.4	32.0-40.4	1200	2470
2 (280/26)	1 x 35	1.4	2.2	14.3-17.9	336	605
2 (280/26)	3 x 35	1.4	4.1	29.3-37.1	1008	1900
2 (280/26)	4 x 35	1.4	4.4	32.5-41.1	1344	2645
2 (280/26)	5 x 35	1.4	4.7	37.0-45.0	1680	2810
1(400/26)	1 x 50	1.6	2.4	16.5-20.6	480	825
1(400/26)	4 x 50	1.6	4.8	37.7-47.5	1920	3635
1(400/26)	5 x 50	1.6	5.1	40.0-50.8	2400	4050
2/0(356/24)	1 x 70	1.6	2.6	18.6-23.3	672	1090
2/0(356/24)	4 x 70	1.6	5.2	42.7-54.0	2688	4830
3/0(485/24)	1 x 95	1.8	2.8	20.8-26.0	912	1405
3/0(485/24)	4 x 95	1.8	5.9	48.4-61.0	3648	6320
4/0(614/24)	1x 120	1.8	3	22.8-28.6	1152	1746
4/0(614/24)	4 x 120	1.8	6	53.0-66.0	4608	6830
300 MCM (765/24)	1 x 150	2	3.2	25.2-31.4	1440	1887
300 MCM (765/24)	4 x 150	2	6.4	58.0-73.0	5760	8320
350 MCM (944/24)	1 x 185	2.2	3.4	27.6-34.4	1776	2274
350 MCM (944/24)	4 x 185	2.2	6.8	64.0-80.0	7104	9800
500 MCM (1221/24)	1x 240	2.4	3.5	30.6-38.3	23.4	2956
500 MCM (1221/24)	4x 240	2.4	7.2	72.0-90.0	9216	12100
-	1 x 300	2.6	3.6	33.5-41.9	2880	3479



## H05BN4-F

### Application and Description

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These EPR (ethylen-propylen rubber) insulated and CSP (chlorosulphonated polyethylene rubber or similar) sheathed electric cables can be used either in dry, humid or wet places or in contact with oil or grease, in weather conditions and under weak mechanical stress, for example for power supply to small appliances in industrial plants, machine shops, heating plates, portable lamps, farming equipment etc. They are also suitable for caravans and camping equipment... The maximum conductor temperature in normal use: 90°C. While high temperature use, skin contact must be avoided.

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### Standard and Approval

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CEI 20-19/12, CEI 20-35 (EN 60332-1), BS6500, BS7919

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### Cable Construction

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- Fine bare copper strands
  - Strands to VDE-0295 Class-5, IEC 60228 Class-5
  - EPR(Ethylene Propylene Rubber) rubber EI7 insulation
  - Color code VDE-0293-308
  - CSP(Chlorosulphonated Polyethylene) outer jacket EM7
- 

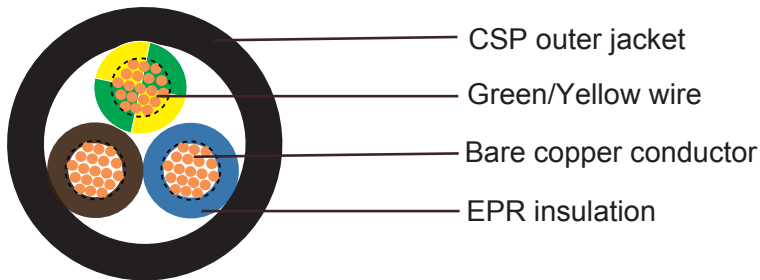
### Technical Characteristics

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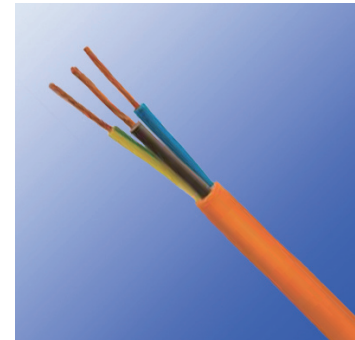
- Working voltage: 300/500 volts
  - Test voltage: 2000 volts
  - Flexing bending radius: 6.0 x Ø
  - Fixed bending radius: 4.0 x Ø
  - Temperature Range: -20° C to +90° C
  - Maximum Short Circuit Temperature: +250° C
  - Flame retardant: IEC 60332.1
  - Insulation resistance: 20 MΩ x km
-



## Italian Standard



H05BN4-F



H05BN4-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
18(24/32)	2 x 0.75	0.6	0.8	6.1	29	54
18(24/32)	3 x 0.75	0.6	0.9	6.7	43	68
18(24/32)	4 x 0.75	0.6	0.9	7.3	58	82
18(24/32)	5 x 0.75	0.6	1.0	8.1	72	108
17(32/32)	2 x 1	0.6	0.9	6.6	19	65
17(32/32)	3 x 1	0.6	0.9	7.0	29	78
17(32/32)	4 x 1	0.6	0.9	7.6	38	95
17(32/32)	5 x 1	0.6	1.0	8.5	51	125



## H07BN4-F WIND90

### Application and Description

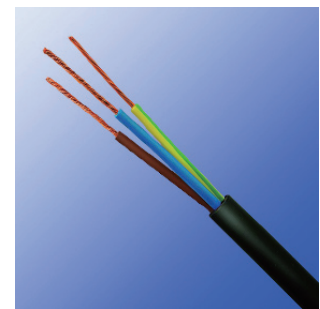
These cables are made with synthetic rubbers having an excellent temperature resistance and can be used either in dry, humid or wet places or in contact with oil or grease, in weather conditions and under medium mechanical stress, for example power supply to equipment in industrial plants, large size boilers, heating plates, portable lamps, electrical tools such as drilling machines, disk saws, portable engines and machines, building and farming equipments etc. These cables are also suitable for stationary equipments, for example designed for wind-tower application, the particular conductor Cable Construction and the used materials have improved the cable torsion resistance (max 150°/m), key requirement for drop cables in wind-generators, on plaster in temporary buildings and builders huts, and wiring in machinery elevators or similar. Suitable for caravans and camping equipment. Especially recommended for service temperature up to 90° C together with good resistance to hot grease and oil. Therefore these cables are ideal for use in plants and industries dealing with grease, oil or oil emulsion treatments, transformation or handling.

### Standard and Approval

CEI 20-19 p.12, CEI 20-35 (EN 60332-1), IEMMEQU HAR IEC 60245-4, IEC 60754-1/2

### Cable Construction

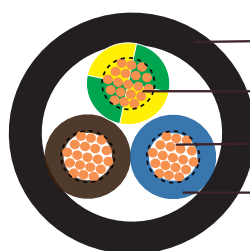
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- EPR(Ethylene Propylene Rubber) rubber EI7 insulation
- Color code VDE-0293-308
- Special polychloroprene rubber outer jacket EM7



H07BN4-F

### Technical Characteristics

- Working voltage: 450/750 volts
- Test voltage: 2500 volts
- Flexing bending radius: 6.0 x Ø
- Fixed bending radius: 4.0 x Ø
- Temperature Range: -40° C to +90° C
- Wind energy: -15° C to +90° C



- Polychloroprene rubber outer jacket
- Green/Yellow wire
- Bare copper conductor
- EPR insulation

H07BN4-F



## Italian Standard

- Maximum Short Circuit Temperature: +250° C
- Flame retardant: IEC 60332.1C2/NF C 32-070
- Insulation resistance: 20 MΩ x km

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
17(32/32)	2 x 1	0.8	1.3	8.2	93
17(32/32)	3 x 1	0.8	1.4	8.9	114
17(32/32)	4 x 1	0.8	1.5	9.8	139
16(30/30)	1 x 1.5	0.8	1.4	5.9	50
16(30/30)	2 x 1.5	0.8	1.5	9.3	118
16(30/30)	3 x 1.5	0.8	1.6	10.0	144
16(30/30)	4 x 1.5	0.8	1.7	11.0	177
16(30/30)	5 x 1.5	0.8	1.8	12.1	226
16(30/30)	7 x 1.5	0.8	2.6	14.7	385
16(30/30)	12 x 1.5	0.8	2.9	18.8	516
16(30/30)	19 x 1.5	0.8	3.2	22.0	800
16(30/30)	24 x 1.5	0.8	3.5	25.7	882
14(50/30)	1 x 2.5	0.9	1.4	6.5	65
14(50/30)	2 x 2.5	0.9	1.7	10.9	172
14(50/30)	3 x 2.5	0.9	1.8	11.7	210
14(50/30)	4 x 2.5	0.9	1.9	12.8	257
14(50/30)	5 x 2.5	0.9	2	14.1	329
14(50/30)	7 x 2.5	0.9	2.8	17.1	445
14(50/30)	12 x 2.5	0.9	3.1	22.1	702
14(50/30)	19 x 2.5	0.9	3.5	26.0	1030
14(50/30)	24 x 2.5	0.9	3.9	30.4	1312
12(56/28)	1 x 4	1	1.5	7.4	89
12(56/28)	2 x 4	1	1.8	12.6	238
12(56/28)	3 x 4	1	1.9	13.5	292
12(56/28)	4 x 4	1	2	14.8	359
12(56/28)	5 x 4	1	2.2	16.3	422
12(56/28)	7 x 4	1	3.1	19.6	618
10(84/28)	1 x 6	1	1.6	8.1	115
10(84/28)	2 x 6	1	1.8	13.8	282
10(84/28)	3 x 6	1	2.1	14.8	355
10(84/28)	4 x 6	1	2.3	16.4	449
10(84/28)	5 x 6	1.2	3.6	18.1	567
8(80/26)	1 x 10	1.2	1.8	10.4	190
8(80/26)	2 x 10	1.2	2.3	19.4	539
8(80/26)	3 x 10	1.2	3.3	20.7	674
8(80/26)	4 x 10	1.2	3.4	22.6	833



AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
8(80/26)	5 x 10	1.2	3.6	24.8	1010
6(128/26)	1 x 16	1.2	1.9	11.6	259
6(128/26)	2 x 16	1.2	2.8	21.8	722
6(128/26)	3 x 16	1.2	3.5	23.3	913
6(128/26)	4 x 16	1.2	3.6	25.4	1138
6(128/26)	5 x 16	1.2	3.9	28.1	1400
4(200/26)	1 x 25	1.4	2	13.7	375
4(200/26)	2 x 25	1.4	3.3	25.9	1043
4(200/26)	4 x 25	1.4	4.1	30.8	1714
4(200/26)	5 x 25	1.4	4.4	33.9	2096
2(280/26)	1 x 35	1.4	2.2	15.4	492
2(280/26)	3 x 35	1.4	4.1	31.0	1745
2(280/26)	4 x 35	1.4	4.4	34.3	2204
2(280/26)	5 x 35	1.4	4.7	39.6	2810
1(400/26)	1 x 50	1.6	2.4	17.7	675
1(400/26)	3 x 50	1.6	3.6	35.8	2409
1(400/26)	4 x 50	1.6	4.8	39.6	3029
1(400/26)	5 x 50	1.6	5.1	44.1	4050
2/0(356/24)	1 x 70	1.6	2.6	20.0	908
2/0(356/24)	3 x 70	1.6	4.2	40.5	3211
2/0(356/24)	4 x 70	1.6	5.2	44.9	4121
3/0(485/24)	1 x 95	1.8	2.8	22.1	1171
3/0(485/24)	3 x 95	1.8	4.8	45.1	4210
3/0(485/24)	4 x 95	1.8	5.9	50.4	5361
4/0(614/24)	1x 120	1.8	3	24.5	1445
4/0(614/24)	3 x 120	1.8	4.8	49.9	5205
4/0(614/24)	4 x 120	1.8	6	55.3	6546
300 MCM (765/24)	1 x 150	2	3.2	26.9	1783
300 MCM (765/24)	3 x 150	2	5.2	54.8	6389
300 MCM (765/24)	4 x 150	2	6.4	60.9	8095
350 MCM (944/24)	1 x 185	2.2	3.4	28.9	2125
350 MCM (944/24)	4 x 185	2.2	6.8	65.7	9652
500 MCM (1221/24)	1x 240	2.4	3.5	32.6	2733
500 MCM (1221/24)	4x 240	2.4	7.2	75.5	12614
-	1 x 300	2.6	3.6	36.5	3348



### H05V-K

#### Application and Description

These insulated wires are determined for installation to the inside of apparatus as well as for the protective laying to the lightings, in dry rooms, in production facilities, switch and distributors boards, in tubes, under and surface mounting of plasters.

#### Standard and Approval

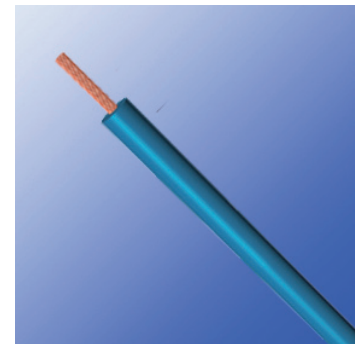
CEI 20-20/3, CEI 20-35 (EN60332-1), CEI 20-52, HD 21.3 S3

#### Cable Construction

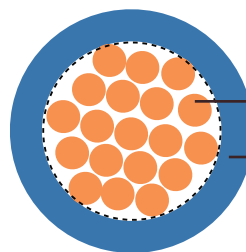
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC TI1 core insulation
- Cores to VDE-0293 colors on chart

#### Technical Characteristics

- Working voltage: 300/500v
- Test voltage: 2000 volts
- Flexing bending radius:  $12.5 \times \varnothing$
- Static bending radius:  $12.5 \times \varnothing$
- Flexing temperature:  $-5^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Static temperature:  $-30^{\circ} \text{C}$  to  $+80^{\circ} \text{C}$
- Flame retardant: IEC 60332.1
- Insulation resistance:  $10 \text{ M}\Omega \times \text{km}$



H05V-K



Bare copper conductor

PVC insulation

#### Cable Parameter

H05V-K

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
20(16/32)	1 x 0.5	0,6	2.1	4.9	10
18(24/32)	1 x 0.75	0,6	2.4	7.2	13
17(32/32)	1 x 1	0,6	2.6	9.6	15



## H07V-K

### Application and Description

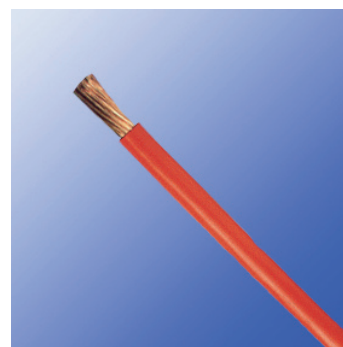
These are not suitable to be installed for laying in tubes, under and surface mounting of plaster and also in closed installation conduits. These are not allowed to install for direct laying on cable trays, channel or tanks. These types are permitted for the inner wiring of equipment, distributor and switchboards and also for protective laying to the lightings with a nominal voltage up to 1000 V alternating current or up to 750 V direct current against earth.

### Standard and Approval

CEI 20-20, CEI20-52, HD 21.3 S3

### Cable Construction

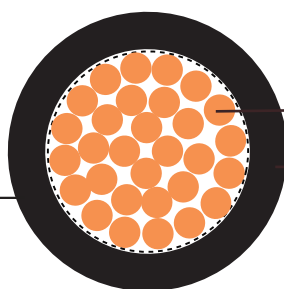
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC TI1 core insulation
- Cores to VDE-0293 colors on chart



H07V-K

### Technical Characteristics

- Working voltage: 450/750V
- Test voltage: 2500 volts
- Flexing bending radius: 12.5 x Ø
- Static bending radius: 12.5 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -30° C to +80° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



Bare copper conductor

PVC insulation

H07V-K





## Italian Standard

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
16(30/30)	1 x 1.5	0,7	3.1	14.4	20
14(50/30)	1 x 2.5	0,8	3.6	24.0	31
12(56/28)	1 x 4	0,8	4.3	38.0	48
10(84/28)	1 x 6	0,8	4.9	58.0	69
8(80/26)	1 x 10	1,0	6.4	96.0	121
6(128/26)	1 x 16	1,0	8.1	154.0	211
4(200/26)	1 x 25	1,2	9.8	240	303
2 (280/26)	1 x 35	1,2	11.1	336	417
1 (400/26)	1 x 50	1,4	13.1	480	539
2/0 (356/24)	1 x 70	1,4	15.5	672	730
3/0 (485/24)	1 x 95	1,6	17.2	912	900
4/0 (614/24)	1 x 120	1,6	19.7	1152	1135
300 MCM (765/24)	1 x 150	1,8	21.3	1440	1410
350 MCM (944/24)	1 x 185	2,0	23.4	1776	1845
500MCM(1225/24)	1 x 240	2,2	27.1	2304	2270



## H05V2-K / H07V2-K

### Application and Description

These special heat-resistant flexible single-conductor hook-up wires are ideal for use in power current installation, switch cabinets, motors and transformers which are subject to direct contact with high temperature (e.g. varnishing machines and drying towers etc.). These are also suitable for inside wiring of electrical equipments such as lighting and heating apparatus.

### Standard and Approval

CEI 20-20, CEI20-52, HD 21.7

### Cable Construction

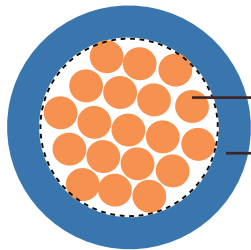
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5, BS 6360 cl. 5 and HD 383
- Special heat resistant PVC T13 core insulation to DIN VDE 0281 part 7
- Cores to VDE-0293 colors
- H05V2-K (20, 18 & 17 AWG)
- H07V2-K (16 AWG and Larger)

### Technical Characteristics

- Working voltage: 300/500v (H05V2-K)/ 450/750v (H07V2-K)
- Working voltage: - Test voltage: 2000 volts
- Flexing bending radius: 10-15 x Ø
- Static bending radius: 10-15 x Ø
- Flexing temperature: +5° C to +90° C
- Static temperature: -10° C to +105° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



## Italian Standard



Bare copper conductor

PVC insulation

H05V2-K



H05V2-K

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
H05V2-K					
20(16/32)	1 x 0.5	0.6	2.5	4.8	8.7
18(24/32)	1 x 0.75	0.6	2.7	7.2	11.9
17(32/32)	1 x 1	0.6	2.8	9.6	14.0
H07V2-K					
16(30/30)	1 x 1.5	0,7	3.4	14.4	20
14(50/30)	1 x 2.5	0,8	4.1	24	33.3
12(56/28)	1 x 4	0,8	4.8	38	48.3
10(84/28)	1 x 6	0,8	5.3	58	68.5
8(80/26)	1 x 10	1,0	6.8	96	115
6(128/26)	1 x 16	1,0	8.1	154	170
4(200/26)	1 x 25	1,2	10.2	240	270
2(280/26)	1 x 35	1,2	11.7	336	367
1(400/26)	1 x 50	1,4	13.9	480	520
2/0(356/24)	1 x 70	1,4	16	672	729
3/0(485/24)	1 x 95	1,6	18.2	912	962
4/0(614/24)	1 x 120	1,6	20.2	1115	1235
300 MCM (765/24)	1 x 150	1,8	22.5	1440	1523
350 MCM (944/24)	1 x 185	2,0	24.9	1776	1850
500MCM(1225/24)	1 x 240	2,2	28.4	2304	2430



## H05V-U / H07V-U

### Application and Description

#### H05 V-U/(H)05 V-U

These insulated wires are determined for the installation to the inside of apparatus as well as for the protective laying to the lightings, in dry rooms, in production facilities, switch and distributor boards, in tubes, under and surface mounting of plasters.

#### H07 V-U/(H)07 V-U

These insulated wires are suitable for laying tubes, under and surface mounting of plasters and also in closed installation conduits. These are not allowed to install for direct laying in cable trays, channels or tanks. These types are permitted for the inner wiring of equipment, distributor and switchboards and also for protective laying to the lightings with a nominal voltage up to 1000 V alternating current or up to 750 V direct current against ground.

### Standard and Approval

CEI 20-20/3, CEI 20-35, CEI 20-52, HD 21.3 S3, IEC60332

### Cable Construction

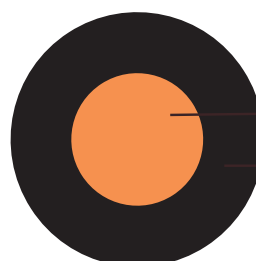
- Solid bare copper single wire
- Solid to DIN VDE 0295 cl-1 and IEC 60228 cl-1
- Special PVC T11 core insulation
- Cores to VDE-0293 colors on chart
- H05V-U (20, 18 & 17 AWG)
- H07V-U (16 AWG and Larger)



H07V-U

### Technical Characteristics

- Working voltage: 300/500v (H05V-U)
- Working voltage: 450/750v (H07V-U)
- Test voltage: 2000V(H05V-U)/2500V (H07V-U)
- Flexing bending radius: 15 x Ø
- Static bending radius: 15 x Ø
- Flexing temperature: -5° C to +70° C



Bare copper conductor

PVC insulation

H07V-U



## Italian Standard

- Static temperature: -30° C to +90° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
20	1 x 0.5	0.6	2.1	4.8	9
18	1 x 0.75	0.6	2.2	7.2	11
17	1 x 1	0.6	2.4	9.6	14
16	1 x 1.5	0.7	2.9	14.4	21
14	1 x 2.5	0.8	3.5	24.0	33
12	1 x 4	0.8	3.9	38.0	49
10	1 x 6	0.8	4.5	58.0	69
8	1 x 10	1.0	5.7	96.0	115



## H05V2-U / H07V2-U

### Application and Description

These cables are for fixed protected installation inside appliances and in, or on, lighting fittings. Suitable for installation in surface mounted or embedded conduits, only for signalling and control circuits. Maximum conductor temperature in normal use 90°C. Not to be used in contact with object higher than 85°C. Not suitable for fixed distribution system.

### Standard and Approval

CEI20-20/7, HD 21.7 S2

### Cable Construction

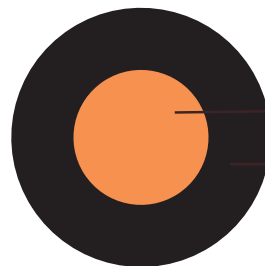
- Solid bare copper single wire
- Solid to DIN VDE 0281-3, HD 21.3 S3 and IEC 60227-3
- Special PVC TI3 ore insulation
- Cores to VDE-0293 colors on chart
- H05V-U (20, 18 & 17 AWG)
- H07V-U (16 AWG and Larger)



H07V2-U

### Technical Characteristics

- Working voltage: 300/500v (H05V-U)
- Working voltage: 450/750v (H07V-U)
- Test voltage: 2000V(H05V-U)/2500V (H07V-U)
- Flexing bending radius: 15 x Ø
- Static bending radius: 15 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -30° C to +80° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



Bare copper conductor

PVC insulation

H07V2-U



### Cable Parameter

<b>AWG</b>	<b>No. of Cores x Nominal Cross Sectional Area # x mm<sup>2</sup></b>	<b>Nominal Thickness of Insulation mm</b>	<b>Nominal Overall Diameter mm</b>	<b>Nominal Copper Weight kg/km</b>	<b>Nominal Weight kg/km</b>
20	1 x 0.5	0.6	2.1	4.8	9
18	1 x 0.75	0.6	2.2	7.2	11
17	1 x 1	0.6	2.4	9.6	14
16	1 x 1.5	0.7	2.9	14.4	21
14	1 x 2.5	0.8	3.5	24.0	33
12	1 x 4	0.8	3.9	38.0	49
10	1 x 6	0.8	4.5	58.0	69
8	1 x 10	1.0	5.7	96.0	115



## H07ZZ-F

### Application and Description

These LSZH cables are flexible, mainly used for mobile service, suitable for installations where is required low smoke and halogen free fumes under fire conditions. Suitable for installations where the cable must withstand medium mechanical stress, for machines in industrial and agricultural workshops, for motors and some transportable machines , for wind mills and for agricultural exploitations.

### Standard and Approval

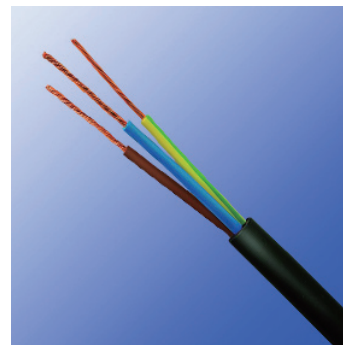
CEI 20-19 p.13, IEC 60245-4 , IEC 60754, EN 61034

### Cable Construction

- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Halogen free rubber compound EI 8 acc. to EN 50363-5
- Color code to VDE-0293-308
- Black halogen free rubber compound EM8 jacket

### Technical Characteristics

- Flexing voltage: 450/750 volts
- Fixed voltage: 600/1000 volts
- Test voltage: 2500 volts
- Flexing bending radius:  $6 \times \varnothing$
- Fixed bending radius:  $4.0 \times \varnothing$
- Flexing Temperature:  $-5^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Fixed Temperature:  $-40^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Short circuit temperature:  $+250^{\circ} \text{C}$
- Flame retardant: IEC 60332.3.C1, NF C 32-070
- Insulation resistance:  $20 \text{ M}\Omega \times \text{km}$

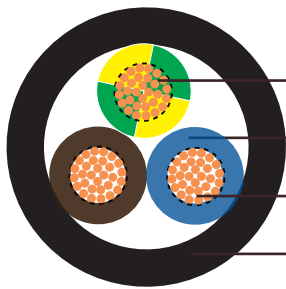


H07ZZ-F





## Italian Standard



- Green/Yellow wire
- Halogen free rubber compound insulation
- Bare copper conductor
- Halogen free rubber compound jacket

H07ZZ-F

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm (min-max)	Nominal Copper Weight kg/km	Nominal Weight kg/km
17 (32/32)	2 x 1	0.8	1.3	7.7-10	19	96
17 (32/32)	3 x 1	0.8	1.4	8.3-10.7	29	116
17 (32/32)	4 x 1	0.8	1.5	9.2-11.9	38	143
17 (32/32)	5 x 1	0.8	1.6	10.2-13.1	46	171
16 (30/30)	1 x 1.5	0.8	1.4	5.7-7.1	14.4	58.5
16 (30/30)	2 x 1.5	0.8	1.5	8.5-11.0	29	120
16 (30/30)	3 x 1.5	0.8	1.6	9.2-11.9	43	146
16 (30/30)	4 x 1.5	0.8	1.7	10.2-13.1	58	177
16 (30/30)	5 x 1.5	0.8	1.8	11.2-14.4	72	216
16 (30/30)	7 x 1.5	0.8	2.5	14.5-17.5	101	305
16 (30/30)	12 x 1.5	0.8	2.9	17.6-22.4	173	500
16 (30/30)	14 x 1.5	0.8	3.1	18.8-21.3	196	573
16 (30/30)	18 x 1.5	0.8	3.2	20.7-26.3	274	755
16 (30/30)	24 x 1.5	0.8	3.5	24.3-30.7	346	941
16 (30/30)	36 x 1.5	0.8	3.8	27.8-35.2	507	1305
14 (50/30)	1 x 2.5	0.9	1.4	6.3-7.9	24	72
14 (50/30)	2 x 2.5	0.9	1.7	10.2-13.1	48	173
14 (50/30)	3 x 2.5	0.9	1.8	10.9-14.0	72	213
14 (50/30)	4 x 2.5	0.9	1.9	12.1-15.5	96	237
14 (50/30)	5 x 2.5	0.9	2.0	13.3-17.0	120	318
14 (50/30)	7 x 2.5	0.9	2.7	16.5-20.0	168	450
14 (50/30)	12 x 2.5	0.9	3.1	20.6-26.2	288	729
14 (50/30)	14 x 2.5	0.9	3.2	22.2-25.0	337	866
14 (50/30)	18 x 2.5	0.9	3.5	24.4-30.9	456	1086
14 (50/30)	24 x 2.5	0.9	3.9	28.8-36.4	576	1332
14 (50/30)	36 x 2.5	0.9	4.3	33.2-41.8	1335	1961
12 (56/28)	1 x 4	1	1.5	7.2-9.0	38	101
12 (56/28)	3 x 4	1	1.9	12.7-16.2	115	293
12 (56/28)	4 x 4	1	2.0	14.0-17.9	154	368
12 (56/28)	5 x 4	1	2.2	15.6-19.9	192	450
12 (56/28)	12 x 4	1	3.5	24.2-30.9	464	1049



### (H)03 Z1Z1-F/(H)05 Z1Z1-F

#### Application and Description

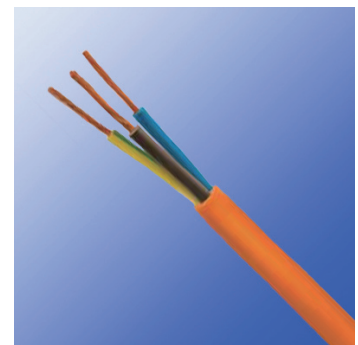
These cables may be used when halogen-free, low smoke and corrosive gas properties are required in case of fire. For moderate demands in the house, kitchen and office, for house equipment in damp rooms (for example: washing machines, dryers and refrigerators). Suitable for cooking and heating equipment, providing that the cable is not in contact with hot components or heat radiation. Not suitable for use in high temperature areas (like in lighting equipment), outside buildings, in industrial or agricultural buildings, connection of electrical power tools.

#### Standard and Approval

CEI 20-20/14, CEI 20-35 (EN60332-1), CEI 20-37 (EN50267), EN50363

#### Cable Construction

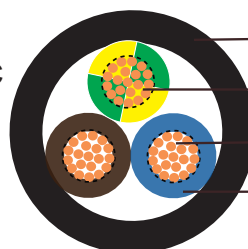
- Fine bare copper strands
- Strands to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5, HD 383
- Thermoplastic T16 core insulation
- Color code VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- Halogen-free thermoplastic TM7 outer jacket
- Black (RAL 9005) or White (RAL 9003)



H05Z1Z1-F

#### Technical Characteristics

- Working voltage: 300/300 volts(H03Z1Z1-F), 300/500 volts(H05Z1Z1-F)
- Test voltage: 2000 volts(H03Z1Z1-F), 2500 volts(H05Z1Z1-F)
- Flexing bending radius: 7.5 x Ø
- Fixed bending radius: 4.0 x Ø
- Flexing Temperature: -5° C to +70° C
- Fixed Temperature: -40° C to +70° C
- Short circuit temperature: +160° C
- Insulation resistance: 20 MΩ x km



- Halogen-free thermoplastic outer jacket
- Green/Yellow wire
- Bare copper conductor
- Thermoplastic insulation

H05Z1Z1-F



## Italian Standard

- Smoke density acc. to EN 50268 / IEC 61034
- Corrosiveness of combustion gases acc. to EN 50267-2-2, IEC 60754-2
- Flame test: flame-retardant acc. to EN 50265-2-1, IEC 60332.1

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
(H)03 Z1Z1-F						
20(16/32)	2 x 0.5	0.5	0.6	5.0	9.6	39
20(16/32)	3 x 0.5	0.5	0.6	5.3	14.4	46
20(16/32)	4 x 0.5	0.5	0.6	5.8	19.2	56
18(24/32)	2 x 0.75	0.5	0.6	5.4	14.4	47
18(24/32)	3 x 0.75	0.5	0.6	5.7	21.6	55
18(24/32)	4 x 0.75	0.5	0.6	6.3	29.0	69
(H)05 Z1Z1-F						
18(24/32)	2 x 0.75	0.6	0.8	6.2	14.4	58
18(24/32)	3 x 0.75	0.7	0.8	6.6	21.6	68
18(24/32)	4 x 0.75	0.8	0.8	7.1	29	81
18(24/32)	5 x 0.75	0.8	0.9	8	36	102
17(32/32)	2 x 1	0.6	0.8	6.6	19	67
17(32/32)	3 x 1	0.8	0.8	6.9	29	81
17(32/32)	4 x 1	0.8	0.9	7.7	38	101
17(32/32)	5 x 1	0.8	0.9	8.4	48	107
16(30/30)	2 x 1.5	0.7	0.8	7.4	29	87
16(30/30)	3 x 1.5	0.8	0.9	8.1	43	109
16(30/30)	4 x 1.5	0.8	1.0	9	58	117
16(30/30)	5 x 1.5	0.8	1.1	10	72	169
14(50/30)	2 x 2.5	0.8	1.0	9.3	48	138
14(50/30)	3 x 2.5	1.0	1.1	10.1	72	172
14(50/30)	4 x 2.5	1.0	1.1	11	96	210
14(50/30)	5 x 2.5	1.0	1.2	12.3	120	260
12(56/28)	2 x 4	0.8	1.1	10.6	76.8	190
12(56/28)	3 x 4	1.0	1.2	11.5	115.2	242
12(56/28)	4 x 4	1.0	1.4	12.5	153.6	298
12(56/28)	5 x 4	1.0	1.4	14.1	192	371



## H05V-R/H07V-R

### Application and Description

These cables are preferably for installation indoors, in cable ducts and in industrial plants or switching stations, under ground installation. Can be used in switchboards and distributor boards or where a thicker strand of multi-wire is required. Found in electronic and electrical equipment and switchgear cabinets designed for export to a European country and for MRO replacement of European made equipment wire.

### Standard and Approval

CEI 20-20/3 , CEI 20-35 (EN60332-1), CEI 20-52

### Cable Construction

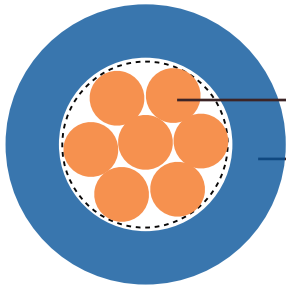
- Bare copper solid/strands conductor
- Strands to VDE-0295 Class-2, IEC 60228 CI-2
- Special PVC T11 core insulation
- Cores to VDE-0293 colors on chart

### Technical Characteristics

- Working voltage: 300/500 volts(H05V-R), 450/750 volts(H07V-R)
- Test voltage: 2000 volts(H05V-R), 2500 volts(H07V-R)
- Flexing bending radius: 15 x Ø
- Static bending radius: 15 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -30° C to +80° C
- Short circuit temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



## Italian Standard



Bare copper conductor

PVC insulation

H05V-R



H05V-R

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05V-R					
20(7/29)	1 x 0.5	0.6	2.2	4.8	9
18(7/27)	1 x 0.75	0.6	2.4	7.2	12
17(7/26)	1 x 1	0.6	2.6	9.6	15
H07V-R					
16(7/24)	1 x 1.5	0.7	3.0	14.4	23
14(7/22)	1 x 2.5	0.8	3.6	24	35
12(7/20)	1 x 4	0.8	4.2	39	51
10(7/18)	1 x 6	0.8	4.7	58	71
8(7/16)	1 x 10	1	6.1	96	120
6(7/14)	1 x 16	1	7.2	154	170
4(7/12)	1 x 25	1.2	8.4	240	260
2(7/10)	1 x 35	1.2	9.5	336	350
1(19/13)	1 x 50	1.4	11.3	480	480
2/0(19/11)	1 x 70	1,4	12.6	672	680
3/0(19/10)	1 x 95	1,6	14.7	912	930
4/0(37/12)	1 x 120	1,6	16.2	1152	1160
300MCM(37/11)	1 x 150	1,8	18.1	1440	1430
350MCM(37/10)	1 x 185	2,0	20.2	1776	1780
500MCM(61/11)	1 x 240	2,2	22.9	2304	2360
	1 x 300	2.4	24.5		2940
	1 x 400	2.6	27.5		3740



## H05Z-K / H07Z-K

### Application and Description

These cables are designed for the internal wiring of switchboards and distributor boards with an alternating nominal voltage up to 1000 Volts or a direct voltage up to 750 volts. Generally install in pipes or ducts and internal wiring of appliances with maximum operating temperature of 90° C, and generally in areas (such as public and government buildings) where smoke and toxic fumes may cause a threat to life and equipment. The cables produce no corrosive gasses when burnt which is particularly important where electronic equipment is installed.

### Standard and Approval

CEI 20-19/9, HD 22.9 S2, BS 7211, IEC 60754-2, EN 50267

### Cable Construction

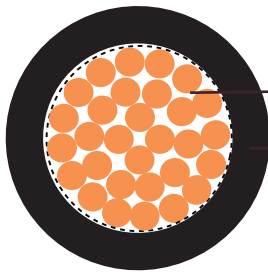
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5 BS 6360 cl. 5, HD 383
- Cross-link polyolefin EI5 core insulation
- LSOH - low smoke, zero halogen

### Technical Characteristics

- Working voltage: 300/500v (H05Z-K), 450/750v (H07Z-K)
- Test voltage: 2500 volts
- Flexing bending radius: 8 x Ø
- Static bending radius: 8 x Ø
- Flexing temperature: -15° C to +90° C
- Static temperature: -40° C to +90° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km
- Smoke density acc. to EN 50268 / IEC 61034
- Corrosiveness of combustion gases acc. to EN 50267-2-2, IEC 60754-2
- Flame test: flame-retardant acc. to EN 50265-2-1, IEC 60332.1



## Italian Standard



Bare copper conductor

LSOH cross-link polyolefin insulation

H05Z-K



H05Z-K

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05Z-K					
20(16/32)	1 x 0.5	0.6	2.3	4.8	9
18(24/32)	1 x 0.75	0.6	2.5	7.2	12.4
17(32/32)	1 x 1	0.6	2.6	9.6	15
H07Z-K					
16(30/30)	1 x 1.5	0,7	3.5	14.4	24
14(50/30)	1 x 2.5	0,8	4	24	35
12(56/28)	1 x 4	0,8	4.8	38	51
10(84/28)	1 x 6	0,8	6	58	71
8(80/26)	1 x 10	1,0	6.7	96	118
6(128/26)	1 x 16	1,0	8.2	154	180
4(200/26)	1 x 25	1,2	10.2	240	278
2(280/26)	1 x 35	1,2	11.5	336	375
1(400/26)	1 x 50	1,4	13.6	480	560
2/0(356/24)	1 x 70	1,4	16	672	780
3/0(485/24)	1 x 95	1,6	18.4	912	952
4/0(614/24)	1 x 120	1,6	20.3	1152	1200
300 MCM (765/24)	1 x 150	1,8	22.7	1440	1505
350 MCM (944/24)	1 x 185	2,0	25.3	1776	1845
500MCM(1225/24)	1 x 240	2,2	28.3	2304	2400



## H05Z-U / H07Z-U / H07Z-R

### Application and Description

These cables are designed for the internal wiring of switchboards and distributor boards with an alternating nominal voltage up to 1000 Volts or a direct voltage up to 750 volts. Generally install in pipes or ducts and internal wiring of appliances with maximum operating temperature of 90° C, and generally in areas (such as public and government buildings) where smoke and toxic fumes may cause a threat to life and equipment. The cables produce no corrosive gasses when burnt which is particularly important where electronic equipment is installed.

### Standard and Approval

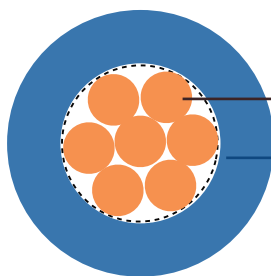
CEI 20-19/9, CEI 20-35 (EN60332-1) / CEI 30-37 (EN50267), CENELEC HD 22.9 , EN50265-2-2, EN50265-2-1

### Cable Construction

- Solid bare copper single wire to IEC 60228 CI-1(H05Z-U / H07Z-U)
- Bare copper strands to IEC 60228 CI-2 (H07Z-R)
- Cross-link polyolefin EI5 core insulation
- Cores to VDE-0293 colors
- LSOH - low smoke, zero halogen

### Technical Characteristics

- Working voltage: 300/500v (H05Z-U), 450/750v (H07Z-U / H07Z-R)
- Test voltage: 2500 volts
- Flexing bending radius: 15 x Ø
- Static bending radius: 10 x Ø
- Flexing temperature: +5° C to +90° C
- Short circuit temperature: +250° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



Bare copper conductor

LSOH cross-link polyolefin insulation

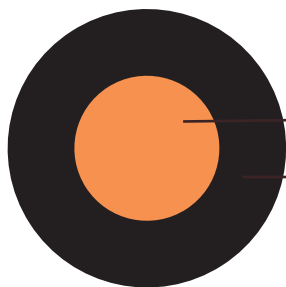
H07Z-R





### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05Z-U					
20	1 x 0.5	0.6	2.0	4.8	8
18	1 x 0.75	0.6	2.2	7.2	12
17	1 x 1	0.6	2.3	9.6	14
H07Z-U					
16	1 x 1.5	0,7	2.8	14.4	20
14	1 x 2.5	0,8	3.3	24	30
12	1 x 4	0,8	3.8	38	45
10	1 x 6	0,8	4.3	58	65
8	1 x 10	1,0	5.5	96	105
H07Z-R					
16(7/24)	1 x 1.5	0.7	3.0	14.4	21
14(7/22)	1 x 2.5	0.8	3.6	24	33
12(7/20)	1 x 4	0.8	4.1	39	49
10(7/18)	1 x 6	0.8	4.7	58	71
8(7/16)	1 x 10	1	6.0	96	114
6(7/14)	1 x 16	1	6.8	154	172
4(7/12)	1 x 25	1.2	8.4	240	265
2(7/10)	1 x 35	1.2	9.3	336	360
1(19/13)	1 x 50	1.4	10.9	480	487
2/0(19/11)	1 x 70	1,4	12.6	672	683
3/0(19/10)	1 x 95	1,6	14.7	912	946
4/0(37/12)	1 x 120	1,6	16.0	1152	1174
300MCM(37/11)	1 x 150	1,8	17.9	1440	1448
350MCM(37/10)	1 x 185	2,0	20.0	1776	1820
500MCM(61/11)	1 x 240	2,2	22.7	2304	2371



— Bare copper conductor

— LSOH cross-link polyolefin insulation

H07Z-U



H07Z-U



## H05BQ-F / H07BQ-F (NGMH11YÖ)

### Application and Description

These cables are used for medium mechanical stress in dry, damp or wet areas, e.g. for connecting agricultural and commercial equipment, for connecting heaters where there is a danger of cable damage due to its contact with hot surfaces. The cable can also be used in electrical appliances such as drills, hand-held circular saws as well as in building sites and refrigeration plants. H07BQ-F can commonly be found in other machinery in agriculture, building sites, docks and refrigeration plants. The robust PUR jacket adds abrasion, notch and tear resistance as well as chemical resistance to oils, fats, petrol, water, ozone, UV radiation, hydrolysis and microbes. Common European designation is NGMH11YÖ.

### Standard and Approval

CEI 20-19 p.10, HD22.10 S1, IEC 60245-4,

### Cable Construction

- Fine bare or tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 and HD383 Class-5
- Rubber compound insulation E16 to VDE-0282 Part-1
- Color coded to VDE-0293-308
- Conductors stranded in layers with optimal lay-length
- Green-yellow earth core in the outer layer
- Polyurethane/PUR outer jacket TMPU- orange (RAL 2003)

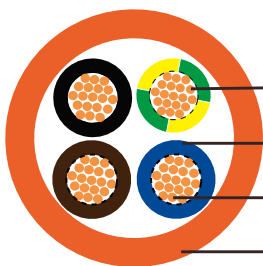
### Technical Characteristics

- Working voltage: 300/500 volts(H05BQ-F), 450/750 volts(H07BQ-F)
- Test voltage: 2000 volts(H05BQ-F), 2500 volts(H07BQ-F)
- Flexing bending radius: 5 x Ø
- Fixed bending radius: 3 x Ø
- Flexing Temperature: -40° C to +80° C
- Fixed Temperature: -50° C to +90° C
- Short circuit Temperature: +250° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05BQ-F						
18(24/32)	2 x 0.75	0.6	0.8	5.7 - 7.4	14.4	52
18(24/32)	3 x 0.75	0.6	0.9	6.2 - 8.1	21.6	63
18(24/32)	4 x 0.75	0.6	0.9	6.8 - 8.8	29	80
18(24/32)	5 x 0.75	0.6	1.0	7.6 - 9.9	36	96
17(32/32)	2 x 1	0.6	0.9	6.1 - 8.0	19.2	59
17(32/32)	3 x 1	0.6	0.9	6.5 - 8.5	29	71
17(32/32)	4 x 1	0.6	0.9	7.1 - 9.3	38.4	89
17(32/32)	5 x 1	0.6	1.0	8.0 - 10.3	48	112
H07BQ-F						
16(30/30)	2 x 1.5	0.8	1.0	7.6 - 9.8	29	92
16(30/30)	3 x 1.5	0.8	1.0	8.0 - 10.4	43	109
16(30/30)	4 x 1.5	0.8	1.1	9.0 - 11.6	58	145
16(30/30)	5 x 1.5	0.8	1.1	9.8 - 12.7	72	169
14(50/30)	2 x 2.5	0.9	1.1	9.0 - 11.6	101	121
14(50/30)	3 x 2.5	0.9	1.1	9.6 - 12.4	173	164
14(50/30)	4 x 2.5	0.9	1.2	10.7 - 13.8	48	207
14(50/30)	5 x 2.5	0.9	1.3	11.9 - 15.3	72	262
12(56/28)	2 x 4	1.0	1.2	10.6 - 13.7	96	194
12(56/28)	3 x 4	1.0	1.2	11.3 - 14.5	120	224
12(56/28)	4 x 4	1.0	1.3	12.7 - 16.2	77	327
12(56/28)	5 x 4	1.0	1.4	14.1 - 17.9	115	415
10(84/28)	2 x 6	1.0	1.3	11.8 - 15.1	154	311
10(84/28)	3 x 6	1.0	1.4	12.8 - 16.3	192	310
10(84/28)	4 x 6	1.0	1.5	14.2 - 18.1	115	310
10(84/28)	5 x 6	1.0	1.6	15.7 - 20.0	173	496



- Green/Yellow wire
- Rubber compound insulation
- Stranded copper conductor
- TMPU outer jacket

H07BQ-F



H07BQ-F



## H05G-K / H07G-K

### Application and Description

These cables are recommended for the internal wiring of switchboards and distributor boards as well as in operating parts in or on lights. The higher temperature range allows for connections to heaters with an alternating nominal voltage of 1000V. or direct nominal voltage of 750V. These cables are all allowed for laying in tubes in and under plaster.

### Standard and Approval

CEI 20-19/7, CEI 20-35(EN60332-1), HD 22.7 S2

### Cable Construction

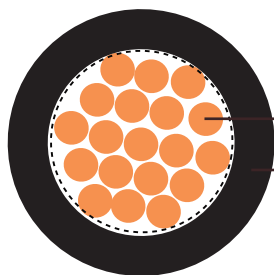
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber compound type EI3 (EVA) to DIN VDE 0282 part 7 insulation
- Cores to VDE-0293 colors

### Technical Characteristics

- Working voltage: 300/500v (H05G-K), 450/750v (H07G-K)
- Test voltage: 2000volts (H05G-K), 2500 volts (H07G-K)
- Flexing bending radius: 7 x Ø
- Static bending radius: 7 x Ø
- Flexing temperature: -25° C to +110° C
- Static temperature: -40° C to +110° C
- Short circuit Temperature: +160° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



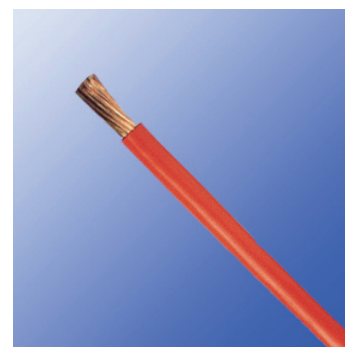
## Italian Standard



Bare copper conductor

Rubber compound insulation

H05G-K



H05G-K

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05G-K					
20(16/32)	1 x 0.5	0.6	2.3	4.8	13
18(24/32)	1 x 0.75	0.6	2.6	7.2	16
17(32/32)	1 x 1	0.6	2.8	9.6	22
H07G-K					
16(30/30)	1 x 1.5	0.8	3.4	14.4	24
14(50/30)	1 x 2.5	0.9	4.1	24	42
12(56/28)	1 x 4	1.0	5.1	38	61
10(84/28)	1 x 6	1.0	5.5	58	78
8(80/26)	1 x 10	1.2	6.8	96	130
6(128/26)	1 x 16	1.2	8.4	154	212
4(200/26)	1 x 25	1.4	9.9	240	323
2(280/26)	1 x 35	1.4	11.4	336	422
1(400/26)	1 x 50	1.6	13.2	480	527
2/0(356/24)	1 x 70	1.6	15.4	672	726
3/0(485/24)	1 x 95	1.8	17.2	912	937
4/0(614/24)	1 x 120	1.8	19.7	1152	1192



## H05G-U / H07G-U/R

### Application and Description

These cables are recommended for the internal wiring of switchboards and distributor boards as well as in operating parts in or on lights. The higher temperature range allows for connections to heaters with an alternating nominal voltage of 1000V. or direct nominal voltage of 750V. These cables are all allowed for laying in tubes in and under plaster.

### Standard and Approval

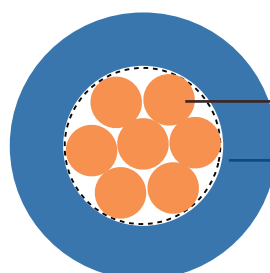
CEI 20-19/7, CEI 20-35(EN60332-1), HD 22.7 S2

### Cable Construction

- Solid bare copper / strands
- Strands to VDE-0295 Class-1/2, IEC 60228 Class-1/2
- Rubber compound type EI3 (EVA) to DIN VDE 0282 part 7 insulation
- Cores to VDE-0293 colors

### Technical Characteristics

- Working voltage: 300/500v (H05G-U), 450/750v (H07G-U/R)
- Test voltage: 2000volts (H05G-U), 2500 volts (H07G-U/R)
- Flexing bending radius:  $7 \times \varnothing$
- Static bending radius:  $7 \times \varnothing$
- Flexing temperature:  $-25^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$
- Static temperature:  $-40^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$
- Short circuit Temperature:  $+160^{\circ}\text{C}$
- Flame retardant: IEC 60332.1
- Insulation resistance:  $10 \text{ M}\Omega \times \text{km}$



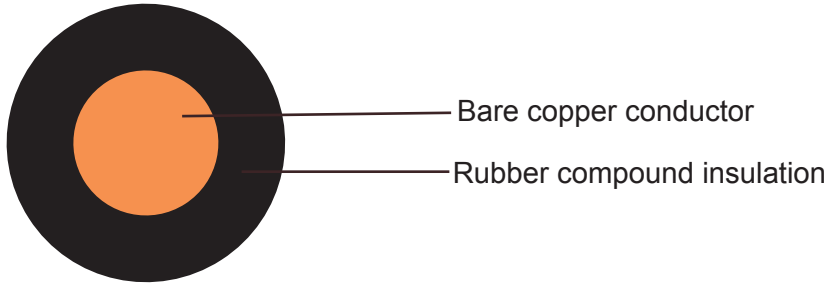
Bare copper conductor

Rubber compound insulation

H07G-R



## Italian Standard



H05G-U



H05G-U

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05G-U					
20	1 x 0.5	0.6	2.1	4.8	9
18	1 x 0.75	0.6	2.3	7.2	12
17	1 x 1	0.6	2.5	9.6	15
H07G-U					
16	1 x 1.5	0.8	3.1	14.4	21
14	1 x 2.5	0.9	3.6	24	32
12	1 x 4	1.0	4.3	38	49
H07G-R					
10(7/18)	1 x 6	1.0	5.2	58	70
8(7/16)	1 x 10	1.2	6.5	96	116
6(7/14)	1 x 16	1.2	7.5	154	173
4(7/12)	1 x 25	1.4	9.2	240	268
2(7/10)	1 x 35	1.4	10.3	336	360
1(19/13)	1 x 50	1.6	12.0	480	487



## H05VV5-F(NYSLYÖ-JZ)

### Application and Description

These cables are suitable for dry, damp and wet locations but not in the open-air. They are used as screened termination and connection cable in the control, measuring and signal technology. The copper braiding optimises protection against external interferences, like electromagnetic fields and stray frequencies. Suitable as a signal and impulse cable for control and inspection of industrial plants, machinery and working processes.

### Standard and Approval

CEI 20-20/13, CEI 20-35 (EN60332-1) , CEI 20-52, HD 21.13 S1

### Cable Construction

- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- PVC insulation T12 to DIN VDE 0281 part 1
- Green-yellow grounding (3 conductors and above)
- Cores to VDE-0293 colors
- PVC sheath TM5 to DIN VDE 0281 part 1

### Technical Characteristics

- Working voltage: 300/500v
- Test voltage: 2000volts
- Flexing bending radius:  $7.5 \times \varnothing$
- Static bending radius:  $4 \times \varnothing$
- Flexing temperature:  $-5^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Static temperature:  $-40^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Short circuit Temperature:  $+150^{\circ} \text{C}$
- Flame retardant: IEC 60332.1
- Insulation resistance:  $20 \text{ M}\Omega \times \text{km}$

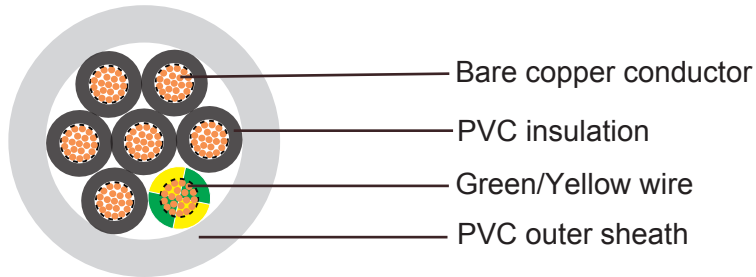


H05VV5-F





## Italian Standard



H05VV5-F

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
20(16/32)	2x0.50	0.6	0.7	5.6	9.7	46
18(24/32)	2x0.75	0.6	0.8	6.2	14.4	52
17(32/32)	2x1	0.6	0.8	6.6	19.2	66
16(30/30)	2x1.5	0.7	0.8	7.6	29	77
14(50/30)	2x2.5	0.8	0.9	9.2	48	110
20(16/32)	3x0.50	0.6	0.7	5.9	14.4	54
18(24/32)	3x0.75	0.6	0.8	6.6	21.6	68
17(32/32)	3x1	0.6	0.8	7	29	78
16(30/30)	3x1.5	0.7	0.9	8.2	43	97
14(50/30)	3x2.5	0.8	1	10	72	154
20(16/32)	4x0.50	0.6	0.8	6.6	19	65
18(24/32)	4x0.75	0.6	0.8	7.2	28.8	82
17(32/32)	4x1	0.6	0.8	7.8	38.4	104
16(30/30)	4x1.5	0.7	0.9	9.3	58	128
14(50/30)	4x2.5	0.8	1.1	10.9	96	212
20(16/32)	5x0.50	0.6	0.8	7.3	24	80
18(24/32)	5x0.75	0.6	0.9	8	36	107
17(32/32)	5x1	0.6	0.9	8.6	48	123
16(30/30)	5x1.5	0.7	1	10.3	72	149
14(50/30)	5x2.5	0.8	1.1	12.1	120	242
20(16/32)	6x0.50	0.6	0.9	8.1	28.8	104
18(24/32)	6x0.75	0.6	0.9	8.7	43.2	132
17(32/32)	6x1	0.6	1	9.5	58	152
16(30/30)	6x1.5	0.7	1.1	11.2	86	196



# Addison Industrial Cables

## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
14(50/30)	6x2.5	0.8	1.2	13.2	144	292
20(16/32)	7x0.50	0.6	0.9	8.1	33.6	119
18(24/32)	7x0.75	0.6	1	8.9	50.5	145
17(32/32)	7x1	0.6	1	9.5	67	183
16(30/30)	7x1.5	0.7	1.2	11.4	101	216
14(50/30)	7x2.5	1.3	0.8	13.4	168	350
20(16/32)	12x0.50	0.6	1.1	10.9	58	186
18(24/32)	12x0.75	0.6	1.1	11.7	86	231
17(32/32)	12x1	0.6	1.2	12.8	115	269
16(30/30)	12x1.5	0.7	1.3	15	173	324
14(50/30)	12x2.5	1.5	0.8	17.9	288	543
20(16/32)	18x0.50	0.6	1.2	12.9	86	251
18(24/32)	18x0.75	0.6	1.3	14.1	130	313
17(32/32)	18x1	0.6	1.3	15.1	173	400
16(30/30)	18x1.5	0.7	1.5	18	259	485
14(50/30)	18x2.5	1.8	0.8	21.6	432	787
20(16/32)	25x0.50	0.6	1.4	15.4	120	349
18(24/32)	25x0.75	0.6	1.5	16.8	180	461
17(32/32)	25x1	0.6	1.5	18	240	546
16(30/30)	25x1.5	0.7	1.8	21.6	360	671
14(50/30)	25x2.5	0.8	2.1	25.8	600	1175
20(16/32)	36x0.50	0.6	1.5	17.7	172	510
18(24/32)	36x0.75	0.6	1.6	19.3	259	646
17(32/32)	36x1	0.6	1.7	20.9	346	775
16(30/30)	36x1.5	0.7	2	25	518	905
14(50/30)	36x2.5	0.8	2.3	29.8	864	1791
20(16/32)	50x0.50	0.6	1.7	21.5	240	658
18(24/32)	50x0.75	0.6	1.8	23.2	360	896
17(32/32)	50x1	0.6	1.9	24.5	480	1052
16(30/30)	50x1.5	0.7	2	28.9	720	1381
14(50/30)	50x2.5	0.8	2.3	35	600	1175
20(16/32)	61x0.50	0.6	1.8	23.1	293	780
18(24/32)	61x0.75	0.6	2	25.8	439	1030
17(32/32)	61x1	0.6	2.1	26	586	1265
16(30/30)	61x1.5	0.7	2.4	30.8	878	1640
14(50/30)	61x2.5	0.8	2.4	37.1	1464	2724



### H05VVC4V5-K

#### Application and Description

These cables are suitable for dry, damp and wet locations but not in the open-air. They are used as screened termination and connection cable in the control, measuring and signal technology. The copper braiding optimises protection against external interferences, like electromagnetic fields and stray frequencies. Suitable as a signal and impulse cable for control and inspection of industrial plants, machinery and working processes.

#### Standard and Approval

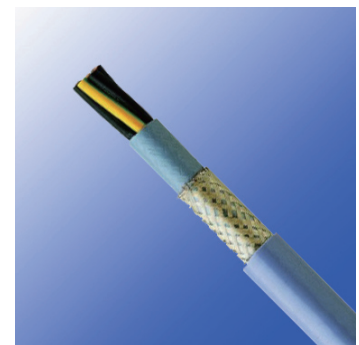
CEI 20-20/13, CEI 20-35 (EN60332-1), CEI 20-52, HD 21.13 S1

#### Cable Construction

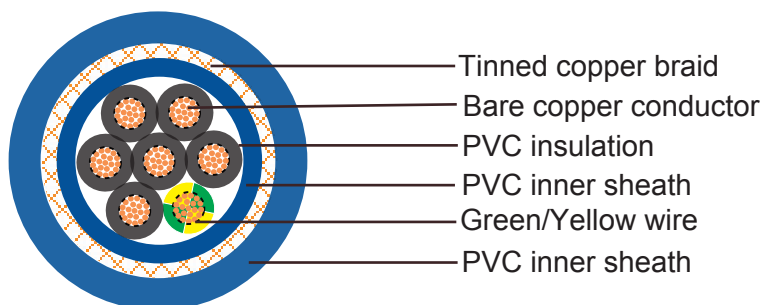
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- PVC insulation T12 to DIN VDE 0281 part 1
- Green-yellow grounding (3 conductors and above)
- Cores to VDE-0293 colors
- PVC inner sheath TM2 to DIN VDE 0281 part 1
- Tinned copper braided shielding, covering approx. 85%
- PVC outer jacket TM5 to DIN VDE 0281 part 1

#### Technical Characteristics

- Working voltage: 300/500v
- Test voltage: 2000volts
- Flexing bending radius: 10 x Ø
- Static bending radius: 5 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -40° C to +70° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



H05VVC4V5-F



H05VVC4V5-F

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Inner Sheath mm	Nominal Thickness of outer Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
20(16/32)	2 x 0,50	0.6	0.7	0.9	7,7	35	105
18(24/32)	2 x 0,75	0.6	0.7	0.9	8	39	115
17(32/32)	2 x 1,0	0.6	0.7	0.9	8,2	44	125
16(30/30)	2 x 1,50	0.7	0.7	1.0	9,3	58	160
14(50/30)	2 x 2,50	0.8	0.7	1.1	10,7	82	215
20(16/32)	3 x 0,50	0.6	0.7	0.9	8	40	115
18(24/32)	3 x 0,75	0.6	0.7	0.9	8,3	47	125
17(32/32)	3 x 1,0	0.6	0.7	1.0	8,8	54	145
16(30/30)	3 x 1,50	0.7	0.7	1.0	9,7	73	185
14(50/30)	3 x 2,50	0.8	0.7	1.1	11,3	106	250
20(16/32)	4 x 0,50	0.6	0.7	0.9	8,5	44	125
18(24/32)	4 x 0,75	0.6	0.7	1.0	9,1	58	155
17(32/32)	4 x 1,0	0.6	0.7	1.0	9,4	68	170
16(30/30)	4 x 1,50	0.7	0.7	1.1	10,7	93	220
14(50/30)	4 x 2,50	0.8	0.8	1.2	12,6	135	305
20(16/32)	5 x 0,50	0.6	0.7	1.0	9,3	55	155
18(24/32)	5 x 0,75	0.6	0.7	1.1	9,7	66	175
17(32/32)	5 x 1,0	0.6	0.7	1.1	10,3	78	200
16(30/30)	5 x 1,50	0.7	0.8	1.2	11,8	106	265
14(50/30)	5 x 2,50	0.8	0.8	1.3	13,9	181	385
20(16/32)	7 x 0,50	0.6	0.7	1.1	10,8	69	205
18(24/32)	7 x 0,75	0.6	0.7	1.2	11,5	84	250
17(32/32)	7 x 1,0	0.6	0.8	1.2	12,2	107	275
16(30/30)	7 x 1,50	0.7	0.8	1.3	14,1	162	395
14(50/30)	7 x 2,50	0.8	0.8	1.5	16,5	238	525
20(16/32)	12 x 0,50	0.6	0.8	1.3	13,3	98	285
18(24/32)	12 x 0,75	0.6	0.8	1.3	13,9	125	330



## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Inner Sheath mm	Nominal Thickness of outer Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
17(32/32)	12 x 1,0	0.6	0.8	1.4	14,7	176	400
16(30/30)	12 x 1,50	0.7	0.8	1.5	16,7	243	525
14(50/30)	12 x 2,50	0.8	0.8	1.7	19,9	367	745
20(16/32)	18 x 0,50	0.6	0.9	1.3	18,6	147	385
18(24/32)	18 x 0,75	0.6	0.8	1.5	19,9	200	475
17(32/32)	18 x 1,0	0.6	0.8	1.5	20,8	243	525
16(30/30)	18 x 1,50	0.7	0.8	1.7	24,1	338	720
14(50/30)	18 x 2,50	0.8	0.9	2.0	28,5	555	1075
20(16/32)	25 x 0,50	0.6	0.8	1.6	22,1	199	505
18(24/32)	25 x 0,75	0.6	0.9	1.7	23,7	273	625
17(32/32)	25 x 1,0	0.6	0.9	1.7	24,7	351	723
16(30/30)	25 x 1,50	0.7	0.9	2.0	28,6	494	990
14(50/30)	25 x 2,50	0.8	1.0	2.3	34,5	792	1440
20(16/32)	36 x 0,50	0.6	0.9	1.7	24,7	317	620
18(24/32)	36 x 0,75	0.6	0.9	1.8	26,2	358	889
17(32/32)	36 x 1,0	0.6	0.9	1.9	27,6	438	910
16(30/50)	36 x 1,50	0.7	1.0	2.2	32,5	662	1305
14(30/32)	36 x 2,50	0.8	1.0	2.4	38,5	1028	1850
20(16/32)	48 x 0,50	0.6	0.9	1.9	28,3	353	845
18(24/32)	48 x 0,75	0.6	1.0	2.1	30,4	490	1060
17(32/32)	48 x 1,0	0.6	1.0	2.1	31,9	604	1210
16(30/30)	48 x 1,50	0.7	1.1	2.4	37	855	1665
14(50/30)	48 x 2,50	0.8	1.2	2.4	43,7	1389	2390
20(16/32)	60 x 0,50	0.6	1.0	2.1	31,1	432	1045
18(24/32)	60 x 0,75	0.6	1.0	2.3	32,9	576	1265
17(32/32)	60 x 1,0	0.6	1.0	2.3	34,7	720	1455
16(30/30)	60 x 1,50	0.7	1.1	2.4	39,9	1050	1990
14(50/30)	60 x 2,50	0.8	1.2	2.4	47,2	1706	2870



## H05BB-F /H07BB-F

### Application and Description

These rubbers insulated and sheathed electric cables, with a parallel EPDM tube, joined with a textile braid, are used especially for electric steam generator irons (named usually “vaporellas”). The cables are suitable for the stripping force on automatic machines and for low temperature environments.

### Standard and Approval

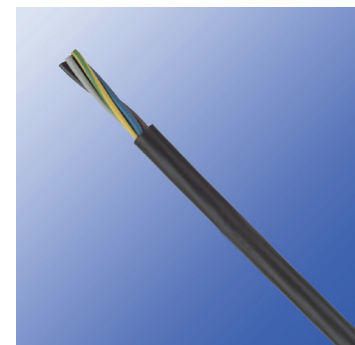
HD 22.12, CEI 20-19/12, NF C 32-102-4

### Cable Construction

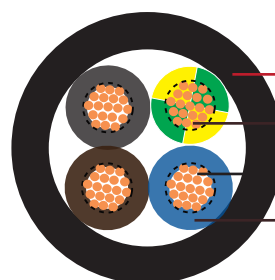
- Bare/Tinned copper strand conductor
- acc. to DIN VDE 0295 class 5. IEC 60228 class 5
- Insulation: EPR rubber type E17
- Color coded to VDE 0293-308(3 conductors and above with yellow/green wire)
- Sheath: EPR rubber type EM6
- Sheath color: normally black

### Technical Characteristics

- Working voltage:
  - H05BB-F: 300/500V
  - H07BB-F: 450/750V
- Test voltage:
  - H05BB-F: 2000V
  - H07BB-F: 2500V
- Flexing bending radius:  $4 \times \varnothing$
- Static bending radius:  $3 \times \varnothing$
- Operating temperature:
  - H05BB-F:  $-40^{\circ}\text{C} - +60^{\circ}\text{C}$
  - H07BB-F:  $-25^{\circ}\text{C} - +90^{\circ}\text{C}$
- Short circuit temperature:  $250^{\circ}\text{C}$
- Flame retardant: VDE 0482-332-1-2/IEC 60332-1



H05BB-F



- EPR outer jacket
- Green/Yellow wire
- Tinned copper conductor
- EPR insulation

H05BB-F



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x <i>mm</i> <sup>2</sup>	Nominal Thickness of Insulation <i>mm</i>	Nominal Thickness of Sheath <i>mm</i>	Nominal Overall Diameter <i>mm</i>	Nominal Weight <i>kg/km</i>
<b>H05BB-F</b>					
18(24/32)	2x0.75	0.6	0.8	6.3	53
17(32/32)	2x1	0.6	0.9	6.8	64
16(30/30)	2x1.5	0.8	1.0	8.3	95
14(50/30)	2x2.5	0.9	1.1	9.8	140
18(24/32)	3x0.75	0.6	0.9	6.8	65
17(32/32)	3x1	0.6	0.9	7.2	77
16(30/30)	3x1.5	0.8	1	8.8	115
14(50/30)	3x2.5	0.9	1.1	10.4	170
12(56/28)	3 x 4	1	1.2	12.2	240
10(84/28)	3 x 6	1	1.4	13.6	320
18(24/32)	4x0.75	0.6	0.9	7.4	80
17(32/32)	4x1	0.6	0.9	7.8	95
16(30/30)	4x1.5	0.8	1.1	9.8	145
14(50/30)	4x2.5	0.9	1.2	11.5	210
12(56/28)	4 x 4	1	1.3	13.5	300
10(84/28)	4 x 6	1	1.5	15.4	405
18(24/32)	5x0.75	0.6	1	8.3	100
17(32/32)	5x1	0.6	1	8.7	115
16(30/30)	5x1.5	0.8	1.1	10.7	170
14(50/30)	5x2.5	0.9	1.3	12.8	255
<b>H07BB-F</b>					
17(32/32)	2x1	0.8	1.3	8.20	89
16(30/30)	2x1.5	0.8	1.5	9.10	113
14(50/30)	2x2.5	0.9	1.7	10.85	165
17(32/32)	3x1	0.8	1.4	8.90	108
16(30/30)	3x1.5	0.8	1.6	9.80	138
14(50/30)	3x2.5	0.9	1.8	11.65	202
17(32/32)	4x1	0.8	1.5	9.80	134
16(30/30)	4x1.5	0.8	1.7	10.85	171
14(50/30)	4x2.5	0.9	1.9	12.80	248
17(32/32)	5x1	0.8	1.6	10.80	172
16(30/30)	5x1.5	0.8	1.8	11.90	218



## H03RT-H

### Application and Description

These cables are suitable for power connecting wire and complete lines between indoor household appliances, generally used for electric iron or electric saucepan. Not suitable for outdoor use nor power supply to electrical tools. Ozone, oxygen, UV rays and heat resistant.

### Standard and Approval

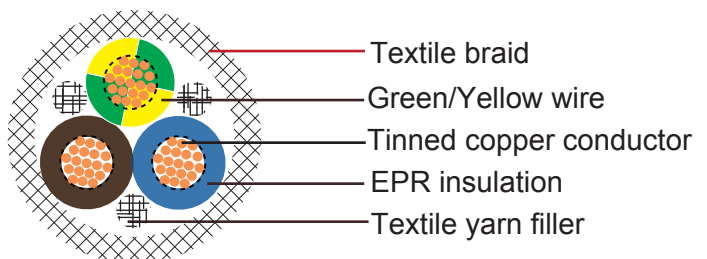
CEI 20-19/14, HD22.14

### Cable Construction

- Flexible bare or tinned copper strand conductor acc. to DIN VDE 0295 class 5. IEC 60228 class 5
- EPR insulation type E14 of HD22.1
- Color coded to VDE 0293-308/HD 308 / UNE 21089-1(3 conductors and above with yellow/green wire)
- Textile yarn filler
- Textile braid of HD22.1

### Technical Characteristics

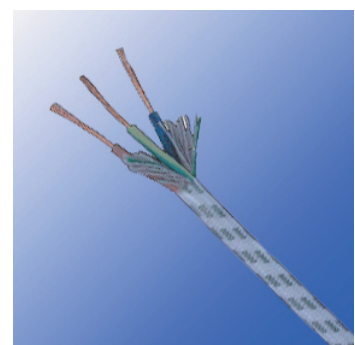
- Working voltage: 300/300 V
- Test voltage: 2000V
- Minimum bending radius: 10× cable diameter
- Temperature range: - 25°C to + 60°C
- Short circuit temperature: 200°C



### Cable Parameter

H03RT-H

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Weight kg/Km
18(24/32)	2×0.75	0.80	6.30±0.20	36
17(32/32)	2×1.0	0.80	6.80±0.20	52
16(30/30)	2×1.5	0.80	7.20±0.20	42
18(24/32)	3×0.75	0.80	6.80±0.20	60
17(32/32)	3×1.0	0.80	7.20±0.20	54
16(30/30)	3×1.5	0.80	7.80±0.20	74







### H05GG-F

#### Application and Description

For general use in domestic premises, kitchens and offices and for supplying appliances where the cables are subjected to low mechanical stresses. Also for low temperature uses.(eg., cooking appliances, soldering irons, toasters)

#### Standard and Approval

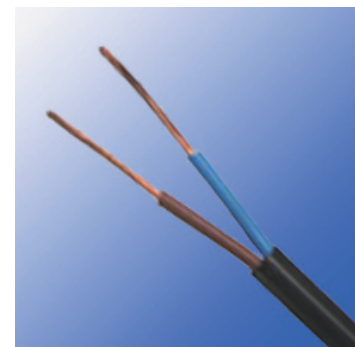
HD 22.11 S1, CEI 20-19/11, NFC 32-102-11

#### Cable Construction

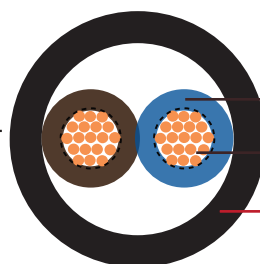
- Fine tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 CI-5
- Cross-linked elastomere E13 insulation
- Color code VDE-0293-308
- Cross-linked elastomere EM 9 outer jacket - black

#### Technical Characteristics

- Working voltage: 300/500V
- Test voltage: 2000V
- Flexing bending radius:  $4 \times \varnothing$
- Static bending radius:  $3 \times \varnothing$
- Temperature range:  $-15^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$
- Short circuit temperature:  $200^{\circ}\text{C}$
- Flame retardant: IEC 60332 -1
- Halogen-free: IEC 60754-1
- Low smoke: IEC 60754-2
- Smoke density: IEC 61034



H05GG-F



- Cross-linked elastomere insulation
- Tinned copper conductor
- Cross-linked elastomere outer jacket

H05GG-F



### Cable Parameter

<b>AWG</b>	<b>No. of Cores x Nominal Cross Sectional Area # x mm<sup>2</sup></b>	<b>Nominal Thickness of Insulation mm</b>	<b>Nominal Thickness of sheath mm</b>	<b>Nominal Overall Diameter mm</b>	<b>Nominal Weight kg/Km</b>
18(24/32)	2x0.75	0.6	0.8	6.3	53
17(32/32)	2x1	0.6	0.9	6.8	64
16(30/30)	2x1.5	0.8	1	8.3	95
14(50/30)	2x2.5	0.9	1.1	9.8	140
18(24/32)	3x0.75	0.6	0.9	6.8	65
17(32/32)	3x1	0.6	0.9	7.2	77
16(30/30)	3x1.5	0.8	1	8.8	115
14(50/30)	3x2.5	0.9	1.1	10.4	170
12(56/28)	3 x 4	1	1.2	12.2	240
10(84/28)	3 x 6	1	1.4	13.6	320
18(24/32)	4x0.75	0.6	0.9	7.4	80
17(32/32)	4x1	0.6	0.9	7.8	95
16(30/30)	4x1.5	0.8	1.1	9.8	145
14(50/30)	4x2.5	0.9	1.2	11.5	210
12(56/28)	4 x 4	1	1.3	13.5	300
10(84/28)	4 x 6	1	1.5	15.4	405
18(24/32)	5x0.75	0.6	1	8.3	100
17(32/32)	5x1	0.6	1	8.7	115
16(30/30)	5x1.5	0.8	1.1	10.7	170
14(50/30)	5x2.5	0.9	1.3	12.8	255



### A07RN-F

#### Application and Description

These cables are designed to provide high flexibility and have the capacity to withstand ozone, weather and oils/greases, mainly used for connecting of power tools, mobile units and machines for medium mechanical requirements in dry and humid rooms, for outdoor use, in explosive areas, in commercial and agricultural plants and on Cable Construction lots. Also suitable for fixed laying e.g. on-wall in provisional buildings, for directly laying on modules of hoisting devices, machinery etc. Max operating voltage in single or three phase system is Uo/U 476/825 volts. In a direct current system max operating voltage is Uo/U 619/1238 volts. If in a fixed or protected installation Uo/U is 600/1000 volts.

#### Standard and Approval

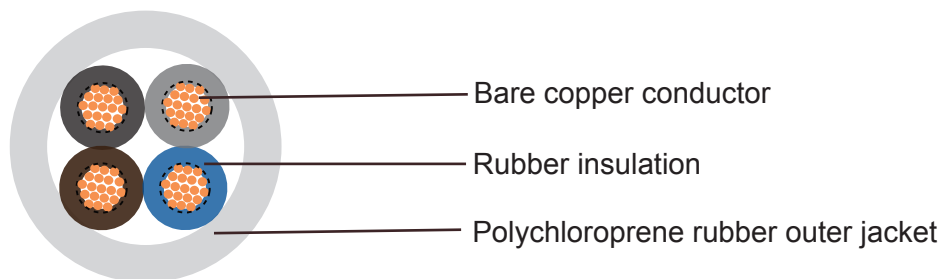
CEI 20-19, HD 22.4, IEC 60245-4

#### Cable Construction

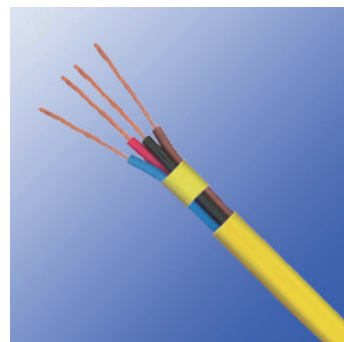
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- 3,4,& 5 cores cables - NO green/yellow ground
- Color code VDE-0293-308
- Green-yellow grounding, 3 conductors and above
- Polychloroprene rubber (neoprene) jacket EM2

#### Technical Characteristics

- Working voltage: 450/750 volts
- Test voltage: 2500 volts
- Flexing bending radius: 7.5 x Ø
- Fixed bending radius: 4.0 x Ø
- Flexing Temperature: -25° C to +60° C
- Fixed Temperature: -40° C to +60° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 20 MΩ x km



A07RN-F



A07RN-F

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm min-max	Nominal Copper Weight kg/km	Nominal Weight kg/km
16(30/30)	3 x 1.5	0.8	1.6	9.2-11.9	43	165
16(30/30)	4 x 1.5	0.8	1.7	10.2-13.1	58	200
16(30/30)	5 x 1.5	0.8	1.8	11.2-14.4	72	240
16(30/30)	7 x 1.5	0.8	2.6	14.5-17.5	101	385
16(30/30)	12 x 1.5	0.8	2.9	17.6-22.4	173	516
16(30/30)	19 x 1.5	0.8	3.2	20.7-26.3	274	800
16(30/30)	24 x 1.5	0.8	3.5	24.3-30.7	346	882
16(30/30)	27 x 1.5	0.8	3.6	25.5-31.5	389	1077
14(50/30)	3 x 2.5	0.9	1.8	10.9-14.0	72	235
14(50/30)	4 x 2.5	0.9	1.9	12.1-15.5	96	290
14(50/30)	7 x 2.5	0.9	2.8	16.5-20.0	168	520
14(50/30)	12 x 2.5	0.9	3.1	20.6-26.2	288	810
14(50/30)	19 x 2.5	0.9	3.5	25.5-31.0	456	1200
14(50/30)	24 x 2.5	0.9	3.9	28.8-36.4	576	1650
14(50/30)	27 x 2.5	0.9	4.2	30.0-37.0	648	1521
14(50/30)	37x 2.5	0.9	4.5	34.0-37.5	725	1952
12(56/28)	3 x 4	1	1.9	12.7-16.2	115	320
12(56/28)	4 x 4	1	2	14.0-17.9	154	395
10(84/28)	3 x 6	1	2.1	14.1-18.0	173	495
10(84/28)	4 x 6	1	2.3	15.7-20.0	230	610
8(80/26)	3 x 10	1.2	3.3	19.1-24.2	288	880
8(80/26)	4 x 10	1.2	3.4	20.9-26.5	384	1060
6(128/26)	3 x 16	1.2	3.5	21.8-27.6	461	1090
6(128/26)	4 x 16	1.2	3.6	23.8-30.1	614	1345



### N07G9-K

#### Application and Description

These cables are particularly suitable for installations in places at risk of fire and with a lot of people about. They are insulated with a special elastomer which ensures both their flame-retarding feature in the case of fire, in compliance with the IEC 332.3 standards, and their release of no halogens, toxic gases or smoke, in compliance with the IEC 754.1 standards. Suitable for fixed lay, in pipe, cable-carrier, channels, inner wiring of electric switchboards, inside interruption and control equipments for voltage until 1000V in c.a. and 750V d.c. to the ground.

#### Standard and Approval

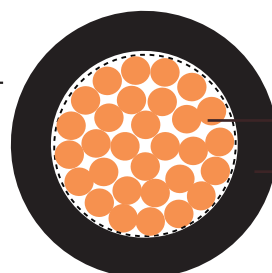
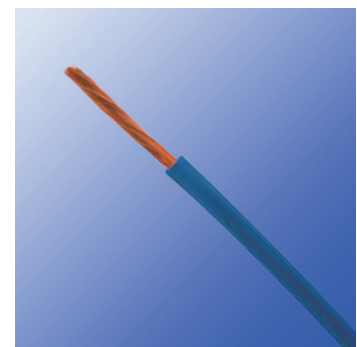
CEI 20-22 II, CEI 20-38, IEC 60332.3, IEC 60754.1, UNEL 35368

#### Cable Construction

- Fine bare copper or annealed copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber type G9 LSOH insulation
- Cores to VDE-0293 colors

#### Technical Characteristics

- Working voltage: 450/750v
- Test voltage: 2000volts
- Minimum bending radius: 4 x Ø
- Flexing temperature: 0° C to 90° C
- Static temperature: -15° C to +90° C
- Short circuit temperature: +250° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



Bare copper conductor

LSOH rubber compound insulation



### Cable Parameter

<b>AWG</b>	<b>No. of Cores x Nominal Cross Sectional Area # x <i>mm</i><sup>2</sup></b>	<b>Nominal Thickness of Insulation <i>mm</i></b>	<b>Nominal Overall Diameter <i>mm</i></b>	<b>Nominal Weight <i>kg/km</i></b>
17(32/32)	1 x 1	0.7	2.7	16
16(30/30)	1 x 1.5	0.7	3.1	20
14(50/30)	1 x 2.5	0.8	3.8	31
12(56/28)	1 x 4	0.8	4.2	45
10(84/28)	1 x 6	0.8	4.7	63
8(80/26)	1 x 10	1.0	6.0	112
6(128/26)	1 x 16	1.0	7.2	166
4(200/26)	1 x 25	1.2	9.4	254
2(280/26)	1 x 35	1.2	10.2	343
1(400/26)	1 x 50	1.4	11.5	485
2/0(356/24)	1 x 70	1.4	13.9	703
3/0(485/24)	1 x 95	1.6	15.7	928
4/0(614/24)	1 x 120	1.6	17.4	1200
300 MCM (765/24)	1 x 150	1.8	19.6	1508
350 MCM (944/24)	1 x 185	2.0	21.2	1817
500MCM(1225/24)	1 x 240	2.2	25.1	2336



### N07V-K

#### Application and Description

These cables are suitable in building trade, industry, handicraft, wiring and power transport. Fitted inside pipes or ducts, either visible or recessed or similar closed systems. Suitable for static, protected use inside switching or control equipment, for alternating current up to 1000 V or direct current up to 750 V to ground. 1 mm<sup>2</sup> section is suitable only for circuits of lifting devices and machines. In fire risk installation the max operating temperature must not be above 55°C. Unsuitable for laying in the external and underground.

#### Standard and Approval

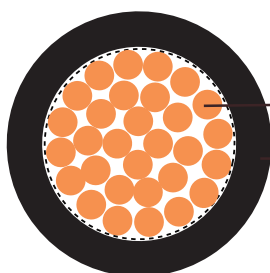
HD 21, CEI 20-22, CEI-UNEL 35752, CEI 20-52, IEC 332-3, Directive Low Voltage Directive 73/23/EEC and 93/68/EEC

#### Cable Construction

- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC R2 core insulation

#### Technical Characteristics

- Working voltage: 450/750V
- Test voltage: 2500 volts
- Minimum bending radius: 4 x Ø
- Maximum operating temperature: -10°C to +70° C
- Maximum short circuit temperature: +160° C
- Flame retardant: IEC 60332.1 CEI EN 50265-2-1; CEI 20-22 II
- Insulation resistance: 20 MΩ x km



— Bare copper conductor

— PVC insulation

N07V-K



N07V-K



### Cable Parameter

<b>AWG</b>	<b>No. of Cores x Nominal Cross Sectional Area # x mm<sup>2</sup></b>	<b>Nominal Thickness of Insulation mm</b>	<b>Nominal Overall Diameter mm</b>	<b>Nominal Copper Weight kg/km</b>	<b>Nominal Weight kg/km</b>
16(30/30)	1 x 1.5	0,7	3.1	14.4	21
14(50/30)	1 x 2.5	0,8	3.6	24	33
12(56/28)	1 x 4	0,8	4.3	38	47
10(84/28)	1 x 6	0,8	4.9	58	68
8(80/26)	1 x 10	1,0	6.4	96	114
6(128/26)	1 x 16	1,0	8.1	154	173
4(200/26)	1 x 25	1,2	9.8	240	265
2(280/26)	1 x 35	1,2	11.1	336	358
1(400/26)	1 x 50	1,4	13.1	480	512
2/0 (356/24)	1 x 70	1,4	15.5	672	702
3/0 (485/24)	1 x 95	1,6	17.2	912	925
4/0 (614/24)	1 x 120	1,6	19.7	1152	1178
300 MCM (765/24)	1 x 150	1,8	22.3	1440	1466
350 MCM (944/24)	1 x 185	2,0	25.4	1776	1812
500MCM(1225/24)	1 x 240	2,2	28.1	2304	2377





## H01N2-D/E (NSKFFÖU)

### Application and Description

These cables are used as a connection between the welding generator, the hand-electrode and the work piece. For use in the automobile industry, ship building, transport and conveyor systems, tool making machinery, welding robots etc. These cables retain their high flexibility even under influence of ozone, light, oxygen, protective gases, oil and petrol. Robust cable structure of these cables makes them resistant to low and high temperature, fire, ozone and radiation, oils, acids, fats and petrols. These cables are also ideal for outside installation in dry, moist and wet areas.

### Standard and Approval

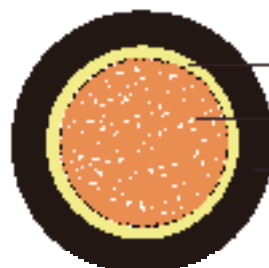
CEI 20-22 II, CEI 20-38, HD22.6 S2, IEC 60332.3, IEC 60754.1

### Cable Construction

- Extra fine bare copper strands
- Strands to DIN VDE 0295, BS 6360, IEC 60228 and HD 383
- Strands to VDE-0295 as listed below
- Synthetic or paper separator over core
- Polychloroprene rubber (neoprene) jacket EM5

### Technical Characteristics

- Working voltage: 100/100 volts
- Test voltage: 1000 volts
- Flexing bending radius:  $12.0 \times \varnothing$
- Fixed bending radius:  $7.5 \times \varnothing$
- Flexing Temperature:  $-25^{\circ} \text{C}$  to  $+80^{\circ} \text{C}$
- Fixed Temperature:  $-40^{\circ} \text{C}$  to  $+80^{\circ} \text{C}$
- Flame retardant: IEC 60332.1



Separator

Extra fine bare copper conductor

Polychloroprene rubber jacket

H01N2-D/E



### Cable Parameter

#### Cables with Standard and Approval flexibility

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
8(320/32)	1 x 10	2.0	7.7-9.7	96	135
6(512/32)	1 x 16	2.0	8.8-11.0	154	205
4(800/32)	1 x 25	2.0	10.1-12.7	240	302
2(1120/32)	1 x 35	2.0	11.4-14.2	336	420
1(1600/32)	1 x 50	2.2	13.2-16.5	480	586
2/0(2240/32)	1 x 70	2.4	15.3-19.2	672	798
3/0(3024/32)	1 x 95	2.6	17.1-21.4	912	1015
4/0(614/24)	1 x 120	2.8	19.2-24.0	1152	1310
300MCM(765/24)	1 x 150	3.0	21.2-26.4	1440	1620
350MCM(944/24)	1 x 185	3.2	23.1-28.9	1776	1916
500MCM(1225/24)	1 x 240	3.4	25.0-29.5	2304	2540

#### Cables with extreme high flexibility

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
8(566/35)	1 x 10	1.2	6.2-7.8	96	119
6(903/35)	1 x 16	1.2	7.3-9.1	154	181
4(1407/35)	1 x 25	1.2	8.6-10.8	240	270
2(1974/35)	1 x 35	1.2	9.8-12.3	336	363
1(2830/35)	1 x 50	1.5	11.9-14.8	480	528
2/0(3952/35)	1 x 70	1.8	13.6-17.0	672	716
3/0(5370/35)	1 x 95	1.8	15.6-19.5	912	1012
4/0(3819/32)	1 x 120	1.8	17.2-21.6	1152	1190
300MCM(4788/32)	1 x 150	1.8	18.8-23.5	1440	1305
350MCM(5852/32)	1 x 185	1.8	20.4-25.5	1776	1511



## FROR - 300/500V and 450/750V

### Application and Description

These flexible cables insulated with Standard and Approval-quality PVC plus a heavyweight PVC sheath, they are suitable for connections and movable equipment, even in places of public show and entertainment. Can be installed inside, in dry or humid environments (AD2), and for temporary use outside and not permissible under the laying plaster or underground, even if protected.

### Standard and Approval

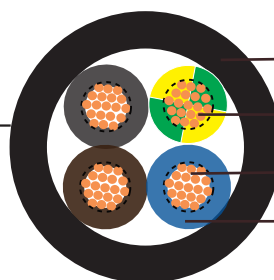
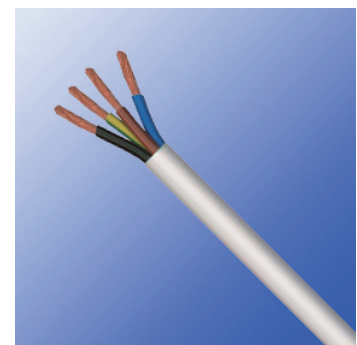
CEI 20-20/1/2, CEI 20-22 II, CEI 20-34, CEI 20-35, CEI 20-37

### Cable Construction

- Fine bare copper strands
- Strands to CEI 20-29 class 5
- PVC core insulation TI2 to CEI 20-11
- Color codes to Unel 00722
- Green-yellow grounding, 3 conductors and above
- PVC outer jacket TM 2 to CEI 20-11 - Black (RAL 9005), Gray(RAL7001/7035)

### Technical Characteristics

- Working Voltage: 300/500 volts, 450/750 volts
- Test voltage: 2500 volts
- Flexing bending radius: 10 x Ø
- Static bending radius: 4 x Ø
- Flexing Temperature: -15° C to +70° C
- Fixed Temperature: 0° C to +70° C
- Short-circuit temperature: 160 °C
- Flame retardant: CEI 20-22 II
- Insulation resistance: 20 MΩ x km



PVC outer jacket

Green/Yellow wire

Bare copper conductor

PVC insulation

FROR-450/750V



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/Km
FROR300/500					
18(24/32)	7 x 1	0.6	1.0	11.1	151
18(24/32)	10 x 1	0.6	1.2	14.3	220
18(24/32)	12 x 1	0.6	1.2	14.8	250
18(24/32)	16 x 1	0.6	1.3	16.5	330
18(24/32)	19 x 1	0.6	1.4	17.7	385
18(24/32)	24 x 1	0.6	1.5	20.7	485
18(24/32)	27 x 1	0.6	1.6	21.4	600
16(30/30)	7 x 1.5	0.7	1.2	13.1	215
16(30/30)	10 x 1.5	0.7	1.3	16.7	305
16(30/30)	12 x 1.5	0.7	1.4	17.5	345
16(30/30)	16 x 1.5	0.7	1.5	19.4	455
16(30/30)	19 x 1.5	0.7	1.6	20.5	520
16(30/30)	24 x 1.5	0.7	1.7	24.3	675
16(30/30)	27 x 1.5	0.7	1.8	25	720
FROR450/750					
18(24/32)	2 x 1	0,7	1.0	8,7	74
18(24/32)	3 x 1	0,7	1,0	9,1	88
18(24/32)	4 x 1	0,7	1.0	9,9	105
18(24/32)	5 x 1	0,7	1,1	11,1	135
16(30/30)	2 x 1,5	0,7	1,0	9,2	89
16(30/30)	3 x 1,5	0,7	1,0	9,8	108
16(30/30)	4 x 1,5	0,7	1,1	10,9	133
16(30/30)	5 x 1,5	0,7	1,2	12	167
14(50/30)	2 x 2,5	0,8	1,2	11,2	134
14(50/30)	3 x 2,5	0,8	1,2	11,9	163
14(50/30)	4 x 2,5	0,8	1,2	12,9	200
14(50/30)	5 x 2,5	0,8	1,3	14,3	252
12(56/28)	2 x 4	0,8	1,2	12,5	178
12(56/28)	3 x 4	0,8	1,3	13,5	227
12(56/28)	4 x 4	0,8	1,3	14,7	278
12(56/28)	5 x 4	0,8	1,5	16,5	351
10(84/28)	2 x 6	0,8	1,3	13,9	242
10(84/28)	3 x 6	0,8	1,4	14,9	305
10(84/28)	4 x 6	0,8	1,4	16,3	375
10(84/28)	5 x 6	0,8	1,5	18	476



## FRORAR

### Application and Description

These cables are for energy transport and signal transmission both in internal and external environments, wet as well. For fixed lay in free air, in pipe or channel, on walling and metallic frames, or suspended. The use of armoured cables is recommended whenever conditions are such that mechanical shocks might occur, the main feature is protection against strikes and rodents. Also appropriate for direct or indirect ground lay.

### Standard and Approval

CEI 20-11, CEI 20-34, IEC 60502-1, CEI 20-22 II, CEI 20-34, CEI 20-35, CEI 20-37

### Cable Construction

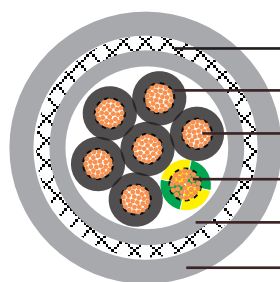
- Flexible bare copper strands
- Strands to CEI 20-29 Class-5
- PVC insulation R2 type
- Colour coded to Unel 00722
- Not fibrous and not hygroscopic fire retardant PVC filler
- Galvanized steel braid with minimum coverage 85%
- Oil and fire retardant transparent PVC TM2 to CEI 20-11 outer jacket

### Technical Characteristics

- Working voltage: 450/750 V
- Test voltage: 2500 V
- Minimum bending radius:  $8 \times \varnothing$
- Fixed installation temperature :  $-15^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Flexible installation temperature :  $0^{\circ} \text{C}$  to  $+70^{\circ} \text{C}$
- Short circuit temperature:  $+160^{\circ} \text{C}$
- Flame retardant: CEI 20-22 II
- Oil retardant: CEI 20-34/0-1
- No flame propagation CEI 20-35
- Insulation resistance:  $20 \text{ M}\Omega \times \text{km}$



FRORAR



- Galvanized steel braid
- PVC insulation
- Bare copper conductor
- Green/Yellow wire
- Not fibrous and not hygroscopic PVC filler
- Oil and fire retardant PVC sheath

FRORAR

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/Km	AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/Km
20(16/32)	2 x 0.5	7.1	52	16(30/30)	10 x 1.5	15.6	465
20(16/32)	3 x 0.5	7.3	64	16(30/30)	12 x 1.5	16.3	495
20(16/32)	4 x 0.5	8.0	81	16(30/30)	16 x 1.5	17.7	550
20(16/32)	5 x 0.5	8.4	96	16(30/30)	24 x 1.5	21.4	750
20(16/32)	7 x 0.5	8.9	118	14(50/30)	2 x 2.5	10.7	210
20(16/32)	10 x 0.5	10.9	210	14(50/30)	3 x 2.5	11.2	240
20(16/32)	12 x 0.5	11.3	230	14(50/30)	4 x 2.5	12.4	270
20(16/32)	16 x 0.5	12.6	260	14(50/30)	5 x 2.5	13.3	340
20(16/32)	24 x 0.5	15.2	425	14(50/30)	7 x 2.5	15.1	450
18(24/32)	2 x 0.75	7.7	70	14(50/30)	10 x 2.5	18.2	590
18(24/32)	3 x 0.75	8.0	88	14(50/30)	12 x 2.5	19.0	630
18(24/32)	4 x 0.75	8.7	108	14(50/30)	16 x 2.5	21.3	750
18(24/32)	5 x 0.75	9.2	128	14(50/30)	24 x 2.5	24.9	1190
18(24/32)	7 x 0.75	10.2	190	12(56/28)	2 x 4	12.7	270
18(24/32)	10 x 0.75	12.5	255	12(56/28)	3 x 4	13.3	310
18(24/32)	12 x 0.75	13.0	290	12(56/28)	4 x 4	15.1	400
18(24/32)	16 x 0.75	14.0	350	12(56/28)	5 x 4	16.3	480
18(24/32)	24 x 0.75	16.9	497	10(84/28)	2 x 6	14.1	390
17(32/32)	2 x 1	8.1	105	10(84/28)	3 x 6	15.4	445
17(32/32)	3 x 1	8.4	120	10(84/28)	4 x 6	16.6	580
17(32/32)	4 x 1	9.0	137	10(84/28)	5 x 6	17.9	700
17(32/32)	5 x 1	10.2	198	8(80/26)	2 x 10	17.5	640
17(32/32)	7 x 1	10.8	220	8(80/26)	3 x 10	18.6	700
17(32/32)	10 x 1	13.3	340	8(80/26)	4 x 10	20.4	860
17(32/32)	12 x 1	14.0	400	4(200/26)	5 x 10	22.5	1080
17(32/32)	16 x 1	15.8	490	6(128/26)	2 x 16	19.9	950
17(32/32)	24 x 1	18.1	510	6(128/26)	3 x 16	21.6	1130
16(30/30)	2 x 1.5	9.1	135	6(128/26)	4 x 16	23.4	1360
16(30/30)	3 x 1.5	9.9	170	4(200/26)	2 x 25	23.9	1450
16(30/30)	4 x 1.5	10.6	200	4(200/26)	3 x 25	25.2	1675
16(30/30)	5 x 1.5	11.3	235	4(200/26)	4 x 25	27.5	1910
16(30/30)	7 x 1.5	12.5	275				



## FROH2R

### Application and Description

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These cables are suitable for connections and movable equipments where performances and entertainments take place. Can be laid inside, even in dry or wet environments or outside but only for a temporary use. The main feature of these cables is its protection against electromagnetic interference thanks to the copper braid. Can be lay under plaster or directly buried, even if protected, is not allowed.

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### Standard and Approval

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CEI 20-11, CEI 20-22 II, CEI 20-29, CEI 20-34, CEI 20-35 , CEI 20-37 pt.2

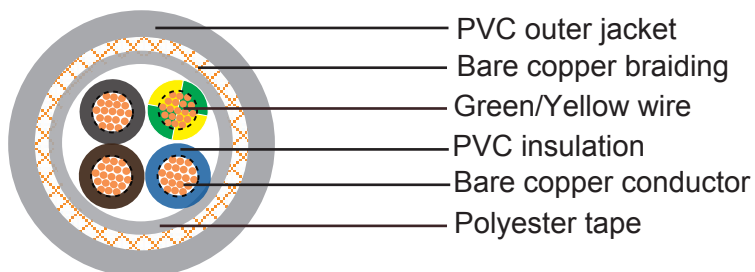
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### Cable Construction

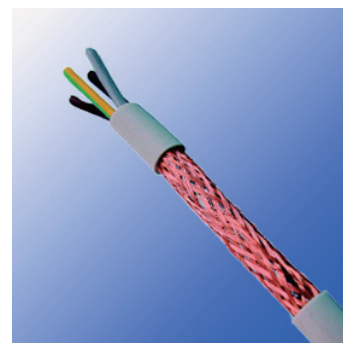
- 
- Flexible bare copper strands
  - Strands to CEI 20-29 Class-5,
  - PVC Insulation compound type TI2 to CEI 20-11
  - Color code according to Unel 00722
  - Polyester Tape
  - Bare copper wires braiding with coverage 75%±5%
  - PVC outer sheath compound type TM2 / Rz according to CEI 20-11
- 

### Technical Characteristics

- 
- Working voltage: 300/500V 450/750V
  - Test voltage: 2000V (300/500V) / 2500V (450/750V)
  - Flexing bending radius: 10 x Ø
  - Static bending radius: 6 x Ø
  - Flexing temperature: 0° C to +70° C
  - Static temperature: -15° C to +70° C
  - Flame retardant: CEI 20-22 II
  - Insulation resistance: 10 MΩ x km
-



FROH2R



FROH2R

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
FROH2R 300/500V					
Seven cores(including ground core )					
17(32/32)	7 x 1	0.6	1.0	10.5	147.1
16(30/30)	7 x 1.5	0.7	1.2	12.1	186.9
14(50/30)	7 x 2.5	0.8	1.4	14.0	242.4
10 cores(including ground core )					
17(32/32)	10 x 1	0.6	1.2	12.8	215.9
16(30/30)	10 x 1.5	0.7	1.3	14.5	263.9
14(50/30)	10 x 2.5	0.8	1.5	16.7	345.5
12 cores(including ground core )					
17(32/32)	12 x 1	0.6	1.2	14.0	252.0
16(30/30)	12 x 1.5	0.7	1.4	16.1	315.1
14(50/30)	12 x 2.5	0.8	1.6	18.7	412.7
14 cores(including ground core )					
17(32/32)	14 x 1	0.6	1.3	14.9	287.9
16(30/30)	14 x 1.5	0.7	1.4	16.9	350.9
14(50/30)	14 x 2.5	0.8	1.6	19.6	460.5
16 cores(including ground core )					
17(32/32)	16 x 1	0.6	1.3	15.6	317.3
16(30/30)	16 x 1.5	0.7	1.5	17.9	397.5
14(50/30)	16x 2.5	0.8	1.7	20.9	520.9
19 cores(including ground core )					
17(32/32)	19 x 1	0.6	1.4	16.6	368.3
16(30/30)	19 x 1.5	0.7	1.5	18.8	449.2
14(50/30)	19 x 2.5	0.8	1.7	22.0	593.7
24 cores(including ground core )					
17(32/32)	24 x 1	0.6	1.5	19.4	459.8
16(30/30)	24 x 1.5	0.7	1.7	22.2	573.0
14(50/30)	24 x 2.5	0.8	1.9	26.4	793.9





## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
FROH2R 450/750V					
Two cores					
17(32/32)	2 x 1	0.7	1.0	8.6	106.7
16(30/30)	2 x 1.5	0.7	1.0	9.0	118.4
14(50/30)	2 x 2.5	0.8	1.2	10.7	169.6
12(56/28)	2 x 4.0	0.8	1.2	12.1	218.9
10(84/28)	2 x 6.0	0.9	1.3	13.5	287.1
Three cores(including ground core )					
17(32/32)	3x 1	0.7	1.0	9.1	123.5
16(30/30)	3 x 1.5	0.7	1.0	9.5	142.2
14(50/30)	3 x 2.5	0.8	1.2	11.3	203.8
12(56/28)	3 x 4.0	0.8	1.3	13.0	277.0
10(84/28)	3 x 6.0	0.9	1.4	14.4	364.8
Four cores(including ground core )					
17(32/32)	4 x 1	0.7	1.0	9.8	144.8
16(30/30)	4 x 1.5	0.7	1.1	10.5	173.5
14(50/30)	4 x 2.5	0.8	1.2	12.2	242.5
12(56/28)	4 x 4.0	0.8	1.3	14.4	345.6
10(84/28)	4 x 6.0	0.9	1.4	15.6	441.3
Five cores(including ground core )					
17	5 x 1	0.7	1.1	10.7	175.4
16(30/30)	5 x 1.5	0.7	1.2	11.5	209.0
14(50/30)	5 x 2.5	0.8	1.3	13.6	308.4
12(56/28)	5 x 4.0	0.8	1.5	15.9	430.7
10(84/28)	5 x 6.0	0.9	1.5	17.1	536.7



## FR2OH1R/FR2OH2R

### Application and Description

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These cables are suitable for connections and movable equipments where performances and entertainments take place. Can be laid inside, even in dry or wet environments or outside but only for a temperatureorary use. The main feature of these cables is its protection against electromagnetic interference thanks to the copper braid. Can be lay under plaster or directly buried, even if protected, is not allowed.

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### Standard and Approval

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CEI 20-11, CEI 20-22 II, CEI 20-29, CEI 20-34, CEI 20-35, CEI 20-37 pt.2

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### Cable Construction

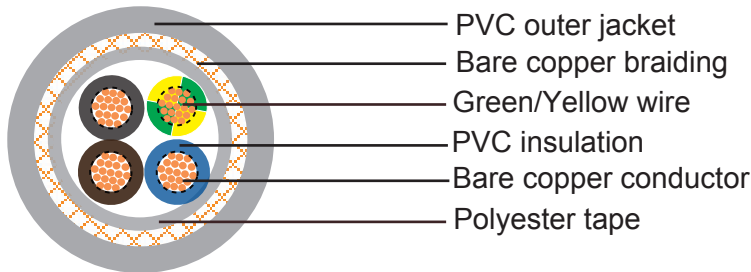
- 
- Flexible bare copper strands
  - Strands to CEI 20-29 Class-5
  - PVC Insulation compound type R2 according to CEI 20-11
  - Color code according to DIN 47100 (up to 0.75 mm<sup>2</sup> ), or Unel 0722 (from 1.0 mm<sup>2</sup>)
  - Polyester tape
  - Bare copper tape(for FR2OH1R)
  - Bare copper wires braiding with coverage 75%±5%(for FR2OH2R)
  - PVC outer sheath compound type TM2 / Rz according to CEI 20-11
- 

### Technical Characteristics

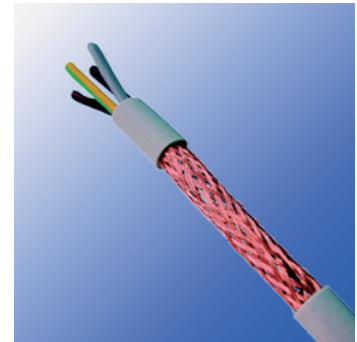
- 
- Working voltage: 300/500V (up to 0.75 mm<sup>2</sup> ) 450/750V (from 1.0 mm<sup>2</sup>)
  - Test voltage: 2000V (300/500V) / 2500V (450/750V)
  - Flexing bending radius: 10 x Ø
  - Static bending radius: 6 x Ø
  - Flexing temperature: 0° C to +70° C
  - Static temperature: -15° C to +70° C
  - Flame retardant: CEI 20-22 II
  - Insulation resistance: 10 MΩ x km
-



## Italian Standard



FR20H2R



FR20H2R

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km	AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km
21(11/32)	2 x 0.35	4.9	33	17(32/32)	5 x 1	8.0	107
21(11/32)	3 x 0.35	5.2	40	17(32/32)	5 G.1	8.0	107
21(11/32)	4 x 0.35	5.6	48	17(32/32)	6 x 1	8.7	128
21(11/32)	5 x 0.35	6.1	59	17(32/32)	7 G.1	8.7	134
21(11/32)	6 x 0.35	6.7	71	17(32/32)	8 G.1	9.6	160
21(11/32)	8 x 0.35	7.3	85	17(32/32)	10 G.1	11.6	210
21(11/32)	10 x 0.35	8.7	110	17(32/32)	12 G.1	11.6	222
21(11/32)	12 x 0.35	8.7	115	17(32/32)	16 G.1	12.9	288
20(16/32)	1 x 0.5	3.2	19	17(32/32)	19 G.1	13.8	342
20(16/32)	2 x 0.5	5.1	37	17(32/32)	25 G.1	16.6	454
20(16/32)	3 x 0.5	5.4	44	17(32/32)	34 G.1	18.7	597
20(16/32)	3 G.0.5	5.4	44	17(32/32)	41 G.1	20.4	700
20(16/32)	4 x 0.5	5.9	55	17(32/32)	50 G.1	22.1	825
20(16/32)	4 G.0.5	5.9	55	17(32/32)	65 G.1	25.2	1080
20(16/32)	5 x 0.5	6.4	67	16(30/30)	2 x 1.50	7.5	77
20(16/32)	6 x 0.5	7.0	80	16(30/30)	3 x 1.50	8.0	100
20(16/32)	7 x 0.5	7.0	83	16(30/30)	3 G.1.50	8.0	100
20(16/32)	8 x 0.5	7.7	99	16(30/30)	4 x 1.50	8.7	123
20(16/32)	10 x 0.5	9.2	127	16(30/30)	4 G.1.50	8.7	123
20(16/32)	12 x 0.5	9.2	134	16(30/30)	5 x 1.50	9.6	153
20(16/32)	16 x 0.5	10.2	176	16(30/30)	5 G.1.50	9.6	153
20(16/32)	19 G.0.5	10.8	198	16(30/30)	6 x 1.50	10.5	185
20(16/32)	24 x 0.5	13.1	273	16(30/30)	7 G.1.50	10,5	194
20(16/32)	25 G.0.5	13.1	277	16(30/30)	8 G.1.50	11.6	230
20(16/32)	37 G.0.5	14.6	365	16(30/30)	10 G.1.50	14.1	309
20(16/32)	41 G.0.5	15.9	412	16(30/30)	12 G.1.50	14.1	327
20(16/32)	50 G.0.5	17.2	485	16(30/30)	16 G.1.50	15.8	429
20(16/32)	65 G.0.5	19.6	620	16(30/30)	19 G.1.50	16.7	483
18(24/32)	1 x 0.75	3.6	25	16(30/30)	25 G.1.50	20.2	660



18(24/32)	2 x 0.75	5.8	49	16(30/30)	34 G.1.50	22.7	865
18(24/32)	3 x 0.75	6.2	61	16(30/30)	41 G.1.50	24.8	1014
18(24/32)	3 G.0.75	6.2	61	16(30/30)	50 G.1.50	27.0	1208
18(24/32)	4 x 0.75	6.7	74	16(30/30)	65 G.1.50	30.8	1569
18(24/32)	4 G.0.75	6.7	74	14(50/30)	2 x 2.5	8.9	111
18(24/32)	5 x 0.75	7.4	92	14(50/30)	3 x 2.5	9.5	145
18(24/32)	6 x 0.75	8.0	108	14(50/30)	3 G.2.5	9.5	145
18(24/32)	7 x 0.75	8.0	113	14(50/30)	4 x 2.5	10.4	183
18(24/32)	8 x 0.75	8.9	133	14(50/30)	4 G.2.5	10.4	183
18(24/32)	10 x 0.75	10.6	175	14(50/30)	5 G.2.5	11.5	226
18(24/32)	12 x 0.75	10.6	185	14(50/30)	7 G.2.5	12.6	288
18(24/32)	16 G.0.75	11.8	239	14(50/30)	8 G.2.5	14.1	353
18(24/32)	19 G.0.75	12.5	270	14(50/30)	12 G.2.5	17.0	490
18(24/32)	25 G.0.75	15.2	377	14(50/30)	16 G.2.5	19.1	651
18(24/32)	37 G.0.75	17.0	507	14(50/30)	25 G.2.5	24.5	1006
18(24/32)	41 G.0.75	18.6	576	12(56/28)	2 x 4	11.2	172
18(24/32)	50 G.0.75	20.2	678	12(56/28)	3 G.4	12.0	226
18(24/32)	65 G.0.75	23.0	985	12(56/28)	4 G.4	13.2	286
17(32/32)	1 x 1	3.8	28	12(56/28)	5 G.4	14.7	368
17(32/32)	2 x 1	6.3	57	10(84/28)	2 x 6	12.6	226
17(32/32)	3 x 1	6.7	71	10(84/28)	3 G.6	13.6	311
17(32/32)	3 G.1	6.7	71	10(84/28)	4 G.6	15.0	396
17(32/32)	4 x 1	7.3	87	10(84/28)	5 G.6	16.6	494
17(32/32)	4 G.1	7.3	87				

G - with green/yellow ground wire

X - without green/yellow ground wire



## FR20HH2R

### Application and Description

These cables are well adapted to use in industrial environments (where chemicals and oils may be present too), in signal and command equipments, in power plants and in any application where is essential guarantee power and control transmission without external interference and noise. Also suitable for valves power supply, alarm system activation, relay lock, etc. They provide a good screening against electromagnetic (copper wires braid) and electrostatic (AL/PETP tape) interferences.

### Standard and Approval

CEI 20-11, CEI 20-22 II, CEI 20-29, CEI 20-35 (EN60332-1), CEI 20-37 pt.1(EN50267)

### Cable Construction

- Flexible bare copper strands
- Strands to CEI 20-29 Class-5,
- PVC Insulation compound type R2 according to CEI 20-11
- Color code according to DIN 47100 (up to 0.75 mm<sup>2</sup>), or Unel 0722 (from 1.0 mm<sup>2</sup>)
- Aluminium/Polyester tape screen
- Bare copper wires braiding
- PVC outer sheath compound type TM2 / Rz according to CEI 20-11

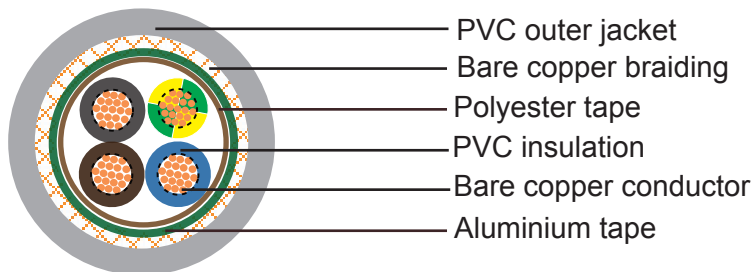
### Technical Characteristics

- Working voltage: 300/300V (up to 0.75 mm<sup>2</sup>) 300/500V (1.0 mm<sup>2</sup>) 450/750V (from 1.5 mm<sup>2</sup>)
- Test voltage: 1500V (up to 1.0 mm<sup>2</sup>) / 2000V (over 1.0mm<sup>2</sup>)
- Flexing bending radius: 12 x Ø
- Static bending radius: 8 x Ø
- Flexing temperature: 0° C to +70° C
- Static temperature: -15° C to +70° C
- Flame retardant: CEI 20-22 II
- Insulation resistance: 10 MΩ x km

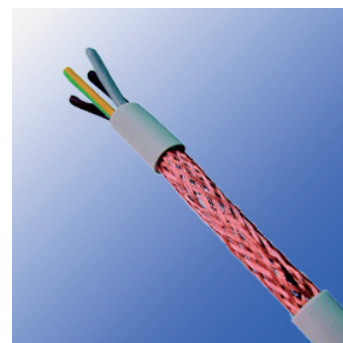


# Addison Industrial Cables

Italian Standard



FR2OHH2R



FR2OHH2R

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km	AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km
23(7/32)	2x0.22	4.0	21.0	18(24/32)	1x0.75	3.5	24.0
23(7/32)	3x0.22	4.2	27.0	18(24/32)	2x0.75	5.8	44.0
23(7/32)	4x0.22	4.4	29.0	18(24/32)	3x/G0.75	6.0	56.0
23(7/32)	5x0.22	4.8	40.0	18(24/32)	4x0.75	6.8	68.0
23(7/32)	6x0.22	5.1	40.0	18(24/32)	5x0.75	7.2	81.0
23(7/32)	7x0.22	5.1	48.0	18(24/32)	6x0.75	8.0	97.0
23(7/32)	8x0.22	5.6	49.0	18(24/32)	7x0.75	8.0	115.0
23(7/32)	10x0.22	6.3	58.0	18(24/32)	8x0.75	8.6	123.0
23(7/32)	12x0.22	6.5	64.0	18(24/32)	10x0.75	9.9	165.0
23(7/32)	16x0.22	7.1	80.0	18(24/32)	12x0.75	10.5	185.0
23(7/32)	19x0.22	7.6	100.0	18(24/32)	16x0.75	11.4	243.0
23(7/32)	24x0.22	8.7	127.0	18(24/32)	19x0.75	12	297.0
23(7/32)	36x0.22	10.0	162.0	18(24/32)	24x0.75	13.7	363.0
23(7/32)	48x0.22	11.4	213.0	18(24/32)	36x0.75	16.2	537.0
23(7/32)	2x2x0.22	5.4	47.0	18(24/32)	48x0.75	18.4	720.0
23(7/32)	4x2x0.22	6.7	72.0	18(24/32)	2x2x0.75	8.6	117.0
23(7/32)	6x2x0.22	7.5	92.0	18(24/32)	4x2x0.75	10.4	178.0
23(7/32)	8x2x0.22	8.3	102.0	18(24/32)	6x2x0.75	11.8	223.0
23(7/32)	12x2x0.22	9.8	124.0	18(24/32)	8x2x0.75	12.9	257.0
23(7/32)	16x2x0.22	10.5	143.0	18(24/32)	12x2x0.75	15.6	409.0
23(7/32)	24x2x0.22	12.4	224.0	18(24/32)	16x2x0.75	16.9	511.0
23(7/32)	36x2x0.22	14.2	331.0	18(24/32)	24x2x0.75	20.7	772.0
23(7/32)	48x2x0.22	16.2	435.0	18(24/32)	36x2x0.75	23.8	1086.0
21(11/32)	2x0.35	4.8	28.0	18(24/32)	48x2x0.75	27.4	1418.0
21(11/32)	3x0.35	5.0	34.0	17(32/32)	1x1	3.7	27.0
21(11/32)	4x0.35	5.6	43.0	17(32/32)	2x1	6.2	52.0
21(11/32)	5x0.35	6.0	53.0	17(32/32)	3x/G1	6.5	67.0
21(11/32)	6x0.35	6.7	60.0	17(32/32)	4x/G1	7.2	80.0
21(11/32)	7x0.35	6.7	76.0	17(32/32)	5x1	7.78	101.0



## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km	AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km
21(11/32)	8x0.35	7.1	72.0	17(32/32)	7x1	8.4	128.0
21(11/32)	10x0.35	8.1	97.0	17(32/32)	8x1	9.1	160.0
21(11/32)	12x0.35	8.5	112.0	17(32/32)	10x1	10.4	190.0
21(11/32)	16x0.35	9.3	142.0	17(32/32)	12x1	11.2	216.0
21(11/32)	19x0.35	10.0	162.0	17(32/32)	16x1	12.3	287.0
21(11/32)	24x0.35	11.2	198.0	17(32/32)	19x1	13.2	340.0
21(11/32)	36x0.35	13.0	283.0	17(32/32)	24x1	15.1	426.0
21(11/32)	48x0.35	14.9	363.0	17(32/32)	36x1	17.7	649.0
21(11/32)	2x2x0.35	7.1	64.0	17(32/32)	48x1	20.5	901.0
21(11/32)	4x2x0.35	8.5	103.0	17(32/32)	2x2x1	9.2	152.0
21(11/32)	6x2x0.35	9.6	132.0	17(32/32)	4x2x1	11.5	274.0
21(11/32)	8x2x0.35	10.7	168.0	17(32/32)	6x2x1	12.8	393.0
21(11/32)	12x2x0.35	12.5	235.0	17(32/32)	8x2x1	14.2	485.0
21(11/32)	16x2x0.35	13.7	349.0	17(32/32)	12x2x1	17.3	727.0
21(11/32)	24x2x0.35	16.5	458.0	17(32/32)	16x2x1	18.9	966.0
21(11/32)	36x2x0.35	18.9	686.0	17(32/32)	24x2x1	22.9	1385.0
21(11/32)	48x2x0.35	21.8	907.0	17(32/32)	36x2x1	26.3	2096.0
20(16/32)	1x0.50	3.2	23.0	17(32/32)	48x2x1	29.9	2766.0
20(16/32)	2x0.50	5.2	35.0	12(56/28)	2x1.5	7.3	71.0
20(16/32)	3x/G0.50	5.4	42.0	16(30/30)	3x/G1.5	7.7	91.0
20(16/32)	4x/G0.50	5.9	51.0	16(30/30)	4x/G1.5	8.7	122.0
20(16/32)	5x0.50	6.5	63.0	16(30/30)	5G1.5	9.3	140.0
20(16/32)	6x0.50	7.0	73.0	16(30/30)	7G1.5	10.5	193.0
20(16/32)	7x0.50	7.0	78.0	16(30/30)	8G1.5	10.9	255.0
20(16/32)	8x0.50	7.4	88.0	16(30/30)	10G1.5	12.6	279.0
20(16/32)	10x0.50	8.5	112.0	16(30/30)	12G1.5	13.3	330.0
20(16/32)	12x0.50	8.9	120.0	16(30/30)	16G1.5	14.9	418.0
20(16/32)	16x0.50	10.0	167.0	16(30/30)	19G1.5	15.9	552.0
20(16/32)	19x0.50	10.5	208.0	16(30/30)	24G1.5	18.1	604.0
20(16/32)	24x0.50	11.8	243.0	16(30/30)	36G1.5	21.4	950.0
20(16/32)	36x0.50	13.9	363.0	16(30/30)	48G1.5	24.8	1265.0
20(16/32)	48x0.50	15.9	494.0	16(30/30)	2x2x1.5	10.9	204.0
20(16/32)	2x2x0.50	7.3	90.0	16(30/30)	4x2x1.5	13.5	310.0
20(16/32)	4x2x0.50	9.2	134.0	16(30/30)	6x2x1.5	15.4	368.0
20(16/32)	6x2x0.50	10.3	173.0	16(30/30)	8x2x1.5	17.1	492.0
20(16/32)	8x2x0.50	11.5	213.0	16(30/30)	12x2x1.5	20.9	766.0
20(16/32)	12x2x0.50	13.6	283.0	16(30/30)	16x2x1.5	23.1	959.0
20(16/32)	16x2x0.50	14.7	423.0	16(30/30)	24x2x1.5	27.9	1416.0
20(16/32)	24x2x0.50	17.8	614.0	16(30/30)	36x2x1.5	31.7	2187.0
20(16/32)	36x2x0.50	20.4	1020.0				
20(16/32)	48x2x0.50	23.5	1359.0				



AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km	AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Overall Diameter mm	Nominal Weight kg/km
14(50/30)	2x2.5	8.7	104.0	12(56/28)	2x4	10.3	176.0
14(50/30)	3x/G2.5	9.2	136.0	12(56/28)	3G4	11.1	226.0
14(50/30)	4x/G2.5	10.4	180.0	12(56/28)	4G4	12.0	280.0
14(50/30)	5G2.5	10.9	212.0	12(56/28)	5G4	13.5	384.0
14(50/30)	7G2.5	12.0	323.0	10(84/28)	2x6	11.6	233.0
14(50/30)	8G2.5	13.3	368.0	10(84/28)	3G6	12.3	323.0
14(50/30)	10G2.5	15.4	472.0	10(84/28)	4G6	13.8	384.0
14(50/30)	12G2.5	16.2	532.0	10(84/28)	5G6	15.3	332.0
14(50/30)	16G2.5	18.0	694.0	8(80/26)	2x10	15.0	353.0
14(50/30)	19G2.5	19.2	810.0	8(80/26)	3G10	15.8	489.0
14(50/30)	24G2.5	22.2	1019.0	8(80/26)	4G10	17.6	641.0
14(50/30)	36G2.5	26.4	1466.0	8(80/26)	5G10	19.5	769.0
14(50/30)	48G2.5	30.2	1917.0				

G - with green/yellow ground wire

X - without green/yellow ground wire





### FG70R

#### Application and Description

These cables are suitable for power transport in industry, yards, residential building and handcraft. For installations on masonry and metal structures, on gangways, pipes, ducts and similar systems. For fixed installation indoors and outdoors. Underground laying is acceptable, even if not protected.

#### Standard and Approval

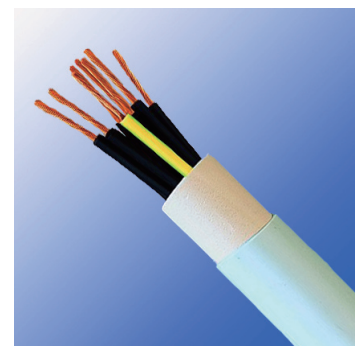
CEI 20-13, CEI 20-22 II, CEI 20-35 (EN60332-1), CEI 20-37 pt.2 (EN50267)

#### Cable Construction

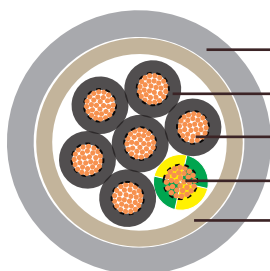
- Flexible conductor of annealed red copper Cl.5
- Rubber HEPR, G7 quality, acc. to CEI 20-11
- Not fibrous and not hygroscopic filler
- Grey PVC RZ quality outer jacket

#### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius: 4 x Ø
- Flexing temperature: -0° C to +90° C
- Static temperature: -25° C to +90° C
- Maximum short circuit temperature: +250° C
- Flame retardant: CEI 20-22 II
- Insulation resistance: 10 MΩ x km



FG70R



FG70R

- Fire retardant PVC RZ sheath
- HEPR insulation
- Annealed copper conductor
- Green/Yellow wire
- Not fibrous and not hygroscopic filler



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
power					
16(30/30)	1 x 1.5	0.7	1.4	5.8	49
14(50/30)	1 x 2.5	0.7	1.4	6.3	60
12(56/28)	1 x 4	0.7	1.4	6.7	80
10(84/28)	1 x 6	0.7	1.4	7.4	102
8(80/26)	1 x 10	0.7	1.4	8.3	147
6(128/26)	1 x 16	0.7	1.4	9.4	206
4(200/26)	1 x 25	0.9	1.4	11.1	290
2(280/26)	1 x 35	0.9	1.4	12.1	390
1(400/26)	1 x 50	1	1.4	13.9	530
2/0(356/24)	1 x 70	1.1	1.4	16.1	720
3/0(485/24)	1 x 95	1.1	1.5	18.0	940
4/0(614/24)	1 x 120	1.2	1.5	19.0	1200
250MCM	1 x 150	1.4	1.6	22.3	1480
350MCM	1 x 185	1.6	1.6	23.6	1800
450MCM	1 x 240	1.7	1.7	26.4	2330
550MCM	1 x 300	1.8	1.8	31.0	3050
750MCM	1 x 400	2.0	1.9	35.7	4000
1000MCM	1 x 500	2.2	2.1	39.5	5020
1250MCM	1 x 630	2.4	2.2	44.0	6600
16(30/30)	2 x 1.5	0.7	1.8	9.6	150
14(50/30)	2 x 2.5	0.7	1.8	10.6	185
12(56/28)	2 x 4	0.7	1.8	11.4	238
10(84/28)	2 x 6	0.7	1.8	12.9	304
8(80/26)	2 x 10	0.7	1.8	14.6	435
6(128/26)	2 x 16	0.7	1.8	16.8	590
4(200/26)	2 x 25	0.9	1.8	20.3	830
2(280/26)	2 x 35	0.9	1.8	22.3	1100
1(400/26)	2 x 50	1	1.8	27.5	1500
16(30/30)	3 x 1.5	0.7	1.8	10.6	165
14(50/30)	3 x 2.5	0.7	1.8	11.4	210
12(56/28)	3 x 4	0.7	1.8	12.5	275
10(84/28)	3 x 6	0.7	1.8	13.8	355
8(80/26)	3 x 10	0.7	1.8	16.2	515
6(128/26)	3 x 16	0.7	1.8	18.3	730
4(200/26)	3 x 25	0.9	1.8	21.8	1040
2(280/26)	3 x 35	0.9	1.8	24.3	1370
1(400/26)	3 x 50	1	1.8	27.8	1875
2/0(356/24)	3 x 70	1.1	1.9	32.4	2610
3/0(485/24)	3 x 95	1.1	2	35.6	3340
4/0(614/24)	3 x 120	1.2	2.1	40.0	4320



## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
300MCM	3 x 150	1.4	2.3	44.8	5300
-	3 x 35 + 25	0.9	1.8	26.0	1600
-	3 x 50 + 25	1	1.8	29.5	2210
-	3 x 70 + 35	1.1	1.9	34.3	3050
-	3 x 95 + 50	1.1	2.1	38.1	3800
-	3 x 120 + 70	1.2	2.2	42.9	5000
-	3 x 150 + 95	1.4	2.4	47.4	6350
16(30/30)	4 x 1.5	0.7	1.8	11.3	190
14(50/30)	4 x 2.5	0.7	1.8	12.3	245
12(56/28)	4 x 4	0.7	1.8	13.5	325
10(84/28)	4 x 6	0.7	1.8	15.1	425
8(80/26)	4 x 10	0.7	1.8	17.6	625
6(128/26)	4 x 16	0.7	1.8	20.0	890
4(200/26)	4 x 25	0.9	1.8	23.9	1300
16(30/30)	5 x 1.5	0.7	1.8	11.7	217
14(50/30)	5 x 2.5	0.7	1.8	13.3	283
12(56/28)	5 x 4	0.7	1.8	14.6	378
10(84/28)	5 x 6	0.7	1.8	16.3	500
8(80/26)	5 x 10	0.7	1.8	19.2	740
6(128/26)	5 x 16	0.7	1.8	21.9	1070
4(200/26)	5 x 25	0.9	1.8	26.5	1550
2(280/26)	5 x 35	0.9	1.8	29.8	2050
1(400/26)	5 x 50	1	2	34.5	2850
control					
16(30/30)	7 x 1.5	0.7	1.8	12.6	241
16(30/30)	10 x 1.5	0.7	1.8	15.0	343
16(30/30)	12 x 1.5	0.7	1.8	16.2	402
16(30/30)	16 x 1.5	0.7	1.8	17.6	471
16(30/30)	19 x 1.5	0.7	1.8	18.6	552
16(30/30)	24 x 1.5	0.7	1.8	21.6	707
14(50/30)	7 x 2.5	0.7	1.8	14.1	329
14(50/30)	10 x 2.5	0.7	1.8	17.6	501
14(50/30)	12 x 2.5	0.7	1.8	18.0	544
14(50/30)	16 x 2.5	0.7	1.8	20.0	686
14(50/30)	19 x 2.5	0.7	1.8	20.7	759
14(50/30)	24 x 2.5	0.7	1.8	24.0	1000

\* Galvanized steel armouring version (FG7ORAR) is available



## FG70H1R/FG70H2R

### Application and Description

These cables are suitable for power transport in industry, yards, residential building and handicraft. For installations on masonry and metal structures, on gangways, pipes, ducts and similar systems. For fixed installation indoors and out. Underground laying is acceptable, even if not protected. Shield guarantees an optimal protection from electromagnetic disturbs; suitable for civil and industrial places and for the transport of signals and commands.

### Standard and Approval

CEI 20-13, CEI 20-22 II, CEI 20-35 (EN60332-1), CEI 20-37 pt.2 (EN50267)

### Cable Construction

- Flexible bare copper conductor to CEI 20-29 cl.5
- Rubber HEPR, G7 quality, acc. to CEI 20-11
- Not fibrous and not hygroscopic filler
- Bare copper tape screen (for FG70H1R)
- Bare copper wire braid (for FG70H2R)
- Grey PVC RZ quality outer jacket

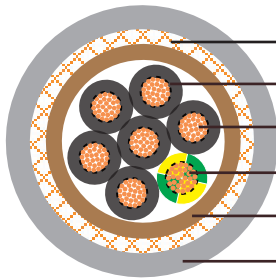
### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius:  $8 \times \varnothing$
- Flexing temperature:  $-0^{\circ} \text{C}$  to  $+90^{\circ} \text{C}$
- Static temperature:  $-25^{\circ} \text{C}$  to  $+90^{\circ} \text{C}$
- Maximum short circuit temperature:  $+250^{\circ} \text{C}$
- Flame retardant: CEI 20-22 II
- Insulation resistance:  $10 \text{ M}\Omega \times \text{km}$

\* Galvanized steel armouring version (FG70H1RAR/FG70H2RAR) is available

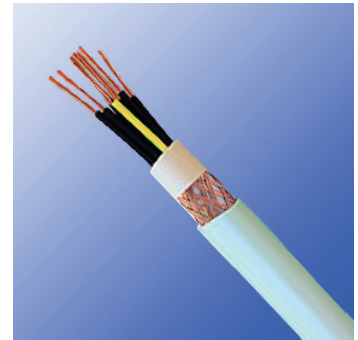


## Italian Standard



- Bare copper braid
- HEPR insulation
- Bare copper conductor
- Green/Yellow wire
- Not fibrous and not hygroscopic PVC filler
- PVC outer sheath

FG7OH2R



FG7OH2R

## Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
power					
16(30/30)	2 x 1.5	0.7	1.8	12.6	241
14(50/30)	2 x 2.5	0.7	1.8	13.5	280
12(56/28)	2 x 4	0.7	1.8	14.5	336
10(84/28)	2 x 6	0.7	1.8	15.5	395
8(80/26)	2 x 10	0.7	1.8	18.4	567
6(128/26)	2 x 16	0.7	1.8	20.5	738
4(200/26)	2 x 25	0.9	1.8	25.3	1107
2(280/26)	2 x 35	0.9	1.8	27.7	1403
1(400/26)	2 x 50	1	1.8	30.6	1830
2/0(356/24)	2 x 70	1.1	1.8	36.4	2571
3/0(485/24)	2 x 95	1.1	1.8	39.0	3143
4/0(614/24)	2 x 120	1.2	1.8	46.3	4316
250MCM	2 x 150	1.4	1.8	52.8	5547
16(30/30)	3 x 1.5	0.7	1.8	13.0	262
14(50/30)	3 x 2.5	0.7	1.8	14.1	316
12(56/28)	3 x 4	0.7	1.8	15.0	380
10(84/28)	3 x 6	0.7	1.8	16.1	456
8(80/26)	3 x 10	0.7	1.8	19.3	675
6(128/26)	3 x 16	0.7	1.8	22.3	939
4(200/26)	3 x 25	0.9	1.8	26.6	1346
2(280/26)	3 x 35	0.9	1.8	29.2	1744
1(400/26)	3 x 50	1	1.8	32.3	2262
2/0(356/24)	3 x 70	1.1	1.9	38.5	3188
3/0(485/24)	3 x 95	1.1	2	44.2	4309
4/0(614/24)	3 x 120	1.2	2.1	51.6	5635
300MCM	3 x 150	1.4	2.3	56.6	6921
350MCM	3 x 185	1.6	2.4	60.2	8079
450MCM	3 x 240	1.7	2.6	69.7	10639



AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
-	3 x 35 + 25	0.9	1.8	31.1	2038
-	3 x 50 + 25	1	1.8	34.7	2606
-	3 x 70+ 35	1.1	1.9	39.8	3540
-	3 x 95 + 50	1.1	2.1	45.9	4818
-	3 x 120 + 70	1.2	2.2	53.9	6358
-	3 x 150 + 95	1.4	2.4	59.0	7852
-	3 x 185 + 95	1.6	2.6	62.8	9066
-	3 x 240 + 150	1.7	2.8	73.0	12078
16(30/30)	4 x 1.5	0.7	1.8	13.8	298
14(50/30)	4 x 2.5	0.7	1.8	14.9	357
12(56/28)	4 x 4	0.7	1.8	16.1	438
10(84/28)	4 x 6	0.7	1.8	17.3	535
8(80/26)	4 x 10	0.7	1.8	20.8	802
6(128/26)	4 x 16	0.7	1.8	24.6	1164
4(200/26)	4 x 25	0.9	1.8	28.8	1664
16(30/30)	5 x 1.5	0.7	1.8	14.9	351
14(50/30)	5 x 2.5	0.7	1.8	16.2	424
12(56/28)	5 x 4	0.7	1.8	17.5	527
10(84/28)	5 x 6	0.7	1.8	18.9	635
8(80/26)	5 x 10	0.7	1.8	23.7	1027
6(128/26)	5 x 16	0.7	1.8	26.9	1415
4(200/26)	5 x 25	0.9	1.8	31.6	2022
control					
16(30/30)	7 x 1.5	0.7	1.8	15.7	399
16(30/30)	10 x 1.5	0.7	1.8	17.8	503
16(30/30)	12 x 1.5	0.7	1.8	19.2	574
16(30/30)	16 x 1.5	0.7	1.8	21.0	690
16(30/30)	19 x 1.5	0.7	1.8	22.6	813
16(30/30)	24 x 1.5	0.7	1.8	24.6	927
14(50/30)	7 x 2.5	0.7	1.8	17.1	496
14(50/30)	10 x 2.5	0.7	1.8	19.5	644
14(50/30)	12 x 2.5	0.7	1.8	21.2	732
14(50/30)	16 x 2.5	0.7	1.8	24.0	950
14(50/30)	19 x 2.5	0.7	1.8	25.0	1056
14(50/30)	24 x 2.5	0.7	1.8	38.3	1281

\* Galvanized steel armouring version (FG7OH1RAR/FG7OH2RAR) is available



## FG70HH2R

### Application and Description

These cables are especially suitable for photovoltaic installations in the link connection between inverter and counter. For energy transport and signals transmission both in internal and external application and wet environments. Ideal for fixed lay on walling and metallic frames. Also appropriate for direct or indirect grounded lay.

### Standard and Approval

CEI 20-13, CEI 20-22 II, CEI 20-35 (EN60332-1), CEI 20-37 pt.2 (EN50267)

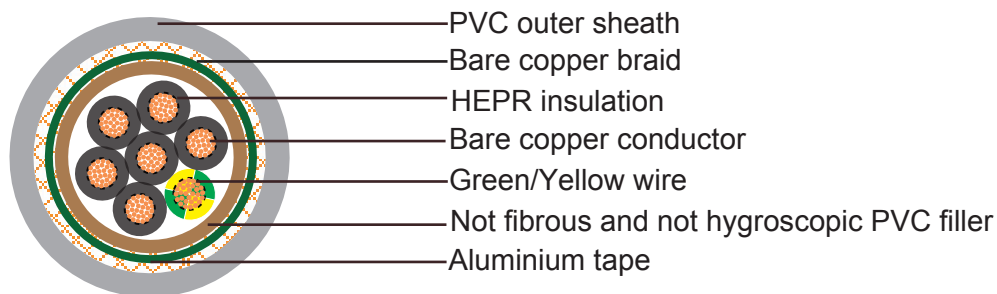
### Cable Construction

- Flexible bare copper conductor to CEI 20-29 cl.5
- Rubber HEPR, G7 quality, acc. to CEI 20-11
- Not fibrous and not hygroscopic filler
- Aluminium tape
- Bare copper wire braid
- Grey PVC RZ quality outer jacket

### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius: 8 x Ø
- Flexing temperature: -0° C to +90° C
- Static temperature: -25° C to +90° C
- Maximum short circuit temperature: +250° C
- Flame retardant: CEI 20-22 II
- Insulation resistance: 10 MΩ x km

\* Galvanized steel armouring version (FG70HHH2RAR) is available



FG70HH2R

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
16(30/30)	3 x 1.5	0.7	1.8	13.0	262
14(50/30)	3 x 2.5	0.7	1.8	14.1	316
12(56/28)	3 x 4	0.7	1.8	15.0	380
10(84/28)	3 x 6	0.7	1.8	16.1	456
8(80/26)	3 x 10	0.7	1.8	19.3	675
6(128/26)	3 x 16	0.7	1.8	22.3	939
4(200/26)	3 x 25	0.9	1.8	26.6	1346
2(280/26)	3 x 35	0.9	1.8	29.2	1744
1(400/26)	3 x 50	1	1.8	32.3	2262
2/0(356/24)	3 x 70	1.1	1.9	38.5	3188
3/0(485/24)	3 x 95	1.1	2	44.2	4309
4/0(614/24)	3 x 120	1.2	2.1	51.6	5635
250MCM	3 x 150	1.4	2.3	56.6	6921
350MCM	3 x 185	1.6	2.4	64.2	8079
450MCM	3 x 240	1.7	2.6	72.7	10639

\* Galvanized steel armouring version (FG70HHH2RAR) is available





## FG7OH1M1/FG7OH2M1

### Application and Description

These cables are suitable for environments with high fire hazards risk, where it's essential to guarantee the safety of people and preserve systems and equipments from the corrosive gases (e.g. schools, hospitals, public premises, hotels, supermarkets, tubes, cinemas, theatres, discotheques, public offices). For fixed installation, both indoor and outdoor, on walls and metallic frames.

### Standard and Approval

CEI 20-13, CEI 20-11, CEI 20-22 III, CEI 20-35 (EN60332-1), CEI 20-37 pt.2 (EN50267)

### Cable Construction

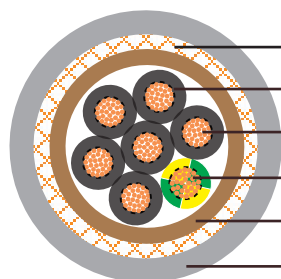
- Flexible bare copper conductor to CEI 20-29 cl.5
- Rubber HEPR, G7 quality, acc. to CEI 20-11
- Not fibrous and not hygroscopic filler
- Bare copper tape screen(for FG7OH1M1)
- Bare copper wire braid(for FG7OH2M1)
- Grey LSOH, type M1 outer jacket

### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius: 8 x Ø
- Flexing temperature: -0° C to +90° C
- Static temperature: -25° C to +90° C
- Maximum short circuit temperature: +250° C
- Flame retardant: CEI 20-22 III - IEC 60332-3-24
- Insulation resistance: 10 MΩ x km



FG7OH2M1



- Bare copper braid
- HEPR insulation
- Bare copper conductor
- Green/Yellow wire
- Not fibrous and not hygroscopic PVC filler
- LSOH outer sheath

FG7OH2M1

### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/Km
power					
16(30/30)	2 x 1.5	0.7	1.8	12.6	241
14(50/30)	2 x 2.5	0.7	1.8	13.5	280
12(56/28)	2 x 4	0.7	1.8	14.5	336
10(84/28)	2 x 6	0.7	1.8	15.5	395
8(80/26)	2 x 10	0.7	1.8	18.4	567
6(128/26)	2 x 16	0.7	1.8	20.5	738
4(200/26)	2 x 25	0.9	1.8	25.3	1107
2(280/26)	2 x 35	0.9	1.8	27.7	1403
1(400/26)	2 x 50	1	1.8	30.6	1830
2/0(356/24)	2 x 70	1.1	1.8	36.4	2571
3/0(485/24)	2 x 95	1.1	1.8	39.0	3143
4/0(614/24)	2 x 120	1.2	1.8	46.3	4316
250MCM	2 x 150	1.4	1.8	52.8	5547
16(30/30)	3 x 1.5	0.7	1.8	13.0	262
14(50/30)	3 x 2.5	0.7	1.8	14.1	316
12(56/28)	3 x 4	0.7	1.8	15.0	380
10(84/28)	3 x 6	0.7	1.8	16.1	456
8(80/26)	3 x 10	0.7	1.8	19.3	675
6(128/26)	3 x 16	0.7	1.8	22.3	939
4(200/26)	3 x 25	0.9	1.8	26.6	1346
2(280/26)	3 x 35	0.9	1.8	29.2	1744
1(400/26)	3 x 50	1	1.8	32.3	2262
2/0(356/24)	3 x 70	1.1	1.9	38.5	3188
3/0(485/24)	3 x 95	1.1	2	44.2	4309
4/0(614/24)	3 x 120	1.2	2.1	51.6	5635
250MCM	3 x 150	1.4	2.3	56.6	6921
350MCM	3 x 185	1.6	2.4	60.2	8079
450MCM	3 x 240	1.7	2.6	69.7	10639



## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/Km
-	3 x 35 + 25	0.9	1.8	31.1	2038
-	3 x 50 + 25	1	1.8	34.7	2606
-	3 x 70+ 35	1.1	1.9	39.8	3540
-	3 x 95 + 50	1.1	2.1	45.9	4818
-	3 x 120 + 70	1.2	2.2	53.9	6358
-	3 x 150 + 95	1.4	2.4	59.0	7852
-	3 x 185 + 95	1.6	2.6	62.8	9066
-	3 x 240 + 150	1.7	2.8	73.0	12078
16(30/30)	4 x 1.5	0.7	1.8	13.8	298
14(50/30)	4 x 2.5	0.7	1.8	14.9	357
12(56/28)	4 x 4	0.7	1.8	16.1	438
10(84/28)	4 x 6	0.7	1.8	17.3	535
8(80/26)	4 x 10	0.7	1.8	20.8	802
6(128/26)	4 x 16	0.7	1.8	24.6	1164
4(200/26)	4 x 25	0.9	1.8	28.8	1664
16(30/30)	5 x 1.5	0.7	1.8	14.9	351
14(50/30)	5 x 2.5	0.7	1.8	16.2	424
12(56/28)	5 x 4	0.7	1.8	17.5	527
10(84/28)	5 x 6	0.7	1.8	18.9	635
8(80/26)	5 x 10	0.7	1.8	23.7	1027
6(128/26)	5 x 16	0.7	1.8	26.9	1415
4(200/26)	5 x 25	0.9	1.8	31.6	2022
control					
16(30/30)	7 x 1.5	0.7	1.8	15.7	399
16(30/30)	10 x 1.5	0.7	1.8	17.8	503
16(30/30)	12 x 1.5	0.7	1.8	19.2	574
16(30/30)	16 x 1.5	0.7	1.8	21.0	690
16(30/30)	19 x 1.5	0.7	1.8	22.6	813
16(30/30)	24 x 1.5	0.7	1.8	24.6	927
14(50/30)	7 x 2.5	0.7	1.8	17.1	496
14(50/30)	10 x 2.5	0.7	1.8	19.5	644
14(50/30)	12 x 2.5	0.7	1.8	21.2	732
14(50/30)	16 x 2.5	0.7	1.8	24.0	950
14(50/30)	19 x 2.5	0.7	1.8	25.0	1056
14(50/30)	24 x 2.5	0.7	1.8	38.3	1281



## FG7M1/FG7OM1

### Application and Description

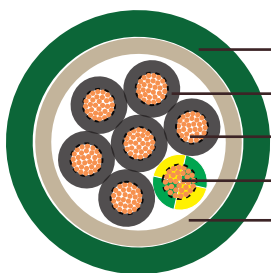
These cables are especially used in power circuits or signals and commands transfer. In environments with high fire hazards risk when it's essential to guarantee the safety of people and goods. Typically hospitals, schools, commercial areas, public premises, hotels, undergrounds, residential buildings and industries ambits with high concentration of persons or instrumental goods. For fixed installation indoor or outdoor, clipped on metallic frames or walls

### Standard and Approval

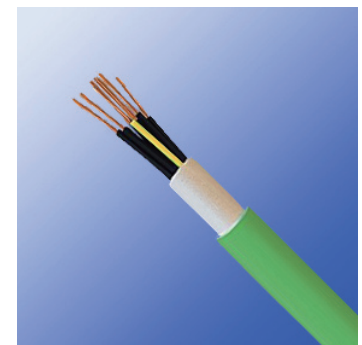
CEI 20-11; CEI 20-13; CEI 20-22 III; CEI 20-29; CEI 20-35; CEI 20-37; CEI-UNEL 00722; CEI-UNEL 35382  
CEI-UMEL 35384

### Cable Construction

- Flexible bare copper conductor to CEI 20-29 cl.5
- Rubber HEPR, G7 quality to CEI 20-11
- LSOH thermoplastic compound filler
- Type M1 LSOH thermoplastic compound outer jacket



- LSOH thermoplastic compound outer jacket
- HEPR insulation
- Annealed copper conductor
- Green/Yellow wire
- LSOH thermoplastic compound filler



FG7OM1

### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius: UNEL 35382: 4 x outer diameter UNEL 35384: 6 x outer diameter
- Flexing temperature: -0° C to +90° C
- Static temperature: -25° C to +90° C
- Maximum short circuit temperature: +250° C
- Flame retardant: CEI 20-22 III, IEC 60332-3-24
- Insulation resistance: 100 MΩ x km



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
FG7M1(power)					
16(30/30)	1x1.5	0.7	1.4	5.8	55
14(50/30)	1x2.5	0.7	1.4	6.3	65
12(56/28)	1x4	0.7	1.4	6.7	85
10(84/28)	1x6	0.7	1.4	7.4	105
8(80/26)	1x10	0.7	1.4	8.3	155
6(128/26)	1x16	0.7	1.4	9.4	210
4(200/26)	1x25	0.9	1.4	11.1	310
2(280/26)	1x35	0.9	1.4	12.1	410
1(400/26)	1x50	1	1.4	13.9	560
2/0(356/24)	1x70	1.1	1.4	16.1	770
3/0(485/24)	1x95	1.1	1.5	18.0	990
4/0(614/24)	1x120	1.2	1.5	19.0	1250
250 MCM	1x150	1.4	1.6	22.3	1550
350 MCM	1x185	1.6	1.6	23.6	1900
450 MCM	1x240	1.7	1.7	26.4	2450
550 MCM	1x300	1.8	1.8	31.0	3000
FG7OM1(power)					
16(30/30)	2x1.5	0.7	1.8	9.6	155
14(50/30)	2x2.5	0.7	1.8	10.6	190
12(56/28)	2x4	0.7	1.8	11.4	240
10(84/28)	2x6	0.7	1.8	12.9	310
8(80/26)	2x10	0.7	1.8	14.6	460
6(128/26)	2x16	0.7	1.8	16.8	620
4(200/26)	2x25	0.9	1.8	20.3	900
2(280/26)	2x35	0.9	1.8	22.3	1200
1(400/26)	2x50	1.0	1.8	27.5	1650
2/0(356/24)	2x70	1.1	1.8	31.5	2050
3/0(485/24)	2x95	1.1	2.0	35.4	2670
4/0(614/24)	2x120	1.2	2.1	39.8	3330
250 MCM	2x150	1.4	2.2	44.1	4100
16(30/30)	3x1.5	0.7	1.8	10.6	175
14(50/30)	3x2.5	0.7	1.8	11.4	220
12(56/28)	3x4	0.7	1.8	12.5	280
10(84/28)	3x6	0.7	1.8	13.8	365
8(80/26)	3x10	0.7	1.8	16.2	550
6(128/26)	3x16	0.7	1.8	18.3	760
4(200/26)	3x25	0.9	1.8	21.8	1100
2(280/26)	3x35	0.9	1.8	24.3	1500
1(400/26)	3x50	1	1.8	27.8	2050
2/0(356/24)	3x70	1.1	1.9	32.4	2850

\* Galvanized steel armouring version (FG7OM1AM1) is available



# Addison Industrial Cables

Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
3/0(485/24)	3x95	1.1	2.0	35.6	3600
4/0(614/24)	3x120	1.2	2.1	40.0	4600
250 MCM	3x150	1.4	2.3	46.5	5600
350 MCM	3x185	1.6	2.4	51.2	6900
450 MCM	3x240	1.7	2.6	58.4	9150
550 MCM	3x300	1.8	2.8	64.0	11000
16(30/30)	4x1.5	0.7	1.8	11.3	200
14(50/30)	4x2.5	0.7	1.8	12.3	260
12(56/28)	4x4	0.7	1.8	13.5	340
10(84/28)	4x6	0.7	1.8	15.1	440
8(80/26)	4x10	0.7	1.8	17.6	670
6(128/26)	4x16	0.7	1.8	20.0	950
4(200/26)	4x25	0.9	1.8	23.9	1400
2(280/26)	3x35+25	0.9	1.8	29.2	1700
1(400/26)	3x50+25	1	1.8	32.4	2300
2/0(356/24)	3x70+35	1.1	1.9	37.0	3100
3/0(485/24)	3x95+50	1.1	2.1	42.0	4050
4/0(614/24)	3x120+70	1.2	2.2	46.9	5250
300MCM	3x150+95	1.4	2.4	52.5	6500
350MCM	3x185+95	1.6	2.5	57.3	7800
500MCM	3x240+150	1.7	2.7	65.5	10500
16(30/30)	5x1.5	0.7	1.8	11.7	250
14(50/30)	5x2.5	0.7	1.8	13.3	320
12(56/28)	5x4	0.7	1.8	14.6	410
10(84/28)	5x6	0.7	1.8	16.3	540
8(80/26)	5x10	0.7	1.8	19.2	800
6(128/26)	5x16	0.7	1.8	21.9	1150
4(200/26)	5x25	0.9	1.8	26.5	1700
2(280/26)	5x35	0.9	1.8	29.8	2250
1(400/26)	5x50	1.0	2.0	34.5	3200
FG7OM1(control)					
16(30/30)	7x1.5	0.7	1.8	12.6	275
16(30/30)	10x1.5	0.7	1.8	15.0	365
16(30/30)	12x1.5	0.7	1.8	16.2	410
16(30/30)	16x1.5	0.7	1.8	17.6	510
16(30/30)	19x1.5	0.7	1.8	18.6	580
16(30/30)	24x1.5	0.7	1.8	21.6	732
14(50/30)	7x2.5	0.7	1.8	14.1	340
14(50/30)	10x2.5	0.7	1.8	17.6	528
14(50/30)	12x2.5	0.7	1.8	18.0	569
14(50/30)	16x2.5	0.7	1.8	20.0	701
14(50/30)	19x2.5	0.7	1.8	20.7	793
14(50/30)	24x2.5	0.7	1.8	24.0	1100

\* Galvanized steel armouring version (FG7OM1AM1) is available



### FTG10 (O)M1

#### Application and Description

These cables are for all those safety systems which, of necessity, must continue to operate even when a fire is in progress. In particular, suitable for smoke detection systems, fire-extinguishing systems, power supply to escalator and automatic doors, power supply to emergency lighting, alarm systems, ventilation plants, etc. Indoor and outdoor fixed laying on wall and racks.

#### Standard and Approval

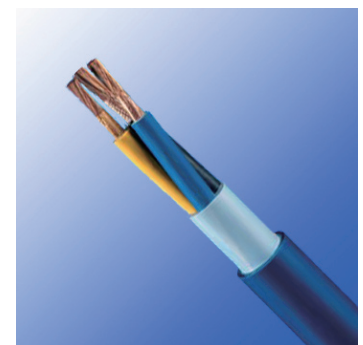
EN 50200, CEI 20-11, CEI 20-22 III, CEI 20-29, CEI 20-35, CEI 20-36, CEI 20-37, CEI 20-45, UNEL 00722

#### Cable Construction

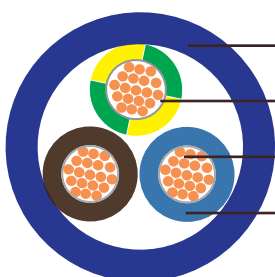
- Flexible bare copper conductor to CEI 20-29 cl.5
- Glass/mica tape
- G10 quality thermoplastic rubber insulation to CEI 20-11
- Type M1 thermoplastic LSOH compound outer jacket

#### Technical Characteristics

- Working voltage: 600/1000 V
- Test voltage: 4000 V
- Minimum bending radius: 14 x Ø
- Flexing temperature: -5° C to +90° C
- Static temperature: -25° C to +90° C
- Maximum short circuit temperature: +250° C
- Flame retardant: CEI 20-22 III - IEC 60332-3-24
- Fire resistant: CEI 20-36 - IEC60331
- Insulation resistance: 10 MΩ x km



FTG10(O)M1



- Thermoplastic LSOH compound outer jacket
- Green/Yellow wire
- Bare copper conductor with mica tape
- Thermoplastic rubber insulation



### Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
Single core					
16(30/30)	1 x 1.5	1.0	1.4	7.6	80
14(50/30)	1 x 2.5	1.0	1.4	8.0	90
12(56/28)	1 x 4.0	1.0	1.4	8.6	110
10(84/28)	1 x 6.0	1.0	1.4	9.1	130
8(80/26)	1 x 10.0	1.0	1.4	10.5	180
6(128/26)	1 x 16.0	1.0	1.4	11.7	250
4(200/26)	1 x 25.0	1.2	1.4	13.0	350
2(280/26)	1 x 35.0	1.2	1.6	14.2	460
1(400/26)	1 x 50.0	1.4	1.6	16.2	620
2/0(356/24)	1 x 70.0	1.4	1.8	17.9	820
3/0(485/24)	1 x 95.0	1.6	2.0	19.6	1100
4/0(614/24)	1 x 120.0	1.6	2.0	21.4	1350
300MCM	1 x 150.0	1.8	2.0	23.3	1630
350MCM	1 x 185.0	2.0	2.0	26.0	1980
500MCM	1 x 240.0	2.4	2.0	29.4	2550
Two cores					
16(30/30)	2 x 1.5	1.0	1.8	13.4	230
14(50/30)	2 x 2.5	1.0	1.8	14.4	270
12(56/28)	2 x 4.0	1.0	1.8	15.5	330
10(84/28)	2 x 6.0	1.0	1.8	16.6	400
8(80/26)	2 x 10.0	1.0	1.8	19.0	560
6(128/26)	2 x 16.0	1.0	1.8	21.2	750
4(200/26)	2 x 25.0	1.2	2.0	23.9	1020
2(280/26)	2 x 35.0	1.2	2.0	26.2	1300
1(400/26)	2 x 50.0	1.4	2.0	30.1	1750
Three cores(including ground core )					
16(30/30)	3 x 1.5	1.0	1.8	14.2	260
14(50/30)	3 x 2.5	1.0	1.8	15.1	320
12(56/28)	3 x 4.0	1.0	1.8	16.4	390
10(84/28)	3 x 6.0	1.0	1.8	17.5	470
8(80/26)	3 x 10.0	1.0	1.8	20.0	670
6(128/26)	3 x 16.0	1.0	1.8	22.6	910
4(200/26)	3 x 25.0	1.2	2.0	25.4	1250
2(280/26)	3 x 35.0	1.2	2.0	27.8	1640
1(400/26)	3 x 50.0	1.4	2.0	32.2	2210





## Italian Standard

AWG	No. of Cores x Nominal Cross Sectional Area # x mm <sup>2</sup>	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/km
Four cores(including ground core )					
16(30/30)	4 x 1.5	1.0	1.8	15.2	300
14(50/30)	4 x 2.5	1.0	1.8	16.4	370
12(56/28)	4 x 4.0	1.0	1.8	17.9	460
10(84/28)	4 x 6.0	1.0	1.8	18.7	560
8(80/26)	4 x 10.0	1.0	2.0	21.9	810
6(128/26)	4 x 16.0	1.0	2.0	24.7	1100
4(200/26)	4 x 25.0	1.2	2.0	27.9	1530
2(280/26)	3 x 35.0+ 1 x 25	1.2	2.0	30.0	1900
1(400/26)	3 x 50.0+ 1 x 25	1.4	2.0	33.7	2440
Five cores(including ground core )					
16(30/30)	5 x 1.5	1.0		16.5	350
14(50/30)	5 x 2.5	1.0	1.8	17.9	430
12(56/28)	5 x 4.0	1.0	1.8	19.3	540
10(84/28)	5 x 6.0	1.0	1.8	20.0	670
8(80/26)	5 x 10.0	1.0	2.0	24.0	990
6(128/26)	5 x 16.0	1.0	2.0	27.1	1350
4(200/26)	5 x 25.0	1.2	2.0	30.7	1870
2(280/26)	5 x 35.0	1.2	2.2	34.0	2480
1(400/26)	5 x 50.0	1.4	2.2	39.7	3410
16(30/30)	7 x 1.5	1.0	1.8	17.9	420
16(30/30)	10 x 1.5	1.0	2.0	21.8	560
16(30/30)	12 x 1.5	1.0	2.0	22.6	630
16(30/30)	16 x 1.5	1.0	2.0	25.4	790
16(30/30)	19 x 1.5	1.0	2.0	26.2	890
14(50/30)	24 x 2.5	1.0	2.0	30.2	1170
14(50/30)	7 x 2.5	1.0	1.8	19.0	520
14(50/30)	10 x 2.5	1.0	2.0	23.7	700
14(50/30)	12 x 2.5	1.0	2.0	24.4	800
14(50/30)	16 x 2.5	1.0	2.0	27.1	1000
14(50/30)	19 x 2.5	1.0	2.0	28.5	1130
14(50/30)	24 x 2.5	1.0	2.2	33.1	1510



## Product Nomenclature

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### Relationship of Cable to Standards

- H Cable conforming with harmonized standards
- A Recognized National Type of cable listed in the relevant Supplement to harmonized standards

### Symbol Value, Uo/U

- 01 100/100V; (<300/300V)
- 03 300/300V
- 05 300/500V
- 07 450/750V

### Material

- B Ethylene-propylene rubber
- G Ethylene-vinyl-acetate
- J Glass-fiber braid
- N Polychloroprene (or equivalent material)
- N2 Special polychloroprene compound for covering of welding cables according to HD 22.6
- N4 Chlorosulfonated polyethylene or chlorinated polyethylene
- N8 Special water resistant polychloroprene compound
- Q Polyurethane
- Q4 Polyamide
- R Ordinary ethylene propylene rubber or equivalent synthetic elastomer for a continuous operating temperature of 60°C
- S Silicone rubber
- T Textile braid, impregnated or not, on assembled cores
- T6 Textile braid, impregnated or not, on individual cores of a multi-core cable
- V Ordinary PVC
- V2 PVC compound for a continuous operating temperature of 90°C
- V3 PVC compound for cables installed at low temperature
- V4 Cross-linked PVC
- V5 Special oil resistant PVC compound
- Z Polyolefin-based cross-linked compound having low level of emission of corrosive gases and which is suitable for use in cables which, when burned, have low emission of smoke
- Z1 Polyolefin-based thermoplastic compound having low level of emission of corrosive gases and which is suitable for use in cables which, when burned, have low emission of smoke



## Italian Standard

### Sheath, concentric conductors and screens

- C Concentric copper conductor
- C4 Copper screen as braid over the assembled cores

### Sheath, concentric conductors and screens

- D Strain-bearing element consisting of one or more textile components, placed at the centre of a round cable or tributed inside a flat cable
- D5 Central heart (non strain-bearing for lift cables only)
- D9 Strain-bearing element consisting of one or more metallic components, placed at the centre of a round cable or distributed inside a flat cable

### Special construction

- No Symbol Circular construction of cable
- H Flat construction of “divisible” cables and cores, either sheathed or non-sheathed
- H2 Flat construction of “non-divisible” cables and cores
- H6 Flat cable having three or more cores, according to DH 359 or EN 50214
- H7 Cable having a double layer insulation applied by extrusion

### Conductor material

- No Symbol Copper
- A Aluminium

### Conductor form

- D Flexible conductor for use in arc welding cables to HD 22Part 6 (flexibility different from Class 5 of HD 383)
- E Highly flexible conductor for use in arc welding cables to HD22 Part 6 (flexibility different from Class 6 of HD 383)
- F Flexible conductor of a flexible cable or cord (flexibility according to Class 5 of HD 383)
- H Highly flexible conductor of a flexible cable or cord (flexibility according to Class 6 of HD 383)
- K Flexible conductor of a cable for fixed installations (unless otherwise specified, flexibility according to Class 5 of HD 383)
- R Rigid, round conductor, stranded, class 2
- U Rigid round conductor, solid, class 1
- Z Special shaped and/or material conductor



### Insulation type

E	Polyethylene
G7	HEPR rubber
G10	Cross linked elastomeric compound halogen free and low smoke t. 90°C
G20	Cross linked elastomeric compound halogen free and low smoke t. 90°C
M9	Thermoplastica compound halogen free and low smoke t. 70°C
R	PVC compound t. 70°C T1 T2 standard
R2	R2 high quality
R3	PVC compound t. 105°
R4	Polyamides compound
R7	PVC compound t. 90°C TI3
T	One or more mica glass tapes or closed glass braid

### Screens and concentric conductors

C	Concentric copper conductor
H1	Tape, flat wire or copper wire screen
H2	Copper braid screen
H3	Double copper braid screen
H4	Longitudinally and corrugated steel tape screen
H5	Longitudinally aluminium coated tape

### Non-metal sheathes

E	Polyethylene
E4	Cross linked polyethylene sheath E4M
G	Rubber sheath
K	Polychloroprene sheath
R4	Polyamide compound sheath
M1	Thermoplastica compound halogen free and low smoke t. 70°C
M2	Elastomeric compound halogen free and low smoke
M3	Elastomeric compound halogen free and low smoke
M4	Elastomeric compound halogen free and low smoke

### Cable shape

O	Round
D	Flat
X	Helically wound



## Characteristics of Insulation and Sheath Compound

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**R2** – thermoplastic compound based on PVC , electrical insulating material of cable at nominal tension U till 3 KV, for fixed laying even in wet places.

- Characteristic temperature: + 70°C
  - Maximum short circuit temperature: + 160°C
  - Pulling tension at break: 15 N/mm
  - Elongation at break: 125 %
  - Insulation constant at 20°C: > 750 MOhm x Km
  - Oxygen index: > 27 %
- 

**TI2** – thermoplastic compound based on PVC , electrical insulating material of cable at nominal tension U not over 750 V, for moving equipment.

- Characteristic temperature: + 70°C
  - Maximum short circuit temperature: + 160°C
  - Pulling tension at break: 10 N/mm
  - Elongation at break: 150 %
- 

**TI3** – thermoplastic compound based on PVC , electrical insulating material of cable at nominal tension U not over 500 V.

- Characteristic temperature: + 90°C
  - Maximum short circuit temperature: + 160°C
  - Pulling tension at break: 15 N/mm
  - Elongation at break: 150 %
- 

**E** – low density polyethylene compound, protective insulating material of cables for fixed laying even in wet places.

- Characteristic temperature: + 70°C
  - Insulation constant at 20°C: > 5 GOhm x Km
-



**E4** – XLPE compound (cross-linked polyethylene), electrical insulating material of conductors and cables at nominal tension U not over 1 KV.

- Characteristic temperature: + 85°C
- Maximum short circuit temperature: + 250°C
- Pulling tension at break: 14,5 N/mm
- Elongation at break: 200 %
- Insulation constant at 20°C: 10 GOhm x Km

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**G7** – cross-linked elastomeric compound at high-module based on synthetic rubber type HEPR, electrical insulating material of conductors and cables at low and medium tension, for fixed laying or for movable connection even in wet placed and fire retardant cables; cables insulated with this compound are fit for underground laying.

- Characteristic temperature: + 90°C
- Maximum short circuit temperature: + 250°C
- Pulling tension at break: 8,5 N/mm
- Elongation at break: 200 %
- Insulation constant at 20°C: 5 GOhm x Km

---

**G10** – low-smoke and low-toxic/corrosive gas emission fire-retardant elastomeric compound, electrical insulating material of conductors and cables at nominal tension U not over 1 KV, for fixed laying or movable connections even in wet placed, cables insulated with this compound are fit for underground laying.

- Characteristic temperature: + 90°C
- Maximum short circuit temperature: + 250°C
- Pulling tension at break: 4,2 N/mm
- Elongation at break: 150 %
- Insulation constant at 20°C: 750 MOhm x Km
- Oxygen index: 32 %

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**Intermediate sheath (bedding)** – generally in PVC, it can also be made with polyethylene or a halogen-free thermoplastic compound.

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## Italian Standard

**Rz** - thermoplastic compound based on PVC, protective sheath of cables for fixed laying even in wet placed and for fire retardant cables, it features an excellent resistance to water, acids and shows a very good behaviour against aromatic hydrocarbons, solvents, U.V rays and flame.

- Pulling tension at break: 12,5 N/mm
  - Elongation at break: 125 %
  - Oxygen index: 30 %
- 

**TM2** - thermoplastic compound based on PVC, protective sheath of cables for movable connections even in wet placed and for fire retardant cables.

- Pulling tension at break: 10 N/mm
  - Elongation at break: 150 %
  - Oxygen index: 30 %
- 

**M1** – low-smoke and low-toxic/corrosive gas emission fire-retardant thermoplastic compound.

- Pulling tension at break: 9 N/mm
  - Elongation at break: 125 %
  - Oxygen index: 35 %
- 

**M2** – low-smoke and low-toxic/corrosive gas emission fire-retardant elastomeric compound.

- Pulling tension at break: 10 N/mm
  - Elongation at break: 150 %
  - Oxygen index: 30 ÷ 35 %
- 

**SYNTETIC RUBBER** - thermoplastic rubber whose characteristics are similar to several vulcanized rubbers; main features include:

- Very good mechanical properties within working temperature range -40 / + 150°C
  - Watery fluids, oils and hydrocarbon resistance
  - Good resistance to abrasion
  - Excellent resistance to ozone and atmospheric agents
-



### Synthetic rubber sheath flame retardant:

- Hardness (SHORE A): 77 ÷ 83
  - Pulling tension at break: 7,2 ÷ 8,5 N/mm
  - Elongation at break: 400 ÷ 580 %
  - Oxygen index: 20 ÷ 25 %
- 

### Synthetic rubber sheath NSF

In compliance with ANSI/NSF 61 for use in production equipments or sanitary applications in direct contact with drinkable water

- Hardness (SHORE A): 73
  - Pulling tension at break: 8,5 N/mm
  - Elongation at break: 460 %
- 

### Synthetic rubber sheath

- Hardness (Shore A): 73
  - Pulling tension at break: 8,3 N/mm
  - Elongation at break: 375 %
-





### Conductor Resistance

Size of conductor AWG	Diameter of solid conductor mm	Ohms per Kilometer 20°C (68°F)	Cross-sectional area of stranded conductor mm <sup>2</sup>	Ohms per Kilometer 20°C (68°F)
32	0,203	563.49	0.0324	588.85
30	0.254	361.13	0.0507	376.96
28	0.320	227.39	0.0804	237.25
26	0.404	142.79	0.128	148.94
24	0.511	89.39	0.205	93.25
22	0.643	54.3	0.324	55.0
21	0.724	42.7	0.412	43.6
20	0.813	33.9	0.519	34.6
19	0.912	26.9	0.653	27.5
18	1.02	21.4	0.823	21.8
17	1.15	16.9	1.04	17.2
16	1.29	13.5	1.31	13.7
15	1.45	10.6	1.65	10.9
14	1.63	8.45	2.08	8.62
13	1.83	6.69	0.63	6.82
12	2.05	5.31	3.31	5.43
11	2.3	4.22	4.17	4.3
10	2.588	3.34	5.261	3.41
...	...	...	...	...



### Insulation Colour Code

#### Colour coded to VDE 0293-308 (HD 308 S2)

2 cores - Brown + Blue

3 cores (G) - Green-Yellow + Brown + Blue

3 cores - Brown + Black + Grey / Blue + Brown + Black






























4 cores (G) - Green-Yellow + Brown + Black + Grey / Green-Yellow + Blue + Brown + Black

4 cores - Blue + Brown + Black + Grey

5 cores (G) - Green-Yellow + Blue + Brown + Black + Grey

5 cores - Blue + Brown + Black + Grey + Black

Single core - Black, Blue, Green/Yellow, Red, Yellow, White, Violet, Brown, Grey, Orange, Pink

	With ground wire	Without ground wire
2 cores	-	 + 
3 cores	 +  + 	 +  +  / 
4 cores	 +  +  +  / 	 +  +  + 
5 cores	 +  +  +  + 	 +  +  +  + 
≥6 cores	 + black numbered	black numbered



## Fire Performance Standard

At present, in cable industry, Fire Retardant, Low Smoke Halogen Free (LSZH), Low Smoke Fume (LSF) and Fire Resistant cables are all described as Fire survival Cables.

### □ Flame Retardant

Fire retardant cables are designed for use in fire situations where the spread of flames along a cable route needs to be retarded. Due to relative low cost, fire retardant cables are widely used as fire survival cables. No matter the cables are installed in single wire or in bundles, during a fire, the flame spread will be retarded and the fire will be confined to a small area, thus reducing the fire hazard due to fire propagation.

### □ Low Smoke & Halogen Free & Fire retardant (LSZH)

LSZH cables are not only characterized by the fire retardant performance but also by the halogen free properties, thus offering low corrosivity and toxicity. During a fire, the LSZH cables will emit less smoke and acid gases which may damage the human being and expensive equipment. Compared with normal PVC cables, LSZH cables outperform by their fire retardancy, low corrosivity and low smoke emission properties, however, normal PVC cables have better mechanical and electrical properties.

### □ Low Smoke Fume (LSF)

The low halogen content and low corrosivity of low smoke fume cables lies somewhat in between their of fire retardant cables and LSZH cables. LSF cables also contain halogen but the content is much less than that of PVC cables. LSF cables are designed to reduce the spread of fire, toxic gases and smoke during fire. The LSF cables are usually manufactured from flame retardant PVC blended with HCL additive and smoke absorbent. These materials help improve the fire performance of the LSF cables.

### □ Fire Resistant (FR)

Fire resistant cables are designed to maintain circuit integrity of those vital emergency services during the fire. The individual conductors are wrapped with a layer of fire resisting mica/glass tape which prevents phase to phase and phase to earth contact even after the insulation has been burnt away. The fire resistant cables exhibit same performance even under fire with water spray or mechanical shock situation.

### □ Fire Performance Class

The main concerns for the cables in their fire survival properties are their flame spread, smoke characterization and gas toxicity. In American fire standard, the concern lies more on the first two and it differs from the European standard which concerns all these aspects. In USA, it is believed that the fire hazard is mainly due to CO toxic gas emitted and the heat release during the conversion of CO to CO<sub>2</sub> during the fire. Therefore, to control the heat release is the most important concern for reducing the fire hazard. However, in European countries, halogen content, the corrosivity of the gases, the smoke density and the toxicity of the gas are equally important factors affecting the safety and survival of human during a fire.



## IEC Standard for Flame Retardancy

The European Electrical Committee categorizes the fire performance of the cables into three classes, namely IEC 60332-1, IEC 60332-2, IEC 60332-3. IEC 60332-1 and IEC 60332-2 are used to assess the flame propagation characteristics of a single wire. IEC 60332-3 is used to assess the flame propagation characteristics of bundled cables. Comparatively speaking, IEC 60332-3 for bundled cables is more demanding than IEC 60332-1 for single wires.

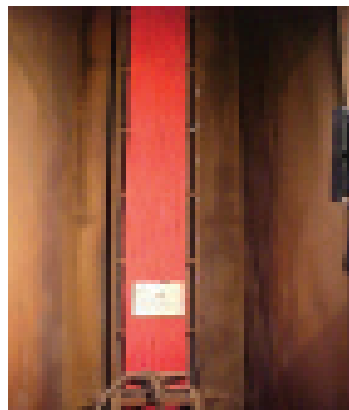
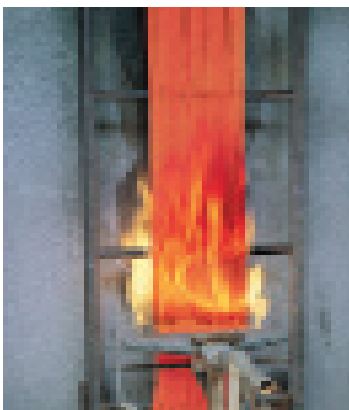
### □ IEC 60332-1/BS 4066-1/EN 50265/CEI 20-35/1 (Flame Test On Single Vertical Insulated Wires/Cables)

This test details a method of test for the assessment of the flame propagation characteristics of a single wire or cable. In this test, a 60cm cable sample is fixed vertically inside a metallic box and a 175mm long flame is applied at 45mm from a gas burner placed at 450mm from the top at the upper portion. The specimen is deemed to have passed this test, if after burning has ceased, the charred or affected position does not reach within 50mm of the lower edge of the top clamp which is equivalent to 425mm above the point of flame application. The test method is not suitable for the testing of some small wires due to the melting of the conductors during the time of application of the flame.



### □ IEC 60332-3/BS 4066-3/EN 50266 /CEI 20-22/3(Flame Test On Bunched Wires/Cables)

IEC60332-3C describes a method of type approval testing to define the ability of bunched cables to resist fire propagation. In this test, a cable specimen, consisting of number of 3.5m length of cables are fixed to a vertical ladder tray where they are applied with a flame from a gas burner for a specified times under controlled air flow. Four categories (A, B, C & D) are defined and distinguished by test duration and the volume of non metallic material of the sample under test. The cable specimen is deemed to have met the requirements of the standard if, after burning has ceased, the extent of charred or affected portion does not reach a height exceeding 2.5m above the bottom edge of the burner.





## UL Standard for Fire Retardancy

### □ **CMP (Plenum Flame Test/ Steiner Tunnel Test)**

Plenum rated cables meet the NFPA -262 standard (formerly known as UL910) which provides the most stringent requirement of all the tests. Cable samples on a horizontal tray in a tunnel type of chamber are burned at 87.9KW (300,000 BTU/Hr) for 20 minutes. To qualify for a plenum rating the cable specimen must have the flame spread of less than 5 feet or 1.5 meters with a smoke density during the test of (a) 0.5 peak and 0.15 maximum average. The CMP cables are usually installed in air ventilation ducts and air returns widely used in Canada and USA. The fire retardant properties of CMP cables are much better than that of normal LSZH cables complying with IEC 60332-1 and IEC 60332-3.

### □ **CMR (Riser Flame Test)**

Riser rated cables meets UL1666. Cable samples on a vertical shaft are burned at 154.5KW (527,500 BTU/Hr) for 30 minutes. To qualify for a riser rating, cable specimen must have the flame spread of less than 12 feet beyond the ignition point. This test does not look at the smoke density or toxicity. Riser rated cables are suitable for vertical shafts not defined as an environmental air plenum.

### □ **CM (Vertical Tray Flame Test)**

General purpose cables meet UL 1581. Cable samples on a 8 feet vertical tray are burned at 20KW (70,000 BTU/Hr) for 20 minutes. The cable specimen is deemed to pass the test if the flame spread will not extend to the upper portion and extinguish by itself. UL 1581 is similar to IEC 60332-3C except for that the number of testing samples is different. This test does not look at the smoke density or toxicity. The CMG cables are usually used in runs penetrating single floor. These cables cannot be installed in vertical pathways.

### □ **CMG (Vertical Tray Flame Test)**

These general purpose cable also meet UL1581. CM and CMG are similar and both are recognized in Canada and USA. This test does not look at the smoke density or toxicity. The CMX cables are usually used in runs penetrating single floor. The cables cannot be installed in vertical pathways.

### □ **CMX (Vertical Wire Flame Test)**

The restricted cables meet UL1581 Limited-use. The test consists of 25 feet long ventilated tunnel. The cable specimen is placed on a ladder inside the tunnel and the flame of 30,000 BTU/Hr is applied to the cable 15 seconds on and 15 seconds off five times for a total exposure to the flame of 1 minute and 15 seconds. To qualify for this test, after the test flame is removed the cable specimen can flame for not more than 60 seconds and the charred portion will not exceed by 25%. UL 1581 VW-1 is similar to IEC 60332-1 except for the difference in the time for flame applied. This test does not look at the smoke density or toxicity. The CMG cables are suitable for use in dwellings and for use in raceway. These cables cannot be installed in bundles and must be protected in metal conduit. This type of cable is chosen as the minimum requirement for commercial installations.

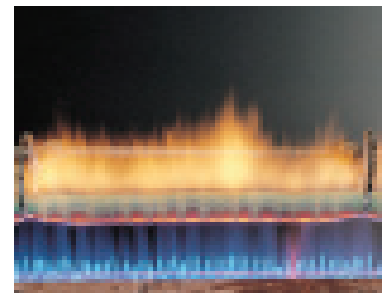


## Standard for Fire Resistance

Fire resistant cables are designed for maintaining circuit integrity during a fire. The IEC and the BS adopted two different standards, namely the IEC 60331 and BS 6387. Comparatively speaking, the fire performance requirement for BS 6387 is more demanding.

### □ IEC 60331/CEI 20-36 Fire Resistance Test

A cable sample is placed over a gas burner and connected to an electrical supply at its rated voltage. Fire is applied for a period of 3 hours. The temperature on the cable is between 750°C and 800°C. After 3 hours, the fire and the power is switched off. 12 hours later, the cable sample is reenergized and must maintain its circuit integrity.



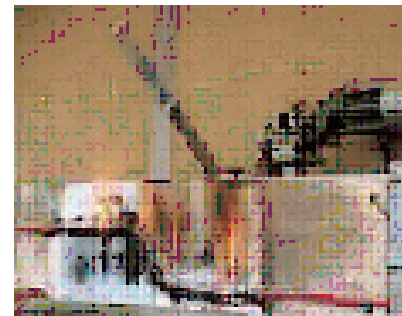
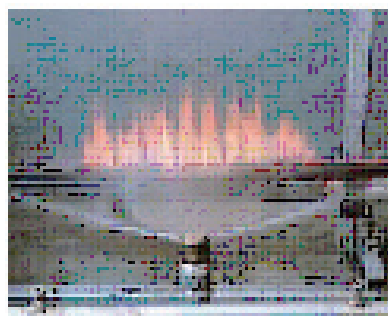
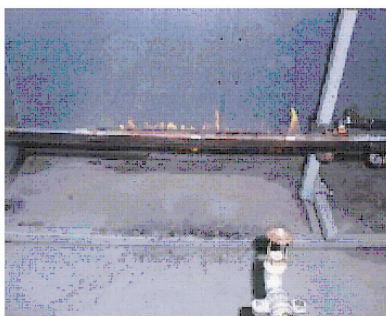
### □ BS6387 Fire Resistance Test

BS6387 specifies the performance requirements for cables required to maintain circuit integrity under fire conditions. It details the following methods to categorize the cables according to cable withstand capacities.

Resistance to fire alone - the cables is tested by gas burner flame while passing a current at its rate voltage. Four survival categories are defined Cat A (3 hours at 650°C), Cat B (3 hours at 750°C), Cat C (3 hours at 950°C), and Cat S (20 minutes at 950°C).

Resistance to fire with water spray - a new sample of cable is exposed to flame at 650°C for 15 minutes while passing a current at its rated voltage and then the spray is turned on to give exposure to both fire and water for a further 15 minutes. A single survival category W is defined if the cables surpassed the testing requirement.

Resistance to fire with mechanical shock - the final requirement is mechanical shock damage. A fresh sample is mounted on a backing panel in an S bend and is exposed to flames while the backing panel is stuck with a steel bar with the same diameter as the cables under test every 30 seconds for 15 minutes. The cables will be tested under the following temperatures: X ( 650°C/15min ), Y ( 750°C/15min ) and Z ( 950°C/15min ). The highest standard for BS 6387 is CWZ.





## Standard for Halogen & Smoke Emission, Corrosivity & Toxicity

### □ IEC 60754-1/BS6425-1/CEI 20-37/2-1 (Emission Of Halogens)

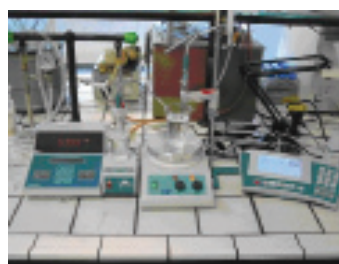
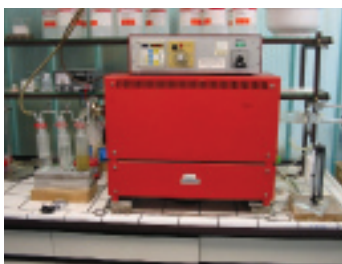
This specifies a test for determination of the amount of halogen acid gas other than the hydrofluoric acid evolved during combustion of compound based on halogenated polymers and compounds containing halogenated additives taken from cable constructions. Halogen includes Fluorine, Chlorine, Bromine, Iodine and Astatine. All these elements are toxic by their nature. In this test, when the burner is heated to 800°C, 1g sample is placed inside and the HCL is absorbed into water inside the chamber fed with air flow. The water is then tested with its acidity. If the hydrochloric acid yield is less than 5 mg/g, the cable specimen is categorized as LSZH. If the hydrochloric acid yield lies between 5mg/g to 15mg/g, the cable specimen is categorized as LSF. IEC60754-1 cannot be used for measuring the exact HCL yield if the yield is less than 5mg/g. This test cannot determine if the cable is 100% halogen free or not. To determine if the cable specimen is 100% halogen free or not, IEC60754-2 has to be employed.

### □ IEC 60754-2/CEI 20-37/2-2 (Corrosivity)

This test specifies a method for the determination of degree of acidity of gases evolved during combustion of the cable specimen by measuring its pH and conductivity. The specimen is deemed to pass this test if the pH value is not less than 4.3 when related to 1 litre of water and conductivity is less than 10us/min. When the HCL yield lies between 2mg/g and 5mg/g, a cable specimen can pass IEC 60754-1 but its pH value will likely be less than 4.3 and therefore cannot pass the IEC 60754-2 test.

### □ IEC 61034-1/ASTM E662/CEI 20-37/3 (Emission of Smoke)

This specifies a test for determination of smoke density. The 3 metre cube test measures the generation of smoke from electric cables during fire. A light beam emitted from a window is projected across the enclosure to a photo cell connected to a recorder at the opposite window. The recorder is adjusted to register from 0% for complete obscuration to 100% luminous transmissions. A 1 metre cable sample is placed in the centre of the enclosure and is applied with a fire. The minimum light transmission is recorded. The result is expressed as percentage of light transmitted. The specimen is deemed to pass this test (IEC61034-1 & 2) if the value is greater than 60% .The higher the light transmittance, the less smoke emitted during a fire.





### □ ISO4589-2/BS2863 (Oxygen Index LOI)

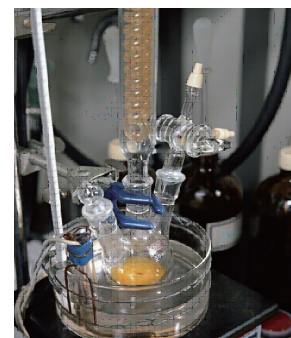
This is a test for assessing the oxygen index of the material in accordance with the test method specified in ASTM D2863-95 (Measuring the minimum oxygen concentration to support candle-like combustion of plastics). At room temperature when the oxygen content in the air exceeds the oxygen index, the material will burn by itself automatically. The higher the oxygen index, the more retardant the cable will be. For example, if the oxygen index of a material is 21%, it means that the material will burn by itself even at room temperature because at room temperature the normal oxygen content is 21%. In general, the oxygen index of a LSZH cables ranges from 33% to 42%.

### □ ISO4589-3/BS2782.1 (Temperature Index TI)

This is a test for assessing the performance of a material when it is tested in accordance with BS2782 Part 1 Method 143A and 143B. The oxygen index of a material will drop when the temperature rises. When the temperature rises and the oxygen index drops to 21%, the material will burn automatically. This temperature is defined as temperature index. For example, the temperature index of coal is 50%. When the temperature climbs to 150°C, its oxygen index drops to 21% and the coal will burn by itself automatically. The temperature index of the coal will then be defined as 150°C. In general, the temperature index of LSZH cables ranges from 250°C to 300°C.

### □ ES713 (Toxicity Index)

This is a test defined by Naval Engineering Standard which is directed at the analysis of a specified set of gaseous species which are commonly present in the combustion products of materials used in military application and which may cause lethality at the time of a fire. In this test a 1g cable specimen is completely burnt inside a sealed chamber of volume 0.7-1m<sup>3</sup> using a burner fed with air and gas to give a non-luminous flame. The resulting chamber atmosphere is quantitatively analysed for a specified set of gases. For each gas, the measured concentration ( $C_i$ ) is scaled up for 100g and the concentration is recalculated as though the combustion products is diffused into a volume of exactly 1m<sup>3</sup>. The resulting concentration ( $C_8$ ) is expressed as the ratio of critical factor ( $C_f$ ) which is equal to the concentration of this gas considered fatal to human for 30 minutes exposure. The ratio  $C_8/C_f$  are summed for all gases detected to give the toxicity index. The higher the toxicity index, the more toxic the cable materials are. In general, the toxicity index of LSZH materials are less than 5. LSZH cable will also emit toxic CO and if the cable materials contains P, N and S, the toxic gases generated will even be greater. Thus LSZH cables cannot be categorized as toxic free. CM, CMR and CMP cables in general contains halogen elements which are essential for passing the strict fire retardancy testing. For example, CMP cables are made from FEP which contains Fluorine and are much more toxic than normal LSZH cables.







## **Caledonian Cables Ltd**

Merchant Ind. Centre  
Mill-Lane, Laughton, Lewes, Sussex, BN8 6AJ  
England  
United Kingdom  
Tel: 44- 207- 4195087  
Fax: 44- 207- 8319489  
Email: [sales@caledonian-cables.com](mailto:sales@caledonian-cables.com)  
[sales@caledonian-cables.co.uk](mailto:sales@caledonian-cables.co.uk)  
[uk@addison-tech.com](mailto:uk@addison-tech.com)