

Caledonian Cables Ltd

Industrial Cables

Harmonized Code



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:***

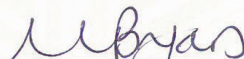
ISO 9001 : 2008

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 **6th September 1997**.....
Current Certificate **7th February 2013**.....
Certificate Expiry **7th February 2014**.....
Certificate Number **A6211**.....



On behalf of QAS International

www.qas-international.com

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.

This certificate must be returned to QAS International on reasonable request.

Issuing Office: QAS International, 20A Oxford Street, Malmesbury, Wiltshire, SN16 9AX



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Harmonized Code

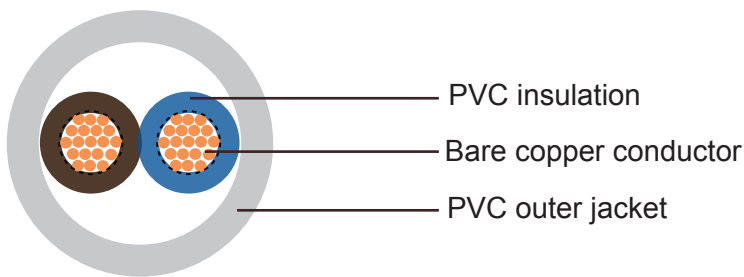
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H03VV-F/ H03VVH2-F

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 mm² are not suitable for outdoor use or use of industrial or farmer machineries. Max operating voltage in single or three phase system is U_o/U 330/330 volts. In a direct current system max operating voltage is U_o/U 495/495 volts.



H03VV-F



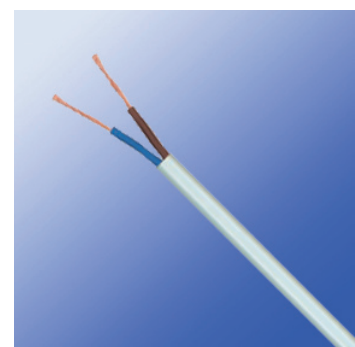
H03VV-F

Standard and Approval

<HAR>BS6500, CENELEC HD21.5, VDE 0281, CEI 20-20/5, CEI 20-35 (EN60332-1), CEI 20-52, CE low voltage directive 73/23/EEC & 93/68/EEC.ROHS compliant



H03VVH2-F



H03VVH2-F



Harmonized Code

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

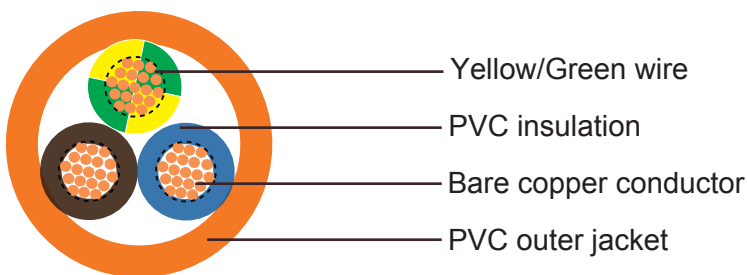
AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H03VV-F						
20(16/32)	2 x 0.50	0.5	0.6	5	9.6	38
20(16/32)	3 x 0.50	0.5	0.6	5.4	14.4	45
20(16/32)	4 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
H03VVH2-F						
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



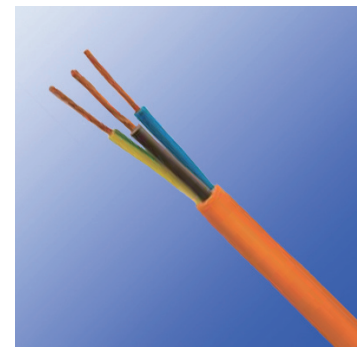
H03V2V2-F/ H03V2V2H2-F

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 adapt 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



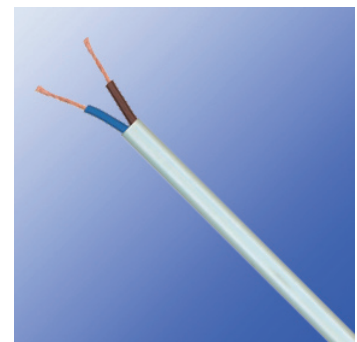
H03V2V2-F

Standard and Approval

<HAR>HD 21.12; HD 308 S2 DIN VDE 0281 part 1, part 12; DIN VDE 0293 part 308; DIN VDE 0295
CEI 20-20/12, CEI 20-35 (EN60332-1) / CEI 20-37 (EN50267), EN50265-2-1



H03V2V2H2-F



H03V2V2H2-F



Harmonized Code

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 ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H03V2V2-F						
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
H03V2V2H2-F						
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

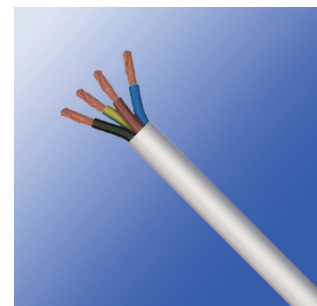
<HAR>CEI 20-20/5 / 20-35 (EN60332-1) /20-52,
0.5 - 2.5mm² to BS6500, 4.0mm² to BS7919, 6.0mm² generally to BS7919,
VDE0281, CENELEC HD21.5, CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

Cable Construction

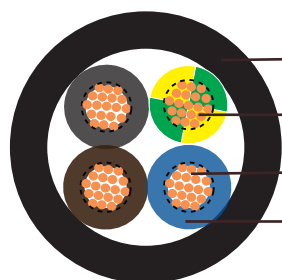
- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T12 to VDE-0281 Part 1
- Color coded to VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- PVC outer jacket TM2

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



H05VV-F



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

H05VV-F

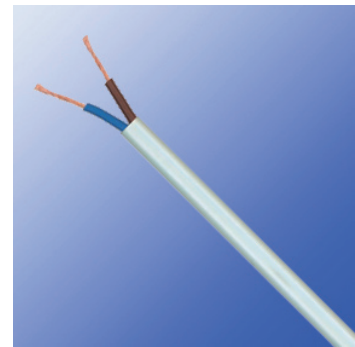


Harmonized Code

- 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 ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05VV-F						
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
10(84/28)	5 x 6.00	0.8	1.4	15.9	289	548
H05VVH2-F						
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

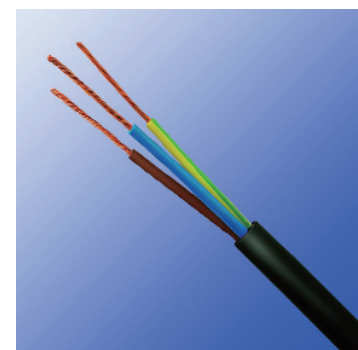
<HAR>HD 21.12; HD 308 S2, DIN VDE 0281 part 1, part 12, DIN VDE 0293 part 308, DIN VDE 0295 CEI 20-20/12, CEI 20-35 (EN60332-1) / CEI 20-37 (EN50267), CENELEC HD 21.12 S1 /EN50265-2-1

Cable Construction

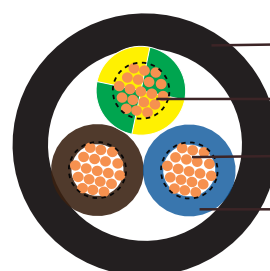
- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T13 to VDE-0281 Part 1
- Green-yellow grounding (3 conductors and above)
- Color coded to VDE-0293-308
- PVC outer jacket TM3

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



H05V2V2-F



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

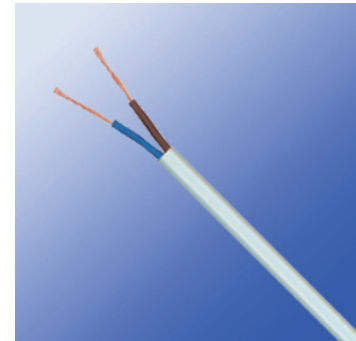
H05V2V2-F



Harmonized Code



H05V2V2H2-F



H05V2V2H2-F

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05V2V2-F						
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
H05V2V2H2-F						
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

<HAR>HD 359 S3, BS EN 50214, DIN VDE 0281 part 404, IEC 60332-1, CSA C22.2 N° 49, UL 62, UL 62

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

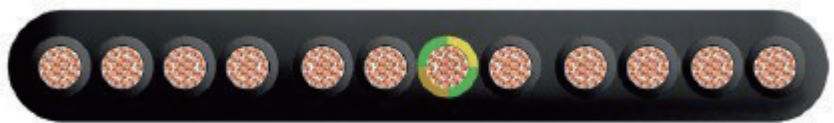
-Bending radius: 10 × cable Ø

-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





Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Conductor Diameter mm	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/Km
H05VVH6-F						
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
H07VVH6-F						
16(30/30)	4 x1.5	1.5	0.8	5.1 x 14.8	130	58
16(30/30)	5 x1.5	1.5	0.8	5.1 x 17.7	158	72
16(30/30)	7 x1.5	1.5	0.8	5.1 x 25.2	223	101
16(30/30)	8 x1.5	1.5	0.8	5.1 x 27.3	245	115
16(30/30)	10 x1.5	1.5	0.8	5.1 x 33.9	304	144
16(30/30)	12 x1.5	1.5	0.8	5.1 x 40.5	365	173
16(30/30)	18 x1.5	1.5	0.8	6.1 x 61.4	628	259
16(30/30)	24 x1.5	1.5	0.8	5.1 x 83.0	820	346
14(50/30)	4 x2.5	1.9	0.8	5.8 x 18.1	192	96
14(50/30)	5 x2.5	1.9	0.8	5.8 x 21.6	248	120
14(50/30)	7 x2.5	1.9	0.8	5.8 x 31.7	336	168
14(50/30)	8 x2.5	1.9	0.8	5.8 x 33.7	368	192
14(50/30)	10 x2.5	1.9	0.8	5.8 x 42.6	515	240
14(50/30)	12 x2.5	1.9	0.8	5.8 x 49.5	545	288
14(50/30)	24 x2.5	1.9	0.8	5.8 x 102.0	1220	480
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



H05VV-F/SJT

Application and Description

These cables are suited to be used for cooking and heating apparatus under the condition that cable does not come in direct contact with hot parts of the apparatus and no other influences or heat. The cables are suitable for fixed installation in furniture, partition walls, decoration covering and in hollow spaces of prefabricated building parts. They are not suitable for use in open air, in industries (also permitted to tailor workshops and of that kind) and in agriculture plants and for connecting commercial electrical tools.

Standard and Approval

<HAR> HD21.5 S3, VDE-0281 Part-5 & Part-2, UL Style 62 (SJT), VW-1, CSA 22.2 No 49, FT-1, CE low voltage directive 73/23/EEC & 93/68/EEC., IEC 60227-5, ROHS compliant

Cable Construction

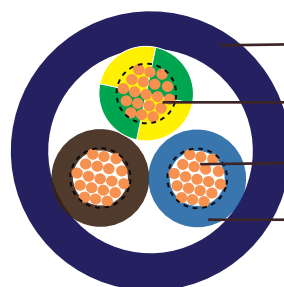
- Bare copper fine wire conductor
- Stranded to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5 and HD 383
- PVC core insulation T12 to VDE-0281 Part 1
- Color coded to VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- PVC outer jacket TM2



H05VV-F/SJT

Technical Characteristics

- Working voltage VDE: 300/500 volts
- Working Voltage UL/CSA: 300 volts
- Test voltage: 2000 volts
- Flexing bending radius: $7.5 \times \varnothing$
- Static bending radius: $4 \times \varnothing$
- Flexing temperature: -5°C to $+70^{\circ}\text{C}$
- Static temperature: -40°C to $+70^{\circ}\text{C}$
- Flame retardant: IEC 60332.1, VW-1
- Insulation resistance: $20 \text{ M}\Omega \times \text{km}$



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

H05VV-F/SJT



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
17(32/32)	2 x 1	0.6	0.8	7.2	19.2	56
17(32/32)	3 x 1	0.6	0.8	7.6	28.8	73
17(32/32)	4 x 1	0.6	0.9	8.6	38.4	86
17(32/32)	5 x 1	0.6	0.9	9.4	48	105
16(30/30)	2 x 1.5	0.7	0.8	7.6	28	82
16(30/30)	3 x 1.5	0.7	0.9	8.3	44	96
16(30/30)	4 x 1.5	0.7	1.0	9.3	58	117
16(30/30)	5 x 1.5	0.7	1.1	10.4	72	144
14(50/30)	2 x 2.5	0.8	1.0	9.2	48	118
14(50/30)	3 x 2.5	0.8	1.1	10	72	152
14(50/30)	4 x 2.5	0.8	1.1	10.9	96	192
14(50/30)	5 x 2.5	0.8	1.2	12.2	120	243
12(56/28)	2 x 4	0.8	1.1	10.6	76	195
12(56/28)	3 x 4	0.8	1.2	11.5	115	235
12(56/28)	4 x 4	0.8	1.2	12.4	154	300
12(56/28)	5 x 4	0.8	1.4	14.1	192	361



H05RN-F/H05RNH2-F

Application and Description

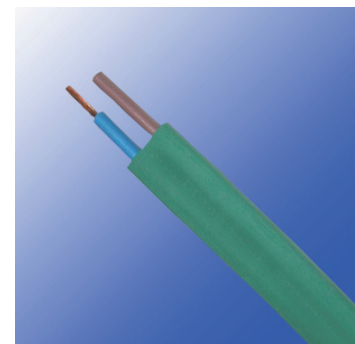
These cables are flexible, mainly recommended for use in electrical equipment under low stress in dry, damp and wet areas in indoor or outdoor environments. Commonly used for connection of electrical appliances when exposed to low mechanical strain in household, offices and for light utilities. Anywhere 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

<HAR> HD22.4 S3, VDE-0282 Part-4, CEI 20-19 p.4, CE low voltage directive 73/23/EEC & 93/68/EEC., IEC 60245-4, ROHS compliant

Cable Construction

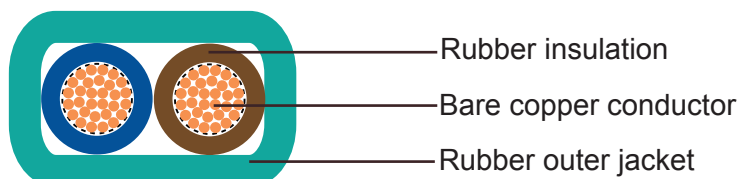
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- Color code VDE-0293-308
- Green-yellow grounding, 3 conductors and above
- Polychloroprene rubber (neoprene) jacket EM2



H05RNH2-F

Technical Characteristics

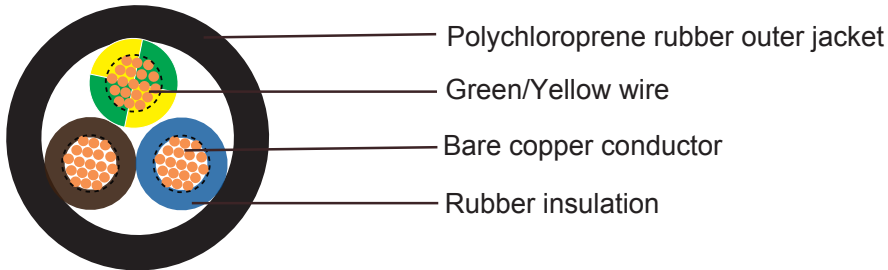
- Working voltage: 300/500 volts
- Test voltage: 2000 volts
- Flexing bending radius: $7.5 \times \varnothing$
- Fixed bending radius: $4.0 \times \varnothing$
- Temperature Range: -30°C to $+60^{\circ}\text{C}$
- Short circuit temperature: $+200^{\circ}\text{C}$
- Flame retardant: IEC 60332.1
- Insulation resistance: $20\text{ M}\Omega \times \text{km}$



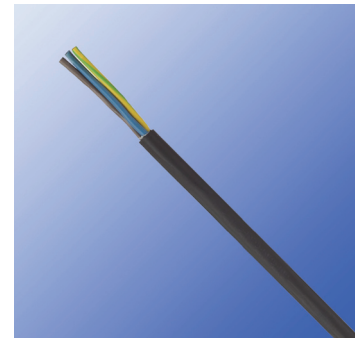
H05RNH2-F



Harmonized Code



H05RN-F



H05RN-F

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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
H05RN-F						
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
H05RNH2-F						
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

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.

Standard and Approval

<HAR> HD22.4 S3, VDE-0282 Part-4, CEI 20-19/4 / 20-35 (EN60332-1),
CE low voltage directive 73/23/EEC & 93/68/EEC., IEC 60245-4, ROHS compliant

Cable Construction

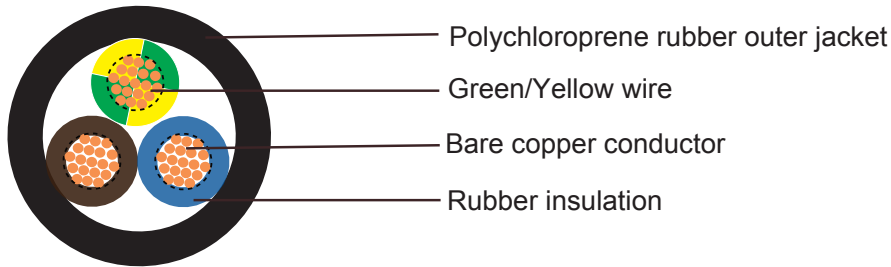
- Fine bare copper strands
 - Strands to VDE-0295 Class-5, IEC 60228 Class-5
 - Rubber core insulation EI4 to VDE-0282 Part-1
 - Color code VDE-0293-308 and HD 186
 - Green-yellow grounding, 3 conductors and above
 - Polychloroprene rubber (neoprene) jacket EM3
-

Technical Characteristics

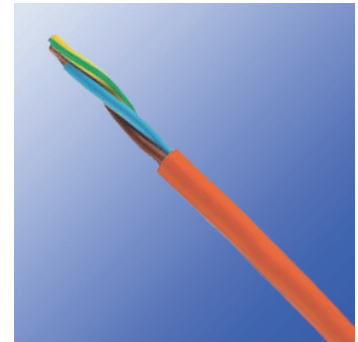
- Working voltage: 300/500 volts
 - Test voltage: 2000 volts
 - Flexing bending radius: $8 \times \varnothing$
 - Fixed bending radius: $6 \times \varnothing$
 - Temperature range: -30°C to $+60^\circ \text{C}$
 - Short circuit temperature: $+200^\circ \text{C}$
 - Flame retardant: IEC 60332.1
 - Insulation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



Harmonized Code



H05RR-F



H05RR-F

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

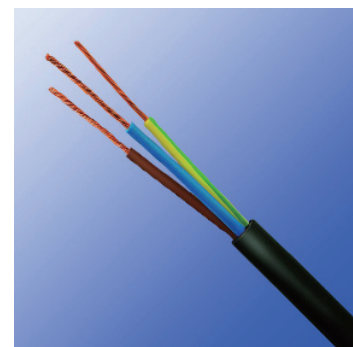
These cables are designed to provide high flexibility and have the capacity to withstand weather, oils/greases, mechanical and thermal stresses. Applications include handling equipment, mobile power supplies, worksites, stage and audio visual equipment, port areas and dams. Also suitable for fixed installations 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

<HAR> HD22.4 S3, VDE-0282 Part-4, CEI 20-19/4 / 20-35 (EN60332-1), IEC 60245-4, CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

Cable Construction

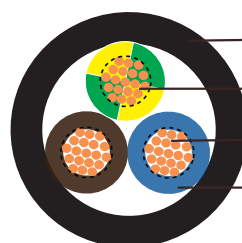
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber core insulation EI4 to VDE-0282 Part-1
- Color code VDE-0293-308 and HD 186
- Green-yellow grounding, 3 conductors and above
- Polychloroprene rubber (neoprene) jacket EM2



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



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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	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



Addison Industrial Cables

Harmonized Code

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



Harmonized Code

H07RN8-F

Application and Description

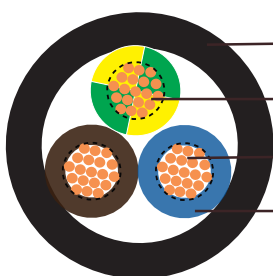
These cables particularly for use in fresh water up to 10 m depth with a maximum water temperature up to 40°C , such as the connection of submersible pumps or similar applications. Not suitable for underwater power transmission or installation in a watercourse, or where it is possible that mechanical 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

<HAR> HD22.16 S1, VDE-0282 Part-16, CEI 20-19 p.16,
CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

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



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

H07RN8-F



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 ²	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



Harmonized Code

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

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.

Standard and Approval

<HAR> CENELEC HD 22.12 S1, CEI 20-19/12, CEI 20-35 (EN 60332-1), BS6500, BS7919, ROHS compliant, VDE 0282 Part-12, IEC 60245-4, CE Low-Voltage

Cable Construction

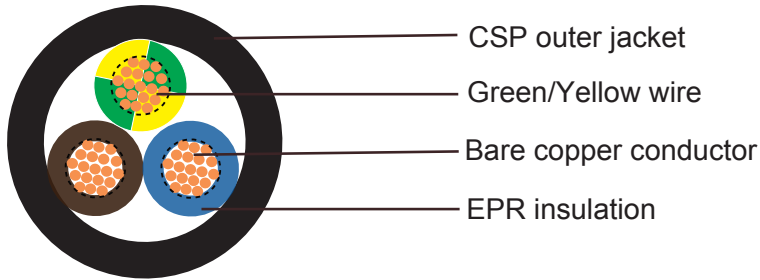
- Fine bare copper strands
 - Strands to VDE-0295 Class-5, IEC 60228 Class-5
 - EPR(Ethylene Propylene Rubber) rubber EI7 insulation
 - Color code VDE-0293-308
 - CSP(Chlorosulphonated Polyethylene) outer jacket EM7
-

Technical Characteristics

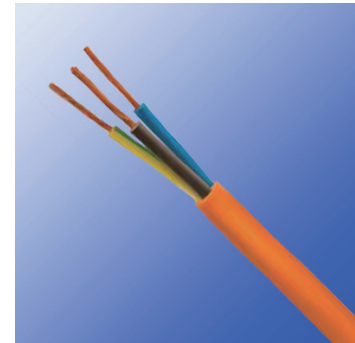
- Working voltage: 300/500 volts
 - Test voltage: 2000 volts
 - Flexing bending radius: 6.0 x Ø
 - Fixed bending radius: 4.0 x Ø
 - Temperature Range: -20° C to +90° C
 - Maximum Short Circuit Temperature: +250° C
 - Flame retardant: IEC 60332.1
 - Insulation resistance: 20 MΩ x km
-



Harmonized Code



H05BN4-F



H05BN4-F

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

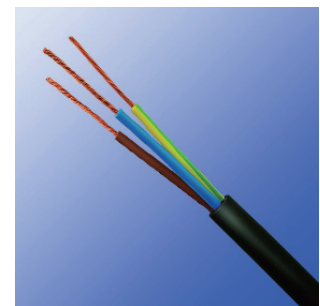
These cables are made with synthetic rubbers having an excellent temperature resistance and can be used either in dry, humid or wet places or in contact with oil or grease, in weather conditions and under medium mechanical stress, for example power supply to equipment in industrial plants, large size 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

<HAR> VDE-0282 Part-12, CENELEC HD 22.12 S1, CEI 20-19 p.12, CEI 20-35 (EN 60332-1), IEMMEQU HAR IEC 60245-4, IEC 60754-1/2, ROHS compliant

Cable Construction

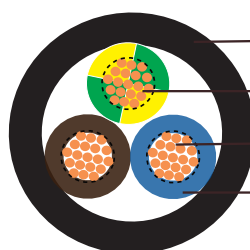
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- EPR(Ethylene Propylene Rubber) rubber EI7 insulation
- Color code VDE-0293-308
- Special polychloroprene rubber outer jacket EM7



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



Harmonized Code

- 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 ²	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 ²	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



Harmonized Code

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

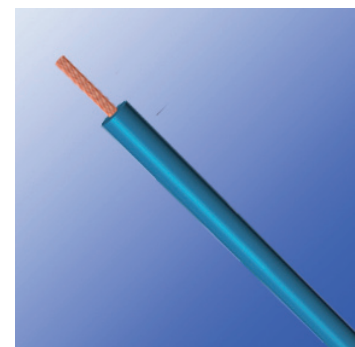
<HAR> HD 21.3 S3, VDE-0281 Part-3, CEI 20-20, CEI20-52,
CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

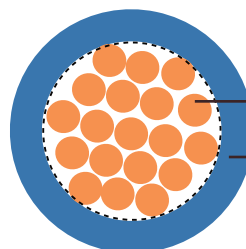
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC TI1 core insulation
- Cores to VDE-0293 colors on chart

Technical Characteristics

- Working voltage: 300/500v
- Test voltage: 2000 volts
- Flexing bending radius: 12.5 x Ø
- Static bending radius: 12.5 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -30° C to +80° C
- Flame retardant: IEC 60332.1
- Insulation resistance: 10 MΩ x km



H05V-K



Bare copper conductor

PVC insulation

Cable Parameter

H05V-K

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

<HAR> HD 21.3 S3, VDE-0281 Part-3, CEI 20-20, CEI20-52,
CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

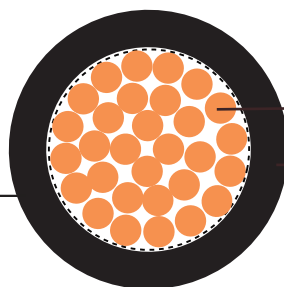
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC TI1 core insulation
- Cores to VDE-0293 colors on chart

Technical Characteristics

- Working voltage: 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



H07V-K



Bare copper conductor

PVC insulation

H07V-K



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm^2	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



H05V-K UL / H07V-K UL

- UL/CSA/HAR/MTW & UL1015 PVC

Application and Description

H05VK UL / H07V-K UL are internationally approved harmonized, UL/CSA and AWM/MTW approved PVC European flexible single-conductor wires. Can be found in appliance wiring and machine tool wiring as well as in control systems. They may also be used in pipes and flexible conduits. Recommended for the internal wiring of apparatus, switchboards and distributor boards in electronic and electrical equipment designed for international use in North American & European countries and for MRO replacement of international made equipment wire.

Standard and Approval

<HAR> HD 21.7 S2, VDE-0281 Part-3, UL-Standard and Approval 1063 MTW, UL-AWM Style 1015, CSA TEW, CSA-AWM I A/B, FT-1, CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

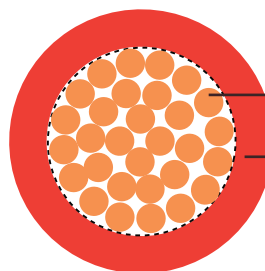
- Fine tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5, HD383 Class-5
- Special PVC TI3 core insulation
- Cores to VDE-0293 colors
- H05V-K UL (22, 20 & 18 AWG)
- H07V-K UL (16 AWG and Larger)
- X05V-K UL & X07V-K UL for non-HAR colors



H07V-K

Technical Characteristics

- Working voltage: 300/500v (H05V-K UL)
- Working voltage: 450/750v (H07V-K UL)
- Working voltage UL/CSA: 600v AC, 750v DC.
- Test voltage: 2500 volts
- Flexing/Static bending radius: 10-15 x Ø
- Temperature HAR/IEC: -40° to +70° C
- Temperature UL-AWM: -40° to +105° C



Bare copper conductor

PVC insulation

H07V-K



Harmonized Code

- Temperature UL-MTW: -40° C to +90° C
- Temperature CSA-TEW: -40° C to +105° C
- Flame retardant: IEC 60332.1, FT-1
- Insulation resistance: 20 MΩ x km

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/Km	Nominal Weight kg/ Km
H05V-K					
20(16/32)	1 x 0.5	0.6	2.5	4.9	11
18(24/32)	1 x 0.75	0.6	2.7	7.2	14
17(32/32)	1 x 1	0.6	2.9	9.6	17
H07V-K					
16(30/30)	1 x 1.5	0,7	3.1	14.4	20
14(50/30)	1 x 2.5	0,8	3.7	24.0	32
12(56/28)	1 x 4	0,8	4.4	38.0	45
10(84/28)	1 x 6	0,8	4.9	58.0	63
8(80/26)	1 x 10	1,0	6.8	96.0	120
6(128/26)	1 x 16	1,0	8.9	154.0	186
4 (200/26)	1 x 25	1,2	10.1	240	261
2 (280/26)	1 x 35	1,2	11.4	336	362
1 (400/26)	1 x 50	1,4	14.1	480	539
2/0 (356/24)	1 x 70	1,4	15.8	672	740
3/0 (485/24)	1 x 95	1,6	18.1	912	936
4/0 (614/24)	1 x 120	1,6	19.5	1152	1184



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

<HAR> HD 21.7 S2, CEI 20-20, CEI20-52, VDE-0281 Part-7,
CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

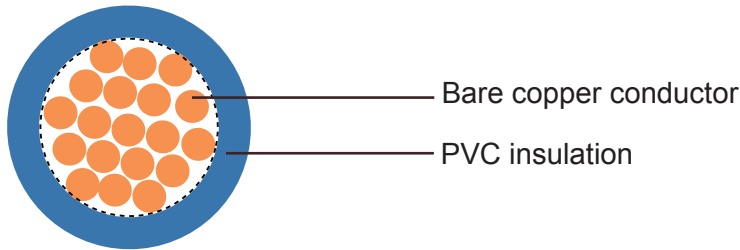
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5, BS 6360 cl. 5 and HD 383
- Special heat resistant PVC T13 core insulation to DIN VDE 0281 part 7
- Cores to VDE-0293 colors
- H05V2-K (20, 18 & 17 AWG)
- H07V2-K (16 AWG and Larger)

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



Harmonized Code



H05V2-K



H05V2-K

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



H05V2-K UL / H07V2-K UL

Application and Description

H05V2-K UL / H07V2-K UL are internationally approved harmonized, UL/CSA and AWM/MTW approved PVC European flexible single-conductor wires with increased temperature range for HAR/IEC and higher working voltage for UL-AWM. Due to these increases it is suitable for use in connections and internal wirings of frequency converters. Can be found in appliance wiring and machine tool wiring as well as in control systems. They may also be used in pipes and flexible conduits. Recommended for the internal wiring of apparatus, switchboards and distributor boards in electronic and electrical equipment designed for international use in North American & European countries and for MRO replacement of international made equipment wire.

Standard and Approval

<HAR> HD 21.7 S2, <HAR> H05V2-K / H07V2-K, VDE-0281 Part-3, UL-Standard and Approval 1063 MTW, UL-AWM Style 10269, CSA TEW, CSA-AWM 1 A/B, FT-1, CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

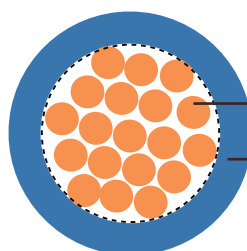
- Fine tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Special PVC core insulation
- Cores to VDE-0293 colors on chart
- H05V2-K UL (22, 20 & 18 AWG)
- H07V2-K UL (16 AWG and Larger)
- X05V2-K UL & X07V2-K UL for non-HAR colors



H05V2-K

Technical Characteristics

- Working voltage: 300/500v (H05V2-K UL)
- Working voltage: 450/750v (H07V2-K UL)
- Working voltage UL(MTW) & CSA: 600v
- Working voltage UL (AWM): 1000v
- Test voltage: 2500 volts (4000 volts UL)
- Flexing/Static bending radius: 10-15 x Ø



Bare copper conductor

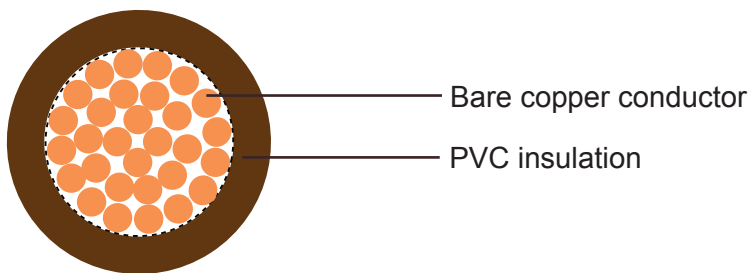
PVC insulation

H05V2-K



Harmonized Code

- Temperature HAR/IEC: -40° to +90° C
- Temperature UL-AWM: -40° to +105° C
- Temperature UL-MTW: -40° C to +90° C
- Temperature CSA-TEW: -40° C to +105° C
- Flame retardant: IEC 60332.1, FT-1, UL VW-1
- Insulation resistance: 20 MΩ x km



H07V2-K



H07V2-K

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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	2.5	4.8	11
18(24/32)	1 x 0.75	0.6	2.7	7.2	14
17(32/32)	1 x 1	0.6	2.9	9.6	16
16(30/30)	1 x 1.5	0,7	3.1	14.4	20
14(50/30)	1 x 2.5	0,8	3.7	24	32
12(56/28)	1 x 4	0,8	4.4	38	50
10(84/28)	1 x 6	0,8	4.9	58	66
8(80/26)	1 x 10	1,0	6.8	96	121
6(128/26)	1 x 16	1,0	8.9	154	211
4(200/26)	1 x 25	1,2	10.1	240	303
2(280/26)	1 x 35	1,2	11.4	336	407
1(400/26)	1 x 50	1,4	14.1	480	600
2/0(356/24)	1 x 70	1,4	15.8	672	790
3/0(485/24)	1 x 95	1,6	18.1	912	1067
4/0(614/24)	1 x 120	1,6	19.5	1115	1277



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

<HAR> HD 21.3 S3, VDE-0281 Part-3, CEI20-20/3,
CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

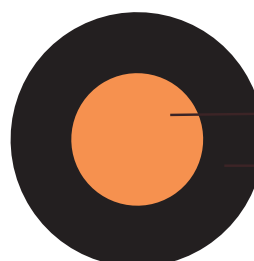
- Solid bare copper single wire
- Solid to DIN VDE 0295 cl-1 and IEC 60228 cl-1
- Special PVC T11 core insulation
- Cores to VDE-0293 colors on chart
- H05V-U (20, 18 & 17 AWG)
- H07V-U (16 AWG and Larger)



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



Harmonized Code

- 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 ²	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

<HAR> HD 21.7 S2, VDE-0281 Part-7, CEI20-20/7,
CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

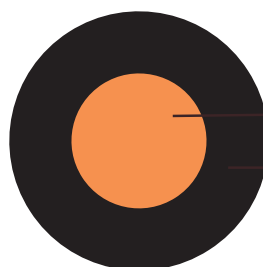
- Solid bare copper single wire
- Solid to DIN VDE 0281-3, HD 21.3 S3 and IEC 60227-3
- Special PVC TI3 ore insulation
- Cores to VDE-0293 colors on chart
- H05V-U (20, 18 & 17 AWG)
- H07V-U (16 AWG and Larger)



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



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm²	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



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

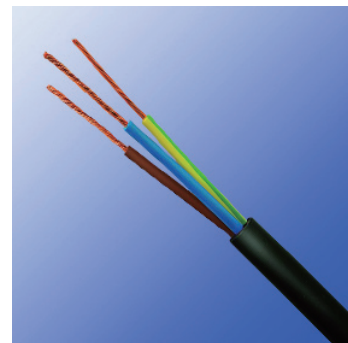
<HAR> HD22.13 S1 & A1, VDE-0282 Part-13, CEI 20-19 p.13, IEC 60245-4 , IEC 60754, EN 61034, CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

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°C to $+70^{\circ} \text{C}$
- Fixed Temperature: -40°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: $20 \text{ M}\Omega \times \text{km}$



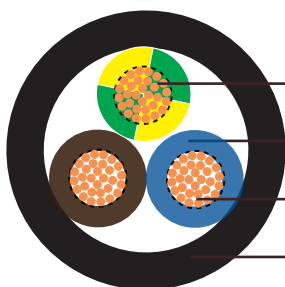
H07ZZ-F



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



Green/Yellow wire

Halogen free rubber compound insulation

Bare copper conductor

Halogen free rubber compound jacket

H07ZZ-F



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

Application and Description

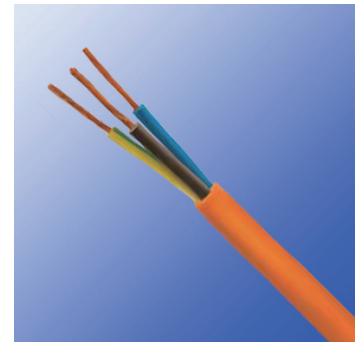
These cables may be used when halogen-free, low smoke and corrosive gas properties are required in case of fire. For moderate demands in the house, kitchen and office, for house equipment in damp rooms (for example: washing machines, dryers and refrigerators). Suitable for cooking and heating equipment, 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

<HAR> HD21.14 S1, VDE-0281 Part-14, VDE 0482-332-1-2, CEI 20-20/14, CEI 20-35 (EN60332-1), CEI 20-37 (EN50267), EN50363, CE low voltage directive 73/23/EEC & 93/68/EEC, ROHS compliant

Cable Construction

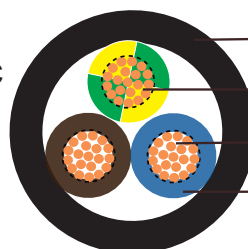
- Fine bare copper strands
- Strands to DIN VDE 0295 cl. 5, BS 6360 cl. 5, IEC 60228 cl. 5, HD 383
- Thermoplastic Tl6 core insulation
- Color code VDE-0293-308
- Green-yellow grounding (3 conductors and above)
- Halogen-free thermoplastic TM7 outer jacket
- Black (RAL 9005) or White (RAL 9003)



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: $7.5 \times \varnothing$
- Fixed bending radius: $4.0 \times \varnothing$
- Flexing Temperature: -5°C to $+70^{\circ} \text{C}$
- Fixed Temperature: -40°C to $+70^{\circ} \text{C}$
- Short circuit temperature: $+160^{\circ} \text{C}$
- Insulation resistance: $20 \text{ M}\Omega \times \text{km}$



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

H05Z1Z1-F



Harmonized Code

- 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 ²	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

<HAR> HD 21.3 S3, BS 6004, VDE-0281 Part-3, CEI 20-20/3 , CEI 20-35 (EN60332-1)
CEI 20-52, CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

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

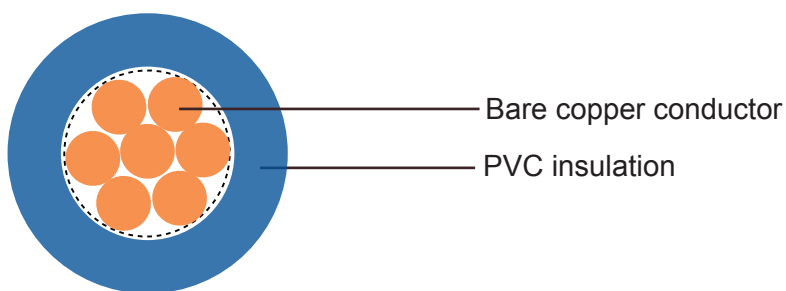
- Working voltage: 300/500 volts(H05V-R), 450/750 volts(H07V-R)
- Test voltage: 2000 volts(H05V-R), 2500 volts(H07V-R)
- Flexing bending radius: 15 x Ø
- Static bending radius: 15 x Ø
- Flexing temperature: -5° C to +70° C
- Static temperature: -30° C to +80° C
- Short circuit temperature: +160° C
-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



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



H05V-R



H05V-R



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

<HAR> HD 22.9 S2, VDE-0282 Part-9, BS 7211, IEC 60754-2, EN 50267, VDE 0482-267, CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

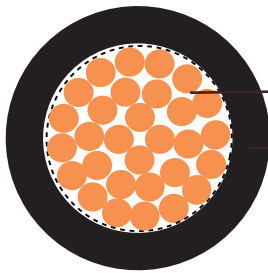
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5 BS 6360 cl. 5, HD 383
- Cross-link polyolefin E15 core insulation
- LSOH - low smoke, zero halogen

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



Harmonized Code



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 ²	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

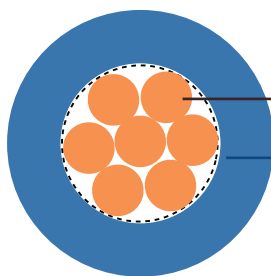
<HAR> HD 22.9 S2, VDE-0282 Part-9, BS 7211, IEC 60754-2, EN 50267, VDE 0482-267, CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

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

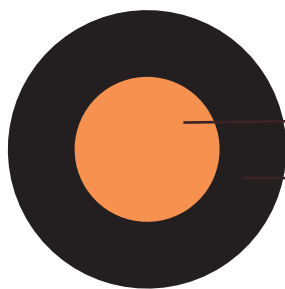
H07Z-R



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

<HAR> HD22.10 S1, VDE-0282 Part-10, CEI 20-19 p.10, CE low voltage directive 73/23/EEC & 93/68/EEC., IEC 60245-4, ROHS compliant

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 TPU- orange (RAL 2003)

Technical Characteristics

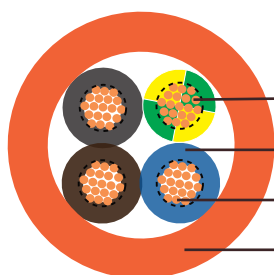
- Working voltage: 300/500 volts(H05BQ-F), 450/750 volts(H07BQ-F)
- Test voltage: 2000 volts(H05BQ-F), 2500 volts(H07BQ-F)
- Flexing bending radius: 5 x Ø
- Fixed bending radius: 3 x Ø
- Flexing Temperature: -40° C to +80° C
- Fixed Temperature: -50° C to +90° C
- Short circuit Temperature: +250° C
-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



Harmonized Code

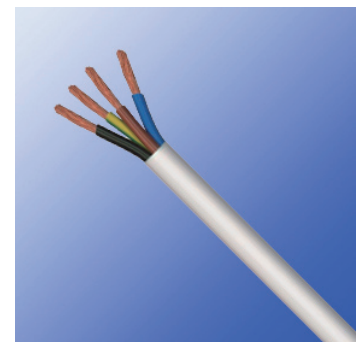
Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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	13.0 - 15.0	101	230
14(50/30)	3 x 2.5	0.9	1.1	17.0 - 20.0	173	398
14(50/30)	4 x 2.5	0.9	1.2	9.0 - 11.6	48	121
14(50/30)	5 x 2.5	0.9	1.3	9.6 - 12.4	72	164
12(56/28)	2 x 4	1.0	1.2	10.7 - 13.8	96	207
12(56/28)	3 x 4	1.0	1.2	11.9 - 15.3	120	262
12(56/28)	4 x 4	1.0	1.3	10.6 - 13.7	77	194
12(56/28)	5 x 4	1.0	1.4	11.3 - 14.5	115	224
10(84/28)	2 x 6	1.0	1.3	12.7 - 16.2	154	327
10(84/28)	3 x 6	1.0	1.4	14.1 - 17.9	192	415
10(84/28)	4 x 6	1.0	1.5	11.8 - 15.1	115	311
10(84/28)	5 x 6	1.0	1.6	12.8 - 16.3	173	310



- Green/Yellow wire
- LSOH cross-link polyolefin insulation
- Bare copper conductor
- Polyurethane/PUR 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

<HAR> HD 22.7 S2, VDE-0282 Part-7, CEI 20-19/7, CEI 20-35(EN60332-1), CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

Cable Construction

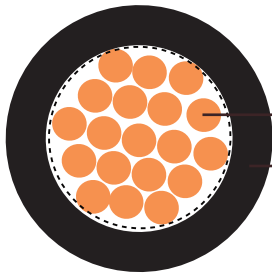
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- Rubber compound type EI3 (EVA) to DIN VDE 0282 part 7 insulation
- Cores to VDE-0293 colors

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



Harmonized Code



Bare copper conductor

Rubber compound insulation

H05G-K



H05G-K

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

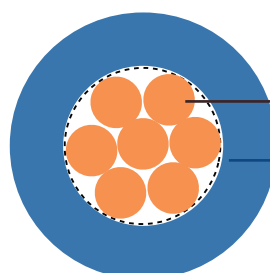
<HAR> HD 22.7 S2, VDE-0282 Part-7, CEI 20-19/7, CEI 20-35(EN60332-1), CE Low Voltage Directive 73/23/EEC and 93/68/EEC, ROHS compliant

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 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

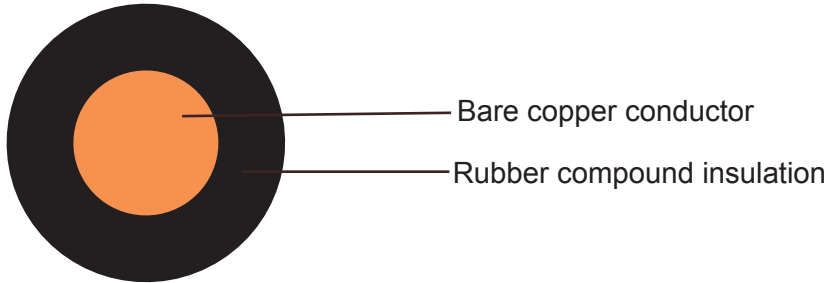


- Bare copper conductor
- Rubber compound insulation

H07G-R



Harmonized Code



H05G-U



H05G-U

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

<HAR> HD 21.13 S1, VDE-0281 Part-13, CEI 20-20/13, CEI 20-35 (EN60332-1) , CEI 20-52, UL 2464

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

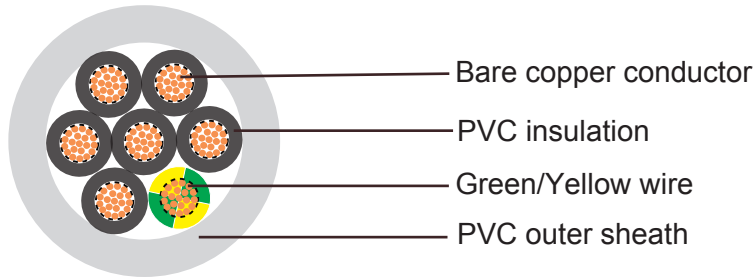
- Working voltage: 300/500v
- Test voltage: 2000volts
- Flexing bending radius: $7.5 \times \varnothing$
- Static bending radius: $4 \times \varnothing$
- Flexing temperature: -5°C to $+70^{\circ} \text{C}$
- Static temperature: -40°C to $+70^{\circ} \text{C}$
- Short circuit Temperature: $+150^{\circ}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



H05VV5-F



Harmonized Code



H05VV5-F

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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

Harmonized Code

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



Harmonized Code

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

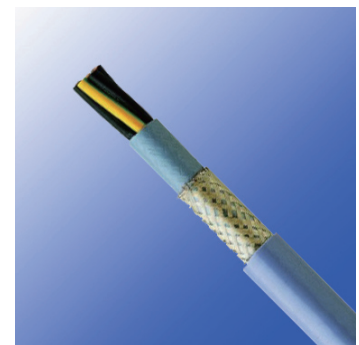
<HAR> HD 21.13 S1, VDE-0281 Part-13, CEI 20-20/13, CEI 20-35 (EN60332-1) , CEI 20-52, UL 2464

Cable Construction

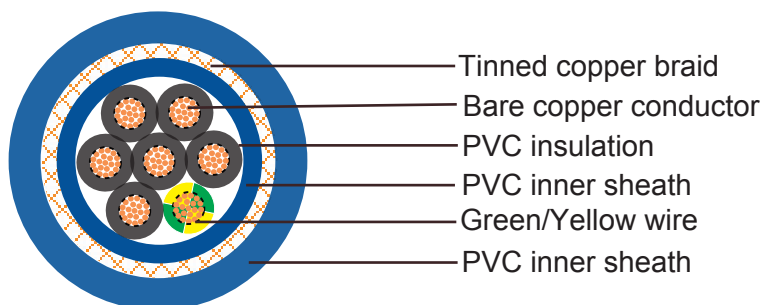
- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 Class-5
- PVC insulation T12 to DIN VDE 0281 part 1
- Green-yellow grounding (3 conductors and above)
- Cores to VDE-0293 colors
- PVC inner sheath TM2 to DIN VDE 0281 part 1
- Tinned copper braided shielding, covering approx. 85%
- 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 ²	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



Harmonized Code

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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



H05VVD3H6-F

Application and Description

These cables are generally used in crews of, elevators for people and heavy burdens, and swift conduct parts of machines. They are applicable for all control, measure and telecommunication systems and are suitable for dry and humid rooms.

Standard and Approval

<HAR> EN 50214; HD 359 S3; IEC 60332-1

Cable Construction

- Bare copper strand conductor acc. to DIN VDE 0295 class 5/6 resp. IEC 60228 class 5/6
- PVC T12 core insulation
- Color coded to VDE 0293-308, >6 wires black with white numerals with green/yellow wire
- Black PVC TM 2 sheath

Technical Characteristics

- Working voltage: 300/500 V
- Test voltage: 2000V
- Minimum bending radius: 10 × Ø
- Flexing temperature: -30 °C - +70 °C
- Static temperature: -40 °C - +70 °C
- Flame retardant: IEC 60332-1
- Insulation resistance: 350 MΩ x km

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Overall Dimension mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
18(24/32)	20 x 0.75	61.8 x 4.2	131	462
18(24/32)	24 x 0.75	72.4 x 4.2	157	546
17(32/32)	12 x 1	41.8 x 4.3	105	330
17(32/32)	14 x 1	47.8 x 4.3	122	382
17(32/32)	18 x 1	57.8 x 4.3	157	470
17(32/32)	24 x 1	74.8 x 4.3	210	617



H05V3V3H6-F/ H05V3V3D3H6-F

Application and Description

This kind of flat cables are used in crews of elevators for people and have burdens, and conducting very swift and hard parts of machines. H05V3V3H6-F type cables having no stretcher carrier elements are advised to use in elevator instalations max. swift not pass 4.0 m/s. These cables freely hanging height is max. 45m and movement limit is max 80m. For the H05V3V3D3H6-F, at the swifts between 4.0/s to 6.3m/s, it's advised to use the cables having stretcher carrier elements. H05V3V3D3H6-F type cables freely hanging height is max. 80m movement limit is max. 150m.

Standard and Approval

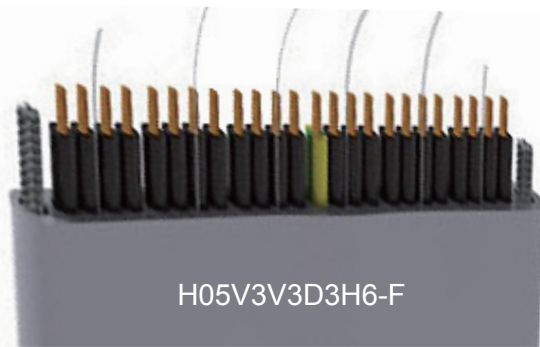
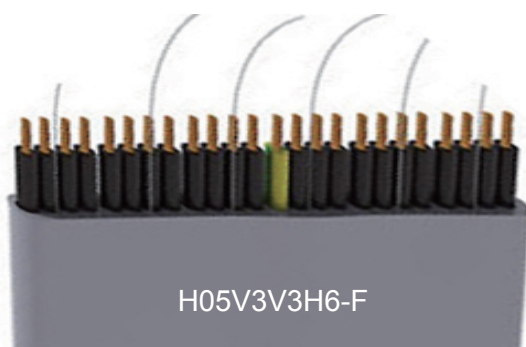
<HAR> EN 50214, HD 359 S3, IEC 60332-1, CSA C22.2 N° 49, DIN VDE 0281 part 404, UL 62

Cable Construction

- Bare copper strand conductor
- acc. to DIN VDE 0295 class 5/6 resp. IEC 60228 class 5/6
- PVC T15 core insulation
- Color coded to VDE 0293-308, >6 wires black with white numerals with green/yellow wire
- Black PVC TM 4 sheath

Technical Characteristics

- Working voltage: 300/500V
- Test voltage: 2000V
- Flexing temperature: - 35 °C - +70 °C
- Flame retardant: IEC 60332 -1
- Insulation resistance: 350 MΩ x km





Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Overall Dimension mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05V3V3H6-F				
18(24/32)	12 x 0.75	33.7 x 4.3	79	251
18(24/32)	16 x 0.75	44.5 x 4.3	105	333
18(24/32)	18 x 0.75	49.2 x 4.3	118	371
18(24/32)	20 x 0.75	55.0 x 4.3	131	415
18(24/32)	24 x 0.75	65.7 x 4.3	157	496
17(32/32)	12 x 1	35.0 x 4.4	105	285
17(32/32)	16 x 1	51.0 x 4.4	157	422
17(32/32)	20 x 1	57.0 x 4.4	175	472
17(32/32)	24 x 1	68.0 x 4.4	210	565
H05V3V3D3H6-F				
18(24/32)	20 x 0.75	61.8 x 4.2	131	462
18(24/32)	24 x 0.75	72.4 x 4.2	157	546
17(32/32)	12 x 1	41.8 x 4.3	105	330
17(32/32)	14 x 1	47.8 x 4.3	122	382
17(32/32)	18 x 1	57.8 x 4.3	157	470
17(32/32)	22 x 1	69.8 x 4.3	192	572
17(32/32)	24 x 1	74.8 x 4.3	210	617



Harmonized Code

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

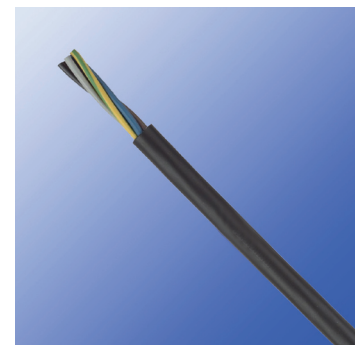
<HAR>HD 22.12, CEI 20-19/12, NF C 32-102-4

Cable Construction

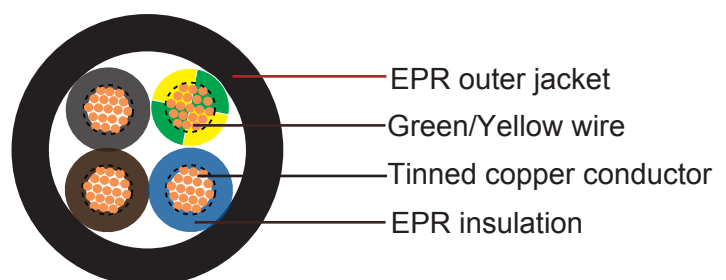
- Bare/Tinned copper strand conductor
- acc. to DIN VDE 0295 class 5. IEC 60228 class 5
- Insulation: EPR rubber type E17
- Color coded to VDE 0293-308(3 conductors and above with yellow/green wire)
- Sheath: EPR rubber type EM6
- Sheath color: normally black

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°C - + 60°C
 - H07BB-F: - 25°C - + 90°C
- Short circuit temperature: 250°C
Flame retardant: VDE 0482-332-1-2/IEC 60332-1



H05BB-F



H05BB-F



Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x <i>mm</i> ²	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>
H05BB-F					
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
H07BB-F					
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



Harmonized Code

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

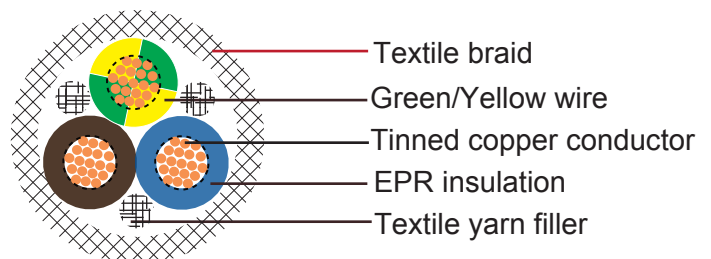
<HAR> HD22.14, ROHS compliant

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

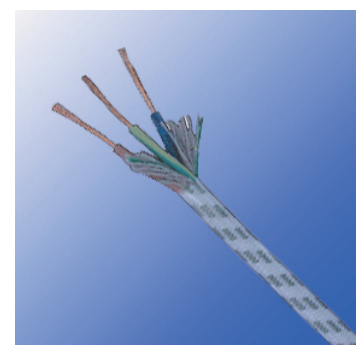
- Working voltage: 300/300 V
- Test voltage: 2000V
- Minimum bending radius: 10× cable diameter
- Temperature range: - 25°C to + 60°C
- Short circuit temperature: 200°C



Cable Parameter

H03RT-H

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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





H05SS-F/H05SST-F

Application and Description

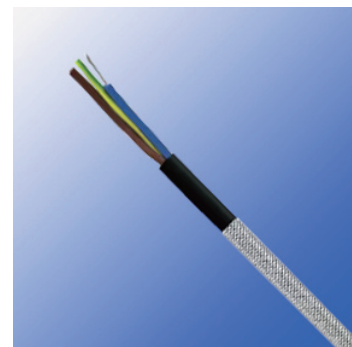
These cables are special 180 Degree C., harmonized, heavy-duty, tear-resistant black silicone multi-core cable for use in high and low temperature areas or where UV light can be damaging. The harmonization approval on these cables makes them ideal for export to or use in European countries and markets. These cables are mainly found in steel mills, foundries, glass factories, baking equipment, burners, heating and lighting systems. The cables have improved characteristics against mechanical stress and are ideal for permanent mechanically protected cable for lighting in industrial applications. The silicone jacket provides added heat-resistance, chemical, oil and acidic resistance. Not permitted for outdoor use.

Standard and Approval

<HAR> HD 22.15 S1, VDE-0282 Part 15, VDE-0250 Part-816 (N2MH2G), CE low voltage directive 72/23/EEC & 93/68/EEC, ROHS compliant

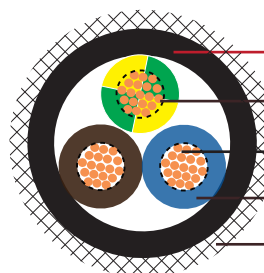
Cable Construction

- Fine tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 CI-5
- Cross-linked silicone (EI 2) core insulation
- Color code VDE-0293-308
- Cross-linked silicone (EM 9) outer jacket - black
- Overall polyester fiber braid(only for H05SST-F)



Technical Characteristics

- Working voltage: 300/500V
- Test voltage: 2000V
- Flexing bending radius: $7.5 \times \varnothing$
- Static bending radius: $4 \times \varnothing$
- Temperature range: -60°C to $+180^{\circ}\text{C}$
- Short circuit temperature: 220°C
- Flame retardant: IEC 60332 -1
- Insulation resistance: $200 \text{ M}\Omega \times \text{km}$
- Halogen-free: IEC 60754-1
- Low smoke: IEC 60754-2



Cross-linked silicone jacket

Green/Yellow wire

Tinned copper conductor

Cross-linked silicone insulation

Polyester fiber braid

H05SST-F



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Thickness of Sheath mm	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
H05SS-F						
18(24/32)	2×0.75	0.6	0.8	6.2	14.4	59.0
18(24/32)	3×0.75	0.6	0.9	6.8	21.6	71.0
18(24/32)	4×0.75	0.6	0.9	7.4	28.8	93.0
18(24/32)	5×0.75	0.6	1.0	8.9	36.0	113.0
17(32/32)	2×1.0	0.6	0.9	6.7	19.2	67.0
17(32/32)	3×1.0	0.6	0.9	7.1	29.0	86.0
17(32/32)	4×1.0	0.6	0.9	7.8	38.4	105.0
17(32/32)	5×1.0	0.6	1.0	8.9	48.0	129.0
16(30/30)	2×1.5	0.8	1.0	7.9	29.0	91.0
16(30/30)	3×1.5	0.8	1.0	8.4	43.0	110.0
16(30/30)	4×1.5	0.8	1.1	9.4	58.0	137.0
16(30/30)	5×1.5	0.8	1.1	11.0	72.0	165.0
14(50/30)	2×2.5	0.9	1.1	9.3	48.0	150.0
14(50/30)	3×2.5	0.9	1.1	9.9	72.0	170.0
14(50/30)	4×2.5	0.9	1.1	11.0	96.0	211.0
14(50/30)	5×2.5	0.9	1.1	13.3	120.0	255.0
12(56/28)	3×4.0	1.0	1.2	12.4	115.0	251.0
12(56/28)	4×4.0	1.0	1.3	13.8	154.0	330.0
10(84/28)	3×6.0	1.0	1.4	15.0	173.0	379.0
10(84/28)	4×6.0	1.0	1.5	16.6	230.0	494.0
H05SST-F						
18(24/32)	2×0.75	0.6	0.8	7.2	14.4	63.0
18(24/32)	3×0.75	0.6	0.9	7.8	21.6	75.0
18(24/32)	4×0.75	0.6	0.9	8.4	28.8	99.0
18(24/32)	5×0.75	0.6	1.0	9.9	36.0	120.0
17(32/32)	2×1.0	0.6	0.9	7.7	19.2	71.0
17(32/32)	3×1.0	0.6	0.9	8.1	29.0	91.0
17(32/32)	4×1.0	0.6	0.9	8.8	38.4	111.0
17(32/32)	5×1.0	0.6	1.0	10.4	48.0	137.0
16(30/30)	2×1.5	0.8	1.0	8.9	29.0	97.0
16(30/30)	3×1.5	0.8	1.0	9.4	43.0	117.0
16(30/30)	4×1.5	0.8	1.1	10.4	58.0	145.0
16(30/30)	5×1.5	0.8	1.1	12.0	72.0	175.0
14(50/30)	2×2.5	0.9	1.1	10.3	48.0	159.0
14(50/30)	3×2.5	0.9	1.1	10.9	72.0	180.0
14(50/30)	4×2.5	0.9	1.1	12.0	96.0	224.0
14(50/30)	5×2.5	0.9	1.1	14.3	120.0	270.0
12(56/28)	3×4.0	1.0	1.2	13.4	115.0	266.0
12(56/28)	4×4.0	1.0	1.3	14.8	154.0	350.0
10(84/28)	3×6.0	1.0	1.4	16.0	173.0	402.0
10(84/28)	4×6.0	1.0	1.5	17.6	230.0	524.0



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

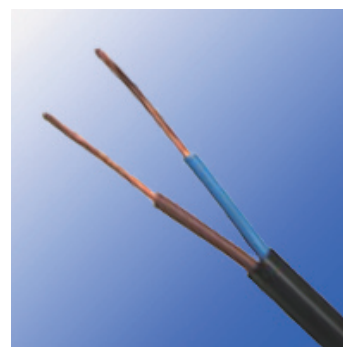
<HAR> HD 22.11 S1, VDE 0282 part 11, CEI 20-19/11, NFC 32-102-11

Cable Construction

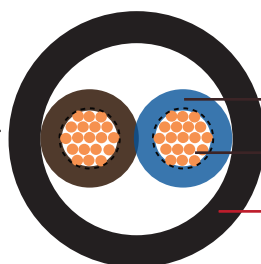
- Fine tinned copper strands
- Strands to VDE-0295 Class-5, IEC 60228 CI-5
- Cross-linked elastomere E13 insulation
- Color code VDE-0293-308
- Cross-linked elastomere EM 9 outer jacket - black

Technical Characteristics

- Working voltage: 300/500V
- Test voltage: 2000V
- Flexing bending radius: $4 \times \varnothing$
- Static bending radius: $3 \times \varnothing$
- Temperature range: -15°C to $+110^{\circ}\text{C}$
- Short circuit temperature: 200°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



Harmonized Code

Cable Parameter

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Thickness of Insulation mm	Nominal Thickness of sheath mm	Nominal Overall Diameter mm	Nominal Weight kg/Km
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



H00V-D

Application and Description

These high flexible earth conductors are used for earthing of portable equipment and short circuiting. These cables perform a protective function in the live repair of high voltage power supply in railway systems, failing current equipment, alternating current systems and in networks of transmission and distribution. Because of that these are designated as safety cables. These earthing cables offer special characteristics with low weights, high flexibility to a wide temperature range and the behavior in high temperature. The protective overall PVC jacket assure essential function for proper protection against mechanical and chemical stresses.

Standard and Approval

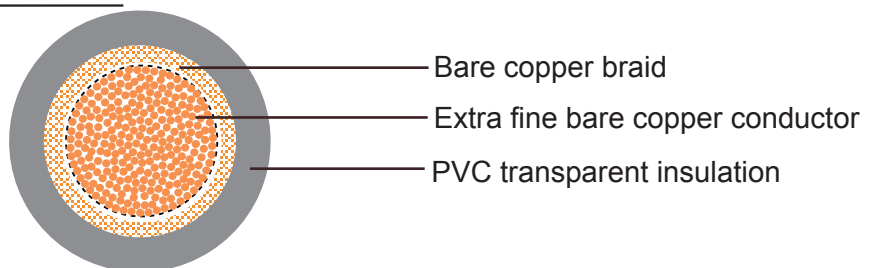
<HAR> EN61138, VDE-0283 Part-3, DIN 46438 & DIN 46440, CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

Cable Construction

- Extra fine bare copper strands
- Strands to DIN VDE 0295, BS 6360, IEC 60228 and HD 383
- Overall bare copper wire braid (for ESUY type)
- PVC transparent jacket TM2
- High stress resistance
- Spark Test 6, 4 & 2 AWG: 5000V
- Spark Test 1 & 2/0 AWG: 6000V
- Spark Test 3/0 - 500 MCM: 8000V

Technical Characteristics

- Working voltage: N/A - earthing only
- Test voltage: 2000 volts
- Minimal bending radius: $12.0 \times \varnothing$
- Temperature range: -5°C to $+70^{\circ}\text{C}$
- Flame retardant: IEC 60332.1
- Insulation resistance: $20\text{ M}\Omega \times \text{km}$



H00V-D



Harmonized Code

Cable Parameter

H00V-D (ESEU type)

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
6(4200/41)	1 x 16	9.1	194	230
4(3192/38)	1 x 25	10.5	280	335
2(4480/38)	1 x 35	12.5	415	475
1(6383/38)	1 x 50	14.2	585	670
2/0(8918/38)	1 x 70	16.8	820	905
3/0(12100/38)	1 x 95	19.8	1090	1220
4/0(15300/38)	1 x 120	21.5	1360	1505
300MCM(19152/38)	1 x 150	24	1650	1940
350MCM(23580/38)	1 x 185	27.6	2150	2390
500MCM(30600/38)	1 x 240	31	2750	3090

H00V-D (ESY type)

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	Nominal Overall Diameter mm	Nominal Copper Weight kg/km	Nominal Weight kg/km
6(525/32)	1 x 16	8.5	155	185
4(798/32)	1 x 25	10.0	240	270
2(1120/32)	1 x 35	12.5	336	390
1(1617/32)	1 x 50	14.0	480	575
2/0(2254/32)	1 x 70	17.2	672	810
3/0(3087/32)	1 x 95	19.5	912	1080
4/0(3822/32)	1 x 120	22.8	1152	1320
300MCM(4802/32)	1 x 150	25.4	1440	1680



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

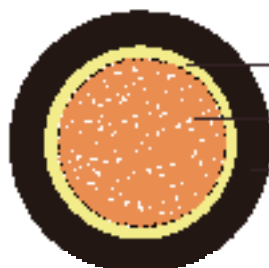
<HAR> HD22.6 S2, VDE-0282 Part-6, IEC 60332.3, IEC 60754.1, UNEL 35368, CEI 20-22 II, CEI 20-38, CE low voltage directive 73/23/EEC & 93/68/EEC., ROHS compliant

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°C to $+80^{\circ}\text{C}$
- Fixed Temperature: -40°C to $+80^{\circ}\text{C}$
- Flame retardant: IEC 60332.1



Separator

Extra fine bare copper conductor

Polychloroprene rubber jacket

H01N2-D/E



Harmonized Code

Cable Parameter

Cables with Standard and Approval flexibility

AWG	No. of Cores x Nominal Cross Sectional Area # x mm ²	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 ²	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
500MCM(5852/32)	1 x 185	1.8	20.4-25.5	1776	1511



Symbol 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

Symbol 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



Harmonized Code

Symbol Sheath, concentric conductors and screens

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

Symbol 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

Symbol 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

Symbol Conductor material

- No Symbol Copper
- A Aluminium

Symbol 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
- U Rigid round conductor, solid



Insulation Colour Code

Colour coded to VDE 0293-308/HD308/NF C 32-081

2 cores - Brown + Blue

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

3 cores - Brown + Black + Grey

3 cores* - Brown + Black + Blue


































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

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	 +  + 	 +  + 
3 cores*	 +  + 	 +  + 
4 cores	 +  +  + 	 +  +  + 
5 cores	 +  +  +  + 	 +  +  +  + 
≥6 cores	 + black numbered	black numbered

* For 1.5mm² to 2.5mm² cables



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 CO₂ 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.

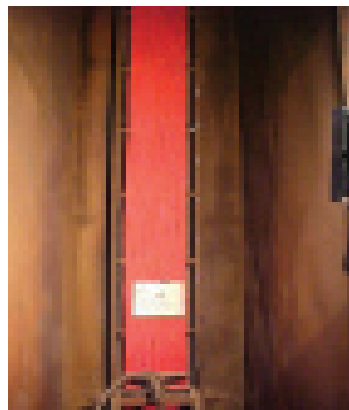
□ IEC 60332-1/BS 4066-1/EN 50265/CEI 20-35/1 (Flame Test On Single Vertical Insulated Wires/Cables)

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.

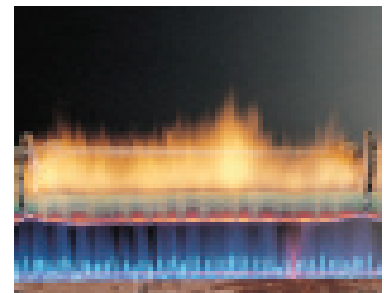


Standard for Fire Resistance

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.



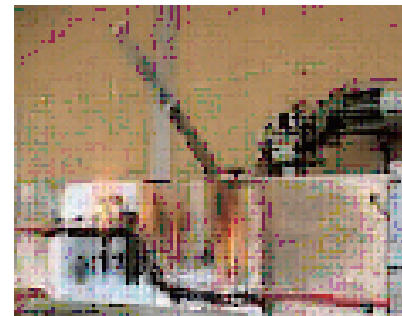
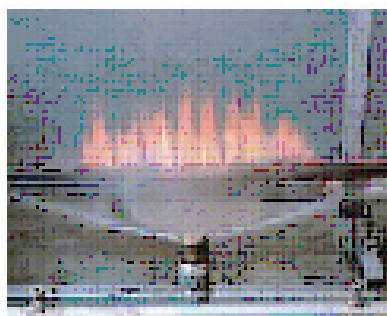
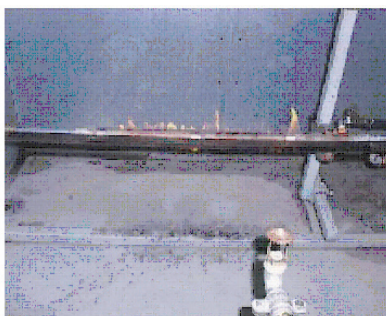
□ BS6387 Fire Resistance Test

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)

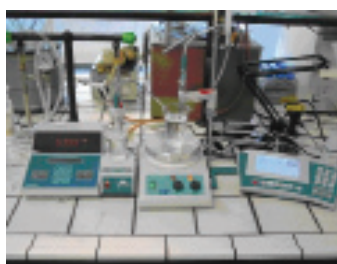
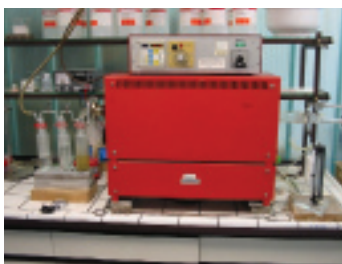
This specifies a test for determination of the amount of halogen acid gas other than the hydrofluoric acid evolved during combustion of compound based on halogenated polymers and compounds containing halogenated additives taken from cable constructions. Halogen includes Fluorine, Chlorine, Bromine, Iodine 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)

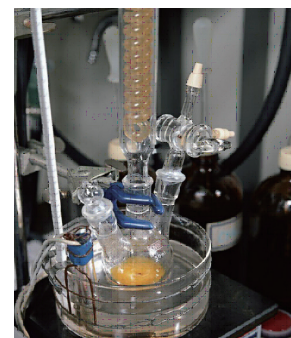
This is a test for assessing the oxygen index of the material in accordance with the test method specified in ASTM D2863-95 (Measuring the minimum oxygen concentration to support candle-like combustion of plastics). At room temperature when the oxygen content in the air exceeds the oxygen index, the 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 0.7-1m³ 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 1m³. The resulting concentration (C₈) 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 C₈/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.





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