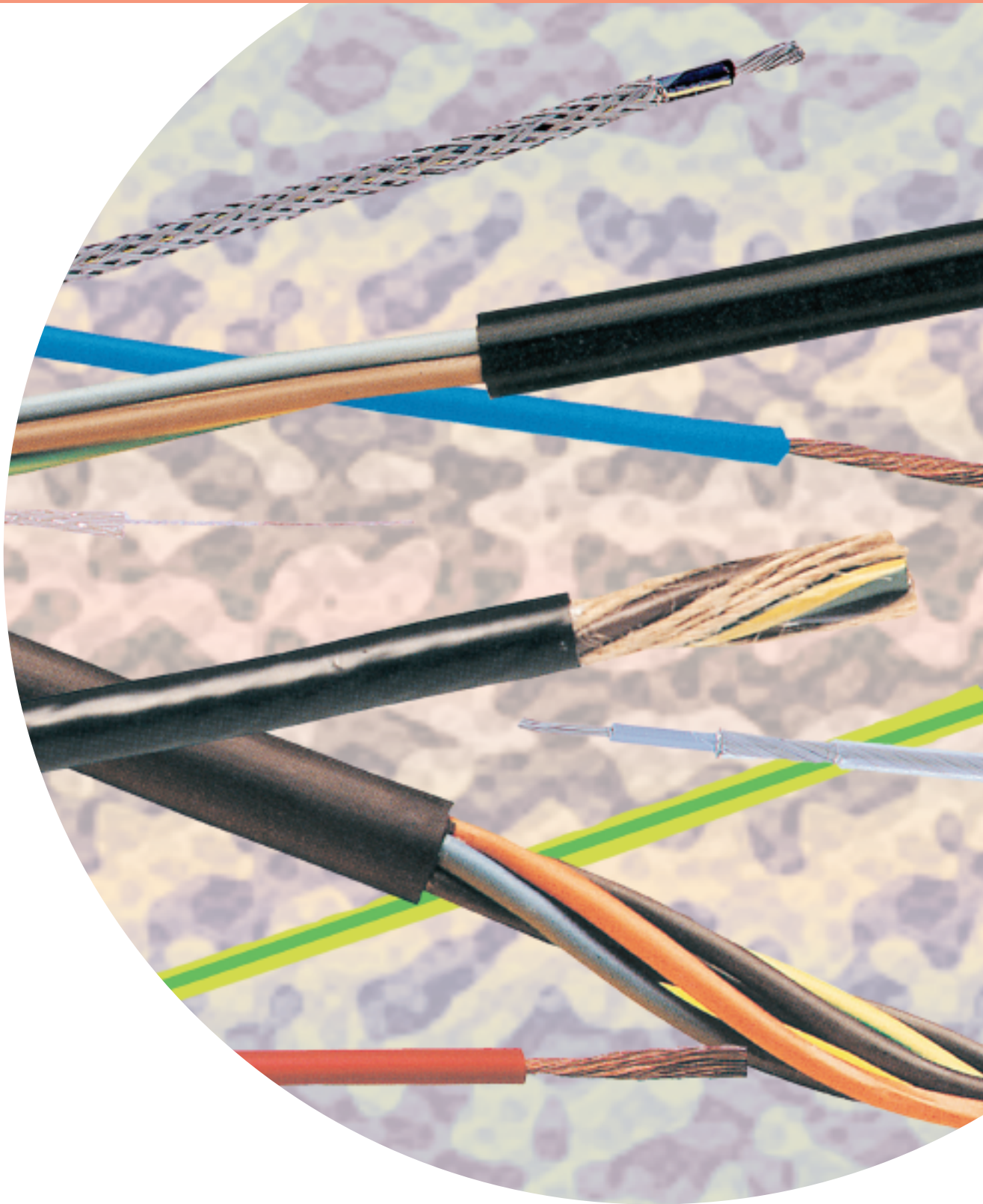


Harmonized European Hook-up Wire, Cable & Cordage



Harmonized European Hook-up Wire, Cable & Cordage

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Harmonized <HAR> Approved Conforms to CE

Lapp's Harmonized and CE conforming cables are utilized on Electronic and Electrical equipment that is intended for use in Europe.

The development and implementation of common standards for the European marketplace facilitates export trade to European countries. An international safety standards agency called CENELEC (European Committee for Electrotechnical Standardization) was formed to develop electrical standards that would be universally acceptable to all CENELEC member nations which are noted in the table below.

The electrical standards are classified as Harmonization Documents. OLFLEX®'s "HAR" cordage and hook-up wire conforms to Harmonization Documents HD-21 and HD-22:

HD-21 Specification for polyvinyl chloride insulated wire and cables.

HD-22 Specification for rubber insulated flexible cords and cables.

In order to identify a harmonized wire or cable, one of the following identification methods are required: (1) Printed

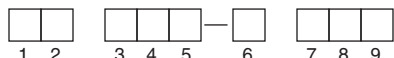
letters (HAR) on either the overall jacket or insulation or (2) Printed tape or identification threads.

Recommended applications as defined in the Harmonization Documents are as follows:

- PVC Cord (H05VV-F) - for use in offices, domestic premises, household appliances. Permitted for cooking and heating applications, provided cable does not contact hot parts and is not subjected to radiation.
(NOT SUITABLE FOR OUTDOOR USE)
- Rubber Cord (H05RR-F/H07RN-F) - for use when cable is subjected to mechanical stress in dry and damp areas. May be used as power supply cable for portable motors, appliances, domestic electric and electrical tools, agricultural and utility water equipment. May be installed on plaster or directly on structural parts of heavy machinery.

The CE symbol identifies a product that conforms to a European Directive developed by a coalition of European countries that form the European Union (EU). This compliance is necessary for exporting certain cable types to countries within the European community.

HARMONIZED WIRE CODING SYSTEM



1. BASIC TYPE

- H Harmonized Type
- A National Type

2. WORKING VOLTAGE

- 03 300/300 Volt
- 05 300/500 Volt
- 07 450/750 Volt

3. INSULATING

- V PVC
- R Rubber
- S Silicone Rubber

4. SHEATH-CLADDING MATERIAL

- V PVC
- R Rubber
- N Chloroprene Rubber
- J Glass-filament Braiding
- T Textile Braiding

5. SPECIAL FEATURES

- H Ribbon Cable, Separable
- H2 Ribbon Cable, Non-Separable

6. CONDUCTOR TYPES

- U Single Wire
- R Multi-Wire
- K Fine Wire (Permanently Installed)
- F Fine Wire (Flexible)
- H Super Fine Wire
- Y Tinsel Strand

7. NUMBER OF CONDUCTORS

8. PROTECTIVE CONDUCTOR

- X Without Protective Conductor
- G With Protective Conductor

9. CONDUCTOR CROSS-SECTIONAL

Area specified in mm²

LICENSING BODIES OF CENELEC*

AUSTRIA	Osterreichischer Verband for Elektrotechnik (OVE)
BELGIUM	Comite' Electrotechnique Belge (CEBEC)
DENMARK	Denmarks Elektriske Materiel Kontrol (DEMKO)
FINLAND	Electrical Inspectorate (SETI)
FRANCE	Union Technique de l' Electricite' (UTE)
GERMANY	Verband Deutscher Elektrotechniker (VDE) e.V, Prüfstelle
GREECE	Hellenic Organization for Standardization (ELOT)
IRELAND	National Standards Authority of Ireland (NSAI)
ITALY	Istituto Italiano del Marchio di Quanta (IMQ)
LUXEMBOURG	ITM
NETHERLANDS	N.V. tot Keuring van Elektrotechnische Materialen (KEMA)
PORTUGAL	Institute Petugues Da Qualidade (IPQ)
SPAIN	Asociacion Electrotcnica Y Electronica Espanola
SWEDEN	Svenska Elektriska Materiel Kontrollanstalten (SEMKO)
UNITED KINGDOM	B.A.S.E.C. — British Approvals Service for Electric Cables Ltd.

<HAR> Hook up Wire

H05V-K, UL Style 1007 + 1569, UL/CSA

H07V-K, UL Style 1015 + 1063, UL (MTW)/ CSA

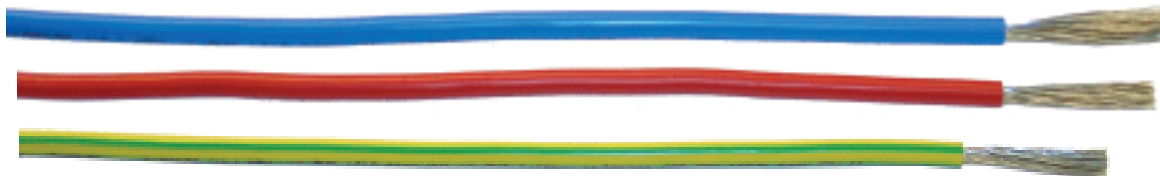


Our internationally approved Hook-up wire satisfies the requirements for both the North American and European markets. The <HAR> approval fulfills the European Harmonization Standard while the UL/CSA/CE certifications fulfill the North American Standards.

This material is recommended for use in the manufacturing of electronics and electrical equipment built for use in North American and Europe. We also offer the H07V-K with an UL(MTW) approval which allows this material to be used in the complete Machine Tool industry.

<HAR> Hook up Wire Construction:

Finely stranded tinned copper conductors; PVC insulation



Color Code:

00= Green/Yellow	05= White	10= Yellow **
01= Black	06= Gray	11= Green **
02= Blue	07= Violet	14= Dark Blue
03= Brown	08= Pink	
04= Red	09= Orange	

Cable Attributes							
	OR-02		FR-02		FL-02		MP-01

Technical Data:

	Temperature Range: HAR/IEC: -40°C to +70°C (+90°C) UL/CSA: -40°C to +105°C		Stranding: Fine wire per VDE 0295, Class 5
	This wiring material conforms to the European H07V2-K standard for +90°C PVC		Test Voltage: 3000V
	Nominal Voltage: HAR/IEC: H05V-K: 300/500V UL/CSA: 300V		Approvals: H05V-K: HAR UL: AWM Style 1007 + 1569 CSA: TEW H07V-K : HAR UL: 1063 MTW Listed, 1015 AWM CSA: TEW
	H05V-K: 450/750V H07V-K: 600V		

Conforms to CE Low Voltage Directive

Part Number	Nominal Outer Diameter inches mm	Approx. Weight lbs/mft kg/km	Part Number	Nominal Outer Diameter inches mm	Approx. Weight lbs/mft kg/km
H05V-K			H07V-K		
20 AWG/ 0.50 mm ² 41804..	.087 2.2	5.8 9	8 AWG/ 10 mm ² 41608..	.268 6.8	80.7 120
19 AWG/ 0.75 mm ² 41805..	.094 2.4	7.5 11	*41609..	.350 8.9	124.3 185
18 AWG/ 1.00 mm ² 41806..	.098 2.5	9.1 14	4 AWG/ 25 mm ² 41610..	.398 10.1	174.8 260
			2 AWG/ 35 mm ² 41611..	.449 11.4	242.0 360
			1 AWG/ 50 mm ² *41612..	.551 14.0	359.6 535
			2/0 AWG/ 70 mm ² *41613..	.622 15.8	494.0 735
			3/0 AWG/ 95 mm ² 41614..	.713 18.1	625.1 930
			4/0 AWG/ 120 mm ² 41615..	.764 19.4	779.7 1160

NOTE: To develop the LAPP USA part number - add the double digit color code to the above part number prefix.

For example: 16AWG H07V-K Green / Yellow: 4160400

* In accordance to the HAR standards as X07V-K without "HAR"- printing.

** For these colors no HAR-approval for 1.5 mm² or larger

<HAR> Hook-up Wire

LEAD FREE/ROHS

Harmonized Hook Up Wire

Types H05V-K, H07V-K

<HAR> CE

Harmonized European hook up wire is recommended for use in electronic and electrical equipment designed for export to European countries and for MRO replacement of European made equipment wire.

Standards: HD 21.1 S2, HD 21.2, HD 21.3 S2; HD 308, 361, 383, 385, 402, 405.1. VDE 0812 (H05), 028 (H07), 0295 class 5. IEC 227.1, 227.2, 227.5, 228, 304, 332-1, 540. BS 6500. DIN 57281, 57250.

<HAR> European Hook up Wire Construction:

Finely stranded bare copper conductors; PVC insulation.



Color Code:

00= Green/Yellow	05= White	10= Transparent**
01= Black	06= Gray	11= Yellow **
02= Blue	07= Violet	12= Green **
03= Brown	08= Pink	14= Dark Blue
04= Red	09= Orange	

Cable Attributes							
	OR-01		FR-02		FL-02		MP-01

Technical Data:

	Temperature Range:	-30°C to +70°C		Conductor Stranding:	Fine Wire per VDE 0295, Class 5
	Nominal Voltage:	H05V-K: 300/500V	H07V-K: 450/750V		Approvals: HAR
	Test Voltage:	2000V	2500V	Conforms to CE Low Voltage Directive	

Part Number	Nominal Outer Diameter inches mm	Approx. Weight lbs/mft kg/km	Part Number	Nominal Outer Diameter inches mm	Approx. Weight lbs/mft kg/km
H05V-K			4 AWG (200/26) 25 mm ²		
20 AWG (16/32) 0.50 mm ²			4521..1	.386 9.8	199 296
4510..1	.083 2.1	5.8 9	2 AWG (280/26) 35 mm ²		
19 AWG (24/32) 0.75 mm ²			4521..2	.433 11.0	265 394
4510..2	.094 2.4	7.5 11	1 AWG (400/26) 50 mm ²		
18 AWG (32/32) 1.00 mm ²			* 4521..3	.512 13.0	346 515
4510..3	.102 2.6	9.1 14	2/0 AWG (560/26) 70 mm ²		
H07V-K			* 4521..4	.610 15.5	466 693
16 AWG (30/30) 1.50 mm ²			3/0 AWG (485/24) 95 mm ²		
4520..1	.118 3.0	14.5 22	4521..5	.669 17.0	615 915
14 AWG (50/30) 2.50 mm ²			4/0 AWG (514/24) 120 mm ²		
4520..2	.146 3.7	21 31	4521..6	.776 19.7	772 1149
12 AWG (56/28) 4 mm ²			300 KCMIL (765/24) 150 mm ²		
4520..3	.169 4.3	31 46	4521..7	.839 21.3	975 1451
10 AWG (84/28) 6 mm ²			370 KCMIL (944/24) 185 mm ²		
4520..4	.193 4.9	45 67	4521..8	.925 23.5	1196 1780
8 AWG (80/26) 10 mm ²			480 KCMIL (1255/25) 240 mm ²		
4520..5	.256 6.5	77 115	4521..9	1.079 27.4	1575 2344
6 AWG (128/26) 16 mm ²					
* 4520..6	.315 8.0	117 174			

NOTE: To develop the Lapp Part number - Insert the double digit color code in the above part number. For example 22 AWG H05V-K Green/Yellow: 4510001

*In accordance to the HAR standards as X07V-K without "HAR"- printing.

** For these colors no HAR approval for 1.5 mm² or larger.

H05VV-F Cordage

Harmonized European Flexible Cordage-PVC



H05VV-F cordage is a flexible PVC insulated, PVC jacketed harmonized cord recommended for use in electronic and electrical equipment such as office

equipment and appliances designed for export to European countries and for MRO replacement of European made equipment.

H05VV-F Construction:

Finely stranded bare copper conductors; PVC insulation; dry lubricant; PVC jacket.



Harmonized Cord Sets with IEC60309 EPIC® Pin & Sleeve Connectors, see Page 641

Options include:

- Plug & pigtail
- Connector & pigtail
- Plug & Connector



Cable Attributes							
	OR-01		FR-01		FL-01		MP-01

Technical Data:

	Minimum Bend Radius for installation:	5 x cable diameter		Stranding:	Fine Wire
	Temperature Range:	-30°C to +70°C		Color Code:	VDE 0293-308, Chart 6, Page 674
	Nominal Voltage:	300/500V		Approvals:	HAR
	Test Voltage:	3000V	Conforms to CE Low Voltage Directive		

For conductor sizes larger than 12 AWG (4 mm²) HAR requires H07RN-F. See Page 188

Black Jacket Old Part Number	Black Jacket New Part Number	Gray Jacket Old Part Number	Gray Jacket New Part Number	Number of Conductors	Nominal Outer Diameter inches	Nominal Outer Diameter mm	Approx. Weight lbs/mft	Approx. Weight kg/km
19 AWG (24/32) 0.75 mm²								
1601103	1601103	810965	810965	2	.252	6.4	35	52
1601102	1601102	810618	810618	3	.268	6.8	42	62
1601126	16011263	810966	8109663	4	.291	7.4	50	75
8109763	81097633	810967	8109673	5	.327	8.5	65	96
18 AWG (32/32) 1.00 mm²								
1601106	1601106	810968	810968	2	.268	6.8	42	61
1601109	1601109	810616	810616	3	.283	7.2	50	74
1601119	16011193	810969	8109693	4	.307	7.8	62	92
1601129	16011293	810970	8109703	5	.346	8.8	76	113
16 AWG (30/30) 1.50 mm²								
1601114	1601114	810971	810971	2	.303	7.7	57	84
1601111	1601111	810617	810617	3	.335	8.5	71	106
1601116	16011163	810675	8106753	4	.374	9.5	90	133
1601123	16011233	810972	8109723	5	.417	10.6	112	167
14 AWG (50/30) 2.50 mm²								
1601121	1601121	810973	810973	2	.366	9.3	85	126
1601125	1601125	810974	810974	3	.394	10.0	106	158
1601135	16011353	810676	8106763	4	.433	11.0	132	196
1601112	16011123	810975	8109753	5	.484	12.3	163	242

* New part numbers due to VDE 0293 color code change, see Chart 6 (Page 674), for more information.

H05RR-F Cordage

Light Duty Rubber Jacketed
Harmonized European Flexible Cordage



H05RR-F is a flexible rubber insulated; rubber jacketed harmonized cord recommended for 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 manufactured for export to European countries or for MRO replacement of European made equipment.

H05RR-F Construction:

Finely stranded bare copper conductors, rubber insulation, dry lubricant, black synthetic rubber jacket



Cable Attributes							
	OR-01		FR-01		FL-01		MP-01

Technical Data:

	Minimum Bend Radius for installation:	15 x cable diameter		Color Code:	VDE 0293-308, Chart 6, Page 674
	Temperature Range:	-25°C to +60°C		Conductor Stranding:	Fine Wire
	Nominal Voltage:	300/500V		Approvals:	HAR
	Test Voltage:	2000V	Conforms to CE Low Voltage Directive		

Part Number	Number of Conductors	Nominal Outer Diameter		lbs/mft	Approx. Weight	
		inches	mm		kg/km	
19 AWG (24/32) 0.75 mm²						
1600203	2	.224 - .291	5.7 - 7.4	41		61
1600207	3	.244 - .319	6.2 - 8.1	50		75
18 AWG (32/32) 1.00 mm²						
1600204	2	.240 - .315	6.1 - 8.0	49		73
1600208	3	.256 - .335	6.5 - 8.5	58		86
16002113	4	.280 - .366	7.1 - 9.3	71		105
16 AWG (30/30) 1.50 mm²						
1600205	2	.299 - .386	7.6 - 9.8	77		115
1600200	3	.315 - .409	8.0 - 10.4	91		135
16002013	4	.354 - .457	9.0 - 11.6	111		165
16002023	5	.386 - .500	9.8 - 12.7	128		190
14 AWG (50/30) 2.50 mm²						
1600206	2	.354 - .457	9.0 - 11.6	108		160
1600209	3	.378 - .488	9.6 - 12.4	128		190
16002123	4	.421 - .543	10.7 - 13.8	158		235
16002133	5	.469 - .602	11.9 - 15.3	191		285

H07RN-F Cordage

Heavy Duty Neoprene Jacketed
Harmonized European Flexible Cordage



H07RN-F cordage is a flexible rubber insulated; neoprene jacketed harmonized cord recommended for equipment, which is a subject to high stress in both dry and damp environments, as well as outdoors. For use with

electronics and electrical equipment such as industrial appliances and tools manufactured for export to European countries or for MRO replacement of European made equipment.

H07RN-F Construction:

Finely stranded bare copper conductors; rubber insulation; dry lubricant; neoprene jacket.



Harmonized Cord Sets with IEC60309 EPIC® Pin & Sleeve Connectors, see Page 641

Options include:

- Plug & pigtail
- Connector & pigtail
- Plug & Connector



- Spiral construction available upon request, see Page 197.

Cable Attributes							
	OR-01		FR-01		FL-01		MP-01

Technical Data:

Minimum Bend Radius for flexible use:	15 x cable diameter	Color Code:	VDE 0293-308, Chart 6, Page 674
Temperature Range:	-25°C to +60°C	Conductor Stranding:	Fine Wire
Nominal Voltage:	450/750V	Approvals:	HAR
Test Voltage:	2500V	Conforms to CE Low Voltage Directive	

Part Number	Number of Conductors	Nominal Outer Diameter		Approx. Weight		Part Number	Number of Conductors	Nominal Outer Diameter		Approx. Weight	
		inches	mm	lbs/mft	kg/km			inches	mm	lbs/mft	kg/km
18 AWG (32/32) 1.00 mm ²						8 AWG (80/26) 10 mm ²					
1600117	3	.338 - .452	8.6 - 11.5	88	130	1600121	3	.787 - 1.004	20.0 - 25.5	595	880
16 AWG (30/30) 1.50 mm ²						16001083*	4	.846 - 1.102	21.5 - 28.0	712	1060
1600103	3	.375 - .492	9.6 - 12.5	111	165	16001093*	5	.944 - 1.200	24.0 - 30.5	880	1300
16001233*	4	.413 - .531	10.5 - 13.5	135	200	6 AWG (126/26) 16 mm ²					
16001043*	5	.452 - .590	11.5 - 15.0	162	240	1600122	3	.866 - 1.161	22.5 - 29.5	737	1090
14 AWG (50/30) 2.50 mm ²						16001103*	4	.964 - 1.259	24.5 - 32.0	910	1345
1600118	3	.452 - .571	11.5 - 14.5	159	235	16001113*	5	1.063 - 1.397	27.0 - 35.5	1137	1680
16001053*	4	.492 - .610	12.5 - 15.5	196	290	4 AWG (196/26) 25 mm ²					
16001293*	5	.531 - .669	13.5 - 17.0	230	347	16001123*	4	1.161 - 1.476	29.5 - 37.5	1350	1995
12 AWG (56/28) 4 mm ²						16001133*	5	1.279 - 1.633	32.5 - 41.5	1672	2470
1600119	3	.512 - .630	13.0 - 16.0	216	320	2 AWG (296/26) 35 mm ²					
16001063*	4	.571 - .708	14.5 - 18.0	267	395	16001143*	4	1.299 - 1.653	33.0 - 42.0	1790	2645
16001303*	5	.629 - .767	16.0 - 19.5	328	485	1 AWG (396/26) 50 mm ²					
10 AWG (84/28) 6 mm ²						16001153*	4	1.496 - 1.909	38.0 - 48.5	2460	3635
1600120	3	.571 - .787	14.5 - 20.0	335	495	2/0 AWG (360/24) 70 mm ²					
16001073*	4	.649 - .866	16.5 - 22.0	412	610	16001163*	4	1.692 - 2.145	43.0 - 54.5	3269	4830
16001313*	5	.708 - .964	18.0 - 24.5	514	760	3/0 AWG (475/24) 95 mm ²					
						16001283*	4	1.929 - 2.381	49.0 - 60.5	4278	6320

* New part numbers due to VDE 0293 color code change, see Chart 6 (Page 674), for more information.

OLFLEX® SJTO Portable Cordage

European Color Code Cordage with UL/CSA Approvals



OLFLEX® SJTO is a UL/CSA approved oil resistant, flexible power supply cord with an international color code. It is recommended for use with portable tools,

motors, sound equipment, portable lights, washing machines and other similar type products.

OLFLEX® SJTO Construction:

Stranded bare copper conductor; PVC insulation; oil resistant black PVC jacket.



Cable Attributes							
	OR-01		FR-01		FL-01		MP-01

Technical Data:

Minimum Bend Radius for flexible use: 8 x cable diameter

Temperature Range: 105°C

Nominal Voltage: 300V

Stranding: Fine Wire

Color Code: Light Blue, Brown, with a green/yellow ground

Approvals: UL Listed, CSA Certified

Conforms to CE Low Voltage Directive

Part Number	Number of Conductors	Insulation Thickness		Jacket Thickness		Nominal Outer Diameter		Approx. Weight	
		inches	mm	inches	mm	inches	mm	lbs/mft	kg/km
18 AWG (41/34) 1.00 mm ²									
811207	3	.030	.76	.030	.76	.328	8.3	64	94
16 AWG (65/34) 1.50 mm ²									
811206	3	.030	.76	.030	.76	.353	9.0	76	111
14 AWG (41/30) 2.50 mm ²									
811205	3	.030	.76	.030	.76	.380	9.7	99	145