HighTempBuild

High temperature resistant cable solutions for building services & lighting

The Quality Connection

LEONI

High Temperature Solutions

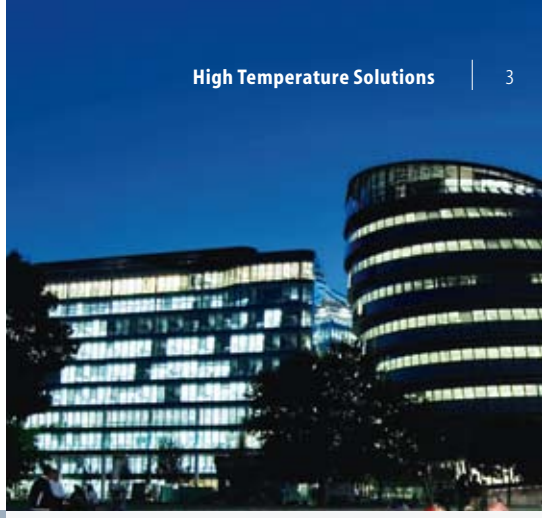
We stay cool when it gets hot.

Safety requirements for building services are increasing all the time. High temperature resistant cables that must guarantee fault-free operation even in the case of fire are frequently required in certain equipment and plant as well as at exposed locations in buildings.

Exceptional temperatures don't easily get us hot under the collar. We are after all one of the world's leading cable manufacturers with a range of products and services in the high temperature segment that stretches from compound development to cable design and production on state-of-the-art extrusion, sintering and taping lines and through to ready-to-connect, assembled cables as well as fully wired modules.

Nor does it matter to us whether the location where our products are used is roasting or decidedly frosty. LEONI's product line-up covers a temperature range from –190 °C to +1,250 °C.

We will provide you with everything from a single source, including comprehensive advice. That's something no other cable manufacturer offers.



LEONI develops and produces high temperature resistant cables among other things for:

- **lamps**
- **lamp holders**
- **heating and air conditioning systems**
- **leakage monitoring systems**

and many other applications involving extreme temperature conditions.

Worldwide innovation leader in the area of application and customer-specific high temperature cables

To meet this objective, we pooled the expertise that LEONI has had for years in this field and in 2007 also set up a new, state-of-the-art production facility, namely LEONI HighTemp Solutions GmbH in Halver, Germany. This is also where the High Temperature Solutions business unit is based.

LEONI HighTemp Solutions GmbH

- PTFE single and multi-core cables
- fluoropolymer-insulated single and multi-core cables
- PTFE cores with silicone jackets
- fluoropolymer-insulated cores with silicone jackets

SiliTherm s.r.l.

- the specialist for silicone single-core and silicone multi-core cables

Issue: April 2008
Subjects to change and error.

Standards & Materials

Standards

We make our products to customer specifications, national and international standards, and will in the future provide all the required approvals.

VDE **DIN**

◄HAR► **EN**

UL/CSA **IEC**

Germanischer Lloyd

FDA (Food and Drug Administration)

VG (German defence equipment standard)

You will find an up-to-date overview on our website **www.leoni-hts.com**

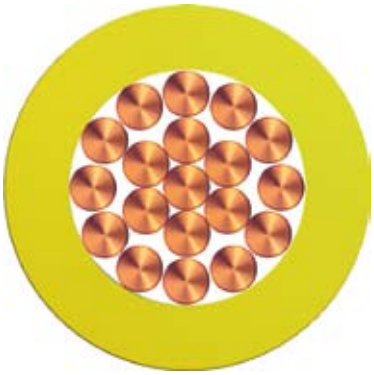
Materials development

For high temperature resistant cables we utilise jacket and insulation materials that meet the demand for a high degree of safety and durability under extreme conditions of use.

Along with thermoplastics, elastomers and thermoplastic elastomers this also includes particularly resilient fluoropolymers as well as silicone rubber. We are also familiar with processing glass fiber and mica materials.

VDE approval

CONFIGURATION



CORES

■ Configuration	0.25 – 6 mm² (Class 1/2/5)
■ Conductor	copper; bare, tinned, silver-plated, nickel-plated or pure nickel
■ Insulation material	PTFE
■ Insulation	Customised colour and marked "VDE Reg.-Nr: 8187"

SPECIFICATIONS

■ Operating voltage (U_{eff})	300/500 V
■ Test voltage (U_{eff})	3.4 kV
■ Temperature rating (20,000 h)	**–190 °C** to **+250 °C**

PTFE single-core cable (MIL-W-16878 compliant config.)

Fp…

APPLICATION

For wiring electrical appliances and lamps up to a max. permissible operating temperature of:

- 130 °C with bare copper conductor
- 180 °C with tinned copper conductor
- 200 °C with silver-plated copper conductor
- 260 °C with nickel-plated copper conductor

CONFIGURATION

- Strand: copper; silver-plated, nickel-plated in compliance with MIL-W-16878 (bare, tinned or pure nickel upon request)
- Insulation: ASTM-D 4895-compliant PTFE 5Y
- Core colour: to customer specification

TECHNICAL SPECIFICATIONS

- Rated voltage: 250 V/ 600 V/ 1000 V
- Test voltage: 2.5 kV/ 3.4 kV/ 5.0 kV
- Temperature rating: **–190 °C** up to **+260 °C**

Cross-section	Conductor construction	Outer–Ø 250 V	Outer–Ø 600 V	Outer–Ø 1000 V
AWG	mm	mm	mm	mm
28	7 x 0.127	0.635 – 0.737	0.787 – 0.991	1.041 – 1.245
26	7 x 0.160	0.737 – 0.838	0.889 – 1.092	1.143 – 1.346
26	19 x 0.102	0.737 – 0.838	0.889 – 1.092	1.143 – 1.346
24	7 x 0.203	0.864 – 0.964	1.016 – 1.219	1.270 – 1.473
24	19 x 0.127	0.864 – 0.964	1.016 – 1.219	1.270 – 1.473
22	7 x 0.254	1.016 – 1.118	1.168 – 1.372	1.422 – 1.626
22	19 x 0.160	1.016 – 1.118	1.168 – 1.372	1.422 – 1.626
20	7 x 0.320	1.219 – 1.321	1.372 – 1.575	1.626 – 1.829
20	19 x 0.203	1.219 – 1.321	1.372 – 1.575	1.626 – 1.829
18	7 x 0.404	–	1.626 – 1.880	1.880 – 2.134
18	19 x 0.254	–	1.626 – 1.880	1.880 – 2.134
16	19 x 0.287	–	1.854 – 2.210	2.108 – 2.413
14	19 x 0.361	–	2.235 – 2.591	2.489 – 2.896
12	19 x 0.455	–	2.718 – 3.073	2.972 – 3.378
10	37 x 0.404	–	3.226 – 3.581	3.480 – 3.886
8	133 x 0.287	–	–	5.055 – 5.563
6	133 x 0.361	–	–	6.426 – 6.934
4	133 x 0.450	–	–	8.865 – 9.373
2	665 x 0.254	–	–	10.033 – 10.541
1	817 x 0.254	–	–	12.065 – 12.573
0	1045 x 0.254	–	–	12.802 – 13.310
00	1330 x 0.254	–	–	14.046 – 14.656
0000	2109 x 0.254	–	–	17.856 – 18.456

PTFE single-core cable (VDE approved)

Fp… 300/500V VDE Reg. no. 8187

APPLICATION

For wiring electrical appliances and lamps up to a max. permissible operating temperature of:

- 130 °C with bare copper conductor
- 180 °C with tinned copper conductor
- 200 °C with silver-plated copper conductor
- 250 °C with nickel-plated copper conductor
- 250 °C pure nickel conductor
  taking the more limited conductivity into account

Cross-section	Insulation wall thickness	Outer-Ø nom.	Copper number
mm^2	mm	mm	kg/km
0.5	0.25 – 0.30	1.5	4.80
0.75	0.25 – 0.30	1.7	7.20
1	0.25 – 0.30	1.9	9.60
1.5	0.25 – 0.30	2.2	14.40
2.5	0.30 – 0.35	2.7	24.00
4	0.30 – 0.40	3.3	38.00
6	0.30 – 0.40	4.3	58.00

CONFIGURATION

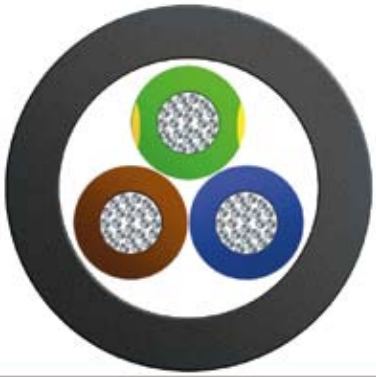
- Strand — copper; bare, tinned, silver-plated, nickel-plated in compliance with VDE 0295 (Class 1/2/5) or pure nickel
- Insulation — VDE 0207, Section 6-compliant PTFE
- Core colour — to customer specification
- Designation — marked VDE-Reg.-Nr.

TECHNICAL SPECIFICATIONS

- Rated voltage — 300/500 V
- Test voltage — 3.4 kV
- Temperature rating — **–190 °C** to **+250 °C**

PTFE multi-core cables

Fp (Fp…) 600V



APPLICATION

Everywhere cables are exposed to high temperatures and where they may also be under mechanical or chemical strain:

- Machinery and plant engineering
- Automotive industry
- Lamp and lighting industry
- Measuring device manufacture

CONFIGURATION

- Strand: copper; bare, tinned, silver-plated, nickel-plated in compliance with VDE 0295 Class 5 or pure nickel
- Insulation: VDE 0207, Section 6-compliant PTFE
- Core colour: to customer specification
- Stranding: rope-lay stranding
- Jacket: VDE 0207, Section 6-compliant PTFE
- Jacket colour: to customer specification

TECHNICAL SPECIFICATIONS

- Rated voltage: 600 V
- Test voltage: 2.0 kV
- Temperature rating: **–190 °C** to **+260 °C**

TEMPERATURE RATINGS OF THE CONDUCTOR MATERIALS

- Copper, bare: up to +130 °C
- Copper, tinned: up to +180 °C
- Copper, silver-plated: up to +200 °C
- Copper, nickel-plated: up to +300 °C
- Pure nickel: up to +600 °C

Cross-section	Core-Ø nom.	Outer-Ø nom.	Weight
mm²	mm	mm	kg/km
2 x 0.75	1.7	4.5	31
3 x 0.75		4.8	42
4 x 0.75		5.1	58
5 x 0.75		5.8	75
7 x 0.75		6.1	92
2 x 1	1.9	4.9	38
3 x 1		5.2	54
4 x 1		5.7	70
5 x 1		6.1	88
7 x 1		6.9	119
2 x 1.5	2.2	5.6	53
3 x 1.5		6.0	72
4 x 1.5		6.5	91
5 x 1.5		7.3	117
7 x 1.5		8.0	154
2 x 2.5	2.7	6.5	88
3 x 2.5		7.2	114
4 x 2.5		7.8	147
5 x 2.5		8.6	180
7 x 2.5		9.7	243

PTFE multi-core cables with braiding

FpCsB (Fp…) 600V

APPLICATION

Everywhere cables are exposed to high temperatures and where they may also be under mechanical or chemical strain:

- Machinery and plant engineering
- Automotive industry
- Lamp and lighting industry
- Measuring device manufacture

CONFIGURATION

- Strand — copper; bare, tinned, silver-plated, nickel-plated or pure nickel (7 or 19-wire)
- Insulation — VDE 0207, Section 6-compliant PTFE
- Core colour — to customer specification
- Stranding — rope-lay stranding
- Taping — separation tape
- Shielding — braid 85% coverage
- Jacket — VDE 0207, Section 6-compliant PTFE
- Jacket colour — to customer specification

TECHNICAL SPECIFICATIONS

- Rated voltage — 600 V
- Test voltage — 2.0 kV (core/core); 1.5 kV (core/braid)
- Temperature rating — **–190 °C** to **+260 °C**

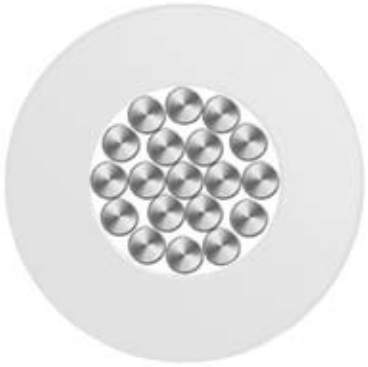
TEMPERATURE RATINGS OF THE CONDUCTOR MATERIALS

- Copper, bare — up to +130 °C
- Copper, tinned — up to +180 °C
- Copper, silver-plated — up to +200 °C
- Copper, nickel-plated — up to +300 °C
- Pure nickel — up to +600 °C

Cross-section	Core-Ø nom.	Outer-Ø nom.	Weight
AWG	mm	mm	kg/km
2 x AWG26	0.889 – 1.092	3.6	25
3 x AWG26		3.8	30
4 x AWG26		3.9	35
5 x AWG26		4.4	44
6 x AWG26		4.9	51
7 x AWG26		4.9	54
2 x AWG24	1.016 – 1.219	3.8	30
3 x AWG24		4.0	35
4 x AWG24		4.2	39
5 x AWG24		4.8	51
6 x AWG24		5.0	55
7 x AWG24		5.0	63
2 x AWG22	1.168 – 1.372	4.1	36
3 x AWG22		4.3	44
4 x AWG22		4.9	54
5 x AWG22		5.3	64
6 x AWG22		5.7	72
7 x AWG22		5.7	78
2 x AWG20	1.372 – 1.575	4.5	44
3 x AWG20		4.9	56
4 x AWG20		5.4	74
5 x AWG20		5.8	84
6 x AWG20		6.3	98
7 x AWG20		6.3	107

Silicone single-core cable N2GFAF -VDE

Si… 300/300V N2GFAF



APPLICATION

For internal wiring subject to high ambient temperatures.

NB

The cable is at risk of abrasion damage if brought into contact with sharp edges. This should be noted when laying and during use.

Cross-section	Conductor construction	Outer-Ø nom.	Copper number
mm^2	mm	mm	kg/km
0.5	16 x 0.20	2.1	4.8
0.75	24 x 0.20	2.4	7.2
1	32 x 0.20	2.5	9.6
1.5	30 x 0.25	3.0	14.4
2.5	50 x 0.25	3.6	24.0

CONFIGURATION

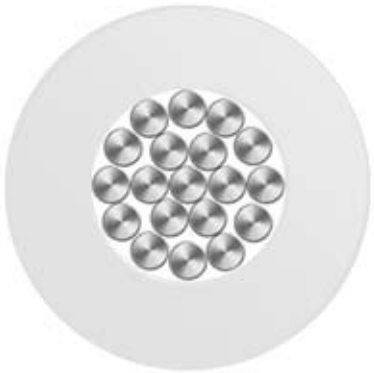
- Strand — Copper, bare, tinned or nickel-plated in compliance with DIN-VDE 0295 Class 5
- Insulation — VDE 0207 Section 20-compliant silicone
- Core colour — with VDE marking upon customer request

TECHNICAL SPECIFICATIONS

- Rated voltage — 300/300V
- Test voltage — 2.0 kV
- Temperature rating — **–40 °C** to **+180 °C**
- Short-circuit temp. — 350 °C

Silicone single-core cable

Si… 300/500 V



APPLICATION

For wiring subject to high ambient temperatures such as

- Lamps and lighting
- Electrical appliances
- Measuring equipment
- Machinery and plant engineering

CONFIGURATION

- Strand: copper; bare, tinned, silver-plated, nickel-plated in compliance with DIN-VDE 0295 Class 5 or pure nickel
- Insulation: VDE 0282 Section 1-compliant silicone
- Core colour: to customer specification

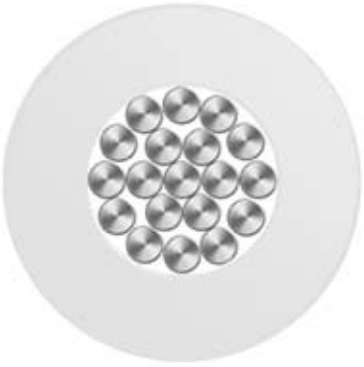
TECHNICAL SPECIFICATIONS

- Rated voltage: 300/500 V
- Test voltage: 2.0 kV
- Temperature rating: **–50 °C** to **+180 °C**
- Short-circuit temp.: **+250 °C**

Cross-section	Conductor construction	Outer-Ø nom.	Copper number
mm^2	mm	mm	kg/km
0.5	16 x 0.20	2.1	4.8
0.75	24 x 0.20	2.3	7.2
1	32 x 0.20	2.4	9.6
1.5	30 x 0.25	2.7	14.4
2.5	50 x 0.25	3.2	24.0
4	56 x 0.30	4.0	38.0
6	84 x 0.30	4.6	58.0
10	80 x 0.40	6.5	96.0
16	128 x 0.40	7.7	154.0
25	200 x 0.40	9.5	240.0
35	280 x 0.40	10.9	336.0
50	400 x 0.40	12.7	480.0
70	356 x 0.50	14.6	672.0
95	485 x 0.50	17.4	912.0
120	614 x 0.50	18.9	1152.0
150	765 x 0.50	20.7	1440.0
185	944 x 0.50	23.5	1776.0
240	1225 x 0.50	26.6	2304.0

Silicone single-core cable

Si… 450/750 V



APPLICATION

For fixed installation in the lamp and lighting, general as well as electrical appliance industries.

CONSTRUCTION

- Strand — Copper; bare or tinned, DIN-VDE 0295 Class 5
- Insulation — VDE 0207 Section 20-compliant silicone
- Core colour — to customer specification

TECHNICAL SPECIFICATIONS

- Rated voltage — 450/750 V
- Test voltage — 2.5 kV
- Temperature rating — **–50 °C** to **+180 °C**
- Short-circuit temp. — up to **+200 °C**

Cross-section	Conductor construction	Outer-Ø nom.	Copper number
mm^2	mm	mm	kg/km
10	80 x 0.40	6.8	96
16	126 x 0.40	7.6	153
25	196 x 0.40	9.4	240
35	276 x 0.40	10.5	336
50	392 x 0.40	12.4	480
70	551 x 0.40	14.4	672

LEONI HighTemp Solutions GmbH
Business Unit
High Temperature Solutions

Alfred-Jung-Strasse 1
58553 Halver
Germany
Phone +49 (0)2353-6687-0
Fax +49 (0)2353-6687-499
E-mail info@leoni-hts.com
www.leoni-hts.com

LEONI Italy S.r.l.
Divisione Silitherm

S.S. 10 – Via Breda
29010 Monticelli d'Ongina (PC)
Italy
Phone +39 (0)523-8157-11
Fax +39 (0)523-8157-50
E-mail info@silitherm.com