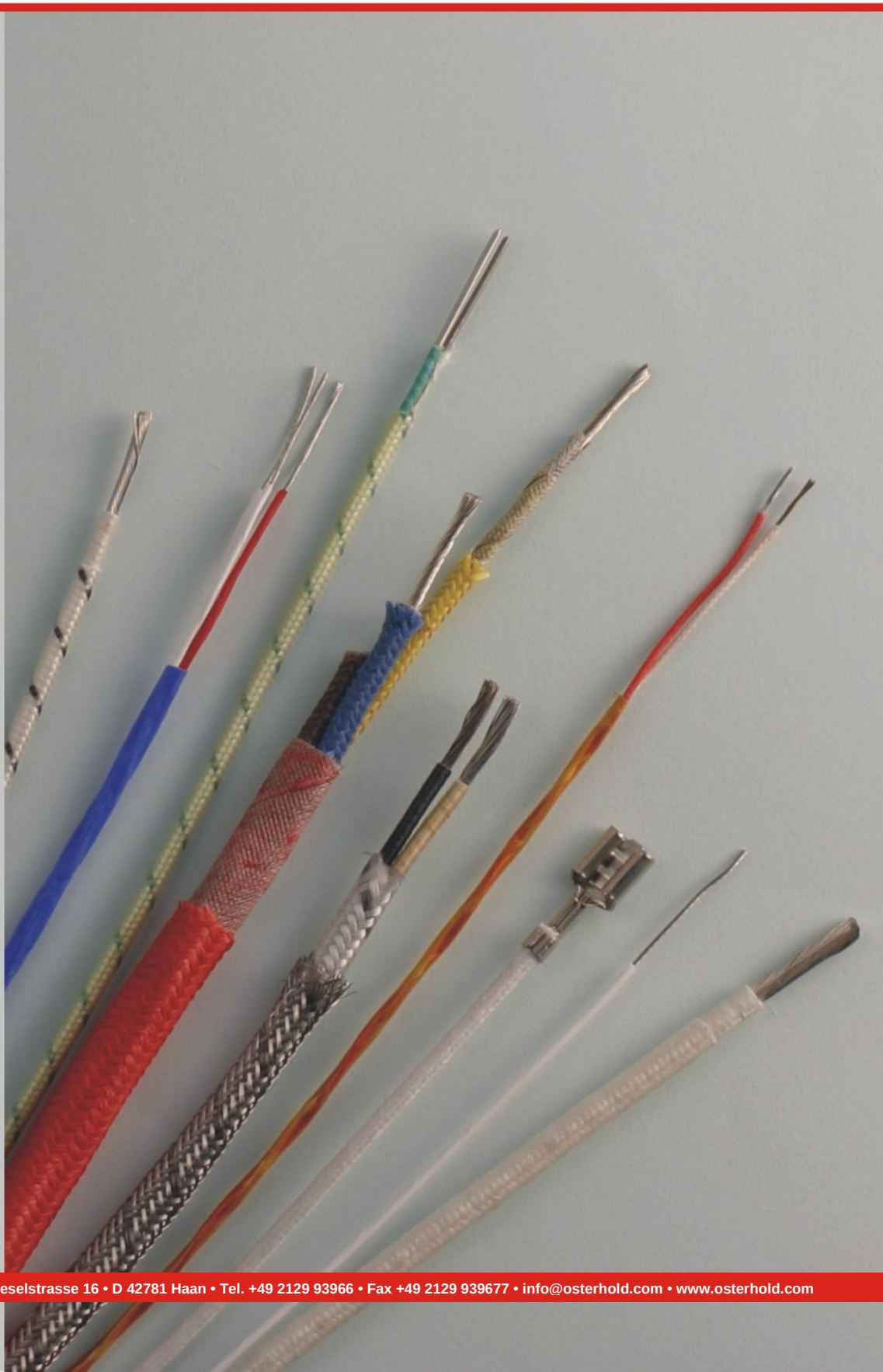
OSTERHOLD
SPEZIALKABEL GmbH

- Heat-resistant special cables and wires, made to customer specification, up to appr. + 1.500° C
- Thermocouple, compensating and connecting cables and wires (inc. nickel cores) up to appr. + 1.200° C
- PTFE as well as Polyimide/Kapton®-insulated cores and cables/wires
- Heating wires and heating coils
- Fiberglass yarns, braided, color coded
- Custom wire and cable assembly



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Dear valued customer,

Our catalogue gives you an accurate overview of our extensive manufacturing and delivery program.

In accordance with your wishes we are constantly modifying and expanding our catalogue.
Referencing in the footnotes indicates the current edition of our catalogue.

Our catalogue represents only a part of our product program.
Flexibility is one of our strongest points; our construction and production lines are ready and able for any situation to realize your special requirements and new developments.

We continue to manufacture our proven thermo-, compensating and connecting cables (incl. nickel cores). These products are delivered with top quality PTFE, Polyimide / Kapton®, MICA and/or diverse fiberglass insulations.

We have also expanded our production program of heating wires and heating coils, as well as high heat-resistant special cables with a temperature range up to approx. + 1.500° C.

Our offer of braided and colored fiberglass yarns is enjoyed throughout the trade and is rising in popularity.

Starting in 2007 we also offer ready-made high heat-resistant wires and diverse related components.

You, our customer, are in the center of all our activities.
Together, with you, we want to develop future products and product innovations.

Should you have any questions, please contact us immediately.
Our team of motivated co-workers will go with you to the wire!

Team OSTERHOLD

CONTENTS

Technical Specifications:

Temperature range: - 60° C to + 300° C
Short duration: > + 400° C
Operating voltage: 300 V / 500 V
Test voltage: 2.000 V
Minimum bending radius: 5 x diameter

Construction:

Flexible nickel-plated copper (NPC), multiple silicone impregnated fiberglass wrapping, silicone impregnated fiberglass braiding, unicolor or with colored tracers.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For wiring of heating elements, sealers, furnaces, kitchens, heating cartridges and extruders. These wires can also be manufactured as multiple wire cable; with or without grounding; with a fiberglass or metal braiding.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

Nominal wire size	Number and diameter of wires	Nominal diameter	Copper weight	Outer diameter of cables	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	1,80 ± 0,10 mm	89 Ω/km	15CNN022..
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	1,90 ± 0,10 mm	39 Ω/km	15CNN050..
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	2,20 ± 0,10 mm	26 Ω/km	15CNN075..
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	2,50 ± 0,15 mm	20 Ω/km	15CNN100..
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	2,80 ± 0,15 mm	13 Ω/km	15CNN150..
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	3,30 ± 0,15 mm	8 Ω/km	15CNN250..
4,00 mm²	56 x 0,30 mm	2,50 mm	38,00 kg / km	4,35 - 0,50 mm	5 Ω/km	15CNN400..
6,00 mm²	84 x 0,30 mm 49 x 0,39 mm	3,05 mm 3,40 mm	58,00 kg / km	4,60 ± 0,20 mm	3 Ω/km	15CNN600..

The last two numbers of the product code (represented by ".. " in the table) indicate the type and/or color of the marking.
1 = identification thread, **2** = unicolor, **43** = green/yellow.

Color Options

1 yellow, **2** red, **3** green, **4** blue, **5** black, **6** brown, **7** orange, **8** violet, **9** pink, **0** white

Example: 01NiN02212 the braiding contains a red tracer.

Technical Specifications:

Temperature range: - 60° C to + 350° C
Short duration: > + 450° C
Operating voltage: 300 V / 500 V
Test voltage: 2.000 V
Minimum bending radius: 5 x diameter

Construction:

Flexible nickel wire, multiple silicone impregnated fiberglass wrapping, silicone impregnated fiberglass braiding, unicolor or with colored tracers.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For wiring of heating elements, sealers, furnaces, kitchens, heating cartridges and extruders. These wires can also be manufactured as multiple wire cable; with or without grounding; with a fiberglass or metal braiding.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

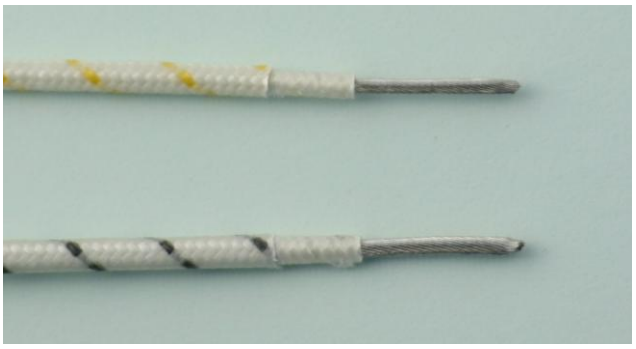
Nominal wire size	Number and diameter of wires	Nominal diameter	Nickel weight	Outer diameter of cables	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	1,80 ± 0,10 mm	382 Ω/km	01NiN022..
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	2,10 ± 0,10 mm	168 Ω/km	01NiN050..
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	2,30 ± 0,15 mm	112 Ω/km	01NiN075..
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	2,60 ± 0,15 mm	84 Ω/km	01NiN100..
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	2,75 ± 0,15 mm	56 Ω/km	01NiN150..
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	3,40 ± 0,15 mm	34 Ω/km	01NiN250..
4,00 mm²	56 x 0,30 mm	2,50 mm	38,00 kg / km	4,20 ± 0,20 mm	21 Ω/km	01NiN400..
6,00 mm²	84 x 0,30 mm 49 x 0,39 mm	3,05 mm 3,40 mm	58,00 kg / km	4,60 ± 0,20 mm	14 Ω/km	01NiN600..

The last two numbers of the product code (represented by ".. " in the table) indicate the type and/or color of the marking.
1 = identification thread, **2** = unicolor, **43** = green/yellow.

Color Options

1 yellow, **2** red, **3** green, **4** blue, **5** black, **6** brown, **7** orange, **8** violet, **9** pink, **0** white

Example: 01NiN02212 the braiding contains a red tracer.



Technical Specifications:

Temperature range: - 60° C to + 450° C
Short duration: > + 700° C
Operating voltage: 300 V / 500 V
Test voltage: 2.000 V
Minimum bending radius: 5 x diameter

Construction:

Flexible nickel wire, multiple silicone impregnated fiberglass wrapping, silicone impregnated fiberglass braiding, unicolor or with colored tracers.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For wiring of heating elements, sealers, furnaces, kitchens, heating cartridges and extruders. These wires can also be manufactured as multiple wire cable; with or without grounding; with a fiberglass or metal braiding.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

Nominal wire size	Number and diameter of wires	Nominal diameter	Nickel weight	Outer diameter of cables	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	1,80 - 0,30 mm	382 Ω/km	02NiN022..
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	1,80 ± 0,15 mm	168 Ω/km	02NiN050..
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	2,30 ± 0,15 mm	112 Ω/km	02NiN075..
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	2,40 ± 0,15 mm	84 Ω/km	02NiN100..
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	2,50 ± 0,15 mm	56 Ω/km	02NiN150..
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	3,10 ± 0,15 mm	34 Ω/km	02NiN250..
4,00 mm²	56 x 0,30 mm	2,50 mm	38,00 kg / km	3,60 ± 0,20 mm	21 Ω/km	02NiN400..

The last two numbers of the product code (represented by ".. " in the table) indicate the type and/or color of the marking. **1** = identification thread, **2** = unicolor, **43** = green/yellow.

Color Options

1 yellow, **2** red, **3** green, **4** blue, **5** black, **6** brown, **7** orange, **8** violet, **9** pink, **0** white

Example: 01NiN02212 the braiding contains a red tracer.

Technical Specifications:

Temperature range: - 60° C to + 600° C
Short duration: > + 800° C
Operating voltage: 300 V / 500 V
Test voltage: 2.000 V
Minimum bending radius: 7 x diameter

Construction:

Flexible nickel wire, multiple polyurethane impregnated fiberglass wrapping and quartz glass braiding.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For wiring of heating elements, sealers, furnaces, kitchens, heating cartridges and extruders. These wires can also be manufactured as multiple wire cable; with or without grounding; with a fiberglass or metal braiding.

General information:

The impregnation used in this article is not suitable for all applications. The cable must could outgas.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

Nominal wire size	Number and diameter of wires	Nominal diameter	Nickel weight	Outer diameter of cables	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	2,10 ± 0,15 mm	382 Ω/km	74NiN022..
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	2,40 ± 0,15 mm	168 Ω/km	74NiN050..
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	2,70 ± 0,15 mm	112 Ω/km	74NiN075..
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	2,80 ± 0,15 mm	84 Ω/km	74NiN100..
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	3,10 ± 0,15 mm	56 Ω/km	74NiN150..
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	3,50 ± 0,15 mm	34 Ω/km	74NiN250..
4,00 mm²	56 x 0,30 mm	2,50 mm	38,00 kg / km	4,00 ± 0,20 mm	21 Ω/km	74NiN400..
6,00 mm²	49 x 0,39 mm	3,40 mm	58,00 kg / km	4,50 ± 0,20 mm	14 Ω/km	74NiN600..

Color Options

Natural (beige)

Technical Specifications:

Temperature range: - 60° C to approx. + 1.000° C
Short duration: approx. + 1.500° C
Operating voltage: 300 V / 500 V
Test voltage: 2.000 V
Minimum bending radius: 10 x diameter

RoHS konform CE

Construction:

Flexible nickel wire or nickel-plated copper (NPC), MICA banding, multiple polyurethane impregnated quartz glass braiding.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing, high heat-resistant.

Application:

For all high heat-resistant wiring in heavy industry (smeltery, steel and glass melting ovens) and in the (petro) chemical industry with increasing requirements.

General information:

The impregnation used in this article is not suitable for all applications. The cable must could outgas.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

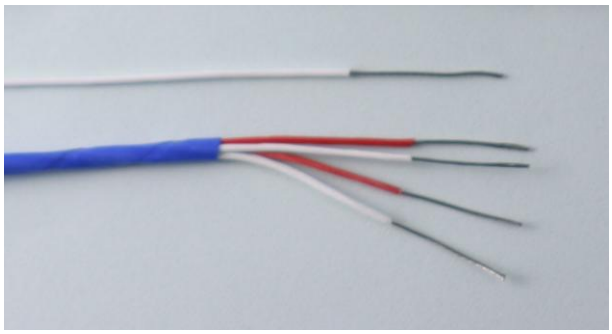
Nominal wire size	Number and diameter of wires	Nominal diameter	Nickel weight	Outer diameter of cable	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	2,20 ± 0,15 mm	382 Ω/km	77NiN022..
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	2,40 ± 0,15 mm	168 Ω/km	77NiN050..
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	2,50 ± 0,15 mm	112 Ω/km	77NiN075..
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	2,60 ± 0,15 mm	84 Ω/km	77NiN100..
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	2,90 ± 0,15 mm	56 Ω/km	77NiN150..
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	3,40 ± 0,15 mm	34 Ω/km	77NiN250..
4,00 mm²	56 x 0,30 mm	2,50 mm	38,00 kg / km	3,90 ± 0,20 mm	21 Ω/km	77NiN400..
6,00 mm²	84 x 0,30 mm	3,05 mm	58,00 kg / km	4,50 ± 0,20 mm	14 Ω/km	77NiN600..

The last two numbers of the product code (represented by ".. " in the table) indicate the type and/or color of the marking. **1** = identification thread, **2** = unicolor, **43** = green/yellow.

Color Options

1 yellow, **2** red, **3** green, **4** blue, **5** black, **6** brown, **7** orange, **8** violet, **9** pink, **0** white

Example: 01NiN02212 the braiding contains a red tracer.



Technical Specifications:

Temperature range: - 190° C to + 260° C
Operating voltage: 300 V / 500 V
Test voltage: 4.000 V
Minimum bending radius: 5 x diameter

Construction:

Flexible nickel wire or nickel-plated copper (NPC), PTFE banding.

Characteristics:

Precision strands = outstanding mechanical insulation, UV resistant, moisture resistant, resistant to chemical atmospheres, very robust, asbestos free, flame retardant and self extinguishing.

Application:

For wiring of heating elements, sealers, furnaces, kitchens, heating cartridges and extruders. These wires can also be manufactured as multiple wire cable; with or without grounding; with a fiberglass or metal braiding.

Manufacturing size: diameter 0,22 mm² to 6,00 mm², larger diameters available upon request.
Delivery size: 500 meter coils or spools.

Nominal wire size	Number and diameter of wires	Nominal diameter	Nickel weight	Outer diameter of cables	Ohmic resistance at + 20° C *(approx.)*	Product code
0,22 mm²	7 x 0,20 mm	0,60 mm	2,20 kg / km	1,10 ± 0,10 mm	382 Ω/km	92Ni1L022.
0,50 mm²	19 x 0,18 mm 7 x 0,30 mm	0,90 mm	4,80 kg / km	1,40 ± 0,10 mm	168 Ω/km	92Ni1L050.
0,75 mm²	19 x 0,224 mm 24 x 0,20 mm	1,10 mm	7,20 kg / km	1,50 ± 0,10 mm	112 Ω/km	92Ni1L075.
1,00 mm²	32 x 0,20 mm	1,25 mm	9,60 kg / km	1,65 ± 0,15 mm	84 Ω/km	92Ni1L100.
1,50 mm²	37 x 0,224 mm 30 x 0,25 mm	1,55 mm	14,40 kg / km	2,05 ± 0,15 mm	56 Ω/km	92Ni1L150.
2,50 mm²	50 x 0,25 mm	1,95 mm	24,00 kg / km	2,45 ± 0,15 mm	34 Ω/km	92Ni1L250.

In the article description the color indicates the strand.

Color Options

1 yellow, **2** red, **3** green, **4** blue, **5** black, **6** brown, **7** orange, **8** violet, **9** pink, **0** white

Example: 92Ni1L0222 has a red PTFE banding.

Thermocouples and Compensating Cables

Thermocouples and compensating cables serve in temperature measuring devices as an electrical connection between the open ends of a thermocouple and an evaluation location.

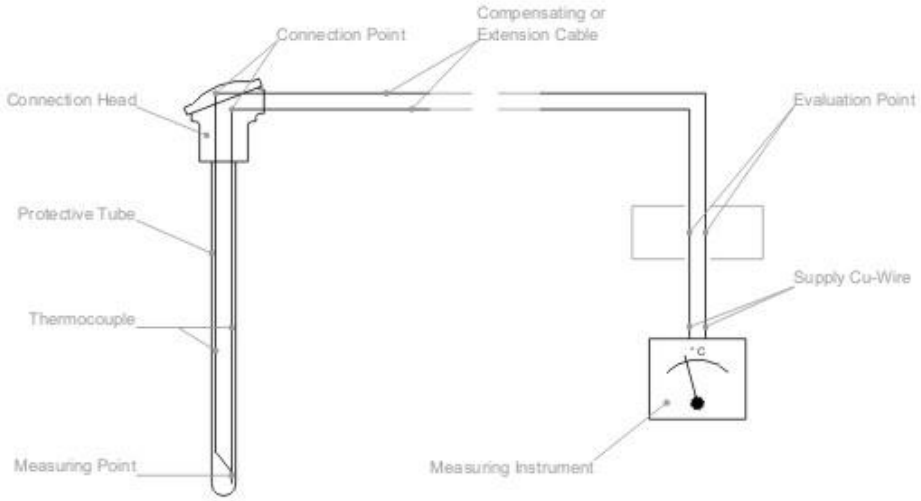
Using a thermocouple, extension or compensating cable depends on:

- the technical requirements of temperature, corrosive resistance and
- economics.

The thermocouple consists of 2 conductors of different materials between which, depending upon temperature, an electrical tension exists. The strength of the electric motors (EMF) produced by the thermocoupling depends on the difference of the measured temperature and the temperature of the free ends of the thermo connection, in the connection head.

The connection of the evaluation location to the measuring instrument can be applied due to the small temperature differentiation in copper cables.

Very often the extension and compensating cables are installed up to the measuring instrument.



Thermocouples:

Thermocouples serve as sensors in temperature measuring instruments. High quality materials are used which, depending on the respective standard and type, register temperatures of up to + 1.250° C.

Extension cables (original materials):

The extension cables form the electrical connection between the thermocouple and the evaluation location resp. the measuring instrument. The materials of extension cables have nominally the same chemical composition as the thermocouple. The most appropriate temperature range is - 25° C to + 200° C.

Compensating cables (alternative materials):

Compensating cables also serve the electrical connection between the thermocouple and the evaluation location resp. the measuring instrument. The materials of the compensating cables have a different chemical composition than the corresponding thermocouple. However, the thermoelectric characteristics of the alternative materials of the compensating cables are identical to those of the corresponding thermocouple. The temperature range is 0° C to + 100° / + 200° C.

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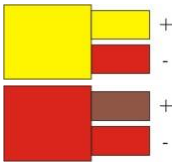
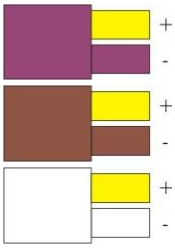
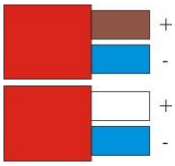
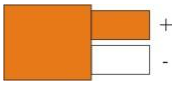
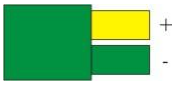
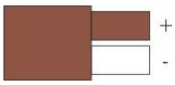
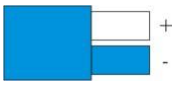
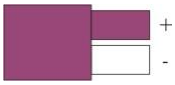
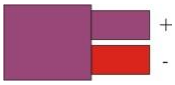
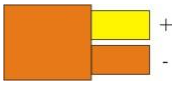
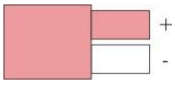
COLOR CODING FOR TEMPERATURE MEASURING TECHNOLOGY

Thermocouple Type		Europe DIN EN 60584 (DIN IEC 584-3)	Germany DIN 43714	USA ANSI MC 96.1	France NF C 42-324	Great Britain BS 4937 / 1843
J	+ Iron (Fe) - Copper-Nickel (CuNi)					
K	+ Nickel-Chromium (NiCr) - Nickel (Ni)					
L	+ Iron (Fe) - Copper-Nickel (CuNi)					
R	+ Platinum- 13 % Rhodium - Platinum					
S	+ Platinum- 10 % Rhodium - Platinum					
B	+ Platinum- 30 % Rhodium - Platinum- 6 % Rhodium					
T	+ Copper (Cu) - Copper-Nickel (CuNi)					
E	+ Nickel-Chromium (NiCr) - Copper-Nickel (CuNi)					
N	+ Nickel-Chromium-Silicon - Nickel- Silicon					
U	+ Copper (Cu) - Copper-Nickel (CuNi)					

Thermocouples

type	alloy +	alloy -	temperature range °C	EMF mV	tolerance class 1 °C	1 tolerance	2 °C	2 tolerance	3 °C	3 tolerance
T	Cu 100 %	Ni 44 % Cu 55 % Mn 1 %	- 200	- 5,753	-	-	-	-	- 200	± 1,5 %
			- 40	- 1,819	- 40	± 0,5 °C	- 40	± 1,0 °C	- 67	± 1,0 °C
			+ 40	1,612	↓	↓	↓	↓	+ 40	↓
			+ 100	4,279	+ 125	± 0,4 %	+ 133	± 0,75 %	-	-
			+ 350	17,819	+ 350	↓	+ 350	↓	-	-
U	Cu 100 %	Ni 44 % Cu 55 % Mn 1 %	- 200	- 5,700	- 200	± 3,0 %	-	-	-	-
			+ 100	4,250	↓	↓	-	-	-	-
			+ 400	21,000	+ 400	± 0,75 %	-	-	-	-
			+ 600	34,310	+ 600	↓	-	-	-	-
J	Fe 95,5 % (et al.)	Ni 44 % Cu 55 % Mn 1 %	- 40	- 2,431	- 40	± 1,5 °C	- 40	± 2,5 °C	-	-
			+ 100	5,269	↓	↓	↓	↓	-	-
			+ 400	21,848	+ 375	± 0,4 %	+ 333	± 0,75 %	-	-
			+ 750	42,281	+ 750	↓	+ 750	↓	-	-
L	Fe 97 % (et al.)	Ni 44 % Cu 55 % Mn 1 %	- 200	- 8,150	- 200	± 3,0 °C	-	-	-	-
			+ 100	5,370	↓	↓	-	-	-	-
			+ 400	22,160	+ 400	± 0,75 %	-	-	-	-
			+ 900	53,140	+ 900	↓	-	-	-	-
E	Ni 90 % Cr 10 %	Ni 44 % Cu 55 % Mn 1 %	- 200	- 9,063	-	-	-	-	- 200	± 1,5 %
			- 40	- 2,787	- 40	± 1,5 °C	- 40	± 2,5 °C	- 167	± 2,5 °C
			+ 40	2,420	↓	↓	↓	↓	+ 40	↓
			+ 100	6,319	+ 375	± 0,4 %	+ 333	± 0,75 %	-	-
			+ 800	61,017	+ 800	↓	↓	↓	-	-
			+ 900	68,787	-	-	+ 900	↓	-	-
K	Ni 90 % Cr 10 %	Ni 95 % Al 2 % Mn 2 % Si 1 %	- 200	- 6,035	-	-	-	-	- 200	± 1,5 %
			- 40	- 1,889	- 40	± 1,5 °C	- 40	± 2,5 °C	- 167	± 2,5 °C
			+ 40	1,612	↓	↓	↓	↓	+ 40	↓
			+ 100	4,096	↓	↓	↓	↓	-	-
			+ 200	8,138	↓	↓	↓	↓	-	-
			+ 300	12,209	+ 375	± 0,4 %	+ 333	± 0,75 %	-	-
			+ 500	20,644	↓	↓	↓	↓	-	-
			+ 700	29,129	↓	↓	↓	↓	-	-
			+ 800	33,275	↓	↓	↓	↓	-	-
			+ 900	37,326	↓	↓	↓	↓	-	-
			+ 1000	41,276	+ 1000	↓	↓	↓	-	-
			+ 1200	48,838	-	-	+ 1200	↓	-	-
N	Ni 84,1 % Cr 14,6 % Si 1,3 %	Ni 95,1 % Si 4,8 % Mg 0,1 %	- 200	- 4,083	-	-	-	-	- 200	± 1,5 %
			- 40	- 1,269	- 40	± 1,5 °C	- 40	± 2,5 °C	- 167	± 2,5 °C
			+ 40	1,065	↓	↓	↓	↓	+ 40	↓
			+ 100	2,774	+ 375	± 0,4 %	+ 333	± 0,75 %	-	-
			+ 1000	36,256	+ 1000	↓	↓	↓	-	-
			+ 1200	43,846	-	-	+ 1200	↓	-	-
R	Pt 87 % Rh 13 %	Pt 100 %	+ 100	0,647	0	± 1,0 °C	0	± 1,5 °C	-	-
			+ 600	5,583	↓	↓	+ 600	± 0,25 %	-	-
			+ 1100	11,850	+ 1100	±[1 + 0,003 x (t-1100)] °C	↓	↓	-	-
			+ 1600	18,849	+ 1600	↓	+ 1600	↓	-	-
S	Pt 90 % Rh 10 %	Pt 100 %	+ 100	0,646	0	± 1,0 °C	0	± 1,5 °C	-	-
			+ 600	5,239	↓	↓	+ 600	± 0,25 %	-	-
			+ 1100	10,757	+ 1100	±[1 + 0,003 x (t-1100)] °C	↓	↓	-	-
			+ 1600	16,777	+ 1600	↓	+ 1600	↓	-	-
B	Pt 70 % Rh 30 %	Pt 94 % Rh 6 %	+ 100	0,033	-	-	-	-	-	-
			+ 600	1,792	-	-	+ 600	± 0,25 %	+ 600	± 4,0 °C
			+ 800	3,154	-	-	↓	↓	+ 800	± 0,5 %
			+ 1000	4,834	-	-	↓	↓	↓	↓
			+ 1200	6,786	-	-	↓	↓	↓	↓
			+ 1400	8,956	-	-	↓	↓	↓	↓
			+ 1600	11,263	-	-	↓	↓	↓	↓
			+ 1700	12,433	-	-	+ 1700	↓	+ 1700	↓

Extension Cables					Compensating Cables						
type	alloy		temperature range °C	tolerance	type	alloy		temperature range °C	tolerance	specific resistance µΩ x cm	
	+	-				+	-			+	-
TX1	Cu 100 %	Ni 44 % Cu 55 % Mn 1 %	- 25 ↓ + 100	± 30 µV (± 0,5 °C)	TC (TX2)	Cu 100 %	Ni 45 % Cu 55 %	- 25 ↓ + 100	± 60 µV (± 1,0 °C)	1,7	49
UX1	Cu 100 %	Ni 44 % Cu 55 % Mn 1 %	0 ↓ + 200	± 3,0 °C *	UC (UX2)	Cu 100 %	Ni 45 % Cu 55 % Mn 1 %	0 ↓ + 200	± 3,0 °C *	1,7	49
JX1	Fe 95,5 % (et al.)	Ni 44 % Cu 55 % Mn 1 %	- 25 ↓ + 200	± 85 µV (± 1,5 °C)	JC (JX2)	Fe 95,5 % (et al.)	Ni 45 % Cu 55 %	- 25 ↓ + 200	± 140 µV (± 2,5 °C)	12	49
LX1	Fe 97 % (et al.)	Ni 44 % Cu 55 % Mn 1 %	0 ↓ + 200	± 3,0 °C *	LC (LX2)	Fe 97 % (et al.)	Ni 45 % Cu 55 %	0 ↓ + 200	± 3,0 °C *	12	49
EX1	Ni 90 % Cr 10 %	Ni 44 % Cu 55 % Mn 1 %	- 25 ↓ + 200	± 120 µV (± 1,5 °C)	EC (EX2)	Ni 90 % Cr 10 %	Ni 45 % Cu 55 %	- 25 ↓ + 200	± 200 µV (± 2,5 °C)	72	49
KX1	Ni 90 % Cr 10 %	Ni 95 % Al 2 % Mn 2 % Si 1 %	- 25 ↓ + 200	± 60 µV (± 1,5 °C)	KC (KX2)	Ni 90 % Cr 10 %	Ni 95 % Al 2 % Mn 2 % Si 1 %	- 25 ↓ + 200	± 100 µV (± 2,5 °C)	72	27
					KCA	Fe 95,5 % (et al.)	Ni 45 % Cu 51 % Mn 2 % Fe 2 %	0 ↓ + 150	± 100 µV (± 2,5 °C)	12	51
					KCB	Cu 100 %	Ni 45 % Cu 55 %	0 ↓ + 100	± 100 µV (± 2,5 °C)	1,7	49
NX1	Ni 84,1 % Cr 14,6 % Si 1,3 %	Ni 95,1 % Si 4,8 % Mg 0,1 %	- 25 ↓ + 200	± 60 µV (± 1,5 °C)	NC	Cu 100 %	Ni 44 % Cu 52 % Mn 2 % Fe 2 %	0 ↓ + 150	± 100 µV (± 2,5 °C)	1,7	52
NX2	Ni 84,1 % Cr 14,6 % Si 1,3 %	Ni 95,1 % Si 4,8 % Mg 0,1 %	- 25 ↓ + 200	± 100 µV (± 2,5 °C)							
					RCA	Cu 100 %	Cu 95 % Ni Mn 5 %	0 + 100	± 30 µV (± 2,5 °C)	1,7	12
					RCB	Cu 100 %	Cu 95 % Ni Mn 5 %	0 + 200	± 60 µV (± 5,0 °C)	1,7	12
					SCA	Cu 100 %	Cu 95 % Ni Mn 5 %	0 + 100	± 30 µV (± 2,5 °C)	1,7	12
					SCB	Cu 100 %	Cu 95 % Ni Mn 5 %	0 + 200	± 60 µV (± 5,0 °C)	1,7	12
					BX ASTM E230	Cu 97 % Mn 3 %	Cu 100 %	0 ↓ + 100	+ 0 µV - 33 µV (+ 0 °C - 3,7 °C)	12,5	1,7
					BC	Cu 97 % Mn 3 %	Cu 100 %	0 + 200	± 40 µV (± 3,5 °C)	12,5	1,7
						Cu 100 %	Cu 100 %	0 + 100	± 40 µV (± 3,5 °C)	1,7	1,7

* This standard does not specify tolerances for extension resp. compensating cables. For this reason we assume the tolerances of the thermocouple within a reduced temperature range up to + 200 °C.

Technical Specifications:

Temperature range: - 60° C to + 350° C
Short duration: > + 450° C
Minimum bending radius: 7,5 x diameter

Construction:

Thermocouple wire and/or stranded conductor, Type J and K Ther-mocouple standard IEC 584, Klasse 1; Type L Thermo-couple standard DIN 43710, 1/2 DIN, Type SX or RX, compensating cable material copper/copper alloy, fiberglass wrapping and braiding, silicone multiple impregnation. Uni or color coded identification threads are possible.

Characteristics:

Parallel guidewires, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section (mm²)	Number and Diameter of wires	Product Code *
J	Fe - CuNi	2 x 0,22 mm²	7 x 0,20 mm	81JE2L022..
K	NiCr - Ni	2 x 0,22 mm²	7 x 0,20 mm	81KE2L022..
L	Fe - CuNi	2 x 0,22 mm²	7 x 0,20 mm	81LE2L022..
J	Fe - CuNi	2 x 0,50 mm²	16 x 0,20 mm	81JE2L050..
K	NiCr - Ni	2 x 0,50 mm²	16 x 0,20 mm	81KE2L050..
L	Fe - CuNi	2 x 0,50 mm²	16 x 0,20 mm	81LE2L050..

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).

Technical Specifications:

Temperature range: - 60° C to + 350° C
Short duration: > + 450° C
Minimum bending radius: 7,5 x diameter

Construction:

Thermocouple wire and/or braid, Type J and K Thermocouple standard IEC 584, Klasse 1; Type L Thermocouple standard DIN 43710, 1/2 DIN, Type SX or RX, compensating cable material copper/copper alloy, Fiberglass wrappings and braiding, silicone multiple impregnation. Uni or color coded identification threads are possible. Braiding of stainless wire 1.4301, coded with colored identification threads.

Characteristics:

UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section	Product Code *
J	Fe - CuNi	2 x 0,22 mm²	83JE2L022.
K	NiCr - Ni	2 x 0,22 mm²	83KE2L022.
L	Fe - CuNi	2 x 0,22 mm²	83LE2L022.
J	Fe - CuNi	2 x 0,50 mm²	83JE2L050.
K	NiCr - Ni	2 x 0,50 mm²	83KE2L050.
L	Fe - CuNi	2 x 0,50 mm²	83LE2L050.

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).

Technical Specifications:

Temperature range: - 60° C to + 450° C
Short duration: > + 700° C
Minimum bending radius: 7,5 x diameter

Construction:

Thermocouple wire and/or braid, Type J and K Thermocouple standard IEC 584, Class1; Type L Thermocouple standard DIN 43710, 1/2 DIN, Type SX or RX Compensating cable material copper/copper alloy; Fiberglass wrapping and braiding, silicone multiple impregnation. Uni or color coded identification threads are possible.

Characteristics:

Parallel guidewires, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section	Product Code *
J	Fe - CuNi	2 x 0,22 mm²	82JE2L022.
K	NiCr - Ni	2 x 0,22 mm²	82KE2L022.
L	Fe - CuNi	2 x 0,22 mm²	82LE2L022.
J	Fe - CuNi	2 x 0,50 mm²	82JE2L050.
K	NiCr - Ni	2 x 0,50 mm²	82KE2L050.
L	Fe - CuNi	2 x 0,50 mm²	82LE2L050.

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).

Technical Specifications:

Temperature range: - 60° C to + 450° C
Short duration: > + 700° C
Minimum bending radius: 7,5 x diameter

Construction:

Thermocouple wire and/or braid, Type J and K Thermocouple standard IEC 584, Class1; Type L Thermocouple standard DIN 43710, 1/2 DIN, Type SX or RX Compensating cable material copper/copper alloy; Fiberglass wrapping and braiding, silicone multiple impregnation. Uni or color coded identification threads are possible. Braiding of stainless steel wire 1.4301, coded with colored identification threads.

Characteristics:

UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section	Product Code *
J	Fe - CuNi	2 x 0,22 mm²	85JE2L022.
K	NiCr - Ni	2 x 0,22 mm²	85KE2L022.
L	Fe - CuNi	2 x 0,22 mm²	85LE2L022.
J	Fe - CuNi	2 x 0,50 mm²	85JE2L050.
K	NiCr - Ni	2 x 0,50 mm²	85KE2L050.
L	Fe - CuNi	2 x 0,50 mm²	85LE2L050.

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).

Technical Specifications:

Temperature range: - 60° C to + 1.000° C
Short duration: > + 1.200° C
Minimum bending radius: 10 x diameter

Construction:

Thermocouple wire and/or braid, Type J and K Thermocouple standard IEC 584, Class1; Type L Thermocouple standard DIN 43710, 1/2 DIN, Type SX or RX Compensating cable material copper/copper alloy; Fiberglass braiding (Silica), polyurethane multiple impregnation. Uni or color coded identification threads are possible.

Characteristics:

Stranded guidewires, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

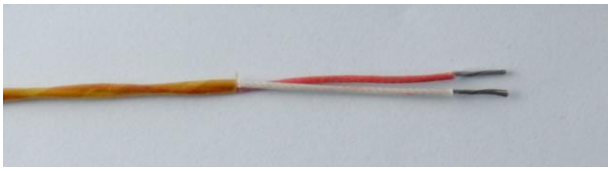
General information:

The impregnation used in this article is not suitable for all applications. The cable must could outgas.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section	Product Code *
J	Fe - CuNi	2 x 0,50 mm	72JE2D050.
K	NiCr - Ni	2 x 0,50 mm	72KE2D050.
L	Fe - CuNi	2 x 0,50 mm	72LE2D050.
J	Fe - CuNi	2 x 0,80 mm	72JE2D080.
K	NiCr - Ni	2 x 0,80 mm	72KE2D080.
L	Fe - CuNi	2 x 0,80 mm	72LE2D080.

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).



Technical Specifications:

Temperature range: - 190° C to + 350° C
Short duration: > + 400° C
Minimum bending radius: 5 x diameter

Construction:

Thermocouple wire and/or braid, Type J and K Thermocouple standard IEC 584, Class1; Type L Thermocouple standard DIN 43710, 1/2 DIN, Type SX or RX Compensating cable material copper/copper alloy, Fiberglass braiding, silicone multiple impregnation. Uni or color coded identification threads are possible. Thermo-welded Polyimide banding (Kapton®).

Characteristics:

Parallel guidewires, UV resistant, resistant to chemical atmospheres, very robust, asbestos free, flame retardant and self extinguishing.

Application:

Transmission of measured temperature values.

Delivery size: 500 meter coils or spools.

Type	Thermocouple	Cross Section	Number and Diameter of wires	Product Code *
J	Fe - CuNi	2 x 0,22 mm²	7 x 0,20 mm	21JE2L022..
K	NiCr - Ni	2 x 0,22 mm²	7 x 0,20 mm	21KE2L022..
L	Fe - CuNi	2 x 0,22 mm²	7 x 0,20 mm	21LE2L022..
J	Fe - CuNi	2 x 0,50 mm²	16 x 0,20 mm	21JE2L050
K	NiCr - Ni	2 x 0,50 mm²	16 x 0,20 mm	21KE2L050
L	Fe - CuNi	2 x 0,50 mm²	16 x 0,20 mm	21LE2L050

* The last numbers of the product code indicate the line according to execution (IEC, ANSI, etc.).

Technical Specifications:

Temperature range: - 60° C to + 350° C
Minimum bending radius: 5 x diameter

Construction:

Solid NiCr alloy core, covered by a PTFE banding, a silicone based impregnated fiberglass braiding, multiple fiberglass wrappings, silicone impregnated.

Characteristics:

UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For preferred industrial applications with high mechanical consistency. Maintains temperature in containers / plants.

General Information:

Our standard version has PTFE banding.
Also other conductor materials available.

Delivery size: 500 meter coils or spools.

To determine the resistance (in Ohms) at the operating temperature multiply the resistance with + 20º C by the coefficient **Ct**:

° C	100	200	300	400	500	600	700	800	900	1.000	1.100	1.200	1.300
Ct	1,03	1,07	1,10	1,13	1,15	1,18	1,19	1,21	1,23	1,25	1,27		

Wire Type	Wire Diameter	Resistance at + 20° C *(approx.)*	Outer Diameter	Product Code
NiCr 3020	0,25 mm	21,187 Ω/m	2,50 mm	117.0021Si
NiCr 3020	0,28 mm	16,890 Ω/m	2,48 mm	117.0026Si
NiCr 3020	0,30 mm	17,713 Ω/m	2,50 mm	117.0022Si
NiCr 3020	0,35 mm	10,810 Ω/m	2,50 mm	117.0020Si
NiCr 3020	0,40 mm	8,2761 Ω/m	2,50 mm	117.0002Si
NiCr 3020	0,45 mm	6,5391 Ω/m	2,50 mm	117.0003Si
NiCr 3020	0,50 mm	5,2967 Ω/m	2,75 mm	117.0004Si
NiCr 3020	0,60 mm	3,6762 Ω/m	2,75 mm	117.0004Si
NiCr 3020	0,70 mm	2,7024 Ω/m	2,75 mm	117.0006Si
NiCr 3020	0,80 mm	2,0690 Ω/m	3,00 mm	117.0007Si
NiCr 3020	0,90 mm	1,6348 Ω/m	3,00 mm	117.0008Si
NiCr 3020	1,00 mm	1,3242 Ω/m	3,00 mm	117.0009Si
NiCr 3020	1,10 mm	1,0944 Ω/m	3,25 mm	117.0010Si
NiCr 3020	1,20 mm	0,9196 Ω/m	3,25 mm	117.0011Si
NiCr 3020	1,30 mm	0,78353 Ω/m	3,25 mm	117.0012Si
NiCr 3020	1,40 mm	0,67560 Ω/m	3,50 mm	117.0013Si
NiCr 3020	1,50 mm	0,58852 Ω/m	3,50 mm	117.0014Si
NiCr 3020	1,60 mm	0,51725 Ω/m	3,75 mm	117.0015Si
NiCr 3020	1,70 mm	0,45819 Ω/m	3,75 mm	117.0016Si
NiCr 3020	1,80 mm	0,40869 Ω/m	3,75 mm	117.0017Si

Technical Specifications:

Temperature range: - 60° C to + 350° C
Short duration: > + 450° C
Minimum bending radius: 5 x diameter

Construction:

Filler elements with coiled NiCr wire, multiple fiberglass wrappings PTFE banded, fiberglass braid, silicone impregnated

Characteristics:

UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing.

Application:

For preferred industrial applications with high mechanical consistency. Maintains temperature in containers / plants. Good flexibility.

Delivery size: 500 meter coils or spools.

Wire Type	Wire Diameter	Resistance at + 20° C *(approx.)*	Outer Diameter	Product Code
NiCr 3020	0,50 mm	23 Ω/m	3,75 ± 0,15 mm	119.0005
NiCr 3020	0,35 mm	35 Ω/m	3,75 ± 0,15 mm	119.0001
NiCr 3020	0,30 mm	100 Ω/m	4,15 ± 0,15 mm	119.0003

Technical Specifications:

Temperature range: - 60° C to approx. + 1.000° C
Short duration: approx. + 1.500° C
Minimum bending radius: 10 x diameter
Operating voltage: 300 V / 500 V
Test voltage: 1.800 V

Construction:

Flexible Ni or nickel-plated copper (NPC) wire, PTFE banding optional, MICA banding, alternatively with metal braiding (electrical and/or mechanical protection) polyurethane multiple impregnation, quartz glass braiding.

Characteristics:

Precision strands = excellent for machine stripping, UV resistant, resistant to chemical atmospheres, very robust, halogen and asbestos free, flame retardant and self extinguishing, extremely high heat-resistant.

Application:

For all high heat-resistant installations in heavy industry (smeltery, steel and glass melting ovens) and in the (petro) chemical industry with increasing requirements.

General information:

The impregnation used in this article is not suitable for all applications. The cable must could outgas.

Delivery size: 500 meter coils or spools.

Nominal Wire Size	Number and Diameter of Cores	Nominal Diameter	Nickel Weight	Outer Diameter	Product Code
3 x 0,50 mm²	16 x 0,20 mm	0,90 mm	14,4 kg	7,00 mm	77CNN3L050
3 x 0,75 mm²	24 x 0,20 mm	1,10 mm	21,6 kg	7,00 mm	77CNN3L075
3 x 1,50 mm²	30 x 0,25 mm	1,60 mm	43,2 kg	7,00 mm	77CNN3L150
3 x 2,50 mm²	50 x 0,25 mm	1,90 mm	72,0 kg	7,50 mm	77CNN3L250
3 x 4,00 mm²	56 x 0,30 mm	2,40 mm	114,0 kg	8,60 mm	77CNN3L400
9 x 0,22 mm²	7 x 0,20 mm	0,60 mm	19,8 kg	7,50 mm	77CNN9L022

We process from the following suppliers:
Stocko, Grote & Hartmann and AMP-Tyco.

Materials:
Polished brass, galvanized brass, tin-plated (glossy), tin-sprayed (dull), nickel-plated steel.

Cross sections:
Standard from 0,50 mm² to 2,50 mm² (max. 4,00 mm² with semi-automatics).

Please contact us for more information.

REFINEMENT

Next to our rich production program we can further be of service by offering you various improvements within the context of our technical capabilities.

We understand refinement to be servicing you with provided cables or and semi-manufactured articles, which we can further process for you.

Our service capabilities cover the following:

- Stranding your provided cores with filler (for optimal roundness of the cable) and production of a cable in accordance with your specifications.
- Further processing of your cable by applying a metal braiding of round wires (Nickel-plated copper, galvanized iron) V2A according to W.-Nr. 1.4301, V4A according to W.-Nr. 1.4401 and/or W.-Nr. 1.4571).
- Further processing of your cable by applying a PTFE or Polyimide (Kapton®) insulation.
- Further processing of your cable by applying a fiberglass braiding with or without identification threads.
- Manufacturing a combination cable (hybrid cable) with your provided components.

APPLICATION

Fiberglass yarn, multiple winding / colored

Multiple winding colored OSTERHOLD-fiberglass yarns are mainly used in the electrical industry for wire and profile wrapping.

Combined with suitable special wire impregnations, this results in insulation of the highest heat-resistant class.

Product description

Multiple winding OSTERHOLD-fiberglass yarns consist of two or more multiple winding yarns which are not rotated with one another.

The chemical and physical characteristics of the raw material used for the fiberglass yarns, are coordinated according to the main field of application for this material - the requirements of the electrical industry.

Type description

The type description of the multiple winding colored OSTERHOLD-fiberglass yarns is coded as follows:

Example:

24 x EC 5 - 5,5 tex T3 Z40

24 x ..... Number of fiberglass strands
E ..... Glass type (E-Glass alkali free)
C ..... Fiber type
5..... Nominal diameter of the fiberglass fiber in µ
5,5 tex .... Nominal refinement of the simple fiberglass yarns in tex (g / 1000 m)
T3..... Fiberglass type T3 (Vetrotex)
Z40..... Rotation direction / number of revolutions

Standards OSTERHOLD-Fiberglass yarns

	Thread Count												
Fiberglass	4 x	6 x	8 x	9 x	10 x	12 x	14 x	16 x	18 x	20 x	24 x	32 x	36 x
EC 5 - 5,5 tex	●	●	●		●	●	●	●	●	●	●	●	●
EC 5 - 11 tex	●	●	●	●		●		●	●	●	●	●	●
EC 7 - 22 tex		●				●			●		●		
EC 9 - 34 tex	●		●			●		●					

Standard indication is Vetrotex type simple T3.
Other yarn types and multiple windings are available upon request.

Delivery and packaging

Multiple winding, colored OSTERHOLD-fiberglass yarns are delivered spiral-wound with precision cross-winding, in goffered cases.

Spools are individually wrapped in foil and packed in cardboard cartons. Each carton bears a label indicating type, net weight, tare weight and control number.

Standard cases mm	Outer Dimension of spool Ø mm	Hub mm	Weight kg	Carton dimension Spools per carton 400 x 400 x 320 mm	550 x 277 x 297 mm
20 x 55	60	40	0,19	100 pieces	
30 x 70	75	55	0,30	100 pieces	
26 x 80	75	65	0,40		54 pieces
50 x 100	90	90	0,50		54 pieces

Storage

Multiple winding, colored OSTERHOLD-fiberglass yarns should be stored in a dry area at a temperature between + 16º C and + 25º C and a relative air humidity of 55% - 65%.

Mechanical Properties

	DIN Testing	E-Glass
Tensile Stretch %	53816	3,3
Tensile Strength (N/mm²)	53816	2.400
Elasticity (N/mm²)		73.000
Density (kg/dm³)		2,6

Electrical Properties

Fiberglass yarns draw out the high resistance, the high dielectric strength as well as the low values for the dielectric constant and the dielectric dissipation factor.

Outstandingly suitable for insulating electrical conductors.

		E-Glass
Dielectric constant at 10^6 Hz		6,5 - 7,7
Dielectric dissipation factor tg_δ at 10^6 Hz		15 - 20 * 10^4
Resistance (Ω x cm)	at + 20° C	10^{15}
	at + 250° C	10^{13}

Thermal Properties

Multiple winding, colored OSTERHOLD-fiberglass yarns are flame resistant. The mechanical characteristics are not affected by temperatures as low as - 100º C.

E-Glass

Linear expansion coefficients: α (K^{-1})		5 x 10^{-6}
Effective heat capacity: c (J/kg -K)		840
Thermal conductivity: W (m * K)		1
Rest tensile strength after temperature stress		
Duration: 24 hours at	+ 300° C	78
	+ 400° C	50
	+ 500° C	30
	+ 600° C	----
Littleton point (Softening point)		+ 840° C

Chemical Properties

Multiple winding, colored Osterhold-fiberglass yarns from E-glass are resistant to oils, fats, solvents and organic acids. The stability relevant to water is classified according to DIN 12111 under the best hydrolytic class 1.

We also deliver…

Fiberglass threads dyed in all the usual colors.

Fiberglass/Polyester Blended yarns in diverse strengths and blending proportions.

PRODUCT PROGRAM

Conductor materials

- Nickel-plated copper, red copper, tin-plated, silver-plated
- Brass
- Nickel
- Thermo alloys: Type J, K, L, N, S
- Nickel-Chromium alloys, according to the different ranges of application
- Other alloys

Insulations

- Fiberglass yarns/threads: Type E
- Fiberglass yarns/threads: Type S
- Quartz glass threads
- Silica threads
- PTFE (Sintered and un-sintered tapes)
- Polyimide (Kapton®) wrapping
- MICA-tape

Screenings and armourings

- Braiding from nickel-plated copper round wires
- Braiding from galvanized iron round wires
- Alu-/Pol-Foils (taped)
- Braiding from V2A round wires (W-Nr. 1.4301, food safe)
- Braiding from V4A round wires (W-Nr. 1.4401 and 1.4571)

APPLICATIONS OVERVIEW

OHH300
OHH350

- For wiring of electrical cookers, baking ovens, data storage units (night electricity), hotplates and other electrical appliances.

OHH450
OHH600
OHH1050

- For thermally higher loaded installations / wiring – connections for heating elements, sealing, furnaces, electrical heaters, etc.

OTHERMO..

- Thermocouples with solid or stranded conductors; various alloys.

OHD

- For preferred industrial applications with high mechanical consistency. Maintains temperature in containers / plants. Good flexibility.

OHWD

- For preferred industrial applications with high mechanical consistency. Maintains temperature in containers / plants. Good flexibility.

OSTERHOLD cores and wires exceed demanded standards in quality and insulation.

Contact us. We'll go with you "to the wire".

Details of operating voltage

Maximum stress unimpaired

The conductor cross section is to be selected in such a way that for the given load of the wiring nowhere and at no time over the permissible operating temperature one of the wires heats up.

The heating up and/or maximum stress of a cable or wire depend on its structure, the material properties and the operating conditions. Additional heat when bundled with other cables or wires, in heating channels, by sun exposure, etc. is to be considered.

As we are not aware of the concrete applications of our products, *the indicated values of the operating voltage are to be regarded as approximate values.* Assistance in determining the operating voltage supplies can be found in VDE 0298 part 4.

METAL CHARACTERISTICS

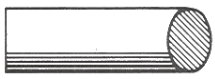
Wire structure (maximum single wire diameter and maximum resistance) is determined in accordance with the International Electronic Commission 60228 guideline. The number of wires is non-committal.

Material	Constant Temperature ° C	Peak Temp. ° C	Melting point approx. ° C	Density at + 20° C kg/dm³
Copper (red)	+ 150	+ 450	+ 1.085	8,89
Copper (nickel-plated)	+ 300	+ 500	+ 1.085	8,89
Nickel	+ 600	+ 900	+ 1.455	8,90
Nickel Chromium 30/20	+ 800	+ 1.000	+ 1.390	7,90
Nickel Chromium 60/15	+ 900	+ 1.100	+ 1.350	8,20
Nickel Chromium 80/20	+ 1.000	+ 1.200	+ 1.400	8,35
Galvanized iron	+ 600	+ 900	+ 1.540	7,90
Stainless steel	+ 600	+ 900	+ 1.540	7,90

CONSTRUCTION OF STRANDED CONDUCTOR

Cross section mm²	Diameter (mm) Cross section of wire (mm²) 1 x d	n x d	n x d	0,50 0,1963 n x 0,50	0,40 0,1257 n x 0,40	0,39 0,1195 n x 0,39	0,30 0,0707 n x 0,30	0,25 0,0491 n x 0,25	0,20 0,0314 n x 0,20	0,18 0,0254 n x 0,18	0,16 0,0201 n x 0,16	0,15 0,0177 n x 0,15	0,13 0,0133 n x 0,13	0,10 0,00785 n x 0,10	0,07 0,00385 n x 0,07	0,05 0,00196 n x 0,05
0,03	0,20														7	19
0,05	0,25													7	15	27
0,07	0,30														19	
0,10	0,35												7			50
0,125	0,40								4			7			30	
0,14	0,42										7			18	36	72
0,15	0,45							3						19	37	
0,20	0,50													25		
0,22	0,53						3		7							
0,25	0,56							5	8			14	19	32	64	128
0,34	0,64						5	7	11			19		42		
0,38	0,70	7 x 0,27			3						19	21		48	100	194
0,40									12						104	
0,50	0,80				4		7	10	16	19		28		64	130	256
0,60									19		30					
0,75	0,98	7 x 0,37			6		11		24			42		96	192	384
0,88		7 x 0,40			7											
0,93								19								
1,00	1,13	7 x 0,43	19 x 0,26				14		32		50	56	80	128	256	512
1,34							19		42							
1,38				7				28					105			
1,50	1,38	7 x 0,52					(19)	30	48			85		192	392	768
1,85							27	37								
2,00	1,60		19 x 037				29	42	65							
2,50	1,78	7 x 0,67			19		35	50	80			140		320	650	1.280
2,62							37									
3,00		7 x 0,74	19 x 0,45				(37)									
3,20							45	66				182				1.630
4,00	2,26	7 x 0,85	19 x 0,52				56	80	128			228		512	1.040	
5,25							75	105	165						1.370	2.690
6,00	2,76	7 x 1,05	19 x 0,64			49	84	122	192			342		756	1.560	

In. acc. with IEC 228 Class1 Class 2 Class 5 Class 6




AWG WIRE DIMENSIONS

In the United States wire dimensions are given in AWG (American Wire Guide).

Cross section mm²	Diameter mm	AWG
0,00203	0,051	44
0,00317	0,064	42
0,00487	0,079	40
0,00811	0,102	38
0,0127	0,127	36
0,0200	0,160	34
0,0324	0,203	32
0,0507	0,255	30
0,0804	0,320	28
0,128	0,405	26
0,205	0,511	24
0,324	0,643	22
0,519	0,813	20
0,823	1,024	18
1,31	1,29	16
2,08	1,63	14
3,31	2,05	12
5,26	2,59	10
8,37	3,26	8
13,3	4,12	6
21,2	5,19	4
33,6	6,54	2
42,4	7,35	1
53,5	8,25	1/0
67,5	9,27	2/0
85,0	10,4	3/0
107,2	11,68	4/0
127	12,7	250
177	15,03	350
253	17,96	500

AWG	Diameter mm	Cross section mm²
500	17,96	253
350	15,03	177
250	12,7	127
4/0	11,68	107,2
3/0	10,4	85,0
2/0	9,27	67,5
1/0	8,25	53,5
1	7,35	42,4
2	6,54	33,6
4	5,19	21,2
6	4,12	13,3
8	3,26	8,37
10	2,59	5,26
12	2,05	3,31
14	1,63	2,08
16	1,29	1,31
18	1,024	0,823
20	0,813	0,519
22	0,643	0,324
24	0,511	0,205
26	0,405	0,128
28	0,320	0,0804
30	0,255	0,0507
32	0,203	0,0324
34	0,160	0,0200
36	0,127	0,0127
38	0,102	0,00811
40	0,079	0,00487
42	0,064	0,00317
44	0,051	0,00203

Conversions from Centigrade to Fahrenheit and Fahrenheit to Centigrade

° F = ° C x 1,8 + 32
° C = (° F - 32) / 1,8

° C	° F
- 50	-58
- 40	-40
- 30	-22
- 24	-11
- 20	-4
- 15	5
- 10	14
- 5	23
0	32
5	41
10	50
16	61
20	68
25	77
30	86
35	95
40	104
45	113
50	122
60	140

° C	° F
70	158
80	176
90	194
100	212
110	230
120	248
130	266
140	284
150	302
160	320
170	338
180	356
190	374
200	392
210	410
220	428
230	446
240	464
250	482
537,7	1000

Length conversions

from	to	factor
Centimeter	Inch	0,3937
Centimeter	Foot	0,03281
Foot	Centimeter	30,48
Foot	Meter	0,3048
Inch	Centimeter	2,54
Inch	Meter	0,0254
Inch	Millimeter	25,4
Inch	Mile	0,00001578
Kilometer	Mile	0,6214
Meter	Foot	3,2808
Meter	Inch	39,3701
Meter	Yard	1,0936
Mile	Kilometer	1,6093

SPOOLS

Spool type	Ø Flange ca. mm	Weight ca. g
K-125	125	200
K-160	160	350
K-200	200	600
K-250	250	1.050
K-355	355	1.850
K-400	400	4.150
One-way spool	350	850

PACKAGING

Dimension in mm	Weight ca. g
250 x 250 x 218	400
355 x 355 x 250	640
390 x 305 x 305	660
400 x 250 x 250	500
500 x 400 x 260	980

Sender

Company: ..... Name: .....

Department: ..... Telephone: .....

Email: ..... Fax: .....

Description of construction

Material
solid, flexible
Other:

Conductor material
Copper: red, tin-plated, silver-plated, nickel-plated,
Pure nickel
Thermo alloy: .....
Heating wire: .....
Other: .....

Conductor cross section (stranded in mm²)
☐ 0,22 mm² ☐ 0,35 mm² ☐ 0,50 mm² ☐ 0,75 mm²
☐ 1,00 mm² ☐ 1,50 mm² ☐ 2,50 mm² ☐ 4,00 mm²
☐ 6,00 mm²
Other cross sections available upon request.

Conductor diameter (wire in mm)
☐ 0,20 mm ☐ 0,30 mm ☐ 0,50 mm ☐ 0,80 mm
☐ 1,00 mm
Other diameters available upon request.

Insulation materials
Fiberglass yarn, PTFE (taped), MICA (taped),
Polyimide taped (Kapton®)

Number of single wires
.....

Core coding
.....

Core stranding / pairs (2) / triples (3) / quads (4)
Total layer
☐ No ☐ Yes
lay-length ..... in mm
Other: .....
With filler: ☐ No ☐ Yes

Inner sheath
Fiberglass yarn, PTFE (taped), MICA (taped),
Polyimide taped (Kapton®)

Screening
Copper braiding (red copper, nickel-plated copper, …)
Other:

Armouring
Braiding from galvanized iron round wire or
stainless steel V2A ☐ (W-Nr.1.4301)
V4A ☐ (W-Nr.1.4401) ☐ (W-Nr.1.4571)

Outer sheath
Fiberglass yarn, PTFE (taped), Polyimide taped (Kapton®)

Outer diameter
..... in ca. mm

Electrical properties
Resistance: ..... Ω/km
Nominal voltage: V
Test voltage: V
Other: .....

Temperature characteristics
Constant temperature: ..... ° C
Short duration: ..... ° C
Targeted application: .....
Other: .....

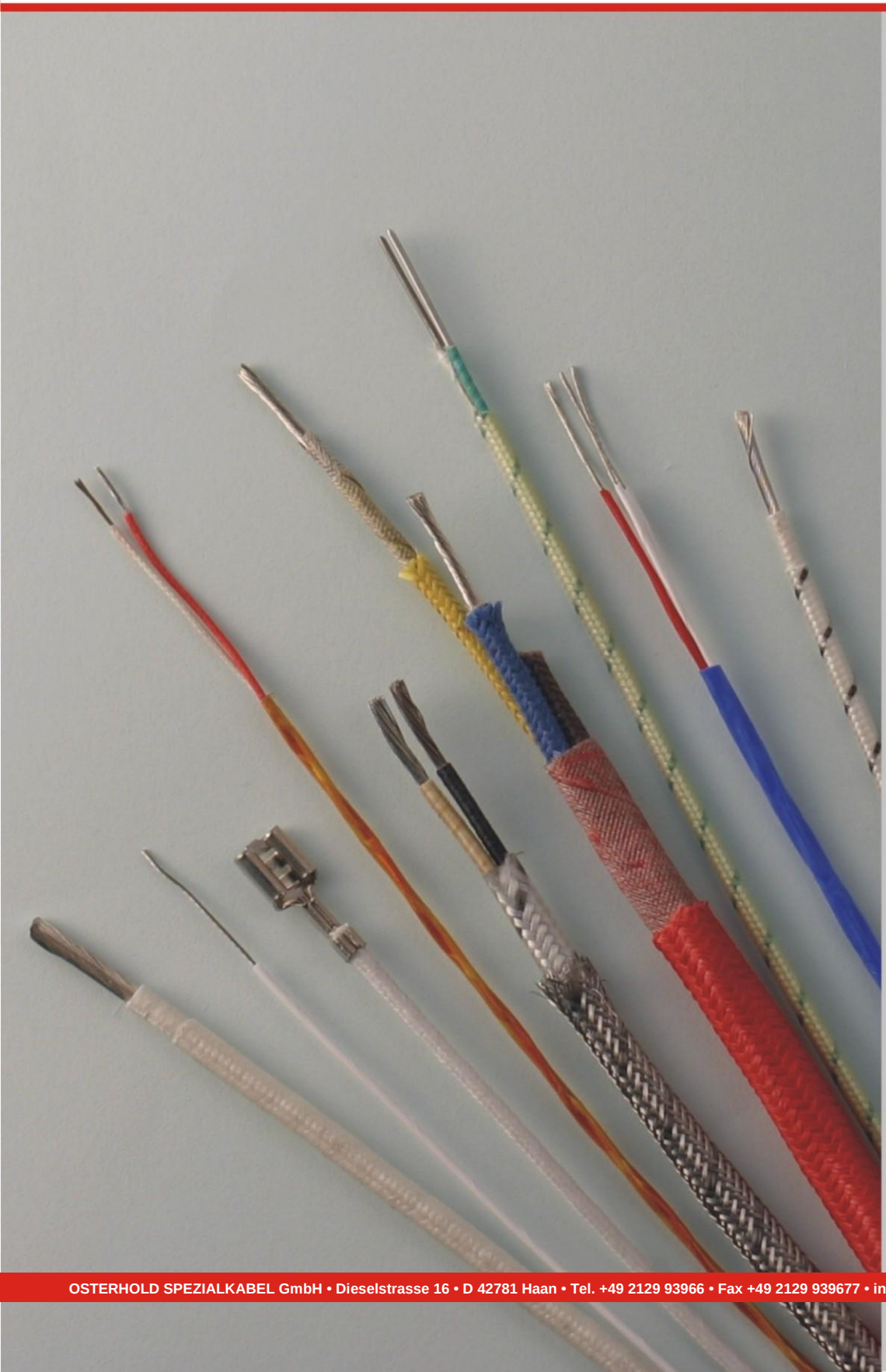
Other properties
.....

Request / Order quantity
.....

CORE COLOR COMPARISON

Core Count	New: HD 308 S2 validity date 01-04-2006 For fixed and flexible installation Wire solid or flexible	
1	b	Pole Conductor L
3	br b gr	Pole Conductor L
1	bl	Neutral Conductor N
1	gn/ye	Protective Conductor PE
	With green-yellow protective conductor	
3	gn/ye bl br	
4	gn/ye br b gr	
5	gn/ye bl br b gr	
	Without green-yellow protective conductor	
2	bl br	
3	br b gr	
4	bl br b gr	
5	bl br b gr b	

Color code: bl = blue, br = brown, b = black, gr = grey, gn/ye = green-yellow



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