

## Winding wires KD500 with ceramic insulation (500°C)

### No storage item

This ceramic wire has been developed in order to produce windings with greater functional reliability, i.e. they also retain their functionality by thermal overloading (peak 1000 °C).

The continuing success of this wire results that it is applied in high tech applications, more often in safety elements, as a precautionary measure.



### Applications:

Special windings in transformers, inductors, coils or sensors that must operate continuously in the low voltage range at higher temperatures of up to 500 °C (peak 1000°C). Different safety applications, resistance to a fire up to 600 °C, without deterioration (mechanical heating, short-circuit, heat hazards etc.).

### Composition:

Conductor:	Copper/Nickel plated 27%
	Different wire material upon request. It is possible to coat special wire material supplied by the customer. Tests will be made at the manufacturer.
Insulation:	Ceramic in thickness from 5 µm to 20 µm
Color:	grey
Sizes:	AWG 41 to AWG 18 resp. 0.07 mm to 1.0 mm
Linear Density:	as copper = 8.92 kg/dm <sup>3</sup> per km
Nickel migration:	KD500 is subject to nickel migration at temperatures >315°C. The effect is negligible on larger sizes but will be considerable on wire diameters smaller than 0.15 mm (AWG 34) after prolonged use (48 hours) with the consequence of an increase in resistivity.

### Temperature resistance:

Operatin temperature: -90°C bis +500°C (2500 h minimum)  
 Short term until 800°C (tested during 10 days respectively 240 h)  
 Peak at 1000°C

### Electrical data:

Test voltage 150V AC, respectively 212V DC, Test with wound wire with minimum bending radius = 20 x diameter, for application with bending radius < 20 x diameter please ask.  
 Breakdown voltage >150V AC  
 Resistivity max. 3 x 10<sup>-6</sup>Ω.cm at 20° C after ageing at 500°C

### Additional properties:

Moisture absorption:	The ceramic is hydrophilic. It might be impregnated when winding is finished.
Chemical resistance:	Inert to solvents, oil, organic material.
Radiation resistance:	High resistance.
Flammability:	Inflammable. At temperatures >1000°C wire may start to melt but will not burn.
Bending radius:	5 x external diameter (see table)
Halogen free:	Yes
Vacuum behaviour:	No outgassing

**Processing instructions:**

Ceramic greatly differentiates itself from normal wire insulation. It is very hard and sensitive to humidity. Thus, it requires special care during processing.



- KD500 wires have to be stored and implemented in a dry place.
- The winding must not be exposed to blows or impacts.
- No high tension forces must be used when winding, as given in the following table
- The bend radius can be a max. of 5 x the outside diameter (refer to the table).
- Wires shall not be unspooled overhead but axial preferably with constant tension force.

Under no circumstances must the wires be kinked. Visual inspection of the winding: In general, a bend radius that is too tight or kinking of the wire can be detected by cracks in the ceramic insulation that is detected as bleaching on the surface.

**Termination:**

The layer of insulation is very thin and adherent to the conductor. Standard stripping tools therefore cannot be used. Stripping can be done by the use of sandpaper with very fine grain.

**Note:** If a mechanical method is used with nickel plated copper, care must be exercised not to strip the nickel from the copper to insure a good weld.

**Connection:**

Ceramic wires can be connected by soldering with silver solder or by crimping or wrapping.

**Dimensions:**

Item number	Diameter [mm]	AWG sizes	Outside Diameter [mm]	Weight [g/km]	Length [m/ kg]
<b>KD500/007</b>	0.07	41	0.086	34	29 800
<b>KD500/010</b>	0.10	38	0.116	71	14 000
<b>KD500/012</b>	0.12	36	0.136	101	9 901
<b>KD500/015</b>	0.15	34	0.167	161	6 210
<b>KD500/017</b>	0.17	33	0.186	202	4 950
<b>KD500/020</b>	0.20	32	0.217	286	3 500
<b>KD500/025</b>	0.25	30	0.268	446	2 240
<b>KD500/030</b>	0.30	28	0.318	637	1 570
<b>KD500/035</b>	0.35	27	0.368	862	1 160
<b>KD500/040</b>	0.40	26	0.418	1 136	880
<b>KD500/045</b>	0.45	25	0.468	1 433	698
<b>KD500/050</b>	0.50	24	0.518	1 754	570
<b>KD500/055</b>	0.55	23	0.568	2 105	475
<b>KD500/060</b>	0.60	22	0.619	2 500	400
<b>KD500/065</b>	0.65	22	0.669	2 899	345
<b>KD500/070</b>	0.70	21	0.719	3 356	298
<b>KD500/075</b>	0.75	20	0.769	3 846	260
<b>KD500/080</b>	0.80	20	0.820	4 348	230
<b>KD500/090</b>	0.90	19	0.920	5 814	172
<b>KD500/100</b>	1.00	18	1.020	7 194	139

Diameter [mm]	Maximum Permitted Tension force [N]	Minimum Bending Radius [mm]	Resistance at 20°C [Ω/m]
7/100	0.23	0.45	7.795
10/100	0.47	0.60	3.818
12/100	0.67	0.70	2.652
15/100	1.06	0.85	1.697
17/100	1.36	0.93	1.322
20/100	1.88	1.10	0.954
25/100	2.95	1.35	0.611
30/100	4.24	1.60	0.424
35/100	5.77	1.85	0.312
40/100	7.54	2.10	0.239
45/100	9.55	2.35	0.189
50/100	11.78	2.60	0.126
55/100	14.25	2.85	0.106
60/100	16.96	3.10	0.090
65/100	19.91	3.35	0.078
70/100	23.09	3.60	0.068
75/100	26.51	3.85	0.059
80/100	30.16	4.10	0.047
90/100	38.17	4.60	0.038
100/100	47.12	5.10	0.032