CLEVERTEX®

HI-COND
Electrically conductive hybrid threads

CleverTex® HI-COND
Highly conductive hybrid sewing threads and yarns

- advanced solution for smart textiles and e-textile products

CleverTex® HI-COND - highly conductive hybrid sewing threads and yarns have been developed and are being continually improved within the framework of the applied R&D projects in the field of "smart" textiles. Our activities have been focused first of all on the integration of the electronic functional blocks and parts into textile products and their applications in the widest possible range of human activities.

CleverTex® HI-COND conductive threads are formed by a process of **multiple twisting of metallic microwires with a non-conductive textile material**, usually a high-tenacity polyester filaments. The result of this process is a “standard” sewing thread, which is fully compatible with all known and used textile technological processes like sewing, embroidery, weaving or knitting.

A significant advantage of this manufacturing concept is the **possibility of customization in terms of fineness, colour shade, electrical conductivity of individual threads.**

Most important features & main advantages of CleverTex® HI-COND threads

Application of CleverTex® HI-COND conductive threads brings main advantages in terms of electrical conductivity, wear stability and maintenance requirements for finished products, resistance to mechanical stress compared to competitive yarns produced by wounding the conductive fine wires around the conventional highly elastic yarn.

CleverTex® HI-COND conductive threads mainly show:

- excellent electrical properties, esp. low linear resistance in Ω/m
- high mechanical resistance
- resistance to maintenance stress (more than 50 washing cycles)
- full compatibility with standard textile manufacturing processes such as weaving, knitting and embroidering

CleverTex® HI-COND electrically conductive sewing threads are subject matter of the Czech utility model reg. No. 2015-31136 owned by VÚB Ústí nad Orlicí and UWB (University of West Bohemia) Pilsen.

Thread types based on metallic material applied

Trade name	Material composition	Fineness [Tex]	Optical diameter [mm]	Linear resistance [Ω/m]
HI-COND Steel art. 93	PES filaments/steel wires 70/30	38	0.22	560
HI-COND Steel art. 51	PES filaments/steel wires 87/13	40	0.25	1150
Trade name	**Material composition**	**Fineness [Tex]**	**Optical diameter [mm]**	**Linear resistance [Ω/m]**
HI-COND CA art. 85A-PUR	PES filaments/Cu_Ag wires insulated 12/88	68	0.18	3
HI-COND CA art. 85	PES filaments/Cu_Ag wires 12/88	65	0.16	3
HI-COND CA art. 53	PES filaments/Cu_Ag wires 47/53	51	0.23	6.5
HI-COND CA art. 105A-PUR	PES filaments/Cu_Ag wires insulated 25/75	70	0.21	3.2
Trade name	**Material composition**	**Fineness [Tex]**	**Optical diameter [mm]**	**Linear resistance [Ω/m]**
HI-COND CA art. 90/2	PA metallized filaments/Cu_Ag wires 70/30	85	0.29	6.6
Trade name	**Material composition**	**Fineness [Tex]**	**Optical diameter [mm]**	**Linear resistance [Ω/m]**
HI-COND Brass art. 25	PES filaments/brass wires 30/70	72	0.22	9
HI-COND Brass art. 27	PES filaments/brass wires 30/70	37	0.16	15

Note: optical diameter, linear resistance values represent the average value, i.e. currently measured value can be in the range +/- 5%

Package format - small spools 100 m, bobbins 250 m, 500 m

Application areas:

CleverTex® HI-COND threads are designed for the creation of fully functional conductive tracks, electrical circuits, various types of sensors, heating elements, antennas and will find application in the development and production of smart textiles and final products for various areas of human activity (home health care, protective clothing, wearable electronics, telemedicine, IoT, sport, fitness and leisure).
Moreover, these threads can be easily and reliably joined by soldering, crimping or resistive spot welding.
Significant applications also include textile connecting single- and multi-track conductive elastic ribbons which can be successfully used as bus-bars.

Linear electrical resistance in Ω/1 m

Smart textile applications **Electromagnetic shielding** **Antistatic protection**

1 10 10^2 10^3 10^4 10^5 10^6 10^7 10^8 10^9 10^{10} 10^{11}

CleverTex® conductive hybrid threads

HI-COND Brass
HI-COND CA

HI-COND Steel

metal coated fibres

carbon containing fibres

CLEVERTEX®
SPECIAL, PROTECTIVE AND FUNCTIONAL TEXTILES

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