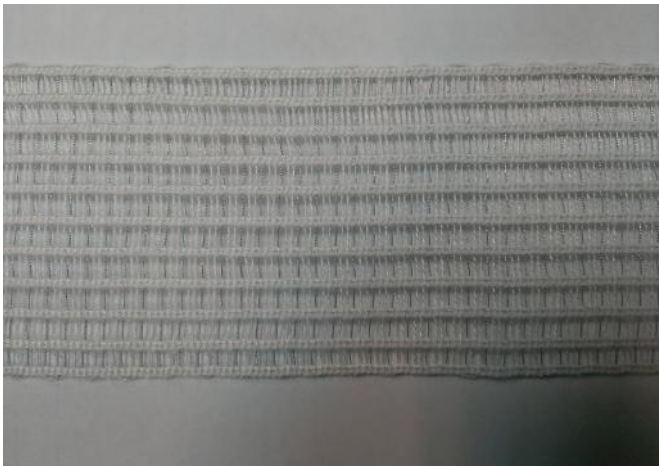




## Non- Carbon Fiber Electrical Heating Textile

### Introduction:

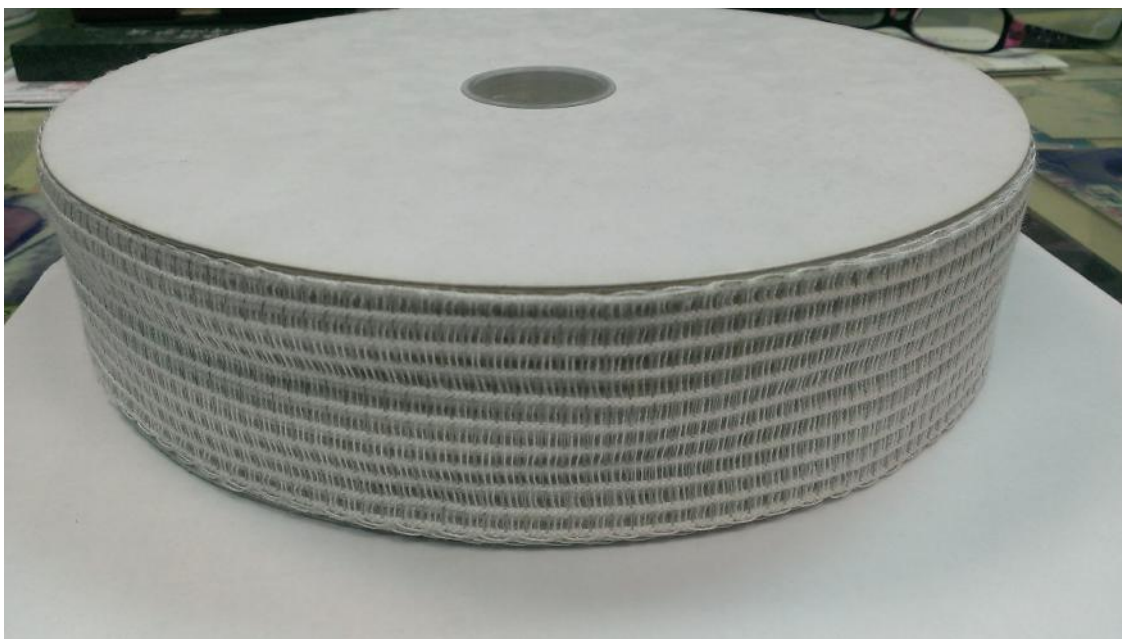
This **Heating Textile** is a new generation electrical heating system which is specially designed for mobile heating, energy saving and safety orientated requirements with DC power. The Ultra Heating Fabric adopts an advanced smart textile technology. A patented **Metal Conductive Yarn** is introduced to the Fabric. The conductive yarn is very fine (the most fineness can go to 0.27 mm diameter in present commercial grade) and strong. The conductive yarn can be easily enhanced in conductivity, strength, and thermal resistance in our advanced design system to meet customer requirements. The metal conductive yarn is perfectly integrated with the Fabric by textile processes. Hence, the Heating Textile is superior soft, light, thin and strong. The most importance is the Textile can be connected with connector or cable by traditional electrical skills, and the connection has higher reliability and yield rate than carbon fiber or metal plating polymer yarn which is widely used as the heating element nowadays.



\* HEATING TEXTILE (5 cm wide)



\* USB HEATING PAD



\* HEATING TEXTILE ( SPOOL )

## PATENTS

1. Conductive yarn capable of withstanding dyeing, finishing and washing

Issued patents:

TW M371733

CN 201485574U

Pending application: US 12/ 787, 378

2. Flexible heating element

Pending applications:

TW 099146482

CN 201120008487.x

## THE REASONS WHY CHOOSE US

### Our Competitive Advantage

1. USB Drive with 5V (Computer/ power bank can drive it quickly).
2. Raise to desired temperature in 5 seconds.
3. DC power, safe, no electromagnetic.
4. Resist to rubbing and squeezing.
5. No production loss.
6. Even and stable heating temperature
7. Easy to proceed /use
8. Lower cost
9. Reach & RoHS
10. Green material, low energy consumption.

Basing on the above advantages, the following information is given for easier comparison between DC power heating/ AC power heating and the efficiency of the products on the market.

Heating Type	DC Power Heating	AC Power Heating
Heating Element	<ol style="list-style-type: none"> <li>1. Carbon Fiber/Carbon Fabric</li> <li>2. Flexible Printed Circuit Board( Film Heater)</li> <li>3. Stainless Steel Fiber</li> </ol>	<ol style="list-style-type: none"> <li>1. Heating Wire</li> <li>2. Carbon Fiber/Carbon Fabric</li> </ol>
Merchandise	<ol style="list-style-type: none"> <li>1. Small and Medium Size Blanket</li> <li>2. Heating Pad</li> <li>3. Heating Jacket</li> </ol>	Large and Medium Size Blanket
Applied Voltage	7.5~12 Volt	110~240 Volt
Electromagnetic Radiation	Low Risk	In Doubt
Safety Design	No strict regulation needed	Need to meet strict regulation
Energy Consuming	Low	High
Weight	Light	Heavy
Retailer Price	About 80~150 USD in Taiwan	About 30~90 USD in Taiwan

From the above comparison, we get the conclusion that the ordinary DC power heating is higher priced but energy safe and real safer.

Why ordinary DC power heating is higher priced.

1. The heating element can not be welded directly to cable or PCB, and an extra welding solution such as terminal mounting are needed.
2. The material property of the heating element is fragile, hence an extra safety solution is required.
3. Most of manufacturers proceed the layout of the heating element by handwork or by expensive equipment.
4. The cost of raw material is higher than the traditional heating wire.

### Products already on market



- The layout of carbon fiber (hand- made)      \* The heating film

Both of the above are very expensive and broken/ damaged easily.

- **The following is the comparison among different DC power heating**

<b>Heating Element</b>	<b>Material behaviour</b>	<b>Welding</b>	<b>Material Cost</b>	<b>Production</b>
<b>Carbon Fiber Carbon Fabric</b>	Brittle, it could be partially broke in layout process or in using. The broken could cause variation of conductivity and seriously effect heating performance. Hence, It needs extra protection.	It can not be welded with cable or PCB directly. Hence, an extra terminal is required. However, manufacturer must pay more attention on the terminal mounting quality. Bad quality could cause safety issue.	Raw material source is limited. Price depends on quality.	Most of manufacturers adopt manual layout. Hence, most of manufacturers are in emerging countries, specially in China.
<b>Flexible Printed Circuit Board (Heating Film)</b>	The circuit printing thickness is very thin. Hence, bending angle of the flexible board is limited.	It can be welded with cable and PCB.	Raw material is expensive.	Special equipments is required. The operation cost is very expensive.
<b>Stainless Steel Fiber</b>	Brittle, it could be partially broke in layout process or in using. The broken could cause variation of conductivity and seriously effect heating performance. Hence, It needs extra protection.	It can not be welded with cable or PCB directly. Hence, an extra terminal is required. However, manufacturer must pay more attention on the terminal mounting quality. Bad quality could cause safety issue.	It is very special raw material and expensive. The source is very limited.	Most of manufacturers adopt manual layout. Hence, most of manufacturers are in emerging countries, specially in China.
<b>Our Metal Conductive Yarn (MCY)</b>	<p>1. The layout of the MCY is a heating fabric. Thus, the layout is very light and flexible, but tough. It can resist complicated stresses.</p> <p>2. The composite structure design of the MCY can provide DC and AC power heating applications through different combinations of metal and polymer. For example, the MCY uses high performance polymer such as PBO as the core, then the MCY can be heated to 500°C.</p>	The MCY can be welded directly with cable or PCB, and don't need any extra welding and safety solution.	X	The MCY and the heating fabric are invented and made in Taiwan. The quality is ensured.

## The diagram about the temperature and the length of textile

Design references:

Testing conditions:

(1)The width of the Heating Textile is 5 cm

(2)The diameter of metal conductive yarn is about 0.27 mm

(3)The pitch of the conductive yarn in the Fabric is about 4 mm

(4)The input voltage to the Textile is 5, 7.4, 9, 12 Voltage, respectively.

**Table 1 (INPUT, VOLTAGE: 5V)**

Length of the Textile	4cm	4.8cm	5.2cm	6.0cm	6.8cm	7.6cm	8.4cm	9.2cm	10.4cm
Current, A	1.5	1.3	1.2	1.05	0.95	0.9	0.86	0.80	0.74
Temperature, °C	130	95	88	80	68	60	52	46	40

**Table 2 (INPUT, VOLTAGE: 7.4V)**

Length of the Textile	7.2cm	8cm	8.8cm	9.6cm	10.4cm	11.2cm	12cm	12.8cm
Current, A	1.3	1.12	1.07	1.05	1.0	0.95	0.9	0.85
Temperature, °C	115	95	90	84	75	71	65	63

**Table 3 (INPUT, VOLTAGE: 9V)**

Length of the Textile	8cm	8.8cm	9.6cm	10.4cm	11.2cm	12cm	12.8cm
Current, A	1.3	1.25	1.18	1.1	1.06	1.02	1.0
Temperature, °C	110	108	100	91	86	82	73

**Table 4 (INPUT, VOLTAGE: 12V)**

Length of the Textile	9.6cm	10.4cm	11.2cm	12cm	12.8cm	20cm	32cm	40cm
Current, A	1.4	1.33	1.27	1.25	1.22	0.9	0.66	0.52
Temperature, °C	123	110	106	104	102	80	55	4

## Our standard spec.

- **Textile wide 5 cm :**

1. Spec. No.: 511- 4

Wide: 5cm

Warp: 11 ends

Material: Polyester

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $4 \pm 0.1$ mm

Temperature conditions: Polyester: 70 °C / 158 °F (Soft point)

Metal Conductive Yarn: 200 °C / 392 °F

Put up: 100M/ roll, 6 rolls/ bag, 2 bags/ carton (1,200M/ Carton)

2. Spec. No.: 521- 4

Wide: 5cm

Warp: 21 ends

Material: Polyester

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $4 \pm 0.1$ mm

Temperature conditions: Polyester: 70 °C / 158 °F (Soft point)

Metal Conductive Yarn: 200 °C / 392 °F

Put up: 100M/ roll, 6 rolls/ bag, 2 bags/ carton (1,200M/ Carton)

3. Spec. No.: N511- 4

Wide: 5cm

Warp: 11 ends

Material: Nomex

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $4 \pm 0.1$ mm

Temperature conditions: 200 °C / 392 °F

Put up: 50M/ roll, 6 rolls/ bag, 1 bags/ carton (600M/ Carton)

- **Textile wide 12 cm :**

1. Spec. No.: 1249- 4

Wide: 12 cm

Warp: 49 ends

Material: Polyester

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $4 \pm 0.1$ mm

Temperature conditions: Polyester: 70 °C / 158 °F (Soft point)

Metal Conductive Yarn: 200 °C / 392 °F

Put up: 50M/ roll, 2 rolls/ bag, 4 bags/ carton (400M/ Carton)

2. Spec. No.: 1249- 10

Wide: 12 cm

Warp: 49 ends

Material: Polyester

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $10 \pm 0.1$ mm

Temperature conditions: Polyester: 70 °C / 158 °F (Soft point)

Metal Conductive Yarn: 200 °C / 392 °F

Put up: 50M/ roll, 2 rolls/ bag, 4 bags/ carton (400M/ Carton)

• **Textile wide 30 cm :**

1. Spec. No.: 30121- 5

Wide: 30 cm

Warp: 121 ends

Material: Polyester

Material of Metal Conductive Yarn: Nomex & Copper alloy

Metal Conductive Yarn pitch:  $5 \pm 0.1$ mm

Temperature conditions: Polyester: 70 °C / 158 °F (Soft point)

Metal Conductive Yarn: 200 °C / 392 °F

Put up: 50M/ roll, 1 rolls/ bag, 4 bags/ carton (200M/ Carton)