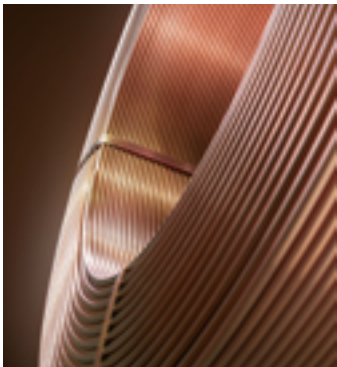
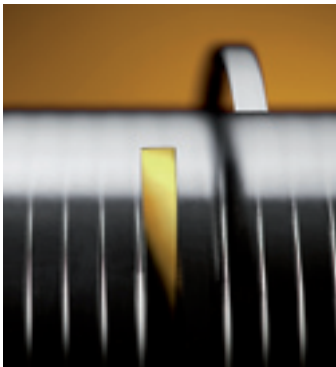
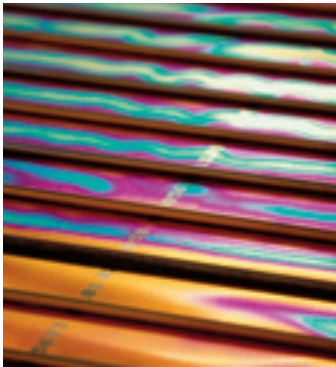
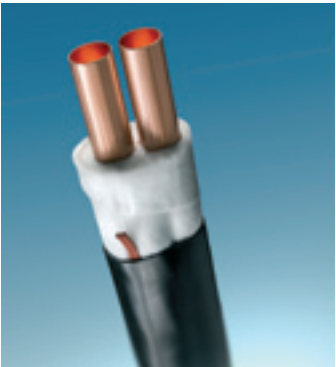
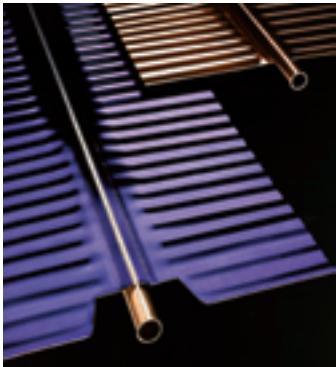
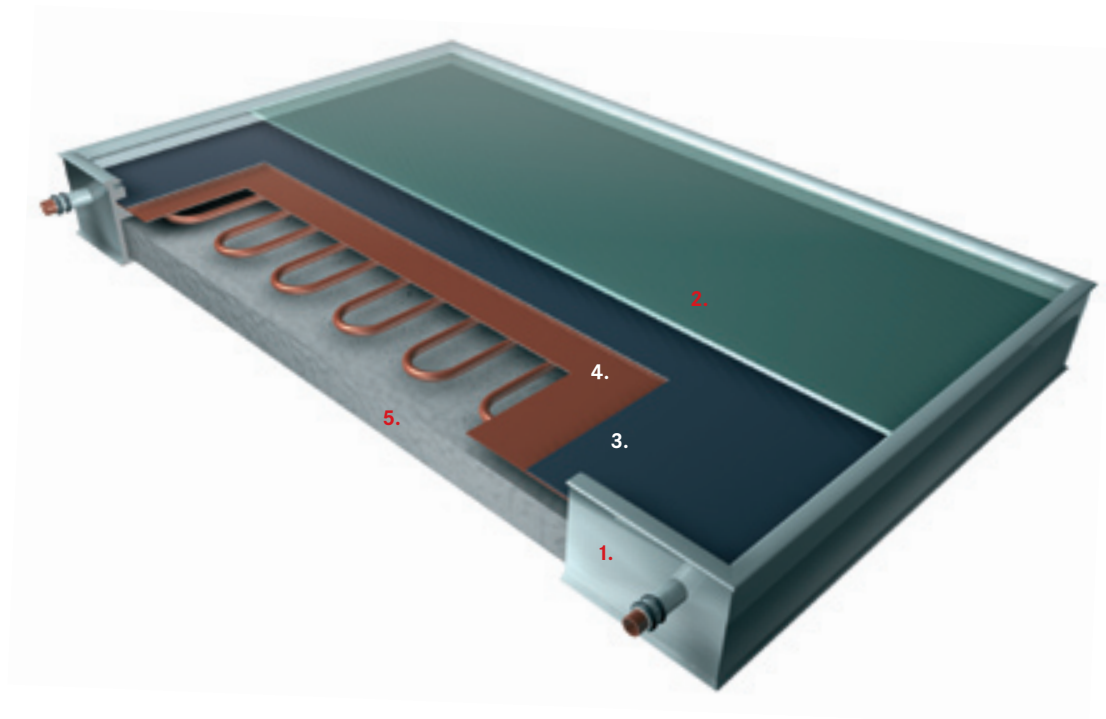
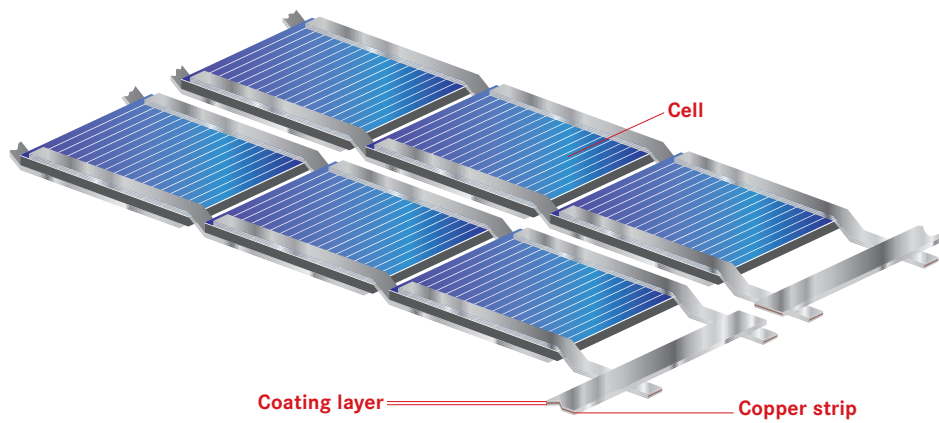


KME Germany GmbH & Co. KG  
High-Tech Copper Products for Solar Systems  
[GB]



# High-Tech Copper Products for Solar Systems



1. Outer frame (aluminium)
2. Transparent cover (safety glass)
3. Absorber coating
4. Copper sheet with integrated copper tubes
5. Thermal insulation

**KME offers a wide range of products for industrial applications and for many different customers in a large variety of industries. The product range includes rolled material – sheets and strips made from copper and copper alloys –, copper tubes for industrial applications, extruded and drawn products, connectors and products for maritime applications. Take advantage of the many different application-oriented solutions based on our material – copper.**

As copper is an exceptionally good heat conducting and temperature resistant material, it is ideal for all the latest and traditional connection processes for solar tube and solar strip contacts in the manufacture of solar collectors. Copper is an ideal material for very demanding ultrasonic and laser welding as well as thermal connection techniques (brazing, soldering, welding).

Various special coatings on the copper solar strip ensure that the sunlight is absorbed and converted in a highly effective and durable manner.

Copper offers the added advantage of a valuable recycling material in high demand throughout the world. This benefit ensures lifelong sustainability for solar components manufactured from copper.

KME copper is an important material for solar systems and is used for manufacture of the following components:

- **Flat collectors and tubular collectors**
- **Coated solar absorber strips**
- **Tubes for the thermal transfer fluid circulation system in the solar collector and in the connection tubes**
- **Fittings for the connection technology (solar press fittings, soldered fittings)**
- **Tube bundles for solar installations/connection tubes**
- **HP Ribbons® for PV modules**
- **Strips for junction boxes in PV systems**

KME – the European copper professional with years of experience in solar systems.

## TECSTRIP®\_solar

High-Tech Copper Strips for Industrial Solar Solutions

High-quality solar thermal collectors with specially coated absorbers based on copper strips. KME has developed a brand name copper strip called **TECSTRIP®\_solar** that is especially suitable for this type of application. A special surface grade developed with a high level of expertise, combined with narrow dimensional tolerances and an outstanding surface evenness ensure that the coating and absorbers are produced to the highest quality.

**TECSTRIP®\_solar** is ideally suited for all conventional welding and soldering techniques in the area of absorber construction and is the perfect system component in combination with **TECTUBE®\_solar**.

*The product for professionals who want only the best.*

## TECTUBE®\_solar

High-Purity Copper Tubes for Industrial Solar Solutions

So that the heat can also be utilized, the reverse sides of the absorbers are connected to copper tubes. In these tubes the solar heat is transferred directly to the fluid circulating in the tube system. **TECTUBE®\_solar**: Hard tubes with a high level of cleanliness ensure highest quality connections to the absorber strip. Suitable for ultrasonic and laser welding, available in straight lengths or 135–560 kg coils. These are top performers that establish an international benchmark.





## HP Ribbons®

High-Performance Ribbons for Photovoltaic Systems

KME offers two different manufacturing technologies:

- **HP Ribbons®** – made from copper wires
- **HP Ribbons®** – made from copper strips

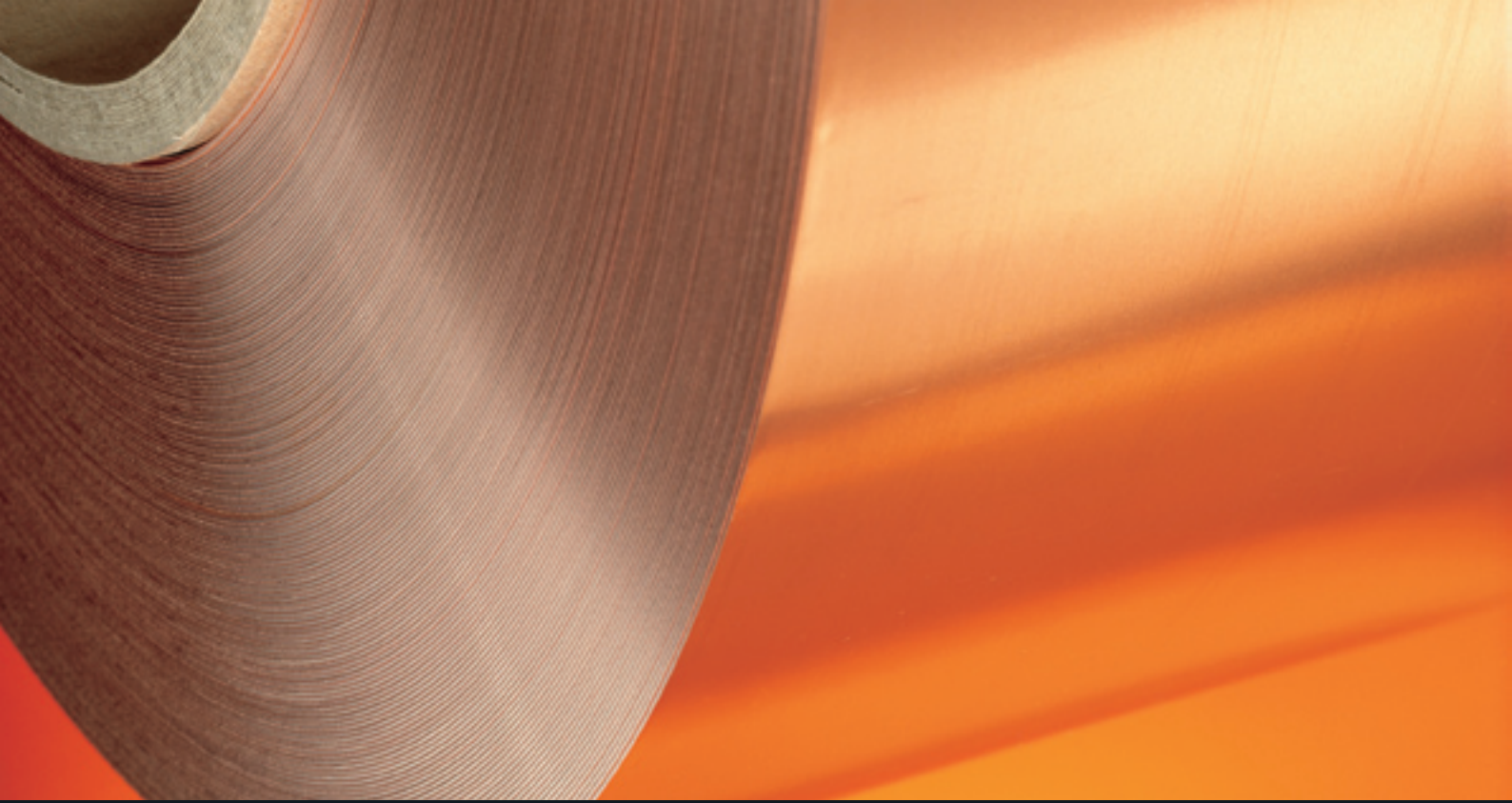
We demand high performance with regard to quality and workability in the PV industry. For this reason, KME has invested in a completely new production line at KME Italy S.p.A. and developed its production facilities at KME Germany AG & Co. KG. Now we are pleased to supply **HP Ribbons®** in superior quality in terms of chemical composition, mechanical properties, narrow tolerances and high straightness to the PV industry.

## WICU® Solar and WICU® Solar Duo

Connection Lines for Solar Technology

The complete system from KME for solar thermal systems: WICU® Solar Duo consists of two perfectly insulated copper tubes wrapped with PE tape and fitted with an electric cable to provide power to the sensor. The system is protected on the outside by a flexible and especially hard-wearing PE sheath. It does not distort at high temperatures, it is absolutely impermeable to gas and is also UV-resistant.





*KME's **TECSTRIP®**\_solar copper strips and **TECTUBE®**\_solar copper tubes are harmonised intermediate products for the industrial manufacture of high-quality solar collectors. The homogeneous use of our copper products **TECSTRIP®**\_solar and*

## TECSTRIP®\_solar

### Product range – TECSTRIP®\_solar – copper strips for solar thermal systems\*

Material	CU-DHP
Sizes	≥ 0.18 x 50 – 1250 mm ≥ 0.12 x 50 – 1000 mm
Availability	Copper strips in coils
Mechanical properties	EN 1652 R240
Surface	Ra 0.15 – 0.30 μ Residual carbon: max. 0.10 mg/dm <sup>2</sup>
Surface protection	With paper inserts
Batch sizes	≤ 700 mm strip width; 3.5 t/multiples > 700 mm strip width; 12 t/multiples
Coil weight	max. 11 kg/mm strip width
Inner diameter of coil	≤ 700 mm strip width; inside diameter 300/400 mm > 700 mm strip width; inside diameter 500/600 mm
Packaging	Special packaging for best surface protection

\*Alternative requirements on request



**TECTUBE®\_solar** offer optimum conditions for extremely economical production of copper absorbers for solar collectors that you can vouch for with your good name for many years to come.

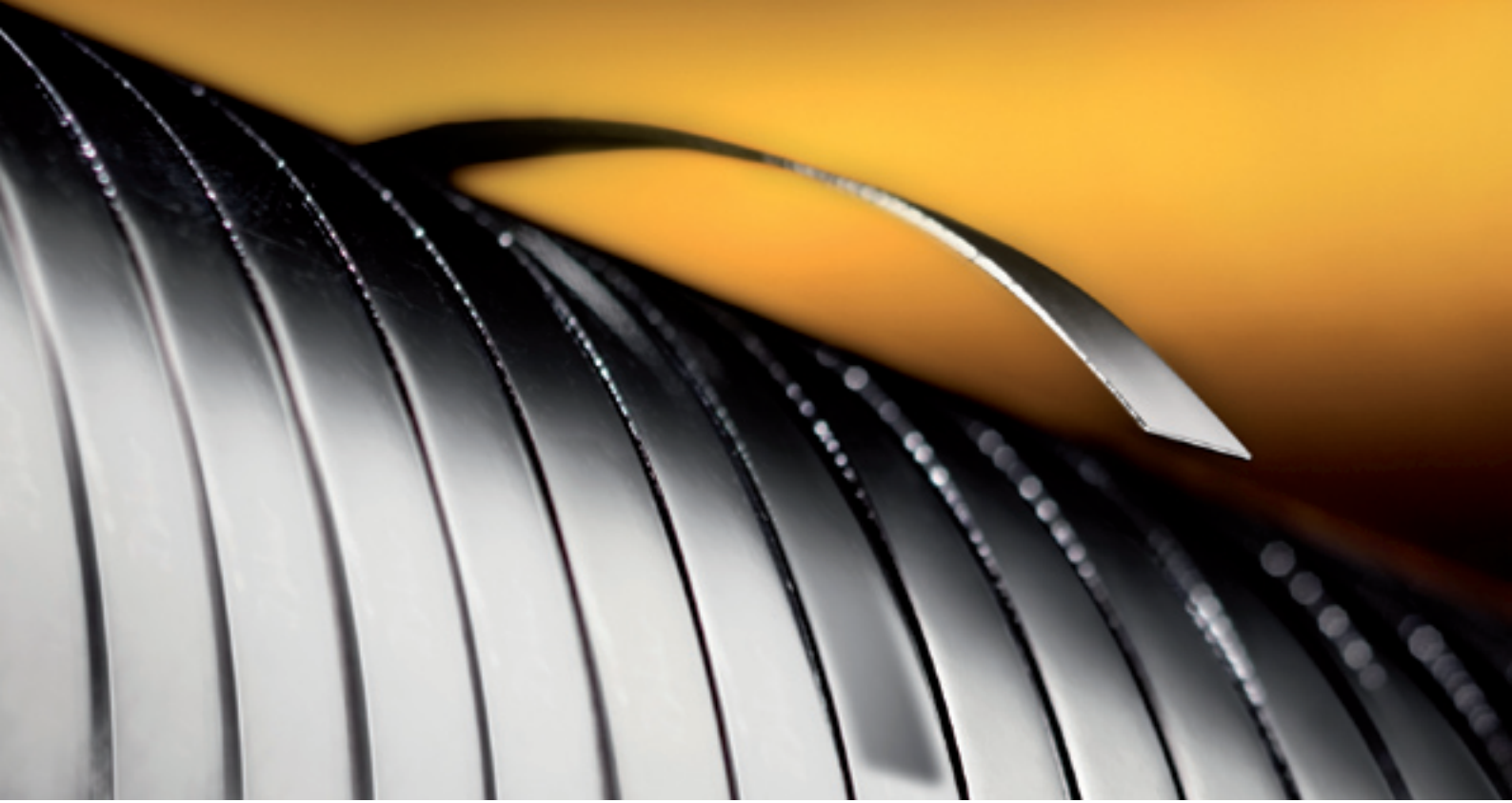
## TECTUBE®\_solar

### Product range – TECTUBE®\_solar – copper tubes for solar thermal systems\*

<b>Material</b>	CU-DHP
<b>Sizes</b>	<b>Outside diameter</b> 6 / 8 / 9 / 10 / 11 / 12 / 18 / 22 mm
	<b>Wall thickness</b> 0.4 to 0.8 mm
<b>Availability</b>	LWC (level wound coils) coil weight 145 kg/225 kg/450 kg/560 kg
	Straight lengths (3 m to 8 m)
<b>Material strengths</b>	"Soft" or "hard" coils in 4 special grades
	Straight lengths "hard"
<b>Dimensional tolerances</b>	EN 12449
<b>Dimensional tolerances</b>	Suitable for the respective connection technology strip/tube
<b>Minimum quantities</b>	approx. 2.5 t per size and delivery
<b>Coil geometry</b>	<b>Coil outside diameter</b> max. 1160 mm
	<b>Coil inside diameter</b> 610 +/- 10 mm
	<b>Coil height</b> 200-650 mm by arrangement
<b>Coil geometry</b>	<b>Coils:</b> On wooden pallet 1.2 x 1.2 m with cardboard inserts, stretched with PE film.
	<b>Straight lengths:</b> Loose, in wooden crates

\*Alternative requirements on request





## **HP Ribbons® – Precision in Tinning and Straightness**

KME supplies **HP Ribbons®** with hot-dip tinned surfaces and precise straightness in top quality.

- The tinning is on all sides of **HP Ribbons®** made from wire.
- The lean production process is characterised by high flexibility in terms of sizes and surfaces.  
Precise direct measurement instruments assure a stable production process with a constant product quality.
- **HP Ribbons®** made from strips stands for 40 years experience in hot-dip tinning.  
The edges are slit and covered with a very thin coating through the slitting process.
- A smooth surface and narrow tolerances on the coating can be provided.
- Several pure tin and tin-alloyed surfaces and coating layers can be produced.
- The high precision in terms of chemical composition and coating layer comply with the requirements for top-quality industrial production of PV modules.

Furthermore, all **HP Ribbons®** from KME are characterised by a very high straightness. This important quality feature for high-performance PV Ribbons ensures our customers an excellent standard of quality and efficiency in the production of PV modules. Customisation of high quality industrial products is our strength and passion.

**HP Ribbons® – Leading in Power.**

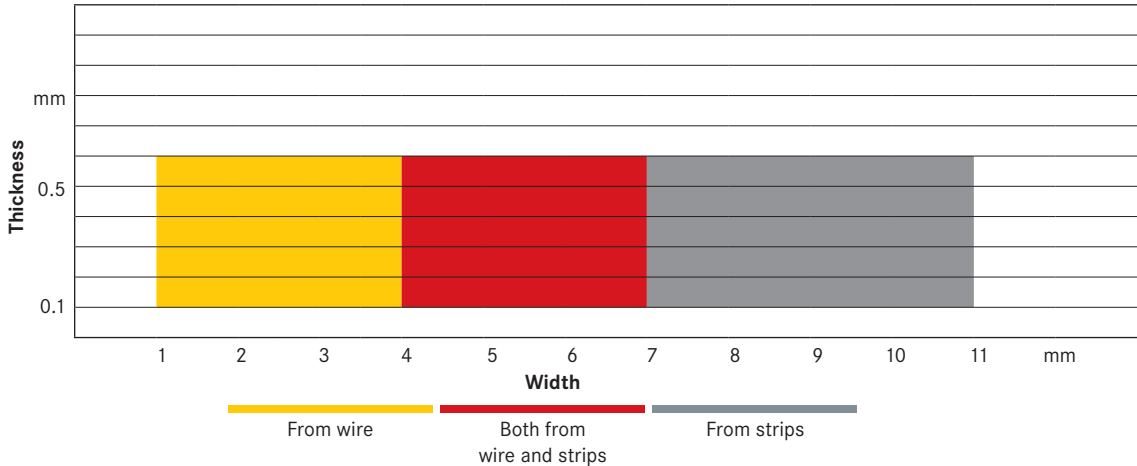


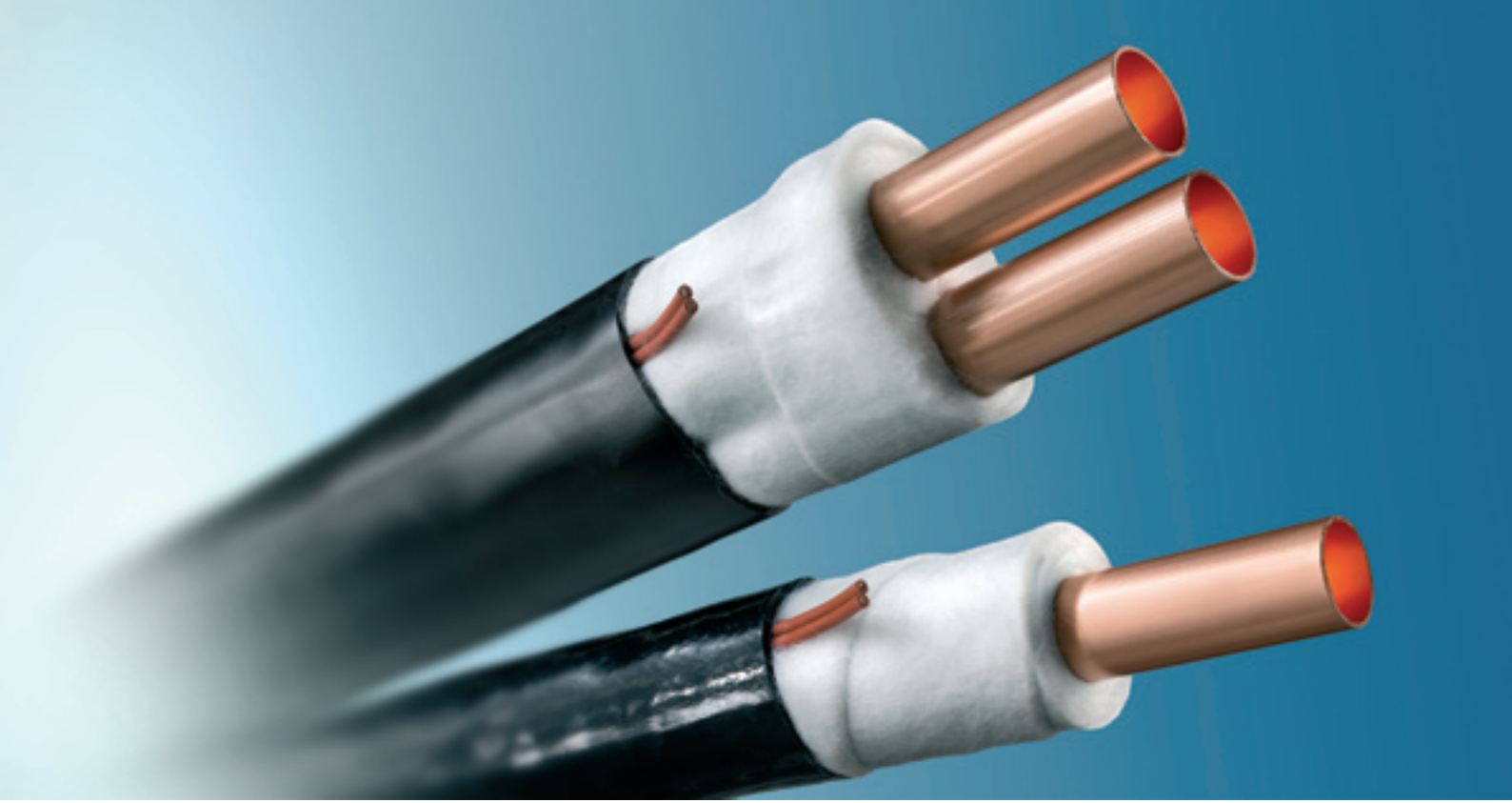


**Production range for HP Ribbons® \***

	From wire	From strips
Alloys	Cu-ETP, Cu-OF on request	Cu-ETP, Cu-OF on request
Width	1-4 mm (+/-0.08) 4-7 mm (+/- 0.12)	4-11 mm (+/-0.1)
Thickness	0.1-0.6 mm (+/- 8 µm)	0.1-0.6 mm (+/-8 µm)
Coating alloys	Sn, SnPb, SnPbAg, SnAg	Sn, SnAg3.5
Coating layers	5-50 µm	5-25 µm
Elongation A50	> 30%	> 30%
Yield strength	< 120 Mpa / < 90 Mpa	< 140 Mpa
Camber	< 3 mm/m up to 3 mm width < 5 mm/m up to 7 mm width	max. 3 mm/m
Delivery form	Spools and pancakes	Pancakes, spools on request

\* The table shows the general production range.  
Detailed requirements to be checked on request.





## WICU® Solar and WICU® Solar Duo

### Connection Lines for Solar Technology

#### *Product benefits*

- *factory-insulated, including control cable*
- *high insulation values*
- *easy, quick and clean to install*
- *maintenance free*
- *ideally protected against the effects of weather, corrosion and mechanical damage*
- *extremely durable and UV-resistant.*
- *choice of tube bundles or single tubes*
- *ISO 9000 certified*
- *halogen free*

#### **Delivery on drums**

- Lengths 60, 150 and 300 m
- Shorter lengths will soon be available.

#### **Thermal insulation**

- Thermal nonwoven temperature-resistant to 180°C, for short periods to 200°C
- Chloride content < 7.8 mg/kg
- Thermal conductivity  $\lambda$ -value  $\leq 0.037 \text{ W}/(\text{m}\cdot\text{K})$

#### **Control line**

- Construction 2 x 0.75 mm<sup>2</sup>
- Silicone lines Temperature range -50°C to +180°C, for short periods +200°C
- Nominal voltage 500 V
- Testing voltage 2000 V
- Insulation resistance 200 W/(m•K)
- Strand construction, fine wire strands acc. to VDE 0295 Class 5

#### **Sheath material**

WICU® Solar and WICU® Solar Duo are protected by an extremely durable, seamlessly extruded outer sheath made from soft polyethylene PE-LD 2YM2, black, halogen-free and UV-resistant.

## KME – what else?

- Europe: The home market of the solar industry and the KME Group
- Worldwide KME sales organisation
- Top quality of our semi-finished copper products
- Very comprehensive production spectrum
- Individual delivery and logistics services by arrangement
- Extensive technical advice for solar strips and solar tubes
- Many years of experience in the solar industry
- Extensively certified
- Membership and active involvement in BSW, ESTIF, DSTTP, ESTTP and other solar industry associations

## Copper – what else?

- Highest thermal conductivity and lowest thermal resistance of all industrial materials
- Ideally suited for all conventional joining techniques (welding with ultrasound, laser, TIG, plasma; soldering/brazing)
- Uniform expansion behaviour in the Cu tube/Cu strip system in case of thermal loading
- Good corrosion resistance in the entire solar absorber
- Excellent ageing resistance under heat and sunlight, UV light
- Especially high energetic degree of efficiency with Cu absorbers
- Only positive long-term experiences with copper absorbers for more than 30 years
- Solar circulation systems made from copper are state of the art, like the time-tested copper tubing systems used in domestic plumbing, heating and air conditioning systems
- Copper braze fittings and copper press fittings are an everywhere available and well accepted connection technology
- In terms of durability and its low creep resistance, copper is extremely suitable for the high operating and stagnation temperatures of solar collectors. Screw connections (e.g. locking ring; beading, ...) especially require that the material has long-term stability.
- Allows the use of ultrasonic welding at high speeds and at low costs of processing and machine investment
- Easy to bend and shape
- The copper strips can be easily coated by the coating industry.
- Copper has a recrystallisation temperature (softening temperature) above the max. stagnation temperature of the solar collector.
- Cu strips/Cu tubes are excellent recycling materials with particularly high purity and value. Full copper absorbers can be completely recycled at the end of their service life.



**KME Germany GmbH & Co. KG**

*Industrial Tubes*

P.O. Box 3253

58690 MENDEN

Carl-Benz-Str. 13

58706 MENDEN

GERMANY

Fon +49(0)2373 / 161-0

Fax +49(0)2373 / 161-249

info-industrial-tubes@kme.com

www.kme.com

*Technical:*

Ulrich Naumann

Fon +49 (0) 2373 161-603

ulrich.naumann@kme.com

*Commercial*

Johannes Pohl

Fon +49 (0) 2373 161-268

johannes.pohl@kme.com