

mkM
we live copper

Tubes
HETCOOL[®]-plus



OUR ASPIRATION

Cool. Cooler. HETCOOL[®]-*plus*.

Copper can cope with cold effortlessly. When other materials begin to become brittle or porous, copper keeps on going and can withstand temperatures as low as -269 °C without deforming. Copper is an outstanding low temperature material used especially often for refrigeration and air conditioning and for medical gas supply. Copper is the material of choice for most refrigerants; the exceptions are defined in law and must be observed. Copper also retains its resilience when the thermometer rises: temperatures of up to +250 degrees are no problem for the red metal.

Copper's bacteriostatic properties – it reduces germs and is antibacterial – are the reason why hospitals and medical facilities rely so heavily on it. It is used in piping systems (where Legionnaires' disease is especially feared) as well as door runners, door handles and other frequently used handles.

Our HETCOOL[®] and HETCOOL[®]-*plus* quality copper tubes have made us a long-standing partner to industrial companies as well as air conditioning and refrigeration businesses. MKM is a long-established company based in Germany and we have the ability, knowledge and materials to fulfil the demanding specifications of these sectors.

From our own alloy foundry – with its range of over fifty alloys – all the way to the semi-finished product, we do everything in-house.

That allows us to keep our material cycle closed (including single-variety recycling), and to offer our customers everything from a single source – including quick coordination because of the short distances involved.

More than a century of experience in manufacturing and processing copper allows us to offer many ways of advising and supporting you when you design your products.

TUBES

Packed well, everything inside stays cool.

MKM supplies seamless copper tubes for refrigeration and air conditioning with factory-fitted heat insulation made of polyethylene foam and a durable, weather-proof external LDPE sheath. That means energy savings compared to bare tubing.

All HETCOOL®-*plus* tubes are clearly inscribed so that they can be traced back to their manufacturer at any time.

The benefits of HETCOOL®-*plus*:

- German quality copper piping
- Energy savings compared to bare tubing
- Clearly legible inscription (manufacturer traceability)
- Standard sizes always available off the shelf
- Various lengths supplied
- Highly UV-resistant

Delivery

Standard sizes are available straight off our warehouse shelves. HETCOOL®-*plus* products come in specially made, standard-compliant, secure packaging. Our packaging guarantees retention of shape, ensuring that a product's properties are preserved to the utmost after leaving the factory. Plastic sealing plugs or caps at either end ensure that the inside of the tube remains clean and sterile. Sea-freight packaging is something else we offer as standard. We can assess individual requirements provided they can be presented technically, and fulfil them at an extra charge.



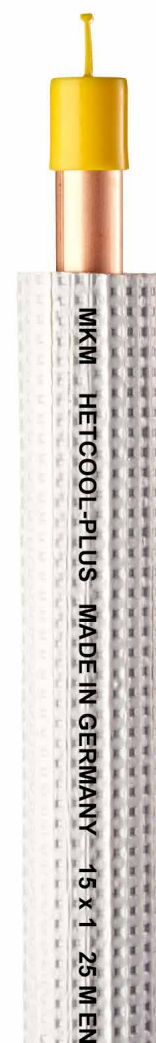
HETCOOL®-*plus* Made in Germany

By opting for MKM tubes you are choosing:

- technically grease-free, clean surfaces
- a corrosion-resistant material
- diffusion resistance
- products that react neutrally to the media flowing through them
- easy handling / connection / installation
- long service life and a high degree of operational safety
- maximum diversity of products and dimensions
- a product manufactured and tested using tolerances based on general industrial standards or customer standards
- a high level of support and advice during the selection process
- decades of experience involving standard and specialised requirements
- a durable, vibrant, versatile and maintenance-free material
- a material that is light and flexible to process
- a recyclable, ecologically and economically competitive material
- integrated production – from the bolt to the finished tube – all from a single source
- more than a century of experience across the entire spectrum of copper production and processing
- a highly qualified workforce
- integrated production
- flexible machinery that is constantly being upgraded
- comprehensive advice and support for:
 - product development
 - surface qualities
 - new material qualities and alloys
 - optimising the use of materials (diameters and cross-sections)
 - developing new applications
 - improving business and technological processes
- product- and order-specific packaging

Technical specifications

| Copper tubing | |
|--|--|
| Material | Cu-DHP |
| Standard | EN 12735-1 |
| Versions | Rings 20 m, 25 m, 50 m (up to 18 x 1.0 mm) |
| Strength | soft (R220) |
| External diameter | 6 – 22 mm metric; 1/4" – 7/8" in inches |
| Wall thicknesses | 0.8 – 1.0 mm |
| Inscription | Copper tubing compliant with EN 12735-1 |
| Heat insulation / sheath EN 14313:2013 | |
| Insulation | closed-cell PE foam CFC-free ratio of closed cells ≥ 90% colour: grey |
| Sheath | extruded LD polyethylene (density 918 kg/m ³) colour: white, finish: embossed |
| Building material category | EN 13501-1-E flame-resistant BL-s1,d0 |
| Temperature range | -40 to +105 °C |
| Wall thickness | 9 mm |
| Density | approx. 33 kg/m ³ |
| Thermal conductivity | $\lambda = 0.036 \text{ W/(m}\cdot\text{K)}$ at 40 °C mean temperature |
| Water vapour diffusion resistance | $\mu \geq 5000$ at 0 °C |
| Labelling | MKM HETCOOL®-plus MADE IN GERMANY Size Length Copper tubing standard / PE soft foam insulation EN 14313 / Fire behaviour / Date of manufacture |



Facts and figures

Metric dimensions

| HETCOOL®-plus rings | | | | | |
|---------------------------------------|-------------------------------------|--|---------------------|----------------------|-------------------|
| External diameter x wall thickness mm | Weight per metre Copper tubing kg/m | Permitted operating pressure ¹⁾ bar | Rings/pallet pieces | Insulation | |
| | | | | External diameter mm | Wall thickness mm |
| 6 x 1 | 0,140 | 200 | 25 | 24 | 9 |
| 10 x 1 | 0,252 | 111 | 20 | 28 | 9 |
| 12 x 1 | 0,308 | 91 | 20 | 30 | 9 |
| 16 x 1 | 0,419 | 67 | 18 | 34 | 9 |
| 18 x 1 | 0,475 | 59 | 15 | 36 | 9 |
| 22 x 1 | 0,587 | 48 | 15 | 40 | 9 |

Other packaging is available on request.

| HETCOOL®-DUO plus rings | | | | | |
|---------------------------------------|------------------------------------|--|---------------------|----------------------|-------------------|
| External diameter x wall thickness mm | Weight per metre Copper tubes kg/m | Permitted operating pressure ¹⁾ bar | Rings/pallet pieces | Insulation | |
| | | | | External diameter mm | Wall thickness mm |
| 6 x 1 / 10 x 1 | 0,140/0,252 | 200/111 | 15 | 24/28 | 9 |
| 6 x 1 / 12 x 1 | 0,140/0,308 | 200/91 | 15 | 24/30 | 9 |
| 6 x 1 / 16 x 1 | 0,140/0,419 | 200/67 | 15 | 24/34 | 9 |
| 10 x 1 / 12 x 1 | 0,252/0,308 | 111/91 | 15 | 28/30 | 9 |
| 10 x 1 / 16 x 1 | 0,252/0,419 | 111/67 | 15 | 28/34 | 9 |
| 10 x 1 / 18 x 1 | 0,252/0,475 | 111/59 | 15 | 28/36 | 9 |
| 12 x 1 / 18 x 1 | 0,308/0,475 | 91/59 | 15 | 30/36 | 9 |

¹⁾ Permitted operating pressure calculated as $R_m = 200N/mm^2$ and $S = 4$.

Dimensions in inches

| HETCOOL®-plus rings | | | | | | |
|---------------------|---------------------------------------|-------------------------------------|--|---------------------|----------------------|-------------------|
| Inches | External diameter x wall thickness mm | Weight per metre Copper tubing kg/m | Permitted operating pressure ¹⁾ bar | Rings/pallet pieces | Insulation | |
| | | | | | External diameter mm | Wall thickness mm |
| 1/4 | 6,35 x 0,8 | 0,124 | 144 | 25 | 24,35 | 9 |
| 3/8 | 9,52 x 0,8 | 0,195 | 92 | 20 | 27,52 | 9 |
| 1/2 | 12,70 x 0,8 | 0,266 | 67 | 20 | 30,70 | 9 |
| 5/8 | 15,88 x 1 | 0,416 | 67 | 18 | 33,88 | 9 |
| 3/4 | 19,05 x 1 | 0,505 | 55 | 15 | 37,05 | 9 |
| 7/8 | 22,23 x 1 | 0,594 | 47 | 15 | 40,23 | 9 |

Other packaging is available on request.

| HETCOOL®-DUO plus rings | | | | | | |
|-------------------------|---------------------------------------|-------------------------------------|--|---------------------|----------------------|-------------------|
| Inches | External diameter x wall thickness mm | Weight per metre Copper tubing kg/m | Permitted operating pressure ¹⁾ bar | Rings/pallet pieces | Insulation | |
| | | | | | External diameter mm | Wall thickness mm |
| 1/4 – 3/8 | 6,35 x 0,8 / 9,52 x 0,8 | 0,124/0,195 | 144/92 | 15 | 24,35/27,52 | 9 |
| 1/4 – 1/2 | 6,35 x 0,8 / 12,7 x 0,8 | 0,124/0,266 | 144/67 | 15 | 24,35/30,70 | 9 |
| 1/4 – 5/8 | 6,35 x 0,8 / 15,88 x 1 | 0,124/0,416 | 144/67 | 15 | 24,35/33,88 | 9 |
| 3/8 – 1/2 | 9,52 x 0,8 / 12,7 x 0,8 | 0,195/0,266 | 92/67 | 15 | 27,52/30,70 | 9 |
| 3/8 – 5/8 | 9,52 x 0,8 / 15,88 x 1 | 0,195/0,416 | 92/67 | 15 | 27,52/33,88 | 9 |
| 3/8 – 3/4 | 9,52 x 0,8 / 19,05 x 1 | 0,195/0,505 | 92/55 | 15 | 27,52/37,05 | 9 |
| 1/2 – 3/4 | 12,7 x 0,8 / 19,05 x 1 | 0,266/0,505 | 67/55 | 10 | 38,70/37,05 | 9 |

¹⁾ Permitted operating pressure calculated as $R_m = 200N/mm^2$ and $S = 4$.

Product areas



STRIP

MKM supplies preliminary strip, industrial strip, transformer strip, cable and HF cable strip and roofing strip. We manufacture all of our strip products using our Conti-M® technology which we developed inhouse, using continuous casting technology to achieve a uninterrupted 24/7 process.



SHEETS, PLATES AND DISCS

MKM offers sheets, plates and discs in a wide range of dimensions. Our rolling mill is supplied by our own foundries. Our strengths lie in a rich range of more than fifty alloys. We can also produce plates and discs to customer specific drawings on request.



WIRE

MKM supplies the entire spectrum of wire rod, from thick, medium and fine wire to stranded wire and wire rope. Our fully integrated Contirod® technology allows us to offer copper wire products and alloy wire products (plain and tinned) with a wide range of finishes.



TUBES

MKM supplies tubes of different lengths, diameters and thicknesses. Our HETCU® (installation tubing) and HETCOOL® (refrigeration, air conditioning and medical technology) product families are extremely well established in the market. Consistent quality management from our own continuous casting plant, right through to the tube drawing process guarantees seamless tubing with outstanding quality.



BARS

MKM is one of Europe's leading producers of copper bars and profiles. Our production range encompasses a wide range of sizes in various grades of copper. We also produce customised profiles based on technical drawings.



CUSTOM SOLUTIONS

MKM develops solutions tailored entirely to its customers' requirements. With the technical means and many years of experience, we regularly find unconventional solutions.

We can manufacture any of our products in compliance with the relevant DIN standards, internationally established standards and custom requirements. All of our packaging is appropriate to the products it contains.

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