

cusmart[®]

FLEXIBLE COPPER TUBE SYSTEM

WATER SUPPLY - HEATING - FLOOR HEATING & COOLING

A close-up photograph of three flexible tubes. On the right, there are several parallel copper tubes with a highly reflective, metallic surface. On the left, there is a white tube with a fine, grid-like texture. In the center, a white tube is shown in a perspective view, with its circular end cut revealing a smooth, copper-colored interior. The background is dark, making the tubes stand out.

HALCOR





HALCOR

HALCOR is a large-scale modern industrial company with over sixty years of experience in metal processing. It holds a significant position in European and global markets and has five modern plants; four in Greece and one in Bulgaria.

The company is dedicated to achieving high quality. It has ISO 9001:2000 certification, uses state-of-the-art technology and employs highly skilled personnel. Substantial, continual investment in research and know-how allows the company to create innovative new products, which supports its aim of being a market leader.

At the same time, HALCOR is committed to sustained development and environmental protection. As such, its production processes are regulated by an ISO 14001:2004 certified Environmental Management System.

Aiming at the total satisfaction of all of its customers' needs, the company focuses on responding reliably and rapidly to demand. It provides exceptional support for its products, which are distributed to more than fifty countries worldwide. HALCOR combines size, strength and technology to achieve its overall vision of putting metals at man's disposal.





The smart side of technology

HALCOR has invested in research and technology to create a new innovative solution in copper tube systems, proving its leading position in the copper processing industry.

CUSMART® are flexible copper tubes with a special compound coating (patent pending).

The online production method ensures unique uniformity and incomparable technical properties. Specially designed tubes for every purpose and a full range of mechanical fittings create plumbing systems of superior technology.

The CUSMART® flexible copper tube system is the future!





Superior beyond any comparison



Multiple applications

CUSMART[®] flexible copper tubes are unsurpassed in every technical aspect, offering great installation ease. Their exceptional flexibility allows cold bending and even manual shaping without “memory” effects. The use of **CUSMART**[®] flexible copper tubes in plumbing cuts down on installation time and cost, offering uncompromised security.

CUSMART[®] flexible copper tubes preserve their physical and technical properties throughout their whole lifetime and are covered by a 20-year manufacturer’s guarantee.

Product description

CUSMART[®] flexible copper tubes are coated with a special white colored compound for enhanced endurance at temperatures up to 95 °C.

CUSMART[®] flexible copper tubes are suitable for the following applications:

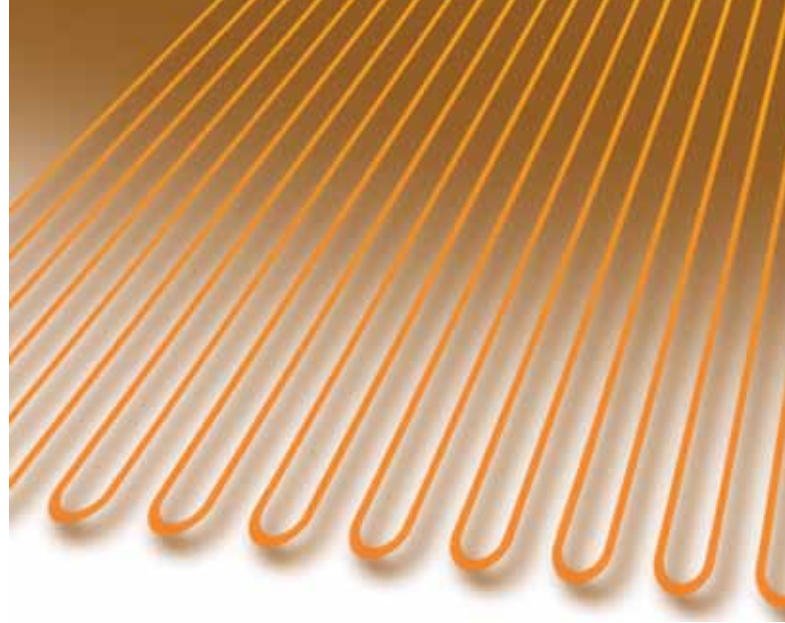
- Heating networks
- Underfloor heating and cooling systems
- Water supply networks

For power saving purposes **CUSMART**[®] is industrially produced with a special PE-X closed-cell Insulation.

Superior technical properties

Specification and test results of **CUSMART**[®] flexible copper tubes meet the requirements and are certified according to DVGW Vp 652, CSTB-Avis Technique 14/06-1066 and ELOT 1425/1426. **CUSMART**[®] tubes are assessed and certified for their suitability in drinking water installations from the NSF organization according to NSF/ANSI 61.

CUSMART[®] flexible copper tubes are made of special high endurance, halogen-free compounds with fire-retardant properties according to DIN 4102/B2 and EN 13501/E.



CUSMART[®] superiority in every aspect

- **Long lifetime**

The long lifetime is attributable to the mechanical properties of copper, which remain unchanged over time.

- **A special process for ensuring hygiene**

This is thanks to a special process that is compliant with EN 1057:2005 for drinking water and clean internal surface. The natural antibacterial properties of copper prevent the growth of pathogens on the internal walls of the tube, which ensures water hygiene.

- **High pressure and temperature fluctuation resistance**

The tubes maintain their mechanical properties even during major temperature fluctuations and are highly frost-resistant in comparison with other conventional products. They can withstand much greater working pressure than that encountered in the water supply networks of buildings, which guarantees safety and reliability.

- **Unique flexibility and final shape stability**

Their special properties allow cold bending even manually and in very tight bends without “shape memory effects”, which more than satisfies the requirements of EN 1057:2005.

- **Exceptional thermal conductivity**

The combination of copper and special coating compounds ensures suitable thermal conductivity in every application: low for water supply and heating and high for underfloor heating.

- **Minimum thermal expansion**

Compared to other materials, copper has a much lower thermal expansion coefficient ($\alpha=0,0168 \text{ mm}/(\text{m} \cdot ^\circ\text{K})$).

- **Cost-effective system**

The completeness, simplicity and easy application with alternative coupling methods (press and compression fittings) ensure reduced installation cost.

- **Impermeability - 100% Oxygen Barrier**

They are completely impermeable and oxygen-tight. Leakage control is performed electronically without failure, according to EN 1057:2005. They are also superior to tubes with seams since welding alters the structure of metal and results in reduced endurance.

- **Recyclable product**

The manufacturing materials used are recyclable, which helps to promote environmental protection and the conservation of natural resources.

- **UV resistance and maximum corrosion resistance**

The adhesion between the tube and coating ensures total corrosion resistance and protection under adverse weather conditions.

- **Significant energy savings with industrial insulation**

The external industrial foam insulation limits heat loss to a minimum, which results in significant energy savings.

MECHANICAL PROPERTIES OF COPPER

Temper	ELOT EN 1057 Classification	Tensile Strength N/mm ² Min. tensile strength	Min. Elongation A5%
Soft	R-220	>220	>40

TECHNICAL PROPERTIES OF CUSMART® TUBES

NOMINAL DIMENSION (mm)	14x2	16x2	18x2	20x2	26x3	32x3
OUTSIDE DIAMETER - (od) (mm)	14	16	18	20	26	32
WALL THICKNESS (mm)	2	2	2	2	3	3
INSIDE DIAMETER (id) (mm)	10	12	14	16	20	26
INSIDE DIAMETER CROSS-SECTION (cm ²)	0,785	1,131	1,5	2,011	3,142	5,309
WATER VOLUME (l/m)	0,0785	0,1131	0,154	0,2011	0,3142	0,5309
MAXIMUM WORKING TEMPERATURE (°C)	95	95	95	95	95	95
THERMAL CONDUCTIVITY COEFFICIENT W / (m • °K)	0,40	0,40	0,40	0,40	0,40	0,40
MAXIMUM WORKING PRESSURE (bar)	35	32	27	25	25	23
MINIMUM BENDING RADIUS WITH BENDING TOOL (mm)	39	45	53	64	89	128
MINIMUM BENDING RADIUS WITH EXTERNAL BENDING SPRING=4x od (mm)	56	64	72	80	104	128
MINIMUM BENDING RADIUS MANUAL=6x od (mm)	84	96	108	120	156	192
PACKAGING	STRAIGHT LENGTHS (m)	3	3	3	3	3
	COILS (m)	100/50	100/50	100/50	100/50	25/50

Different dimensions and lengths are available upon request.

Significant and uninterrupted energy saving

CUSMART® flexible tubes with external industrial insulation are suitable for all heating and hot water supply plumbing networks inside and outside buildings. The insulation is a cross-linked polyethylene (PE-X) foam product structured in closed type microcells. Energy saving is a result of the spectacular reduction of temperature loss to over 50% compared to similar networks without insulation. The total final energy saving may reach 20% a year.

TECHNICAL PROPERTIES OF INDUSTRIAL INSULATION CUSMART® TUBES

NOMINAL DIMENSION (mm)	14x2	16x2	18x2	20x2	26x3	32x3
TOTAL OUTSIDE DIAMETER (INSULATION THICKNESS: 9 mm)	32	34	36	38	44	50
PACKAGING - COIL (m)	100/50	100/50	100/50	100/50	25/50	25
TECHNICAL PROPERTIES OF INSULATION				PE-X MATERIAL		
INSULATION THICKNESS				9 mm		
DENSITY ACC. TO, DIN 53420, ASTM D 1667				30-33 Kg/m ³		
THERMAL CONDUCTIVITY COEFFICIENT (λ) ACC. TO ASTM C 335				0,035 W/m·K		
VAPOR-WATER DIFFUSION RESISTANCE COEFFICIENT (μ) ACC. TO DIN 52615				>9.000		
WORKING TEMPERATURE				-80 °C to +110 °C		
FIRE SAFETY				DIN 4102-B2, NF P 92 501-M1, CL1, DIN EN 13 501-Class E		
CHEMICAL RESISTANCE ACC. TO ASTM 543-56 T				Excellent		
SOUND INSULATION ACC. TO DIN 4109 300-2500Hz				≈ 60%		

All values presented above were obtained in typical laboratory conditions and can be amended without prior notice.



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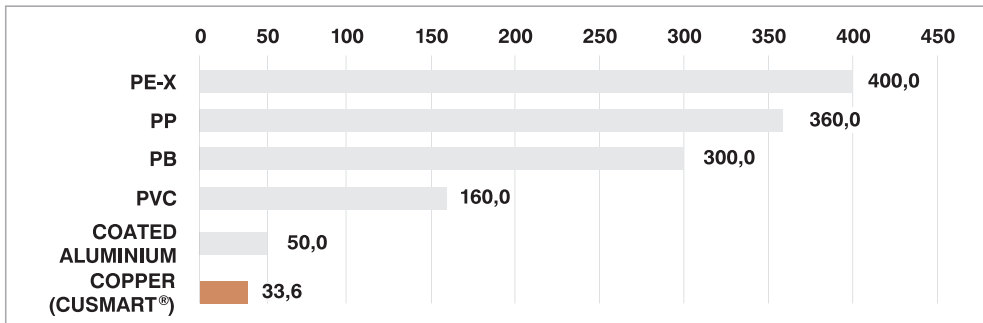
ATEC 14/06-1066



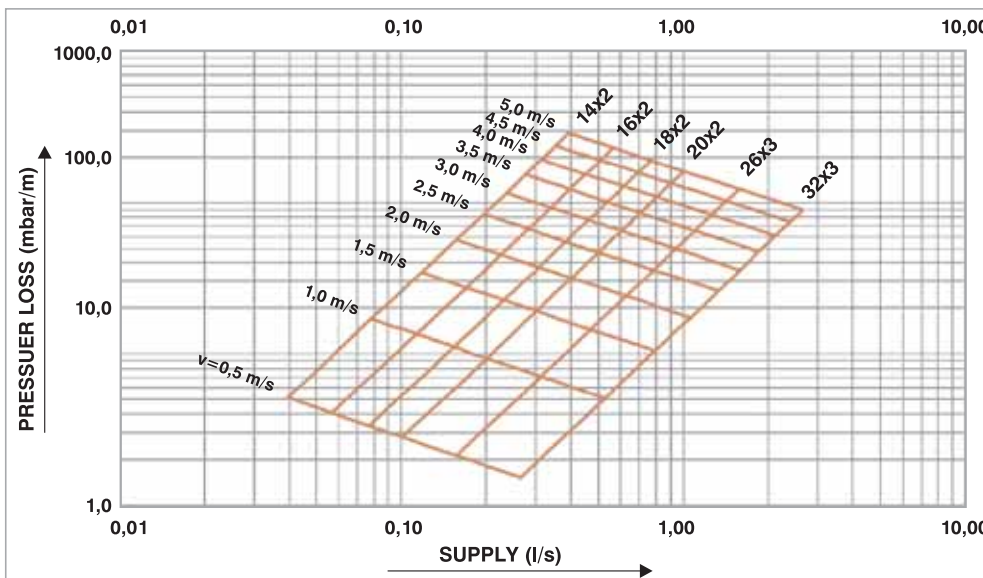
Certified to ANSI NSF 61



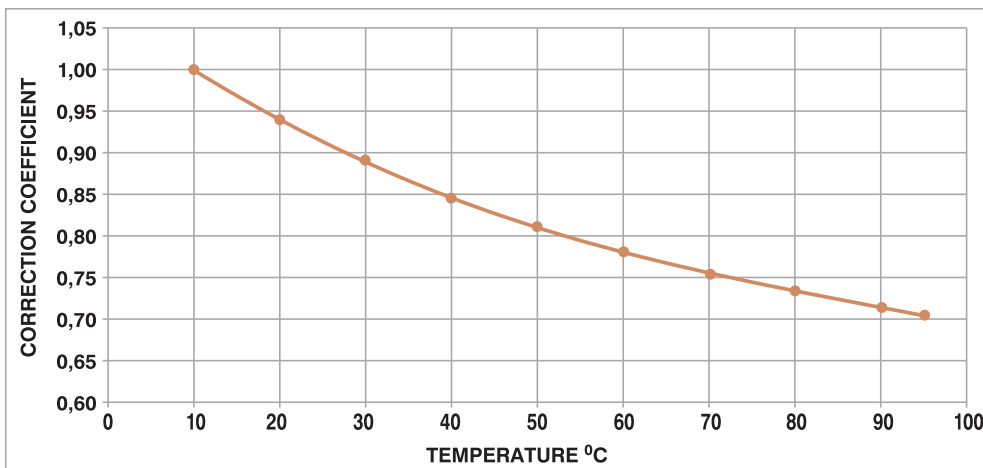
COMPARATIVE DIAGRAM FOR LINEAR EXPANSION OF THE TUBE (mm)
 $\Delta T = 40\text{ }^{\circ}\text{C}$, $L=50\text{ m}$



PRESSURE LOSS DIAGRAM at 10 °C



CORRECTION COEFFICIENT FOR PRESSURE LOSS ACCORDING TO TEMPERATURE



CUSMART®



The CUSMART® all-inclusive flexible copper tube system includes a full range of CUSMART FITTINGS (press, push and compression fittings), as well as tools, ensuring reliable results in every application.

HALCOR

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