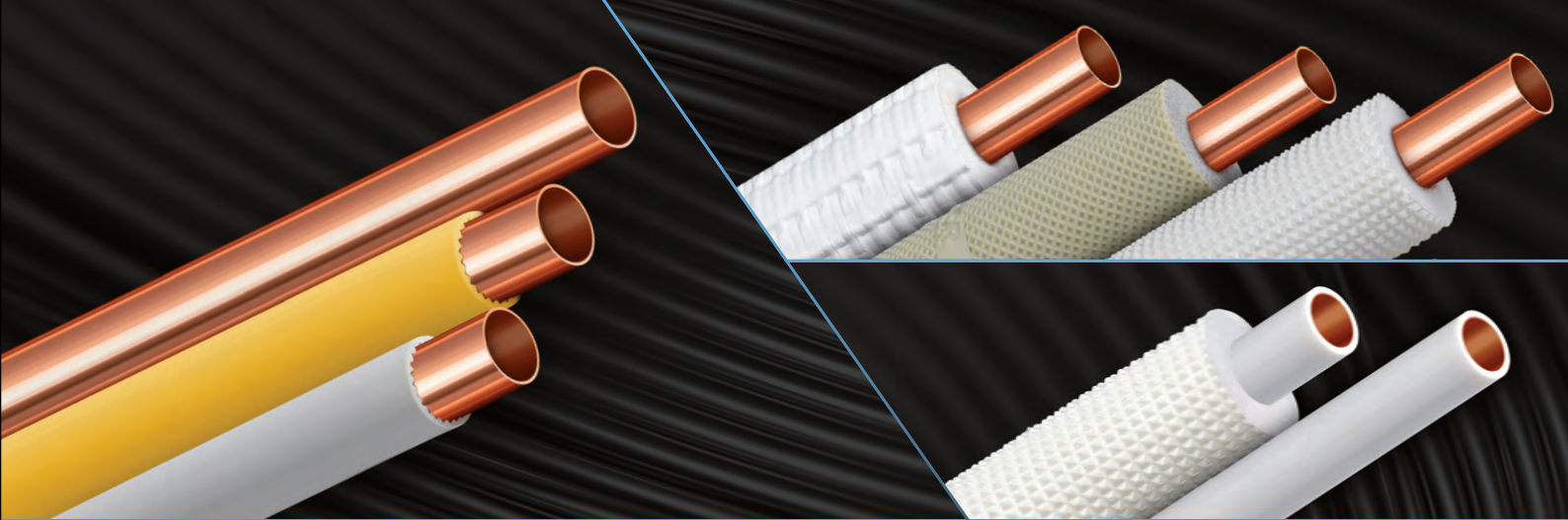


# HALCOR

Evolving Beyond Copper

## BUILDING INSTALLATIONS





**HALCOR**

Evolving Beyond Copper

COPPER & ALLOYS  
EXTRUSION DIVISION:



Member of **Copper Alliance**

Halcor is the largest producer of copper tubes in Europe, implementing long term investments that provide dynamic markets with a wide range of sustainable products and innovative solutions. With more than 80 years of metal processing experience and know-how, Halcor, the copper & alloys extrusion division of ElvalHalcor SA, is a trustful business partner to industrial companies that build equipment and parts, as well as, to wholesalers that distribute products to meet global demands. A dynamic network of owned commercial subsidiaries around Europe and supportive technical services enables Halcor to bring expert solutions to the industry with agility and reliability. Committed to constantly investing in sustainable development, Halcor strategically focuses on R&D&I creating solutions for low carbon and recyclable products, for applications such as energy-efficient equipment, renewable energy sources and electric vehicles, contributing to the global transition to a green economy.

High quality in production is achieved through strict controls applied throughout the production process. With a consistent quality focus, Halcor implements an ISO 9001:2015 Certified Quality Management System and leverages high technologies and expert staff.



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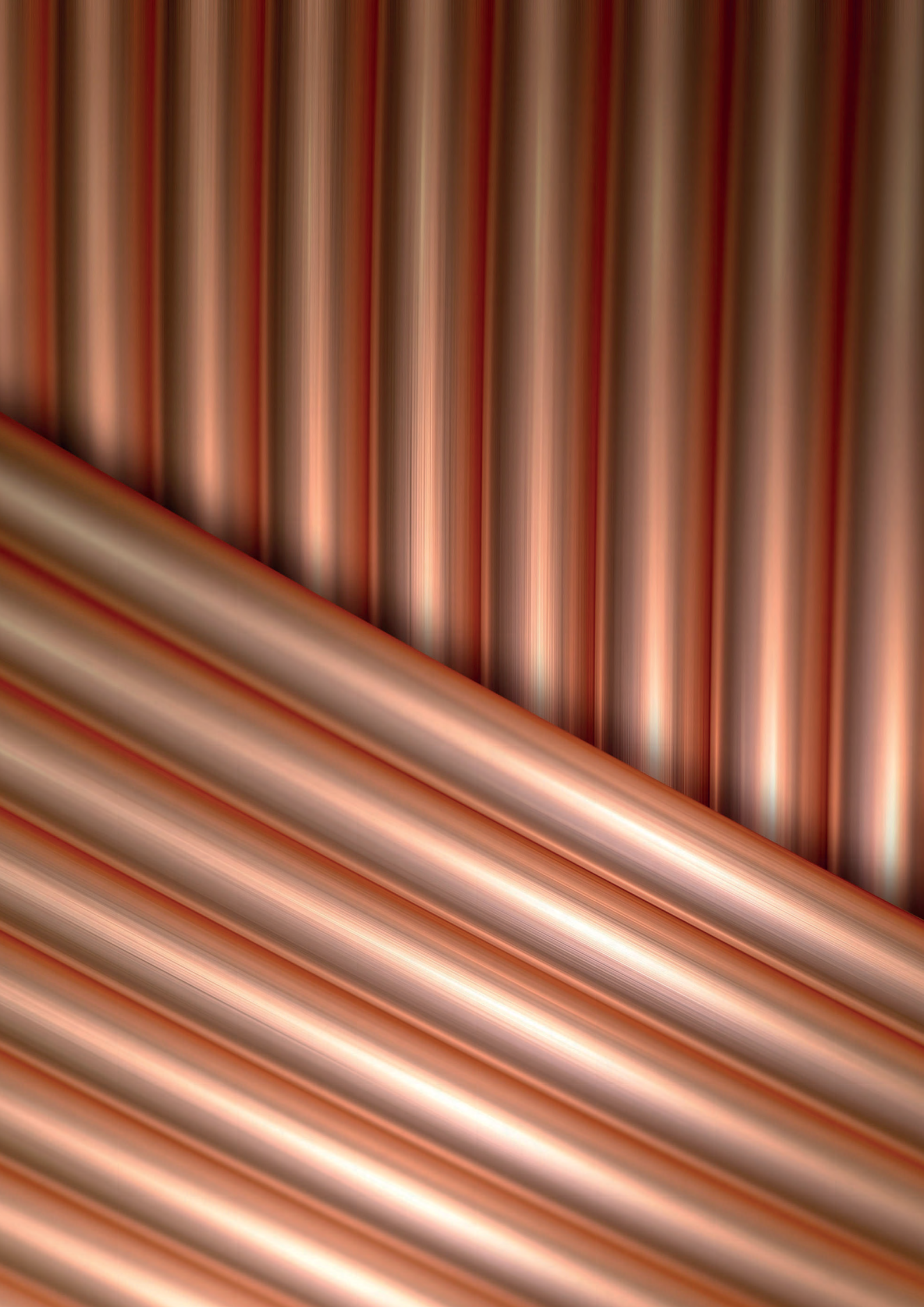
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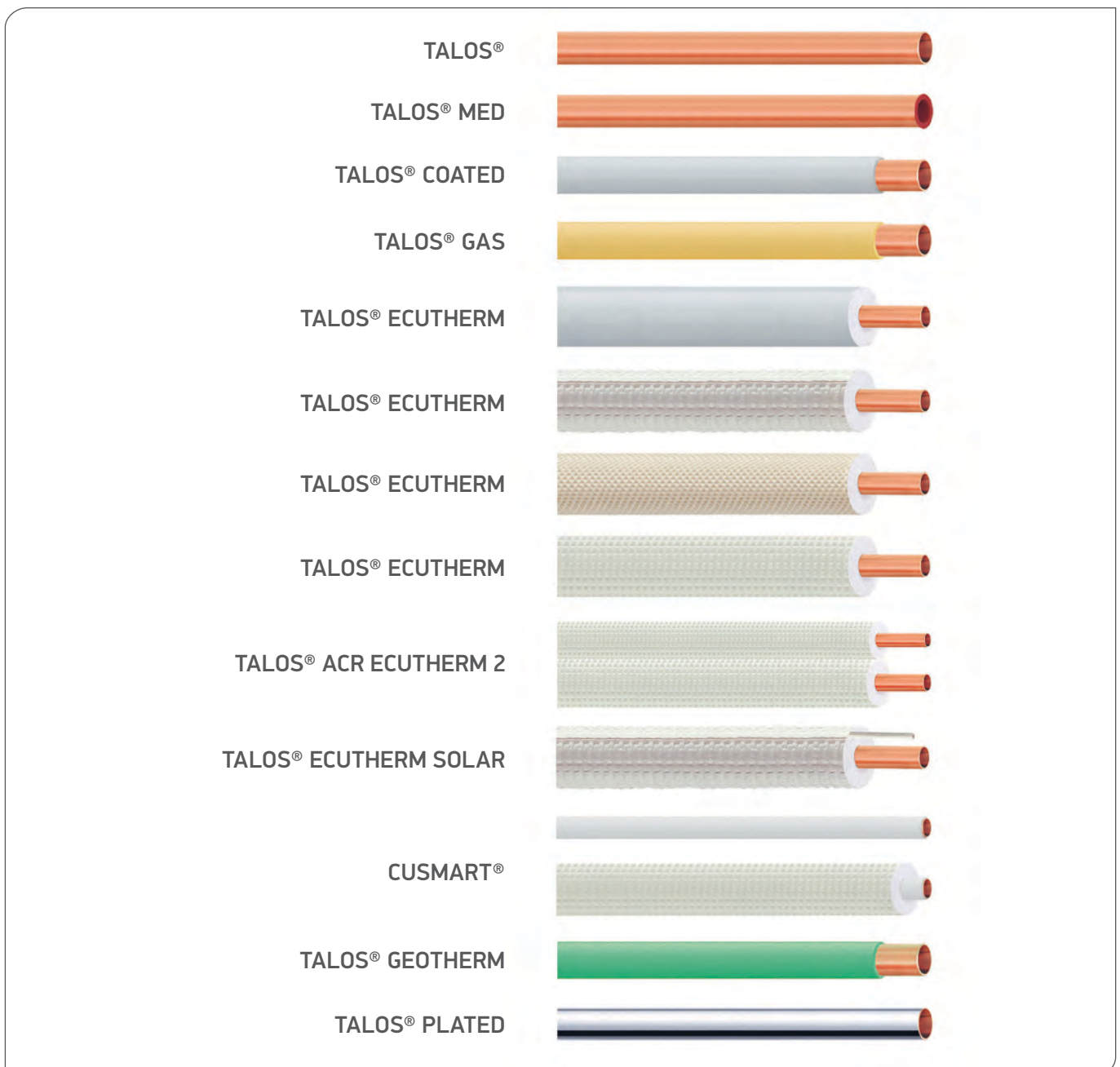
## Versatility with the Reliability of Copper

TALOS® copper tubes, with their high quality of manufacturing provide:

- Long lifetime
- Resistance to pressure, temperature and fire
- Low thermal expansion and enhanced shape stability
- Complete impermeability
- Potable water hygiene
- Style and space saving
- Cost-effectiveness

TALOS® copper tubes are widely used in a variety of construction installations, such as potable water and hot water supply, central heating, natural gas, air conditioning, fire extinguishing networks, medical gas networks, etc.

They are manufactured according to European standards such as EN 1057 and EN 13349 for coated pipes for sanitary and gas applications, EN 12735 for air conditioning systems, EN 13348 for medical applications, etc.



# TALOS®

- WATER SUPPLY
- HEATING
- NATURAL GAS
- COOLING

Copper is an ideal material for tubes used in water installations due to its inherent properties. One primarily advantageous property of copper as material for plumbing systems is its ability to resist corrosion.

The corrosion resistance of copper tubes is largely due to the interaction of water flowing inside the tube which features a thin layer of copper oxide {CuO}. In fact, copper has high affinity with oxygen hence quickly after manufacture of the tube a thin layer of copper oxide {CuO} is formed, which adheres to the metal surface. Water molecules react with the oxide during normal use and they form a copper hydroxide {Cu(OH)<sub>2</sub>}, which again has almost similar affinity with the underlying metallic copper. This newly formed layer of copper hydroxide is in fact the protective substance, offering chemical and mechanical stability.

In real world, submicron irregularities (peaks and troughs) are always present on metallic surfaces even when “mirror finish” is attained. A measure of the magnitude of these irregularities is the roughness parameter Ra, which for copper tubes is <0.5µm. Lubricating oils used in the tube manufacturing process could be trapped in such irregularities. Such traps interrupt the continuity of the protective layer, thus reduce the effectiveness of the above mechanism. The objective for a “durable” tube will be the complete removal of any trace of oil even when trapped in subsurface cavity.

The cleaning method applied in TALOS® copper tubes is simple and effective. Air is enriched with pre-calculated amount of oxygen and is forced into the tubes at temperatures that exceed the lubricant’s flash point. The result of this cleaning process is a tube surface fully

covered with copper oxide, whilst the lubricants have been decomposed and “burned” by the excess of oxygen. This in effect facilitates the formation of the copper hydroxide {Cu(OH)<sub>2</sub>}, when water is introduced in the installation.

This cleaning process by “inner surface oxidation” has been a state of the art in the industry and has been applied by established manufacturers of copper tubes. In certain cases, the same process was applied with the use of a mixture of neutral (noble) gases and oxygen. Evidently the end result of the aforementioned oxidizing gases, i.e. the formation of an oxide layer, “guarantees” the effective removal of the tube drawing lubricants and ensures the generation a healthy continuous film of protective hydroxide layer. European as well as international norms have recognized the value of “tube cleanliness” and have specified a “maximum level” of remaining organic matter (in effect oil residues). In particular, European norm EN1057 specifies that a level of 0.20mg/dm<sup>2</sup> is not to be exceeded. The effectiveness of the TALOS® cleaning process for removal of oils has been tested and certified by well recognized quality organizations. The measured levels are much lower than “the upper limit” of the European norms EN1057.



Microscopic view (x5000) of well developed copper hydroxide {Cu(OH)<sub>2</sub>} protective layer formed on the inner surface of TALOS® copper tube.

## TALOS® Tubes Advantages

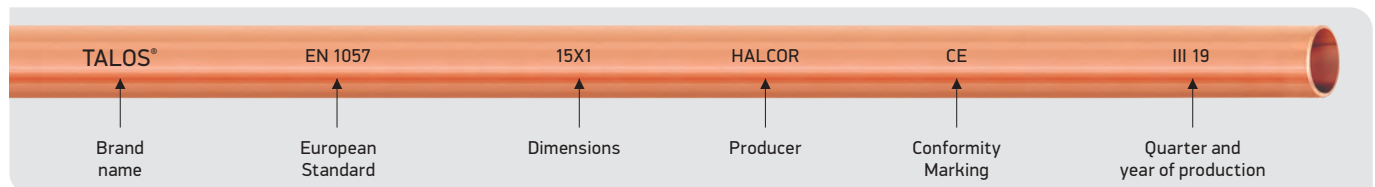
TALOS® copper tubes for the sanitary and heating industry provide substantial advantages:

- TALOS® copper tubes are easy to install with cost-effectiveness and provide safe and secure operation.
- TALOS® copper tubes are resistant to high operating pressures and temperatures.
- TALOS® copper tubes are completely air -and water- tight and retain their physical and mechanical properties unchanged over time.
- They are stable and self-supporting.
- TALOS® copper tubes, according to EN 1057, are covered by a 30-year manufacturer's warranty.

## TALOS® Half Hard Copper Tubes Special Advantages

- Ease of cold bending
- Reduction of necessary fittings
- Easier construction of networks
- Faster installation and higher workmanship
- Overall lower installation costs

## Minimum Marking



## Standard Dimensions



The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

## SOFT COILS

Diameter x thickness d x s (mm)	Internal diameter (mm)	Nominal copper weight (kg/m)	External surface area (m <sup>2</sup> /m)	Filling volume (l/m)	Packaging		Maximum Allowable Pressure (bar)
					Length of Coil (m)	Coils per pallet	
6 x 1,00	4,0	0,140	0,019	0,013	50	40	226
8 x 0,60	6,8	0,124	0,025	0,036	50	28	97
8 x 1,00	6,0	0,196	0,025	0,028	50	28	163
10 x 0,70	8,6	0,182	0,031	0,058	50	24	90
10 x 1,00	8,0	0,252	0,031	0,050	50	24	127
12 x 1,00	10,0	0,308	0,038	0,079	50	20	104
14 x 1,00	12,0	0,363	0,044	0,113	50	14	88
15 x 1,00	13,0	0,391	0,047	0,133	50	30	82
15 x 1,50	12,0	0,566	0,047	0,113	50	14	127
16 x 1,00	14,0	0,419	0,050	0,154	50	12	77
18 x 1,00	16,0	0,475	0,057	0,201	25	40	66
22 x 1,00	20,0	0,587	0,069	0,314	25	30	54
22 x 1,50	19,0	0,860	0,069	0,284	25	31	82
28 x 1,50	25,0	1,111	0,088	0,491	25	12	64

Non-standard dimensions are manufactured upon request.

## Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

## Specifications

EN 1057

## Quality Marks

BSI, AFNOR, NSAI, AENOR, RAL / DVGW, KIWA / GASTEC-QA, SITAC, STF VTT, GOST, VIK.

## Mechanical Properties

Temper	EN 1057 Designation	Min. Tensile Strength R <sub>m</sub> (MPa)	Min. Elongation, A%
Soft	R-220	220	40
Half Hard	R-250	250	20 or 30*
Hard	R-290	290	3

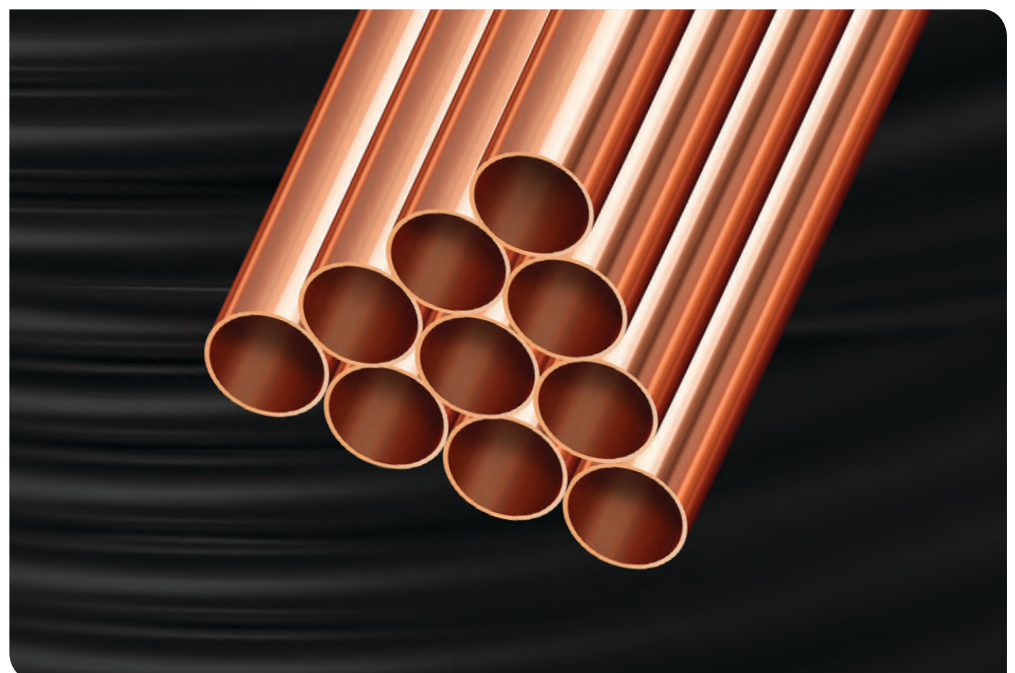
\* depending on the dimension

## Standard Dimensions

## STRAIGHT HALF HARD

Diameter x thickness d x s (mm)	Internal diameter (mm)	Nominal copper weight (kg/m)	External surface area (m <sup>2</sup> /m)	Filling volume (l/m)	Packaging		Maximum Allowable Pressure (bar)
					Straight lengths	Pieces per bundle	
10 x 0,70	8,6	0,182	0,031	0,058	3m	900	90
10 x 1,00	8,0	0,252	0,031	0,050	4m	250	127
12 x 0,70	10,6	0,221	0,038	0,088	3m	800	74
12 x 1,00	10,0	0,308	0,038	0,079	4m	400	104
15 x 0,70	13,6	0,280	0,047	0,145	3m	600	58
15 x 0,80	13,4	0,318	0,047	0,141	3m	600	67
15 x 1,00	13,0	0,391	0,047	0,133	4m	600	82
18 x 0,80	16,4	0,384	0,057	0,211	3m	450	56
18 x 1,00	16,0	0,475	0,057	0,201	4m	450	66
22 x 0,80	20,4	0,474	0,069	0,327	3m	300	45
22 x 1,00	20,0	0,587	0,069	0,314	4m	300	54
22 x 1,50	19,0	0,860	0,069	0,284	4m	80	82
28 x 0,90	26,2	0,682	0,088	0,539	3m	200	40
28 x 1,00	26,0	0,755	0,088	0,531	4m	200	42
28 x 1,50	25,0	1,111	0,088	0,491	4m	100	64
35 x 1,20	32,6	1,134	0,110	0,835	3m	100	40
35 x 1,50	32,0	1,405	0,110	0,804	4m	50	50
42 x 1,20	39,6	1,369	0,132	1,232	3m	90	33
42 x 1,50	39,0	1,699	0,132	1,195	4m	90	42
54 x 1,20	51,6	1,772	0,170	2,091	3m	60	26
54 x 2,00	50,0	2,908	0,170	1,963	4m	30	43
66,7 x 1,20	64,3	2,198	0,210	3,247	3m	25	21
66,7 x 2,00	62,7	3,618	0,210	3,088	3m	25	35
76,1 x 1,50	73,1	3,129	0,239	4,197	3m	20	23
76,1 x 2,00	72,1	4,44	0,239	4,083	3m	20	30

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

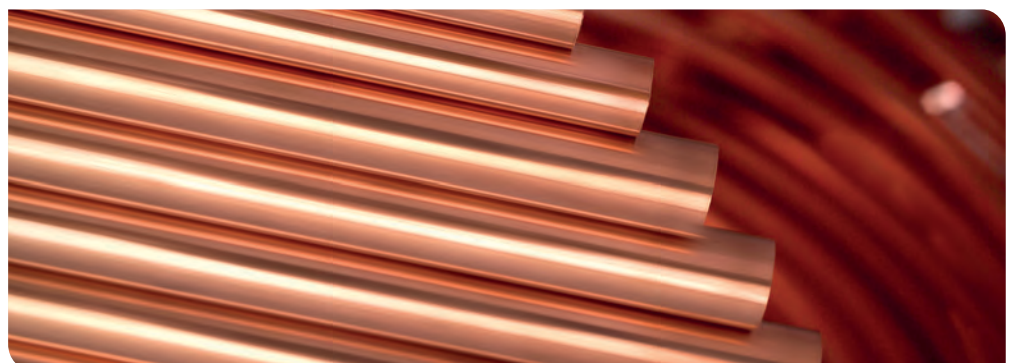


## Standard Dimensions

### STRAIGHT HARD

Diameter x thickness d x s  (mm)	Internal diameter  (mm)	Nominal copper weight  (kg/m)	External surface area  (m <sup>2</sup> /m)	Filling volume  (l/m)	Packaging		Maximum Allowable Pressure  (bar)
					Straight lengths	Pieces per bundle	
10 x 0,80	8,4	0,206	0,031	0,055	5m	500	103
10 x 1,00	8,0	0,252	0,031	0,050	5m	400	127
12 x 0,80	10,4	0,251	0,038	0,085	5m	400	85
12 x 1,00	10,0	0,308	0,038	0,079	5m	300	104
14 x 0,80	12,4	0,295	0,044	0,121	5m	300	72
14 x 1,00	12,0	0,363	0,044	0,113	5m	300	88
15 x 0,80	13,4	0,318	0,047	0,141	5m	300	67
15 x 1,00	13,0	0,391	0,047	0,133	3m & 5m	260	82
16 x 1,00	14,0	0,419	0,050	0,154	5m	240	77
18 x 0,80	16,4	0,385	0,057	0,211	3m	450	56
18 x 1,00	16,0	0,475	0,057	0,201	5m	200	66
22 x 0,90	20,2	0,531	0,069	0,320	5m	200	51
22 x 1,00	20,0	0,587	0,069	0,314	5m	150	54
28 x 0,90	26,2	0,682	0,088	0,539	3m	200	40
28 x 1,00	26,0	0,755	0,088	0,531	4m	200	42
28 x 1,50	25,0	1,111	0,088	0,491	4m	60	64
35 x 1,00	33,0	0,950	0,110	0,855	3m	100	33
35 x 1,50	32,0	1,405	0,110	0,804	4m	50	50
35 x 2,00	31,0	1,844	0,110	0,755	4m	50	68
42 x 1,00	40,0	1,146	0,132	1,257	3m	90	28
42 x 1,20	39,6	1,368	0,132	1,232	3m & 4m	90	33
42 x 1,50	39,0	1,700	0,132	1,195	4m	40	42
54 x 1,00	52,0	1,484	0,170	2,124	3m	60	21
54 x 1,20	51,6	1,771	0,170	2,091	3m & 4m	60	26
54 x 1,50	51,0	2,202	0,170	2,043	4m	60	32
54 x 2,00	50,0	2,908	0,170	1,963	4m	30	43
64 x 2,00	60,0	3,467	0,201	2,827	3m	25	36
66,7 x 1,20	64,3	2,198	0,210	3,247	5,8m	25	21
66,7 x 2,00	62,7	3,618	0,210	3,088	3m	25	35
76,1 x 1,50	73,1	3,129	0,239	4,197	5m	20	23
76,1 x 2,00	72,1	4,144	0,239	4,083	3m	20	30
88,9 x 2,00	84,9	4,859	0,279	5,661	4m	15	26
108 x 2,00	104,0	5,928	0,339	8,495	5m	10	21
108 x 2,50	103,0	7,375	0,339	8,332	4m	10	27

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.





- FIRE EXTINGUISHING NETWORKS



### Maximum Fire protection and Safety

TALOS® SPRINKLER copper tubes are the fastest and most cost-effective choice, for the construction of permanent fire extinguishing water supply networks and automatic sprinkler systems. TALOS® SPRINKLER copper tubes for fire extinguishing networks, provide substantial advantages:

- Smooth surface with minimal pressure loss due to low friction, resulting in smaller tube sizes for specific water supply requirements.
- Various options in joining methods
- Easy to transport, install and support, even in limited spaces.
- High thermal conductivity that ensures prevention of extreme temperature peaks.
- Completely air and water tight and practically maintenance free.
- Excellent corrosion resistance, compared to other metals
- Extreme temperature resistance (copper melting point 1083°C)
- Fully recyclable

TALOS® SPRINKLER copper tubes are the ideal material for the construction of fire extinguishing installations in different areas, such as: hospitals, factories, warehouses, schools, museums, restaurants, hotels, sports facilities, offices, shops, car parks, houses. TALOS® SPRINKLER copper tubes, according to EN 1057, are covered by a 30-year manufacturer's warranty.

### Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

### Specifications

EN 1057

### Quality Marks

BSI, AFNOR, NSAI, AENOR, RAL / DVGW, KIWA / GASTEC-QA, SITAC, STF VTT, GOST, VIK.

### Mechanical Properties

Temper	EN 1057 Designation	Min. Tensile Strength $R_m$ (MPa)	Min. Elongation, A%
Soft	R-220	220	40
Half Hard	R-250	250	20 or 30*
Hard	R-290	290	3

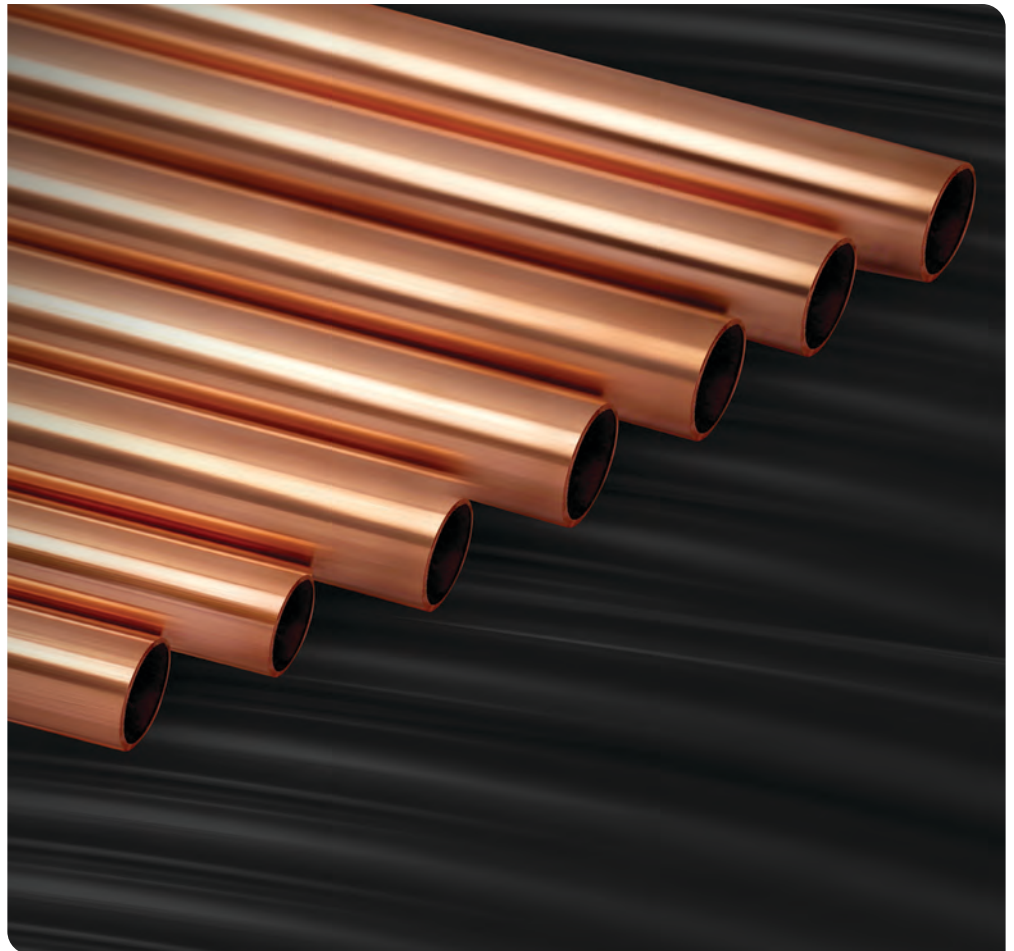
\* depending on the dimensions

## Standard Dimensions

### STRAIGHT LENGTHS

Diameter x thickness d x s (mm)	Internal diameter (mm)	Nominal copper weight (kg/m)	External surface area (m <sup>2</sup> /m)	Filling volume (l/m)	Packaging		Maximum Allowable Pressure (bar)
					Type	Pieces per bundle	
15 x 1,00	13,0	0,391	0,047	0,133	Straight lengths of 4m	600	82
18 x 1,00	16,0	0,475	0,057	0,201		450	66
22 x 1,00	20,0	0,587	0,069	0,314		300	54
28 x 1,00	26,0	0,755	0,088	0,531		200	42
35 x 1,50	32,0	1,405	0,110	0,804		50	50
42 x 1,50	39,0	1,699	0,132	1,195		40	42
54 x 1,50	51,0	2,202	0,170	2,043		60	32
54 x 2,00	50,0	2,908	0,170	1,963		30	43
64 x 2,00	60,0	3,467	0,201	2,827		25	36
66,7 x 2,00	62,7	3,618	0,210	3,088		25	35
76,1 x 2,00	72,1	4,144	0,239	4,083		20	30
88,9 x 2,00	84,9	4,859	0,279	5,661		15	26
108 x 2,50	103,0	7,375	0,339	8,332		10	27

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.





- MEDICAL GAS DISTRIBUTION NETWORKS



### Cleanliness and Resistance

In the sensitive healthcare areas and installations, it is imperative to use materials that safeguard cleanliness and have a neat appearance and durability. TALOS® MED copper tubes, can withstand high operating pressures with unlimited durability, thanks to the natural strength of copper, hence they are the ideal choice for the construction of medical gases distribution networks. TALOS® MED copper tubes are manufactured according to the requirements of standard EN 13348. They are supplied with end caps to prevent contamination by foreign matter intrusion during storage or transportation.

### Mechanical Properties

Temper	EN 13348 Designation	Min. Tensile Strength, R <sub>m</sub> (MPa)	Min. Elongation, A%
Soft	R-220	220	40
Half Hard	R-250	250	30
Hard	R-290	290	3

### Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

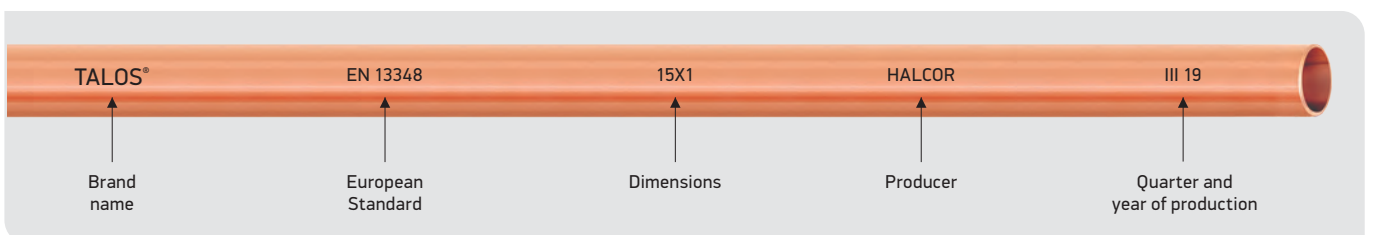
### Specifications

EN 13348

### Quality Marks

BSI

### Minimum Marking



## Standard Dimensions

### STRAIGHT LENGTHS

Diameter x thickness d x s (mm)	Internal diameter (mm)	Nominal copper weight (kg/m)	External surface area (m <sup>2</sup> /m)	Filling volume (l/m)	Packaging	Maximum Allowable Pressure (bar)
6 x 1,00	4,0	0,140	0,019	0,013	Straight lengths of 5m	226
8 x 1,00	6,0	0,196	0,025	0,028		163
10 x 1,00	8,0	0,252	0,031	0,050		127
12 x 1,00	10,0	0,308	0,038	0,079		104
15 x 1,00	13,0	0,391	0,047	0,133		82
18 x 1,00	16,0	0,475	0,057	0,201		66
22 x 1,00	20,0	0,587	0,069	0,314		54
28 x 1,00	26,0	0,755	0,088	0,531		42
35 x 1,50	32,0	1,405	0,110	0,804		50
42 x 1,50	39,0	1,700	0,132	1,195		42
54 x 2,00	50,0	2,908	0,170	1,963		43
64 x 2,00	60,0	3,476	0,201	2,827		36
66,7 x 2,00	62,7	3,618	0,210	3,088		35
76,1 x 2,00	72,1	4,144	0,239	4,083		30
88,9 x 2,00	84,9	4,857	0,279	5,661		26
108 x 2,50	103,0	7,375	0,339	8,332		27

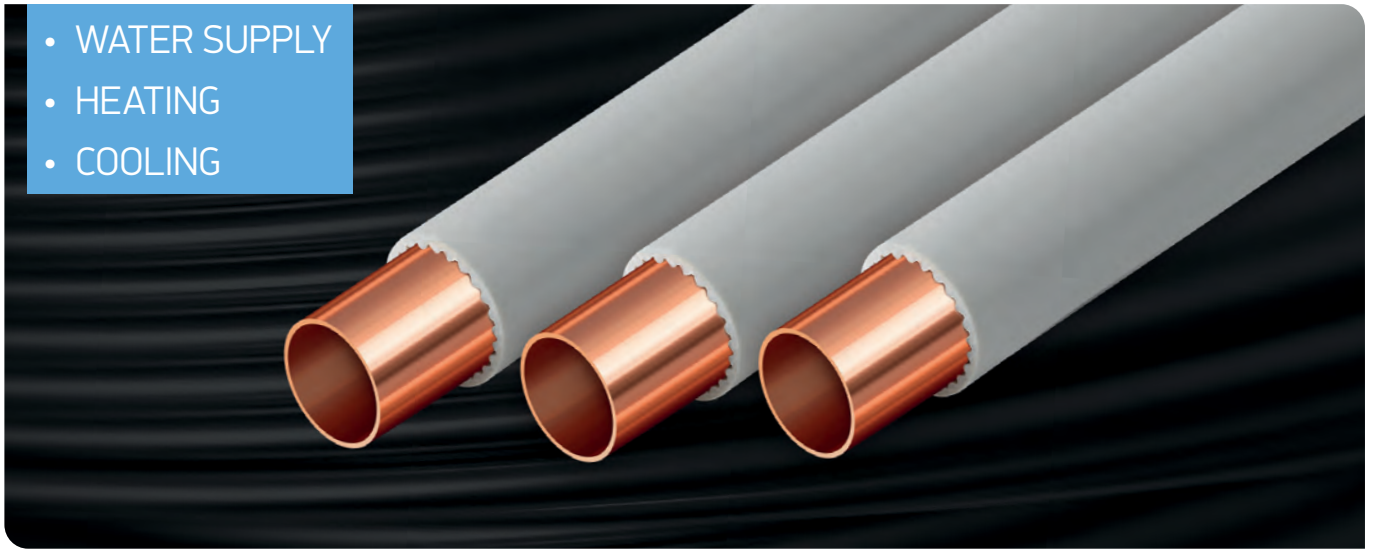
The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.



# TALOS®

## COATED™

- WATER SUPPLY
- HEATING
- COOLING



TALOS® COATED plastic-coated copper tubes are designed to provide additional exterior protection in plumbing building installations. In particular, the plastic coating offers protection against mechanical abrasion during installation, protection against the weather, as well as, protection against aggressive environments either above or below the ground.

### Material

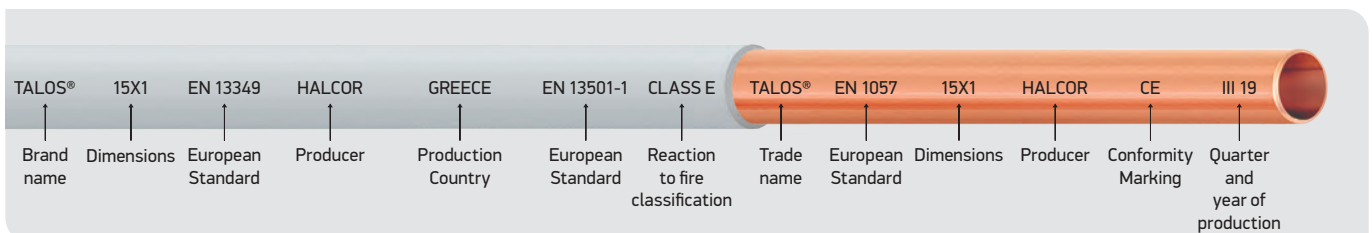
Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

### Specifications

Copper Tube: EN 13349, EN 1057

Plastic Sheathing: Classified as Class E according to EN 13501-1 classification system.

### Minimum Marking



### Quality Marks

Copper tube: AFNOR, RAL / DVGW, BSI, AENOR, NSAI, DVGW, KIWA / GASTEC-QA, SITAC, STF VTT, GOST VIK.

### Mechanical Properties

Temper	EN 1057 Designation	Min. Tensile Strength $R_m$ (MPa)	Min. Elongation, A%
Soft	R-220	220	40
Half Hard	R-250	250	20 or 30*
Hard	R-290	290	3

\* Depending on the dimension.



## Standard Dimensions

### SOFT COILS

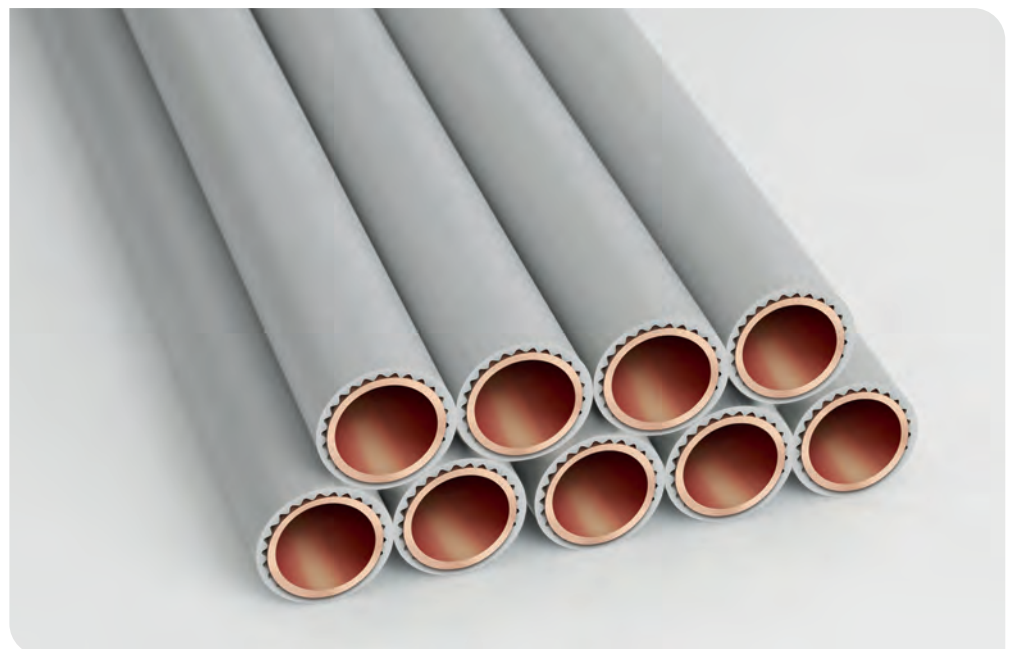
Copper tube ext. diam. x thickness dxs (mm)	Overall ext. diameter D (mm)	Tube filling volume (l/m)	Nominal copper weight (kg/m)	Thermal* capacity (Kcal/h)	Min. bending radius for hand bending (mm)	Min. bending radius with bending tool (mm)	Packaging in coils (m) long	Maximum Allowable Pressure (bar)
12 x 1,00	16	0,079	0,308	4.400	100	-	25 or 50	104
15 x 1,00	19	0,133	0,391	7.500	120	-		82
16 x 1,00	20	0,154	0,420	8.700	130	-		77
18 x 1,00	23	0,200	0,475	11.300	145	-	25	66
22 x 1,00	27	0,315	0,537	17.700	175	-		54
15 x 0,80	19	0,141	0,318	8.000	125	-	25 or 50	67
18 x 0,80	23	0,211	0,385	11.900	150	-		56

### STRAIGHT LENGTHS

Copper tube ext. diam. x thickness dxs (mm)	Overall ext. diameter D (mm)	Tube filling volume (l/m)	Nominal copper weight (kg/m)	Thermal* capacity (Kcal/h)	Min. bending radius for hand bending (mm)	Min. bending radius with bending tool (mm)	Packaging in coils (m) long	Maximum Allowable Pressure (bar)
15 x 1,00	19	0,133	0,391	7.600	-	55	Straight lengths of 4m	82
16 x 1,00	20	0,154	0,420	8.600	-	60		77
18 x 1,00	23	0,191	0,563	11.200	-	70		66
22 x 1,00	27	0,314	0,587	17.400	-	-		54

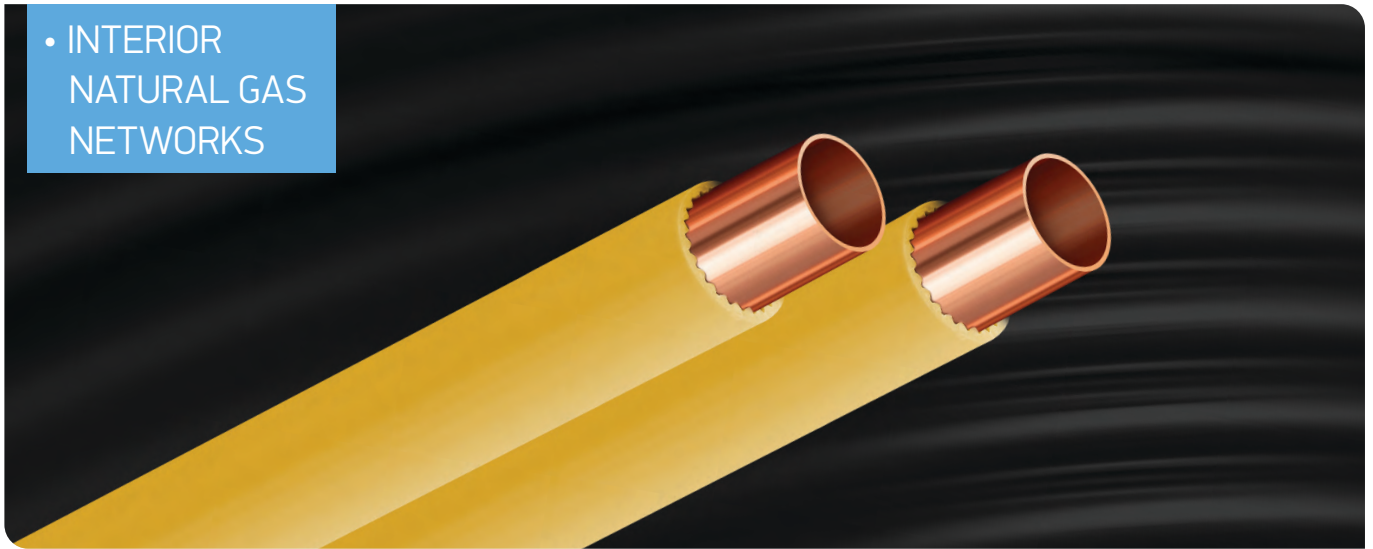
The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

\* For a temperature drop of 20°C and a water velocity of 0,8 m/sec.





• INTERIOR  
NATURAL GAS  
NETWORKS



TALOS® GAS plastic coated copper tubes are the ideal choice for natural gas installations. In particular, the plastic coating offers external protection against the elements, as well as mechanical abrasion during installation, thus providing a safe and durable solution for the transportation of natural gas.

### Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

### Quality Marks

Copper tube: AFNOR, RAL, BSI, AENOR, NSAI, SITAC, STF VTT, KIWA / GASTEC-QA, GOST VIK.

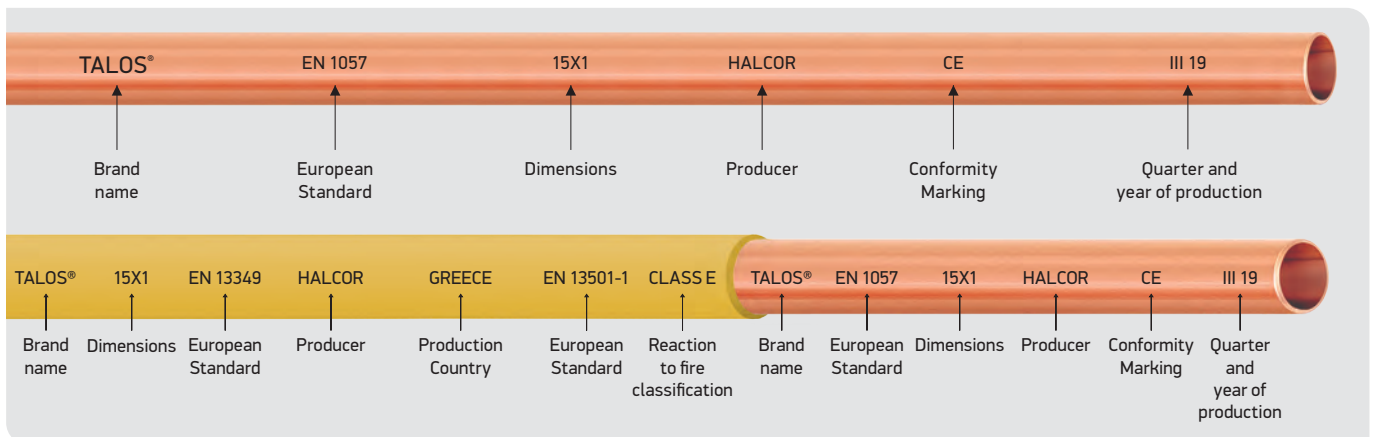
### Mechanical Properties

Temper	EN 1057 Designation	Min. Tensile Strength R <sub>m</sub> (MPa)	Min. Elongation, A%
Soft	R-220	220	40
Half Hard	R-250	250	20
Hard	R-290	290	3

### Specifications

Copper Tube: EN 1057, EN 13349  
Plastic Sheathing: Classified as Class E according to EN 13501-1 classification system.

### Minimum Marking





## Standard Dimensions

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

### COATED IN COILS

Copper tube ext. diam. x thickness d x s (mm)	Overall ext. diameter D (mm)	Tube filling volume (l/m)	Nominal copper weight (kg/m)	Min. bending radius for hand bending (mm)	Min. bending radius with bending tool EN 1057 (mm)	Packaging in coils (m) long	Maximum Allowable Pressure (bar)
15 x 1,00	19	0,133	0,391	120	-	25 or 50	82
15 x 1,20	19	0,125	0,463	120	-	50	100
18 x 1,00	22	0,201	0,475	145	-	25 or 50	66
18 x 1,20	22	0,191	0,564	145	-	25	80
22 x 1,00	26	0,314	0,587	175	-	25	54

### BRAZING ALLOYS USED FOR COPPER TUBES AND FITTINGS

Filler Alloy code (acc.to EN 1044)	AG 106	AG 203	AG 104	CP 105	CP 203
Filler Alloy code (acc.to DIN 8513)	L-Ag34Sn	L-Ag44	L-Ag45Sn	L-Ag2P	L-CuP6
Melting Range (°C)	630 - 730	675 - 735	640 - 680	645 - 825	710 - 890
Working Temperature (°C)	710	730	670	740	760
Flux (acc. to EN 1045)	FH 10	FH 10	FH 10	without (*)	without (*)
Flux (acc. to DIN 8511-1)	F-SH 1	F-SH 1	F-SH 1	without (*)	without (*)

(\*) If the fittings are made of alloy and not pure copper, then a FH 10 flux is required.

### STRAIGHT LENGTHS

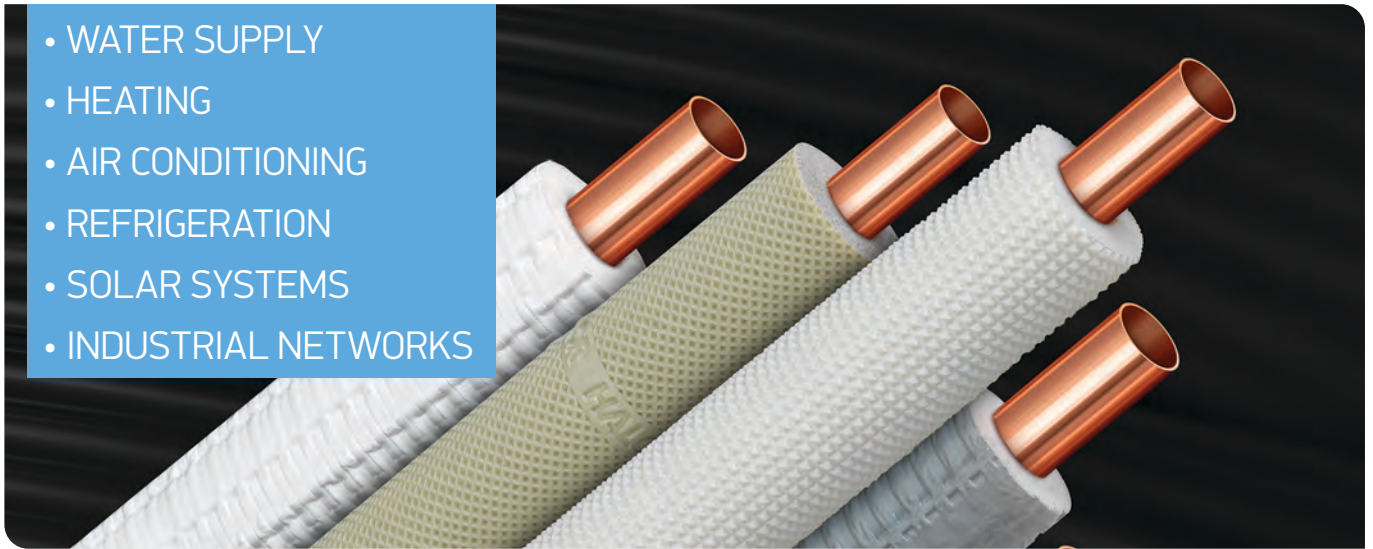
Diameter x thickness d x s (mm)	Internal diameter (mm)	Nominal copper weight (kg/m)	External surface area (m <sup>2</sup> /m)	Filling volume (l/m)	Min. bending radius with bending tool EN 1057 (mm)	Packaging		Maximum Allowable Pressure (bar)
						Type	Pieces per bundle	
10x1,00	8,0	0,252	0,031	0,050	40	Straight lengths of 4m	250	127
12x1,00	10,0	0,308	0,038	0,079	45		400	104
15x1,00	13,0	0,391	0,047	0,133	55		600	82
15x1,20	12,6	0,463	0,047	0,125	-		125	100
18x1,00	16,0	0,475	0,057	0,201	70		450	66
18x1,20	15,6	0,564	0,057	0,191	-		100	80
22x1,00	20,0	0,587	0,069	0,314	-		300	54
22x1,50	19,0	0,860	0,069	0,284	-		80	82
28x1,50	25,0	1,111	0,088	0,491	-		60	64
35x1,50	32,0	1,405	0,110	0,804	-		50	50
35x2,00	31,0	1,845	0,110	0,755	-		50	68
42x1,50	39,0	1,699	0,132	1,195	-		40	42
42x2,00	38,00	2,236	0,132	1,134	-		40	56
54x2,00	50,0	2,908	0,170	1,963	-		30	43
64x2,00	60,0	3,467	0,201	2,827	-		25	36
76,1x2,00	72,1	4,144	0,239	4,083	-		20	30
88,9x2,00	84,9	4,859	0,279	5,661	-		15	26
108x2,50	103,0	7,375	0,339	8,332	-		10	27

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

Cu tubes in Natural Gas installations should be joined to fittings (according to standards EN 1254-1 & EN 1254-5) or components, using filler alloys with high melting point. The acceptable alloys have been standardized (see for example standard EN 1044 replaced by EN ISO 17672).



- WATER SUPPLY
- HEATING
- AIR CONDITIONING
- REFRIGERATION
- SOLAR SYSTEMS
- INDUSTRIAL NETWORKS



### Advanced Technology that saves Energy and protects the Environment.

- Significant and continuous energy savings
- Safe network operation
- Reduction of installation time
- High resistance to mechanical stress
- Ease of forming
- External or embedded installations
- Resistance to extreme atmospheric conditions

TALOS® ECUTHERM pre-insulated copper tubes are advanced technological products of high added value and significantly superior in effectiveness compared to conventional insulation methods.

The unique advantages offered by the TALOS® ECUTHERM copper tubes, such as copper resistance and durability, coupled with high performance pre-insulation (Engineering Foams), result in significant energy savings. With a competitive market price and low installation cost, TALOS® ECUTHERM copper tubes are the ideal choice for every modern application.

### High Performance Technological Product

The insulating material used in the manufacturing of TALOS® ECUTHERM copper tubes is an extruded high quality polyethylene foam suitably expanded to form a foam with closed microcells, free of FCFC and fibrous substances, and is cross-linked (PE-X) to provide increased strength depending on the requirements of the application.

The closed microcells of the insulating material, combined with the protective outer polyethylene skin, form an integral barrier to aggressive environments, rendering the tube suitable for a variety of applications, such as heating, cooling, air conditioning and a multitude of plumbing installations.

TALOS® ECUTHERM copper tubes are produced in compliance to the requirements of standards that apply in most of the European Union countries, as regards insulation properties, chemical characteristics and resistance to fire. They exhibit low  $\lambda$  coefficient, determining its heat conductivity properties and high  $\mu$  coefficient which determines its resistance to penetration of moisture.

The TALOS® ECUTHERM copper tubes are available in coils of 25 & 50 meter lengths and insulation thickness of 6, 9, 10, and 13mm, suiting a variety of insulation needs.



## Reliability that only TALOS® copper tubes can provide.

TALOS® copper tubes are manufactured according to (a) the Harmonised European Standard EN 1057 for use in plumbing installations or (b) the European Standard EN 12735-1 for use in air conditioning and refrigeration installations. TALOS® ACR ECUTHERM copper tubes meet the requirements imposed by new generations of refrigerants (HFCs, HFOs) which are adopted by major refrigeration and air conditioning unit manufacturers. TALOS® copper tubes, with their high quality of manufacture, provide:

- Long lifetime
- Resistance to pressure, temperature and fire
- Complete network impermeability
- Hygienic, safe, and bacteria free potable water
- Quality and reliability of installation
- Versatile applications
- Comprehensive range of sizes
- Aesthetic result and space saving

## Copper Tube Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration  $P=0,015\% - 0,04\%$ , classified as CW024A, or Cu-DHP, according to the European alloy coding system.

## Specifications

TALOS® ECUTHERM: WATER PIPES: EN 1057

TALOS® ACR ECUTHERM: REFRIGERATION PIPES EN 12735-1

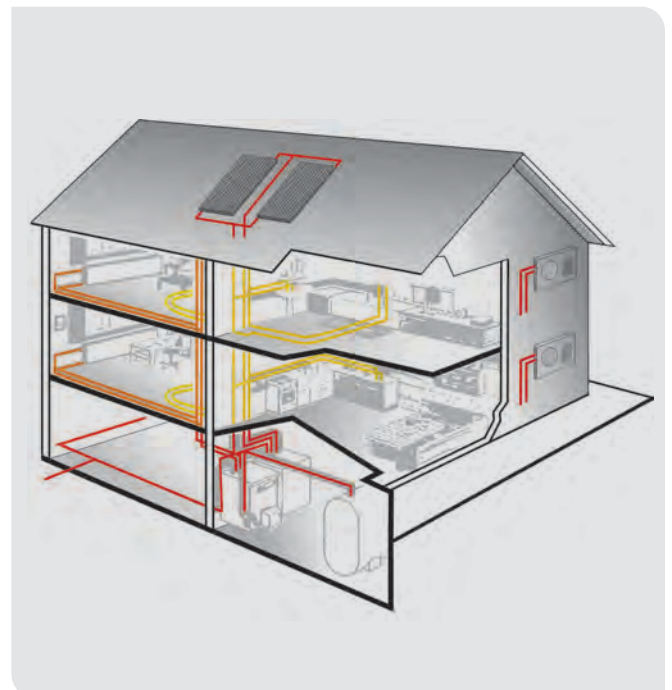
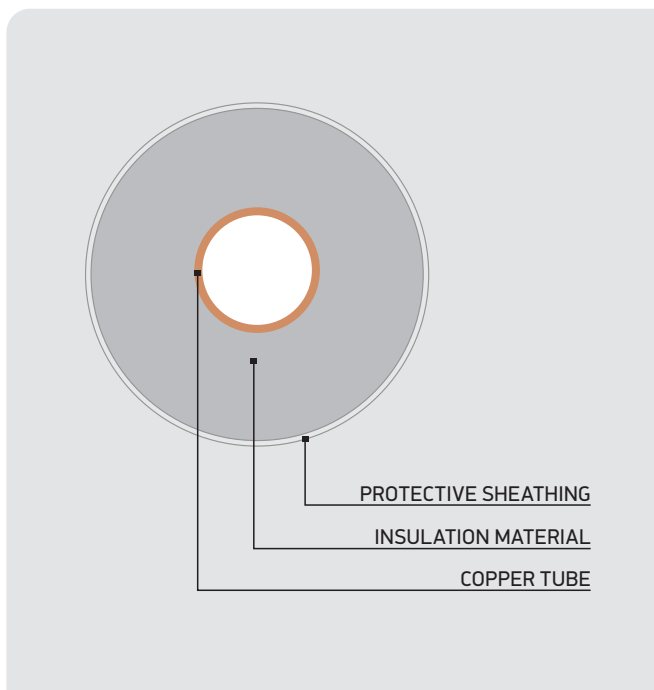
## Quality Marks

WATER PIPES: RAL / DVGW, BSI, AFNOR, AENOR, CSTB (Avis Technique), NSAI, KIWA / GASTEC-QA, SITAC, STF VTT, GOST VIK.

REFRIGERATION PIPES: TÜV, GL.

## Mechanical Properties

Temper	EN 1057 / EN 12735 Designation	Min. Tensile Strength $R_m$ (MPa)	Min. Elongation, A%
Soft	R-220	220	40





## Insulation Technical Properties



Cross-linked Polyethylene



RESISTANCE

MATERIAL	PE-X foam
DENSITY ACCORDING TO DIN 53420 ASTM D 1667	30-33 Kg/m <sup>3</sup>
THERMAL CONDUCTIVITY COEFFICIENT ( $\bar{\alpha}$ ) ACCORDING TO EN ISO 8497	0,0357 W/mK (0°C) 0,0389 W/mK (40°C)
VAPOUR-WATER DIFFUSION RESISTANCE CO-EFFICIENT ( $\mu$ ) ACCORDING TO EN13469	12,500
WORKING TEMPERATURE	-80°C to +110°C
REACTION TO FIRE	EN 13501-1 Class B or Class E, DIN 4102, B2, BS 476, NF P 92 501-M1
RESISTANCE TO CHEMICAL AGENTS ACC. TO ASTM 543-56 T	Very good
DIMENSIONAL STABILITY ACCORDING TO ISO 2796 FOR TEMPERATURES UP TO 100°C	<5%

Values are listed, as obtained under standard laboratory conditions and may be amended, without prior notice.

## TALOS® ECUTHERM Standard Dimensions according to EN 1057

Copper tube external diameter	mm	6	8	10	12	15	16	18	22
Copper tube wall thickness	mm	0,80	0,80	0,80	1,00	1,00	1,00	1,00	1,00
Overall external diameter with 9mm thick insulation	mm	24	26	28	30	33	34	36	40
Maximum Allowable Pressure	bar	182	132	103	104	82	77	66	54

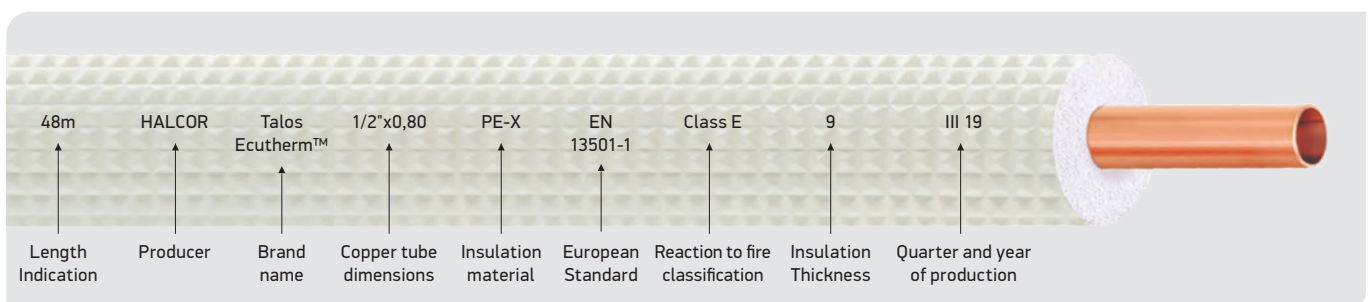
The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

## TALOS® ACR ECUTHERM Standard Dimensions according to EN 12735-1

Copper tube external diameter	Inch	3/16	1/4	5/6	3/8	1/2	5/8	3/4	7/8
	mm	4,76	6,35	7,94	9,52	12,70	15,87	19,05	22,22
Copper tube wall thickness	mm	0,80	0,80	0,80	0,80	0,80	1,00	1,00	1,00
Overall external diameter with 9mm thick insulation	mm	22,76	24,35	25,94	27,52	30,70	33,87	37,05	40,23
Maximum Allowable Pressure	bar	238	171	133	109	80	77	62	53

Maximum Pressure calculation according to EN 14276:2020 which complies with the European Directive PED 2014/68/EU (Pressure Equipment Directive)

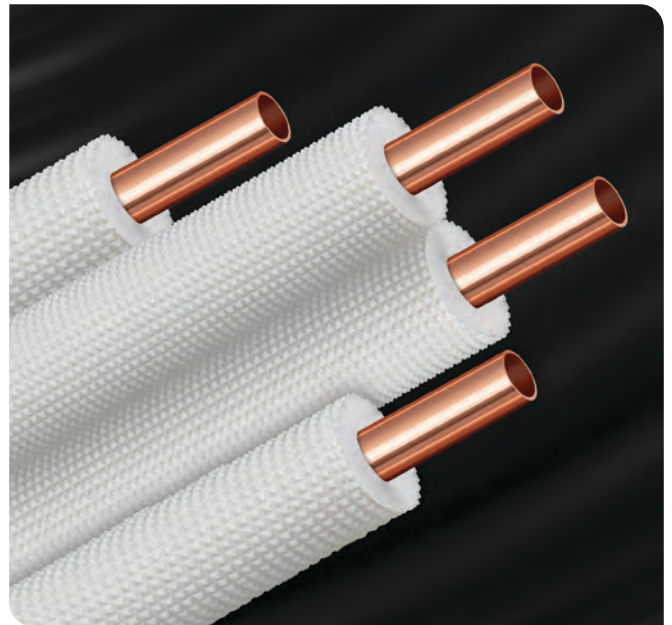
## Marking





**TALOS® ECUTHERM 1/2" & 5/8"**  
**Indicative Calculation Of Insulation Thickness**

Air conditioning and refrigeration units, operate in temperatures lower than ambient temperature. This temperature difference may lead to unwanted vapour condensation on the insulation outer surface; therefore it must be compensated by the appropriate insulation thickness. The thickness of the insulation (with reference to Mollier's diagram), is calculated taking into consideration the temperature of the fluid (or gas) inside the pipes, ambient temperature and the relative humidity of the air.



TEMPERATURE INSIDE THE TUBE (°C)	INSULATION THICKNESS (mm)											
	AMBIENT TEMPERATURE (°C) AND RELATIVE HUMIDITY (%)											
	25°C			30°C			35°C			40°C		
	50%	60%	70%	50%	60%	70%	50%	60%	70%	50%	60%	70%
+15		6	6	6	6	6	6	6	9	6	6	9
+10	6	6	6	6	6	9	6	6	9	6	6	9
+5	6	6	9	6	6	9	6	6	9	6	9	9
0	6	6	9	6	6	9	6	9	9	6	9	13
-5	6	6	9	6	9	9	6	9	13	6	9	13
-10	6	9	9	6	9	13	6	9	13	9	9	13
-20	6	9	13	9	9	13	9	9	13	9	13	13

1/2 inch - 12,7 mm

5/8 inch - 15,88 mm



- AIR CONDITIONING
- REFRIGERATION



### Clear Advantage in Refrigeration and Air Conditioning

TALOS® ACR ECUTHERM 2 pre-insulated copper tubes, manufactured by HALCOR are an innovation that ensures significant advantages for refrigeration and air conditioning installers.

- Simplified installation process and reduction of installation time
- Reduction of overall network installation cost
- Reliable operation of installations and significant energy savings
- Competitive purchase price
- Aesthetic result and space saving

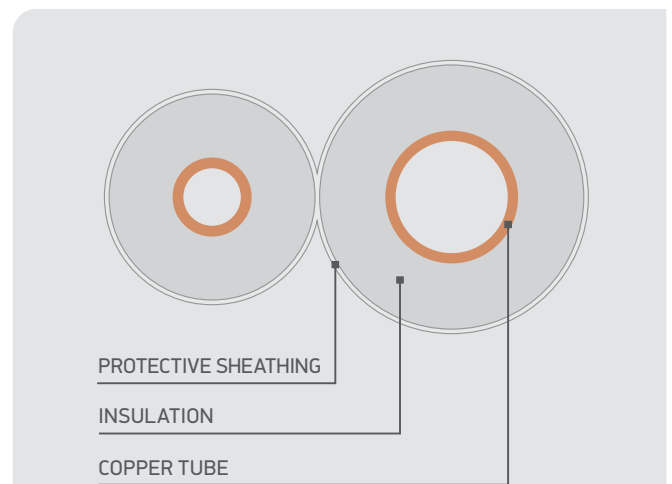
### Pair Combinations for any Application

TALOS® ACR ECUTHERM 2 copper tubes are manufactured in pairs, firmly connected along their entire length, and in eight standard size combinations which cover sufficiently the usual connectivity requirements of any refrigeration or air conditioning unit. TALOS® ACR ECUTHERM 2 copper tube pairs, form a single unit which is installed easily and fast, ensuring professional results.

### Certified Quality

TALOS® ACR ECUTHERM 2 pre-insulated copper tubes, have been certified by the German quality assurance organization RWTUV, with regard to trials and manufacturing tests.

The quality and reliability of such products, is ensured through the implementation of a Quality Assurance System, according to standard ISO 9001: 2015, certified by TÜV Hellas.



#### PAIR DIAMETERS

1/4" + 3/8"

1/4" + 1/2"

1/4" + 5/8"

1/4" + 3/4"

3/8" + 1/2"

3/8" + 5/8"

3/8" + 3/4"

1/2" + 3/4"



## Appropriate also for the new Green Refrigeration Units

According to the European Standard EN 12735-1, as well as current market requirements, laid down by the use of new generation of refrigerants, including HFCs and HFOs, adopted by all major manufacturers of refrigeration and air conditioning units the following standardisation is applied to TALOS® ACR ECUTHERM 2 copper tubes:

- For an external diameter of 1/4" to 1/2", the wall thickness is standardised at 0.80 mm.
- For an external diameter of 5/8" to 3/4", the wall thickness is standardised at 1.00 mm.

## Copper Tube Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

## Quality Marks

REFRIGERATION PIPES: TÜV, GL.

## Mechanical Properties

Temper	EN 1057 / EN 12735 Designation	Min. Tensile Strength R <sub>m</sub> (MPa)	Min. Elongation, A%
Soft	R-220	220	40

## Insulation Technical Properties



Cross-linked Polyethylene



RESISTANCE

MATERIAL	PE-X foam
DENSITY ACCORDING TO DIN 53420 ASTM D 1667	30-33 Kg/m <sup>3</sup>
THERMAL CONDUCTIVITY COEFFICIENT (λ) ACCORDING TO EN ISO 8497	0,0357 W/mK (0°C) 0,0389 W/mK (40°C)
VAPOUR-WATER DIFFUSION RESISTANCE CO-EFFICIENT (μ) ACCORDING TO EN13469	12,500
WORKING TEMPERATURE	-80°C to +110°C
REACTION TO FIRE	EN 13501-1 Class B or Class E, DIN 4102, B2, BS 476, NF P 92 501-M1
RESISTANCE TO CHEMICAL AGENTS ACC. TO ASTM 543-56 T	Very good
DIMENSIONAL STABILITY ACCORDING TO ISO 2796 FOR TEMPERATURES UP TO 100°C	<5%

Values are listed, as obtained under standard laboratory conditions and may be amended, without prior notice.

## Standard Pair Dimensions (Coils 15m, 25m, 30m Long)

Maximum allowable pressure calculation according to EN 14276:2020 which complies with the European Directive PED 2014/68/EU (Pressure Equipment Directive)

Copper tube external diameter	Inch	1/4-3/8	1/4-1/2	1/4-5/8	1/4-3/4	3/8-1/2	3/8-5/8	3/8-3/4	1/2-3/4
	mm	6,35-9,52	6,35-12,7	6,35-15,87	6,35-19,05	9,52-12,7	9,52-15,87	9,52-19,05	12,7-19,05
Copper tube wall thickness	mm	0,80-0,80	0,80-0,80	0,80-1,00	0,80-1,00	0,80-0,80	0,80-1,00	0,80-1,00	0,80-1,00
Overall external diameter with 9mm thick insulation	mm	24,4-27,5	24,4-30,7	24,4-33,9	24,4-37,10	27,5-30,7	27,5-33,9	27,5-37,1	30,7-37,1
Maximum Allowable Pressure	bar	171-109	171-80	171-77	171-62	109-80	109-77	109-62	80-62

Other sizes and special packaging in pallets or cardboard boxes are available upon request.



- WATER SUPPLY
- HEATING
- FLOOR HEATING & COOLING



### The Smart side of Technology

HALCOR has invested in research and technology to create innovative solution in copper tube systems, proving its leading position in the copper processing industry. CUSMART® are patented flexible copper tubes with a special compound coating. The online production method ensures unique uniformity and incomparable technical properties. Specially designed tubes for every purpose and a full range of mechanical fittings result in plumbing systems of superior technology.

### 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 warranty.

### 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

### Superior Technical Properties

Specification and test results of CUSMART® flexible copper tubes meet the requirements of DVGW VP 652 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/CAN 61. CUSMART® flexible copper tubes are made of special high endurance, compounds with fire retardant properties according to 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 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 operating 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”.

### 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 joining 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 faults, according to EN 1057. 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.

## Quality Marks

RAL, NSF\*

\*Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

## Mechanical Properties

Temper	Min. Tensile Strength $R_m$ (MPa)	Min. Elongation, A%
Soft	220	40





## Technical Properties of CUSMART® Copper Tubes

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

NOMINAL DIMENSIONS (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 <sup>2</sup> )		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 CO-EFFICIENT W/(m • °K)		0,40	0,40	0,40	0,40	0,40	0,40
MAXIMUM ALLOWABLE PRESSURE (bar)		35	34	29	26	26	27
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	3
	COILS (m)	100/50	100/50	100/50	100/50	25/50	25

Different dimensions and lengths are available upon request.

## Technical Properties of Industrial Insulation CUSMART® Copper Tubes

NOMINAL DIMENSIONS (mm)		14x2	16x2	18x2	20x2	26x3	32x3
TOTAL OUTSIDE DIAMETER (INSULATION THICKNESS: 9mm)		32	34	36	38	44	50
PACKAGING - COIL (m)		100/50	100/50	100/50	100/50	25/50	25

## Insulation Technical Properties

MATERIAL	PE-X or PE foam
DENSITY ACCORDING TO DIN 53420 ASTM D 1667	30-33 Kg/m <sup>3</sup>
THERMAL CONDUCTIVITY COEFFICIENT (λ) ACCORDING TO EN ISO 8497	0.0357 W/mK (0°C) 0.0389 W/mK (40°C)
VAPOUR-WATER DIFFUSION RESISTANCE CO-EFFICIENT (μ) ACCORDING TO EN13469	12,500
WORKING TEMPERATURE	-80°C to +110°C (+90°C for PE foam)
REACTION TO FIRE	EN 13501-1 Class B or Class E, DIN 4102, B2, BS 476, NF P 92 501-M1
RESISTANCE TO CHEMICAL AGENTS ACC. TO ASTM 543-56 T	Very good
DIMENSIONAL STABILITY ACCORDING TO ISO 2796 FOR TEMPERATURES UP TO 100°C	<5%

Values are listed, as obtained under standard laboratory conditions and may be amended, without prior notice.

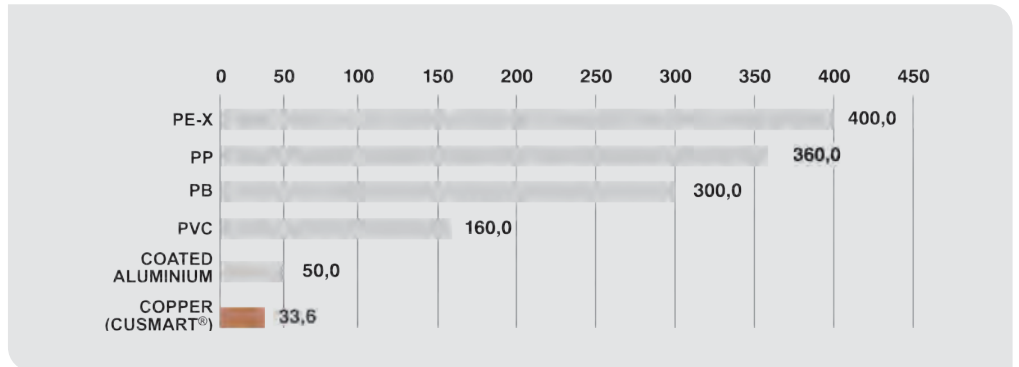
### **Significant and Uninterrupted Energy Saving**

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 polyethylene foam 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.

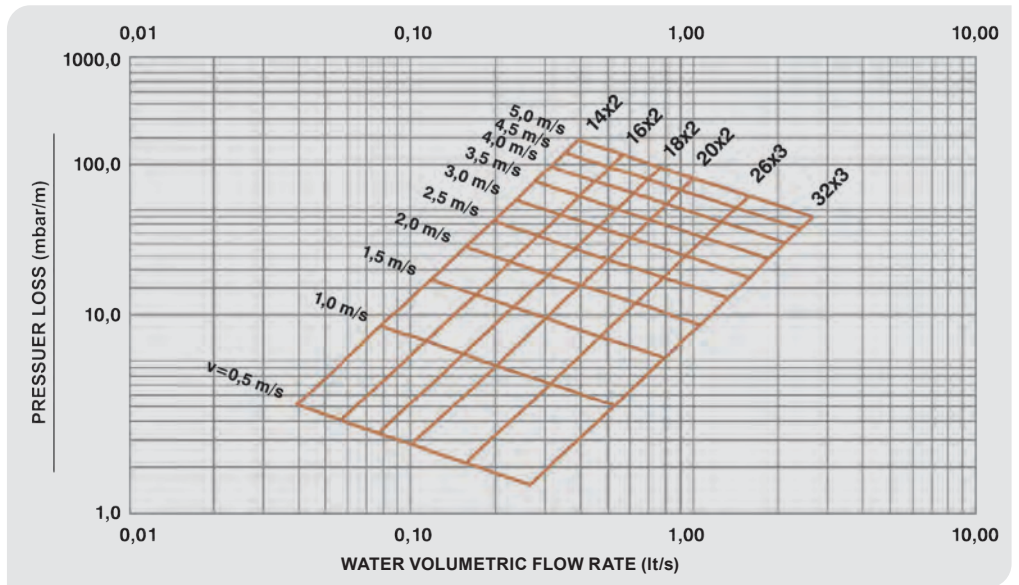




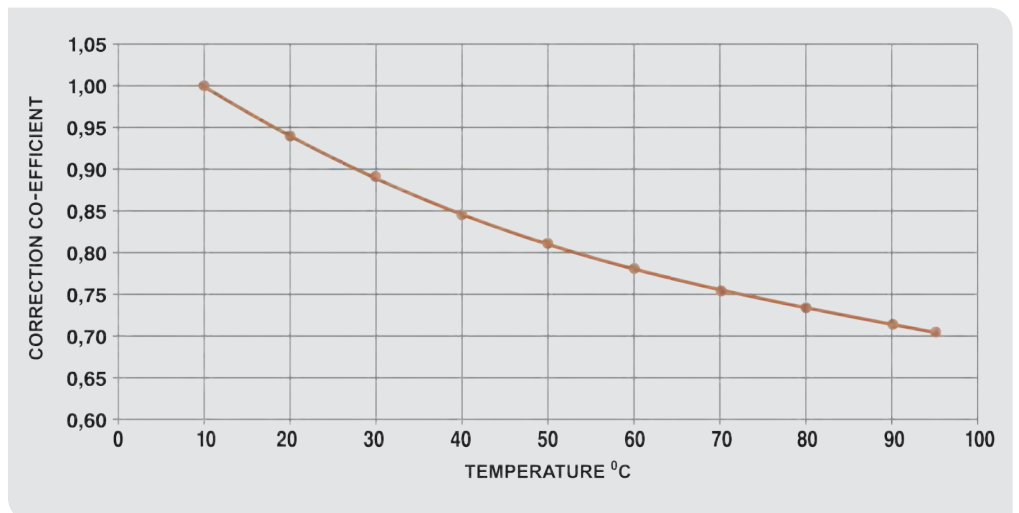
**Comparative Diagram  
for Linear Expansion  
of the Tube (mm)  
 $\Delta T = 40^{\circ}C, L=50 M$**

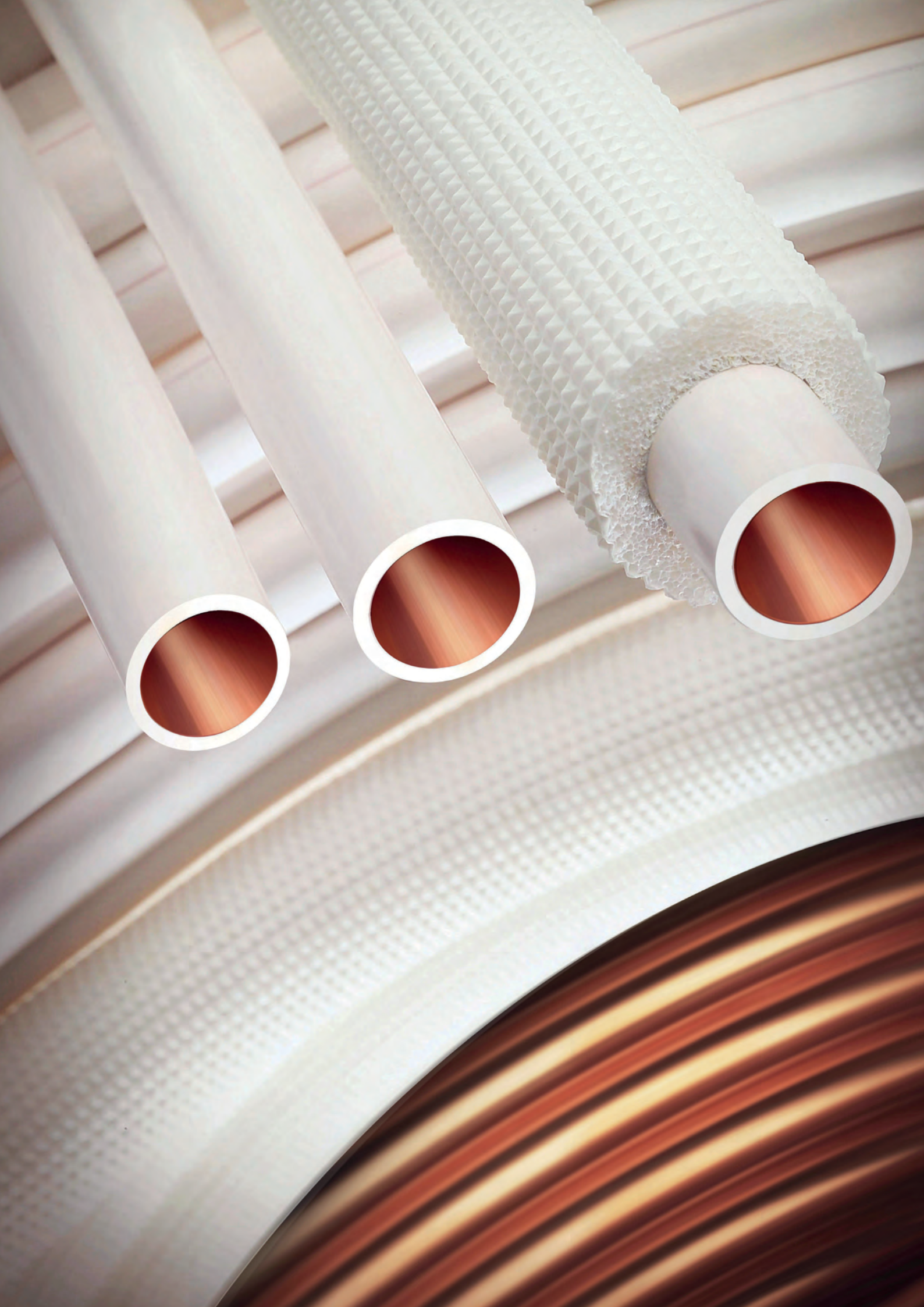


**Pressure Loss  
at 10°C**



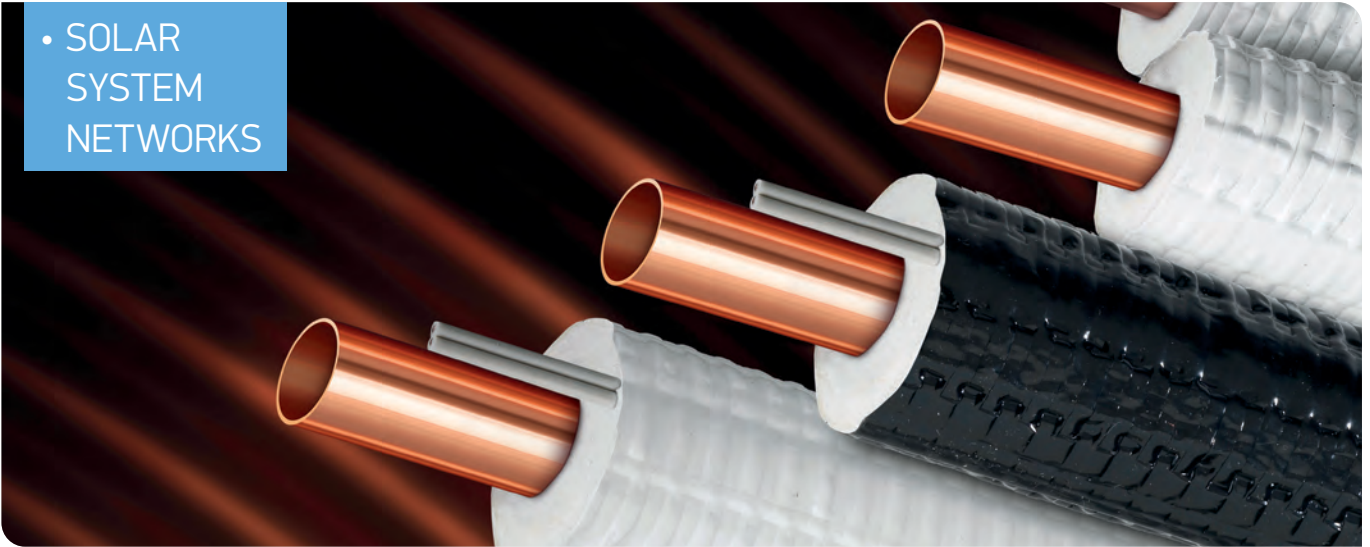
**Pressure Loss  
Correction Factor  
in relation to  
Temperature**





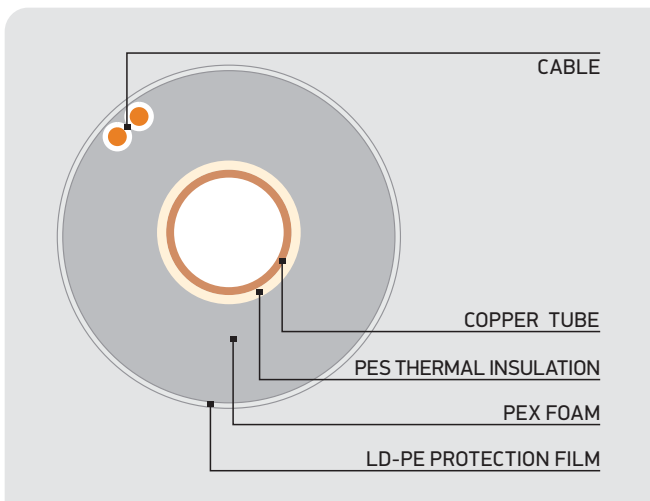


## • SOLAR SYSTEM NETWORKS



Due to its superior physical and chemical properties, engineers have always relied on copper for thermo hydraulic systems. The exploration of solar energy has also unveiled this red metal's advantages in solar systems, the most important being its high thermal conductivity. These systems are easy to install, efficient (both in energy consumption and maintenance) and reliable (comparably long life cycle). The use of factory insulated TALOS® ECUTHERM SOLAR copper tubes now greatly improves the solar system by offering even more advantages to copper tubes.

TALOS® ECUTHERM SOLAR copper tubes are manufactured in pairs (one for supply and one for return), in standardized dimensions which sufficiently cover the usual requirements of solar systems. The two pieces are attached throughout their length, while the tubes also include an incorporated cable for the connection of temperature sensors. For easy connection, separation between the two lines is also possible.



### Modern Technology in Solar Installations

The unique advantages of copper with regards to strength and durability combined with the high efficiency factory insulation make an integral assembly that is easy and fast to install, ensuring professional results and offering high energy saving. Given this competitive advantage and the low cost of installation, TALOS® ECUTHERM SOLAR copper tubes constitutes the optimum choice for any modern structure.

Factory insulated TALOS® ECUTHERM SOLAR copper tubes by HALCOR represent an innovation which guarantees significant advantages for Solar System installers.

- Simplification of installation process and reduction of working time
- Safe operation of networks with high strength in mechanical strain and weather conditions
- Reduction of total cost of construction for the networks
- Reliable operation of installation and significant energy saving
- 30 year warranty for the copper tube, manufactured according to EN 1057

### Reliability offered only by TALOS® Copper Tubes

TALOS® copper tubes are manufactured according to European and U.S. specifications and have been certified by most international quality organizations (RAL/DVGW, BSI, AFNOR, AENOR, CSTB, NSAI).



## High Performance Technological Product

TALOS® ECUTHERM SOLAR copper tubes are coated with a 3-layer system. To begin with, a high temperature resistant PES insulation layer is positioned on the outside of the copper tube. An industrial insulation of cross-linked polyethylene (PE-X) foam structured in closed micro-cells

provides thermal insulation. An external covering creates an integral resistance barrier against the external environment.

## Copper Tube Technical Characteristics

Phosphorus deoxidized copper (DHP-CU) in soft temper (R220), according to EN 1057.

## Insulation Technical Properties



Cross-linked Polyethylene



RESISTANCE

FOAM MATERIAL	PES/PE-X
DENSITY ACCORDING TO DIN 53420 ASTM D 1667	30-33 Kg/m <sup>3</sup>
THERMAL CONDUCTIVITY COEFFICIENT (λ) ACCORDING TO ISO 8497	0,0357 W/mK (0°C) 0,0389 W/mK (40°C)
VAPOUR-WATER DIFFUSION RESISTANCE CO-EFFICIENT (μ) ACCORDING TO EN13469	12,500
WORKING TEMPERATURE	-80°C to +150°C
REACTION TO FIRE	EN13501-1
RESISTANCE TO CHEMICAL AGENTS ACC. TO ASTM 543-56 T	Very good
PROTECTIVE FILM (White or Black Color)	300μm UV RESISTANT

Values are listed, as obtained under standard laboratory conditions and may be amended, without prior notice.

## Standardized Dimensions (Roll Lengths 10, 15, 20, 25 meters) TALOS® ECUTHERM SOLAR

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 150°C.

Outside diameter of copper tube	mm	10	11	12	15	18	22
Wall thickness	mm	0,50	0,60	0,60	0,70	0,75	0,90
Total diameter with 13mm thick insulation	mm	36	37	38	41	44	48
Maximum Allowable Pressure (at 150°C)	bar	55	60	55	51	45	45
Bend radius	4xOD						

Outside diameter of copper tube	mm	10	11	12	15	18	22
Wall thickness	mm	1,0	1,0	1,0	1,0	1,0	1,0
Total diameter with 13mm thick insulation	mm	36	37	38	41	44	48
Maximum Allowable Pressure (at 150°C)	bar	111	100	91	72	58	47
Bend radius	4xOD						

## Standardized Dimensions TALOS® ECUTHERM SOLAR 2

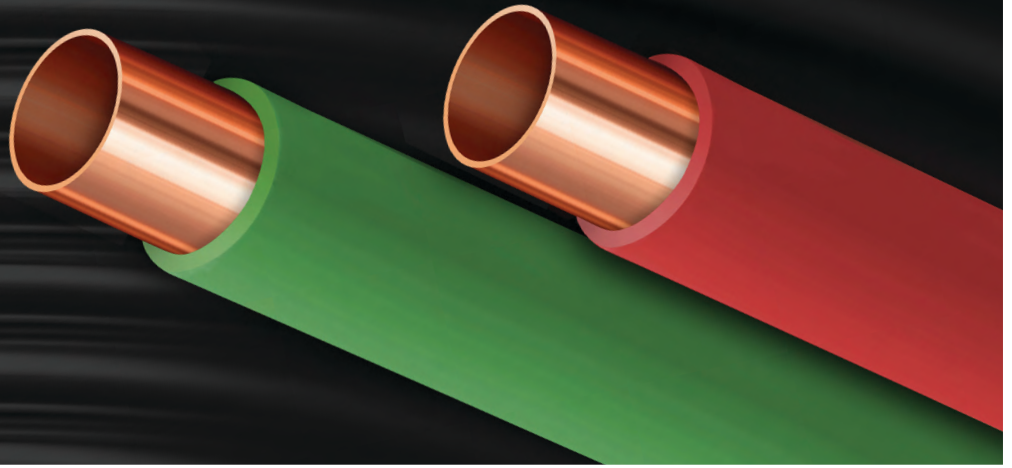
12/12, 15/15, 18/18, 22/22

## Cable Technical Characteristics

CONDUCTOR MATERIAL	COPPER
FLEXIBILITY OF CONDUCTOR	FLEXIBLE, CLASS E
COLOR	WHITE
NO. OF POLES	2
NOMINAL VOLTAGE V <sub>0</sub> /V	300/300
NOMINAL CROSS SECTION OF CONDUCTOR	2 x 0,75mm <sup>2</sup>



• GEOTHERMAL  
HEATING  
AND COOLING



## Geothermal Heat Pumps

Geothermal heat pumps are electrically powered systems that use the earth's energy to provide heating, cooling, as well as, hot water for homes and commercial buildings. Unlike conventional systems that burn a fuel to generate heat, geothermal heat pumps use electricity to move heat from the earth into the building, allowing much higher efficiencies. Research indicates that geothermal systems reduce the cost of heating and cooling an average of 30% to 60% when compared to conventional systems. This is feasible by taking advantage of the relatively constant temperature of the earth below its surface. Because the ground is almost always at a more favorable temperature than the ambient air, savings from geothermal systems occur in both the summer and winter seasons.

## Direct Exchange (DX) Geothermal

DX geothermal systems use the earth as an energy reservoir, taking advantage of the constant 12°C temperature about 1,5m below the surface. Copper tubes run underground and circulate the refrigerant that exchanges heat directly with the soil through the walls of the copper tubing. The refrigerant absorbs and gives off heat more easily because of the highly conductive copper. By running tubes underground, the refrigerant is always exposed to a temperature of 12°C, unlike other systems that are exposed to much hotter and colder outside air temperatures.

## Copper Tubing is Key to Success of DX Geothermal Systems

The direct exchange (DX) geothermal heat pump utilizes buried copper tubing filled with circulating refrigerant to exchange the heat in a building with the earth. The direct exchange technology is

25%-35% more efficient than traditional geothermal systems. The reason is the reduced number of thermal heat transfers, hence the term direct exchange. DX systems use an electrical compressor to circulate refrigerant through individual ground loops made from copper. The less efficient, traditional systems use electrical pumps to circulate water/antifreeze solutions through buried plastic pipes. DX geothermal systems do not require an additional pump to move the refrigerant through the ground or any intermediate heat exchanger. Moreover, copper-based DX systems are able to reach high efficiencies while using a relatively shorter and smaller set of buried copper tubing, therefore reducing installation costs.

## Advantages of DX Systems with Copper Coils over other Geothermal Systems

- DX geothermal systems have the refrigerant run directly through the copper coil in the earth. This eliminates the need for plastic water pipe and circulating pump found in water-source geothermal heat pumps.
- DX systems use ground loops made of copper tubing that tend to be more efficient, since there is no intermediate heat exchanger.
- Heat is transferred directly between the refrigerant and the ground, and the amount of piping can be reduced by 1/3 to 1/2 compared to other geothermal systems. DX systems also require about 1/2 the amount of holes and thus are the optimum choice for installations where the amount of space for the ground loop is limited.
- Installation of copper loops is flexible because they can be installed horizontally, vertically, or diagonally as space requires.
- Copper tubing has a long history of use in air conditioning and refrigeration. Copper tubes are able to resist high ope-



rating pressures with unlimited durability, thanks to the natural strength of copper.

- Copper tubing is strong, ductile, and resistant to corrosion and is available in many different diameters and in long coil lengths. Copper connections can be brazed, the tubing may be bent, and copper tubing is economically available.

## Specifications

TALOS® GEOTHERM copper tubes are manufactured according to the EN 12735 standard for Air-Conditioning and Refrigeration applications. TALOS® GEOTHERM copper tubes are certified to meet the requirements of the Pressure Equipment Directive (PED) 2014/68/EU, as well as the German regulation AD 2000/W0 for pressure vessels. Geothermal copper coils are end-sealed to maintain internal cleanness and can be optionally supplied with an external polyolefin protective coating. Additionally, the coils can be supplied pre-charged with nitrogen gas to ensure their absolute gas-tightness and facilitate the installation procedure.

## Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system. Protective coating made from polyolefin with a max. operating temperature of 95°C.

## Quality Certificates

TUV, AD 2000/W0, GL

Maximum Allowable  
Pressure calculation  
according to EN 14276:2020  
Standard which complies  
with the European  
Directive PED 2014/68/EU  
(Pressure Equipment Directive)

## Mechanical Properties

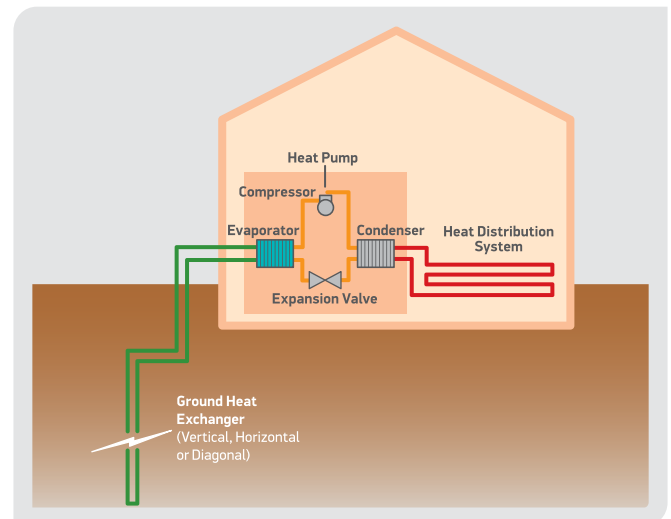
Temper	MIn. Tensile Strength, N/mm <sup>2</sup>	Yield Strength; R <sub>p0.2</sub> (Mpa)	Elongation A% (min)
R220 (acc. to 12735-1)	220	-	40
Y040 (acc. to 12735-2)	220	40-90	40

## Form of Delivery

PNC or Bunch Coils of 25 - 150m

LWC of 75 - 580kg

Packaged on pallets or in carton boxes



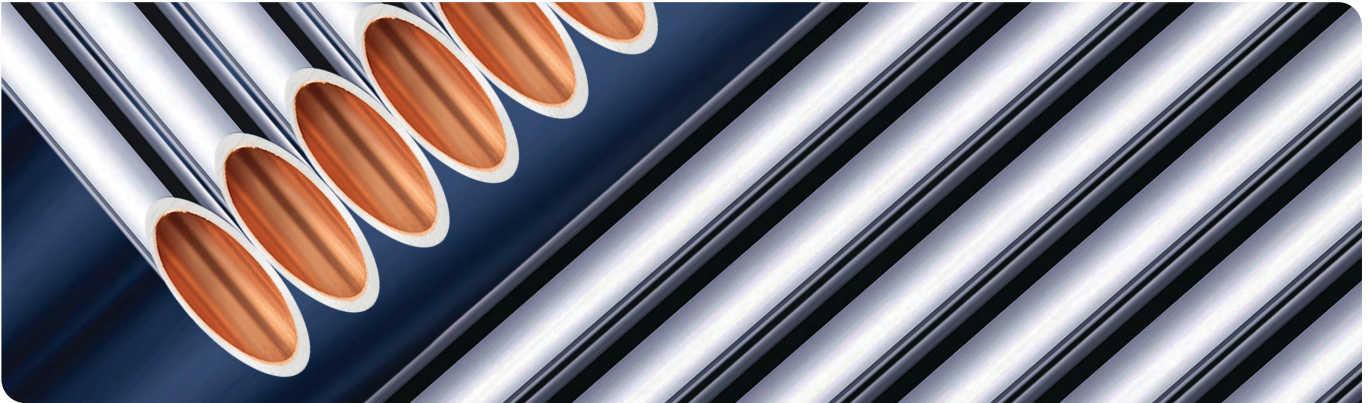
## Standard Dimensions

Copper tube external diameter x wall thickness (mm)	Nominal copper weight (kg/m)	Maximum Allowable Pressure (bar)
9,52 x 0,4	0,102	52
9,52 x 0,5	0,126	66
9,52 x 0,6	0,150	80
9,52 x 0,7	0,173	94
9,52 x 0,8	0,195	109
12,7 x 0,6	0,203	59
12,7 x 0,7	0,235	70
12,7 x 0,8	0,266	80
15,87 x 0,8	0,337	63
19,05 x 0,8	0,408	52
19,05 x 1,0	0,505	62

Other dimensions are available upon request.

# TALOS<sup>®</sup>

## PLATED<sup>™</sup>



### Product Description

TALOS<sup>®</sup> PLATED copper tubes have been developed for use in sanitary and heating installations. These metal plated copper tubes provide unique aesthetics and are suitable for both new build and renovation work. There is no need to conceal the tubes and the result delivers a smart finish, which is easy to keep clean. TALOS<sup>®</sup> PLATED copper tubes possess excellent resistance to internal, as well as external corrosion due to the inherent properties of copper and the tough external coating. The metallic coating ensures a brightly polished, mirror-like surface that is long lasting and is well matched with other plated accessories found in contemporary bathroom and heating installations. TALOS<sup>®</sup> PLATED copper tubes are supplied in half hard or soft temper that enables easy bending. This makes TALOS<sup>®</sup> PLATED copper tubes quick to install, saving time and money.

### TALOS<sup>®</sup> PLATED Copper Tube Half Hard or Soft in Straight Lengths

Outside Diameter* (mm)	Wall Thickness (mm)	Length** (m)	Maximum Allowable Pressure (bar)
10	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	90-127
12	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	74-104
14	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	63-88
15	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	58-82
16	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	55-77
18	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	48-66
22	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	39-54
32	0,7 - 1,0	1 / 1,2 / 2 / 2,75 / 3	27-36

\* Additional diameters and tempers are available upon request.

\*\* Additional lengths are available upon request.  
Soft temper available in certain lengths only.

The values of the maximum allowable pressure refer to the material condition R200. A safety factor of 3.0 is used. The minus tolerance of the wall thickness is considered. No further processing is taken into account. For temperature up to 100°C.

### Product Features

- Long lasting plated surface for that modern chromium-look which fits perfectly with contemporary taps, radiators, towel rails and bathroom fittings.
- Suitable for all exposed plumbing installations, in both horizontal and vertical runs.
- Half-hard or Soft temper to retain the bendable qualities of copper tube.
- Supplied in a variety of straight lengths to save waste.

### Material

Copper phosphorus deoxidised (minimum copper content 99,90%, phosphorus concentration P=0,015% - 0,04%, classified as CW024A, or Cu-DHP, according to the European alloy coding system.

### Specifications:

Mechanical properties: EN 1057 / Internal cleanliness: EN 1057  
Company standard: TB010





**HALCOR**

Evolving Beyond Copper

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