

KME-installation tubes for medical applications + vacuum

KME-Trade-Name :	TECTUBE®_med
Material :	Cu – DHP acc. to DIN EN 13348
Supply shape:	straight lengths and pancake coils
Tube sizes :	see Table 1 + 2
Tolerances:	<u>acc. to EN 13348</u>
Technical specification :	<u>acc. to EN 13348</u>
Tube- signature identification:	tube embossing acc. to <u>EN 13348</u>
Tube inside cleanliness :	max. 0,20 mg/dm ² <u>acc. to EN 13348</u>
Max. safe working pressure :	see Table 1 + 2
Mill inspection certificates :	acc. to EN 10204 / 2.2
Packaging :	▪ tube ends tight closed by caps or plugs ▪ Tubes in cartons, No. of tubes / carton see in Tab.2
Special remarks about installation :	Installation should be done by qualified installers having the necessary practical and theoretical knowledge about installation of medical gas tube systems and/ or refrigeration tube systems.
<u>Important :</u>	Before and during hard brazing the tube inside volume must be purged by oxygen-free gas to avoid re-oxidation in hot fitting area.
Fittings / joints :	Hard-braze-fittings are up to now the state-of-the art. Further questions pls. address to fitting producers.
Bending property:	acc. to the EN 13348 (or see table 5 on page 5)
CE - marking	see <u>foreword EN 13348</u> : “tubes acc. to EN 13348 are <u>not</u> specified as a “Medical Product” acc. to Directive 93/42/EWG”
Support for technical questions:	Telefon: 0049 - 2373 / 161- 603 e-mail : ulrich.naumann@kme.com

This information is checked and refers to the knowledge at day of creation (29th of March 2017).
 This information has not the intention to be complete in all details – these are only some answers about the main questions in this application and product.
 Updates due to product improvements and / or processing improvements remains in our option.

The relevant EN – specifications can be bought over Beuth-Verlag, in Berlin.

KME- installation tubes for refrigeration and air conditioning

KME-Trade-Name :	TECTUBE®_cips
Material :	Cu – DHP acc. to DIN EN 12735-1
Supply shape:	- straight lengths (5m) - pancake coils (25m or 35m)
Tube sizes :	see Table 1 + 2
Tolerances:	<u>acc. to EN 12735-1</u>
Technical specification :	<u>acc. to EN 12735-1</u>
Tube- signature identification:	tube embossing acc. to <u>EN 12735-1</u>
Tube inside cleanliness :	max. 0,38 mg/dm ² acc. to <u>EN 12735-1</u>
Max. safe working pressure :	see Table 1 + 2
Mill inspection certificates :	acc. to EN 10204 / 2.2
Packaging :	▪ tube ends tight closed by caps or plugs ▪ Tubes in cartons, No. of tubes / carton see in Tab.2
Special remarks about installation :	Installation should be done by qualified installers having the necessary practical and theoretical knowledge about installation of medical gas tube systems and/ or refrigeration tube systems.
<u>Important :</u>	Before and during hard brazing the tube inside volume must be purged by oxygen-free gas to avoid re-oxidation in hot fitting-area.
Fittings / joints :	Hard-braze-fittings are up to now the state-of-the art. Further questions pls. address to fitting producers.
Bending property:	acc. to the EN 13348 (or see table 5 on page 5)
Support for technical questions:	Tel. : 0049 - 2373 / 161- 603 e-mail : ulrich.naumann@kme.com

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TECTUBE_cips / TECTUBE_med - specialised tubes made at KME

Sizes, working pressure, packaging

Tab. 1: Standard - Sizes **TECTUBE®_cips_med** in pancake-coils

tube size * mm	tube weight kg / m	max. pressure for safe working**	temper	No. of pancake- coils per carton	No. of pancake- coils per carton	Shipping units	
6 x 1	0,14	200 bar	R 200, soft	2 pcs a 35 m	1 pc a 25 m	1.750 m	1.125 m
8 x 1	0,20	143 bar	R 200, soft	2 pcs a 35 m	1 pc a 25 m	1.400 m	875 m
10 x 1	0,25	111 bar	R 200, soft	1 pc a 35 m	1 pc a 25 m	875 m	625 m
12 x 1	0,31	91 bar	R 200, soft	1 pc a 35 m	1 pc a 25 m	700 m	625 m
15 x 1	0,39	71 bar	R 200, soft	1 pc a 25 m	1 pc a 25 m	500 m	500 m
16 x 1	0,42	66 bar	R 200, soft	1 pc a 25 m	1 pc a 25 m	500 m	375 m
18 x 1	0,48	59 bar	R 200, soft	1 pc a 25 m	1 pc a 25 m	500 m	200 m
22 x 1	0,59	48 bar	R 200, soft	1 pc a 25 m	1 pc a 25 m	500 m	250 m

*All tubes acc. to EN 12735-1
and EN 13348.

** Relating to the material condition R200 (soft)
and calculated with the nominal dimensions
and quadruple safety factor acc. to DIN 43614

Tab. 2 : Standard- Size **TECTUBE®_cips_med** in straight length

tube size * mm	tube weight kg / m	max. pressure for safe working **	temper	Tubes per carton	Shipping unit
6 x 1	0,14	200 bar	R 290, hard	40 pcs a 5m	1.200 m
8 x 1	0,20	143 bar	R 290, hard	40 pcs a 5m	1.200 m
10 x 1	0,25	111 bar	R 290, hard	24 pcs a 5m	1.080 m
12 x 1	0,31	91 bar	R 290, hard	10 pcs a 5 m	1.000 m
15 x 1	0,39	71 bar	R 290, hard	10 pcs a 5 m	600 m
16 x 1	0,42	67 bar	R 290, hard	10 pcs a 5 m	600 m
18 x 1	0,48	59 bar	R 290, hard	10 pcs a 5 m	600 m
22 x 1	0,59	48 bar	R 290, hard	10 pcs a 5 m	600 m
28 x 1	0,76	37 bar	R 290, hard	10 pcs a 5 m	450 m
28 x 1,5	1,11	57 bar	R 290, hard	10 pcs a 5 m	450 m
35 x 1,5	1,40	45 bar	R 290, hard	5 pcs a 5 m	225 m
42 x 1,5	1,70	37 bar	R 290, hard	5 pcs a 5 m	225 m
54 x 2	2,91	38 bar	R 290, hard	5 pcs a 5 m	100 m
64 x 2	3,47	32 bar	R 290, hard	***	10 m / 100 m
70 x 2	3,80	29 bar	R 290, hard	***	10 m / 100 m
76,1 x 2	4,14	27 bar	R 290, hard	***	10 m / 100 m
80 x 2	4,36	26 bar	R 290, hard	***	10 m / 100 m
88,9 x 2	4,86	23 bar	R 290, hard	***	10 m / 100 m
104 x 2	5,70	20 bar	R 290, hard	***	5 m / 25 m
108 x 2,5	7,37	24 bar	R 290, hard	***	5 m / 25 m
133 x 3	10,90	23 bar	R 290, hard	***	5 m / 25 m

*All tubes acc. to EN 12735-1
and EN 13348.

** Relating to the material condition R200 (soft)
and calculated with the nominal dimensions
and quadruple safety factor acc. to DIN 43614

*** Without cardboard packaging, wrapped in foil and corrugated card board
with triple steel strapping as small bunch or big bunch (in tube length of 5m).

Table 3 : industrial and medical gases for TECTUBE®_cips _med Copper tubes :

Gas type	chemical abbreviation	special application suggestion
Inert gas ■ Nitrogen ■ Helium / Argon ■ all further noble gases ■ Carbon dioxide (water free carbon dioxide)	N ₂ He/Ar CO ₂	TECTUBE®_cips / TECTUBE®_med (dry)
Inflammable Gases and refrigerating medium ■ Hydrogen ■ pure hydrocarbons ■ liquid gas (propane / butane)	H ₂	TECTUBE®_cips / TECTUBE®_med
Safety freezing agents ■ FCKW ■ CKW ■ FKW		TECTUBE®_cips / TECTUBE®_med
■ Air / compressed air / oxygen / vacuum		TECTUBE®_cips / TECTUBE®_med
Speciale medical gases ■ Argon / Helium ■ Nitrogen ■ Nitrous oxide ■ Oxygen ■ Air / compressed air ■ Vacuum ■ Carbon dioxide	Ar/He N ₂ N ₂ O O ₂ CO ₂ **	TECTUBE®_med (aeriform) (dry)

Table 4: Gases that should not be used / passed through copper tubes :

■ Acetylene	C ₂ H ₂	
■ Ammoniac	NH ₃	(moist)*
■ Chloric gas	CL ₂	(moist)*
■ Chloric hydrogen	HCL	(moist)*
■ Phosgene	COCL ₂	
■ Sulphur dioxide	SO ₂	(moist)*
■ Hydrogen sulfide	H ₂ S	(moist)*

* If this gas is in absolute dry condition then copper tubes could be used to transmit.

Bending KME-Copper tubes: TECTUBE®_cips _med

When required, the bending test shall be carried out under current operating conditions using appropriate bending machines without internal mandrel in accordance with **EN ISO 8491**. The test piece shall be bent to an angle of 90° and to the appropriate minimum radius of curvature given in **Table 5**.

Table 5

Nominal outside diameter (mm)	Minimum radius of curvature	
	Internal radius	Neutral axis radius
6	27	30
8	31	35
10	35	40
12	39	45
14	43	50
15	48	55
16	52	60
18	61	70

Maße in Millimeter

Furthermore KME Germany ensures that the 22 x 1 mm und 22 x 1,5 mm copper tube is bendable up to a minimum radius of curvature of 70 / 80 mm.