

HME-Installation tubes for medical gases + vacuum

KME-Trade-Name:	TECTUBE®_med
Material:	<u>Cu – DHP acc. to DIN EN 13348</u>
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 <u>acc. to EN 13348</u>
Tube retraceability:	verified though the identification marking on the tube
Tube inside cleanliness:	max. 0,20 mg/dm ² <u>acc. to EN 13348</u>
Max. safe working pressure:	see Table 1 + 2
Temperature range:	min. -150°C / max. + 100°C
Mill inspection certificates:	<u>acc. to EN 10204 / 2.2</u>
Packaging:	▪ tube ends tight closed by caps or plugs ▪ Tubes in cartons, No. of tubes / carton see in Tab.1
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:	<u>acc. to the EN 13348</u> (or see table 9 on page 7)
CE – marking:	see foreword in EN 13348: “tubes acc. to EN 13348 are <u>not</u> specified as a “Medical Product” acc. to directive 93/42/EWG”
Support for technical questions:	Telephone: 0049 - 2373 / 161- 0

This information is checked and refers to the knowledge at day of creation (21th of January 2019).

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 the Beuth-Verlag, in Berlin.

HME-Installation tubes for air conditioning and refrigeration

KME-Trade-Name:	TECTUBE®_cips
Material:	<u>Cu – DHP acc. to DIN EN 12735-1</u>
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 <u>acc. to EN 12735-1</u>
Tube retraceability:	verified though the identification marking on the tube
Tube inside cleanliness:	max. 0,38 mg/dm ² <u>acc. to EN 12735-1</u>
Max. safe working pressure:	see Table 1 + 2
Temperature range:	min. -150°C / max. + 100°C
Mill inspection certificates:	<u>acc. to EN 10204 / 2.2</u>
Packaging:	▪ tube ends tight closed by caps or plugs ▪ Tubes in cartons, No. of tubes / carton see in Tab.1
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:	<u>acc. to the EN 13348</u> (or see table 9 on page 7)
Support for technical questions:	Telephone: 0049 - 2373 / 161- 0

This information is checked and refers to the knowledge at day of creation (21th of January 2019).

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

TECTUBE_cips / TECTUBE_med - specialised tubes made at HME

Sizes, working pressure, packaging

Tab. 1: Metric- Sizes **TECTUBE®_cips_med** in pancake-coils (in soft temper)

tube size * mm	tube weight kg / m	max. pressure for safe working**	temper	No. of pancake- coils per carton	No. of rings per carton	Shipping units	
						pancake-coils	rings
6 x 1	0,14	194 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	139 bar	R 200, soft	2 pcs a 35 m	1 pc a 25 m	1.400 m	875 m
10 x 1	0,25	109 bar	R 200, soft	1 pc a 35 m	1 pc a 25 m	875 m	625 m
12 x 1	0,31	89 bar	R 200, soft	1 pc a 35 m	1 pc a 25 m	700 m	625 m
15 x 1	0,39	70 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	57 bar	R 200, soft	1 pc a 25 m	1 pc a 25 m	500 m	200 m
22 x 1	0,59	46 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 min. tolerance of dimensions and safety factor of 3,5 acc. to AD2000 / DK1 i164

Tab. 2 : Metric- Sizes **TECTUBE®_cips_med** in straight length (in half-hard temper)

tube size* mm	tube weight kg / m	max. pressure for safe working **	temper	Tubes per carton	Shipping unit
12 x 1	0,31	89 bar	R 250, half-hard	10 St a 5m	1.000 m
15 x 1	0,39	70 bar	R 250, half-hard	10 St a 5m	600 m
18 x 1	0,48	58 bar	R 250, half-hard	10 St a 5m	600 m
22 x 1	0,59	47 bar	R 250, half-hard	10 St a 5 m	600 m
28 x 1	0,76	37 bar	R 250, half-hard	10 St a 5 m	450 m
28 x 1,5	1,11	56 bar	R 250, half-hard	10 St a 5 m	450 m
35 x 1,5	1,41	44 bar	R 250, half-hard	5 St a 5 m	225 m
42 x 1,5	1,70	36 bar	R 250, half-hard	***	25 m / 225 m

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

** Relating to the material condition R200 (soft) and calculated with the min. tolerance of dimensions and safety factor of 3,5 acc. to AD2000 / DK1 i164

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

TECTUBE_cips / TECTUBE_med - specialised tubes made at HME

Sizes, working pressure, packaging

Tab. 3 : Metric- Sizes **TECTUBE®_cips_med** in straight length (in hard temper)

tube size * mm	tube weight kg / m	max. pressure for safe working **	temper	Tubes per carton	Shipping unit
6 x 1	0,14	194 bar	R 290, hard	40 pcs a 5m	1.200 m
8 x 1	0,20	139 bar	R 290, hard	40 pcs a 5m	1.200 m
10 x 1	0,25	109 bar	R 290, hard	24 pcs a 5m	1.080 m
12 x 1	0,31	89 bar	R 290, hard	10 pcs a 5 m	1.000 m
15 x 1	0,39	70 bar	R 290, hard	10 pcs a 5 m	600 m
16 x 1	0,42	66 bar	R 290, hard	10 pcs a 5 m	600 m
18 x 1	0,48	57 bar	R 290, hard	10 pcs a 5 m	600 m
22 x 1	0,59	46 bar	R 290, hard	10 pcs a 5 m	600 m
28 x 1	0,76	36 bar	R 290, hard	10 pcs a 5 m	450 m
28 x 1,5	1,11	55 bar	R 290, hard	10 pcs a 5 m	450 m
35 x 1,5	1,40	43 bar	R 290, hard	5 pcs a 5 m	225 m
42 x 1,5	1,70	36 bar	R 290, hard	***	25 m / 225 m
54 x 2	2,91	37 bar	R 290, hard	***	25 m / 225 m
64 x 2	3,47	31 bar	R 290, hard	***	10 m / 100 m
70 x 2	3,80	28 bar	R 290, hard	***	10 m / 100 m
76,1 x 2	4,14	26 bar	R 290, hard	***	10 m / 100 m
80 x 2	4,36	25 bar	R 290, hard	***	10 m / 100 m
88,9 x 2	4,86	22 bar	R 290, hard	***	10 m / 100 m
104 x 2	5,70	19 bar	R 290, hard	***	5 m / 25 m
108 x 2,5	7,37	23 bar	R 290, hard	***	5 m / 25 m
133 x 3	10,90	22 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 min. tolerance of dimensions and safety factor of 3,5 acc. to AD2000 / DK1 i164

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

Tab. 4: Inch - Sizes **TECTUBE®_cips_med** in pancake-coils (in soft temper)

tube size * mm	tube weight kg / m	max. pressure for safe working**	temper coils per carton	No. of pancake- per carton	No. of cartons per pallet	Shipping unit per carton / per pallet	
6,35 x 0,80	0,12	146 bar	R 200, soft	11 pcs a 15 m	32	165 m	5280 m
9,52 x 0,80	0,18	94 bar	R 200, soft	7 pcs a 15 m	32	105 m	3360 m
12,70 x 0,80	0,25	69 bar	R 200, soft	6 pcs a 15 m	32	90 m	2880 m
15,88 x 0,80	0,32	54 bar	R 200, soft	4 pcs a 15 m	32	60 m	1920 m
19,05 x 0,80	0,38	45 bar	R 200, soft	2 pcs a 15 m	13	30 m	390 m
19,05 x 0,90	0,43	51 bar	R 200, soft	2 pcs a 15 m	13	30 m	390 m
22,22 x 1,00	0,54	45 bar	R 200, soft	2 pcs a 15 m	13	30 m	390 m

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

** Relating to the material condition R200 (soft) and calculated with the min. tolerance of dimension and safety factor of 3,5 acc. to AD2000 / DK1 i164

TECTUBE_cips / TECTUBE_med - specialised tubes made at HME

Sizes, working pressure, packaging

Tab. 5 : Inch- Sizes TECTUBE®_cips_med in straight length (in half-hard temper)

tube size * mm	tube weight kg / m	max. pressure for safe working **	temper	Packing Unit in bundles*** (kg / Mtr.)
9,52 x 0,80	0,18	94 bar	R 250, half-hard	max. 500 / 2690m
12,70 x 0,89	0,29	77 bar	R 250, half-hard	max. 500 / 1790m
15,88 x 1,02	0,42	68 bar	R 250, half-hard	max. 500 / 1290m
19,05 x 1,02	0,52	56 bar	R 250, half-hard	max. 500 / 1060m
22,22 x 1,14	0,67	52 bar	R 250, half-hard	max. 500 / 820m
28,58 x 1,27	0,97	45 bar	R 250, half-hard	max. 500 / 575m
34,93 x 1,40	1,31	40 bar	R 250, half-hard	max. 500 / 420m
41,28 x 1,52	1,52	37 bar	R 250, half-hard	max. 500 / 315m
53,98 x 1,78	2,60	33 bar	R 250, half-hard	max. 500 / 215m

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

** Relating to the material condition R200 (soft) and calculated with the min. tolerance of dimensions and safety factor of 3,5 acc. to AD2000 / DK1 i164

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

Tab. 6: Inch- Size TECTUBE®_cips_med in straight length (in hard temper)

tube size * mm	tube weight kg / m	max. pressure for safe working **	temper	Packing Unit in bundles*** (small / big)
9,52 x 0,80	0,18	94 bar	R 290, hard	120m / 1200m
12,70 x 0,80	0,25	69 bar	R 290, hard	50m / 1000m
15,88 x 0,80	0,32	54 bar	R 290, hard	50m / 600m
19,05 x 0,90	0,43	51 bar	R 290, hard	50m / 600m
22,22 x 1,00	0,54	45 bar	R 290, hard	50m / 600m
25,40 x 1,00	0,68	40 bar	R 290, hard	50m / 600m
28,58 x 0,89	0,66	33 bar	R 290, hard	50m / 450m
28,58 x 1,25	0,89	46 bar	R 290, hard	50m / 450m
34,93 x 1,00	0,87	29 bar	R 290, hard	25m / 225m
34,93 x 1,25	1,09	36 bar	R 290, hard	25m / 225m
41,28 x 1,00	1,13	24 bar	R 290, hard	25m / 225m
41,28 x 1,25	1,27	30 bar	R 290, hard	25m / 225m
53,98 x 1,20	1,77	22 bar	R 290, hard	25m / 250m
66,68 x 1,63	2,77	24 bar	R 290, hard	10m / 100m
79,38 x 1,63	3,31	20 bar	R 290, hard	10m / 100m
92,08 x 2,03	4,59	22 bar	R 290, hard	5m / 25m

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

** Relating to the material condition R200 (soft) and calculated with the min. tolerance of dimensions and safety factor of 3,5 acc. to AD2000 / DK1 i164

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

Table 7: Industrial and medical gases for TECTUBE®_cips _med Copper tubes

Gas type	chemical abbreviation	A SHRAE-Nr.	special application suggestion
Inert gas			TECTUBE®_cips / TECTUBE®_med
■ Nitrogen	N ₂	R-728	
■ Helium / Argon	He/Ar	R-704 / R-740	
■ all further noble gases			
■ Carbon dioxide (water free carbon dioxide)	CO ₂ **	R-744	
Inflammable Gases and refrigerants			TECTUBE®_cips / TECTUBE®_med
■ Hydrogen	H ₂	R-702	
■ pure hydrocarbons			
■ liquid gas (propane / butane)			
Safety refrigerants			TECTUBE®_cips / TECTUBE®_med
■ FCKW			
■ CKW			
■ FKW			
■ Air / compressed air / oxygen / vacuum			TECTUBE®_cips / TECTUBE®_med
Speciale medical gases and industrial gases			TECTUBE®_med
■ Argon / Helium	Ar/He	R-740 / R-704	
■ Nitrogen	N ₂	R-728	
■ Nitrous oxide	N ₂ O	R-744a	
■ Oxygen	O ₂	R-732	
■ Air / compressed air			
■ Vacuum			
■ Carbon dioxide	CO ₂ **	R-744	
			(dry)

Table 8: 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)* *
■ Sulphur dioxide	SO ₂	(moist)* *
■ Hydrogen sulfide	H ₂ S	(moist)* *

* Technical rules for Acetylene-devices and Potassium-carbid-stock (TRAC) do not allow to put in contact acetylene with copper.

** If this gas is in absolute dry condition then copper tubes could be used to transmit under responsibility of planning / installation company.
We recommend technical clearing together with tube producer.

Bending HME Copper tubes:

TECTUBE®_cips

TECTUBE®_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 9**.*

Table 9

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

(All sizes in Millimeter)

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

* Extract out of the DIN EN 13348