HME-Installation tubes for medical gases + vacuum

HME-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:	acc. to EN 13348
Technical specification:	acc. to EN 13348
Tube- signature identification:	tube embossing acc. to EN 13348
Tube retraceability:	verified though the identification marking on the tube
Tube inside cleanliness:	max. 0,20 mg/dm² acc. to EN 13348
Max. safe working pressure:	see Table 1 + 2
Temperature range:	min. -150°C / max. + 100°C
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.
Important:	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 foreword EN 13348: “tubes acc. to EN 13348 are not 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 (23.of April 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

HME-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:	acc. to EN 12735-1
Technical specification:	acc. to EN 12735-1
Tube- signature identification:	tube embossing acc. to EN 12735-1
Tube retraceability:	verified though the identification marking on the tube
Tube inside cleanliness:	max. 0,38 mg/dm² acc. to EN 12735-1
Max. safe working pressure:	see Table 1 + 2
Temperature range:	min. -150°C / max. + 100°C
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.
Important:	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:	Telephone: 0049 - 2373 / 161- 0

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TECTUBE_cips / TECTUBE_med - specialised tubes made at HME

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 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 / DKI i164

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
12 x 1	0,31	89 bar	R 250, halfhard	10 St a 5m	1.000 m
15 x 1	0,39	70 bar	R 250, halfhard	10 St a 5m	600 m
18 x 1	0,48	58 bar	R 250, halfhard	10 St a 5m	600 m
22 x 1	0,59	47 bar	R 250, halfhard	10 St a 5 m	600 m
28 x 1	0,76	37 bar	R 250, halfhard	10 St a 5 m	450 m
28 x 1,5	1,11	56 bar	R 250, halfhard	10 St a 5 m	450 m
35 x 1,5	1,41	44 bar	R 250, halfhard	5 St a 5 m	225 m
42 x 1,5	1,70	36 bar	R 250, halfhard	***	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 / DKI 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 3: 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	(dry)
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_2O	R-744a	
■ Oxygen	O_2	R-732	(aeriform)
■ Air / compressed air			
■ Vacuum			
■ Carbon dioxide	CO_2**	R-744	(dry)

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

■ Acetylene	C_2H_2 *	
■ Ammoniac	NH_3	(moist)* *
■ Chloric gas	CL_2	(moist)* *
■ Chloric hydrogen	HCL	(moist)* *
■ Sulphur dioxide	SO_2	(moist)* *
■ Hydrogen sulfide	H_2S	(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 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

(All sizes in Millimeter)

Furthermore HME 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.

* Extract out of the DIN EN 13348