



MedBraze Medical Gas Tubes & Fittings

Brazed Copper Fittings to EN 1254 -1
Suitable for Medical Gas Copper Tube to EN 13348
Medical Grade Gas System in Compliance with HTM02-01





KE KELIT has over 80 years' experience in the design and manufacture of piping systems. We are confident in supplying high quality, innovative and environmentally friendly piping systems to New Zealand's markets.

With the introduction of our MedBraze system, KE KELIT New Zealand now has a complete offering of piping systems from press/crimp fittings, push fittings, standard braze and now a medical grade braze system.

KE KELIT New Zealand continues delivering industrial, commercial and residential projects across New Zealand. The speed and ease of installation are the results of years of innovative product development.

The Global brands represented by KE KELIT New Zealand are symbols for quality that have been trusted names in competitive markets for decades.

We continue to support New Zealand's leading architects, consultants, installers, and homeowners with the highest quality European designed and manufactured piping and HVAC equipment.



Medical Gas Certification & Warranty Information

KE KELIT New Zealand's Medical Gas Copper Braze Fittings are suitable for jointing degreased Medical Gas Copper Tube compliant with EN 13348 and EN 1057, as mentioned in HTM02-01.

Designed specifically for Medical Gas Pipelines, KE KELIT New Zealand's copper tubes and fittings are compliant with the special requirements of cleanliness, packaging, design as outlined in HTM02-01.

KE KELIT New Zealand's range of tubes and fittings offer a cleanliness of 0.02 mg/dm² or below on the degreased surface of the tubes and fittings. Each fitting will be individually bagged in clear protective polythene bags and sealed to ensure cleanliness. All tubes are individually end-capped to maintain their internal cleanliness.

All fittings are degreased, individually bagged, sealed, and identified as medical gas fittings.

MedBraze Medical Gas Fittings distributed by KE KELIT New Zealand are subject to and comply with the quality requirements set out in ISO 9001:2000.



KE KELIT New Zealand's MedBraze Fittings come with a 25 year warranty from date of manufacture. Terms and conditions apply. Please contact KE KELIT New Zealand for full warranty information.

KE KELIT New Zealand stock MedBraze tubes and fittings in sizes up to 76.1mm. Tube and fittings in sizes 108mm, 133mm, and 159mm are available via indent only.

Indent products are marked with a red asterisk (*).

Please contact KE KELIT New Zealand for more information.

Medical Gas Tubes & Fittings – Specifically Designed for Medical Gases & Vacuum

KE KELIT New Zealand distribute MedBrazed copper tubes & fittings that are manufactured in accordance with *ISO 9001 Quality Management Systems*. The tube conforms to the European Standard *EN13348 Copper & copper alloys – Seamless, round copper tubes for medical gases or vacuum*, in the sizes 15-159mm in diameter and with an equivalent wall thickness of Table X.

Fittings are manufactured to *EN 1254-1 Copper and copper alloys – Plumbing fittings – Part 1: Fittings with end for capillary soldering or capillary brazing to copper tubes* and are cleaned to meet the requirements of *EN 13348*.

MedBrazed Copper Tubes

With reference to *EN 13348 Seamless, round copper tubes for medical gases*, MedBrazed is the specific solution for the medical sector in which, given the high level of quality required for use in hospital facilities, a high degree of excellence in quality and reliability is mandatory. Medical gases have a direct impact on human health and their purity must be safeguarded throughout all transport stages to protect the safety of treated patients. MedBrazed is subject to particularly restrictive chemical, mechanical, dimensional and safety characteristics, it is suitable for vacuum systems and the distribution of medical gases and fluids (for example, oxygen, nitrous oxide, nitrogen, helium, carbon dioxide, xenon, medical air, air for feeding surgical instruments, anaesthetic gases, and vapours).

MedBrazed copper tubes and fittings are tested in accordance with *EN 723 (Combustion method for determination of the carbon content on the inner surface of copper tubes or fittings)*. Determining lubricant residue as total carbon content by measuring carbon dioxide generated, the lubricant residue on the inner surface of the tube shall conform to the following requirements, as listed in HTM 02-01:

Outside Diameter (mm)		Value (mg/dm ²)
Over	Up to and including	Maximum
6	133	0.20
133	219	0.38

The tubes are individually capped at both ends after cleaning.

The applicable jointing method for MedBrazed copper tubes and fittings is brazing, the brazing filler metal (brazing rod) is to be in accordance with *EN 1044*. During brazing operations, the inside of the tubes must be purged with a protective gas (such as nitrogen). Methodology for the pipeline jointing is prescribed in the NHS (UK) Health Technical Memorandum 02-01:2006 (HTM 02-01).

MedBraz Copper Fittings

MedBraz Fittings are manufactured to *BS EN 1254-1:1998 (Specification for copper and copper alloy fittings with capillary ends for soldering and brazing for use with copper tubes)* and are cleaned to meet the requirements set out in EN 13348.

All fittings are supplied in individually sealed protective polythene bags, labeled with product information and are specifically designed and labeled for Medical Gas applications. Improving product identification and avoiding confusion with similar sized water fittings.

All fittings comply to NHS (UK) Health Technical Memorandum 02-01:2006 (HTM 02-01).

EN 13348 Copper Tube Maximum Operating Pressures (EN 1057 Dimensional Sizes Type X)							
Product Code	Outside Diameter (mm)	Wall Thickness (mm)	Max. Pressure (bar)			Lengths (Per Pack)	Lengths (Per Bundle)
			Hard (R290)	1/2 Hard (R250)	Annealed (R220)		
6320XB00	15	0.7	61	48	40	10	100
6320XD00	22	0.9	53	42	35	10	100
6320XE00	28	0.9	42	33	27	10	100
6330XF00	35	1.2	44	35	29	5	50
6330XG00	42	1.2	37	29	24	2	20
6330XH00	54	1.2	29	23	19	2	20
6330XI00	66.7	1.2	23	18	15	1	10
6330XJ00	76.1	1.5	25	20	17	1	10
6330XL00	108	1.5	18	14	12	1	10
6330XM00	133	1.5	14	11	9	1	10
6330XN00	159	2	16	13	10	1	10

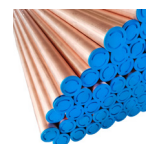
1. Annealed pressures based on annealed temper after brazing
2. Temper stocked by KE KELIT New Zealand is as follows:
 - a. Half hard: 15 to 28mm
 - b. Hard: Sizes 35mm and above
3. The maximum pressure for the system shall be dictated by the component with the lowest maximum allowable pressure which in most cases will be the brazed joint

1. KE KELIT MedBraze Copper Tube & Fitting Range

Copper Tube

Suitable for Medical Gas & Vacuum

1/2 Hard or Hard 5.8m Lengths



Code	Description	Size (OD)	Length
6320XB00	Medical Gas and Vacuum Tube to EN13348 (1/2 Hard) 15 x 0.7 mm (5.8m)	15mm	1
6320XD00	Medical Gas and Vacuum Tube to EN13348 (1/2 Hard) 22 x 0.9 mm (5.8m)	22mm	1
6320XE00	Medical Gas and Vacuum Tube to EN13348 (1/2 Hard) 28 x 0.9 mm (5.8m)	28mm	1
6330XF00	Medical Gas and Vacuum Tube to EN13348 (Hard) 35 x 1.2 mm (5.8m)	35mm	1
6330XG00	Medical Gas and Vacuum Tube to EN13348 (Hard) 42 x 1.2 mm (5.8m)	42mm	1
6330XH00	Medical Gas and Vacuum Tube to EN13348 (Hard) 54 x 1.2 mm (5.8m)	54mm	1
6330XI00	Medical Gas and Vacuum Tube to EN13348 (Hard) 66.7 x 1.2 mm (5.8m)	66.7mm	1
6330XJ00	Medical Gas and Vacuum Tube to EN13348 (Hard) 76.1 x 1.5 mm (5.8m)	76.1mm	1
6330XL00	Medical Gas and Vacuum Tube to EN13348 (Hard) 108 x 1.5 mm (5.8m) *	108mm	1
6330XM00	Medical Gas and Vacuum Tube to EN13348 (Hard) 133 x 1.5 mm (5.8m) *	133mm	1
6330XN00	Medical Gas and Vacuum Tube to EN13348 (Hard) 159 x 1.5 mm (5.8m) *	159mm	1

CMG410

Straight Coupling

Female x Female



Code	Description	Size (OD)	Bag
63600BB0	CMG410 Medical Gas & Vacuum - Straight Coupling 15mm	15mm	1
63600DD0	CMG410 Medical Gas & Vacuum - Straight Coupling 22mm	22mm	1
63600EE0	CMG410 Medical Gas & Vacuum - Straight Coupling 28mm	28mm	1
63600FF0	CMG410 Medical Gas & Vacuum - Straight Coupling 35mm	35mm	1
63600GG0	CMG410 Medical Gas & Vacuum - Straight Coupling 42mm	42mm	1
63600HH0	CMG410 Medical Gas & Vacuum - Straight Coupling 54mm	54mm	1
63600II0	CMG410 Medical Gas & Vacuum - Straight Coupling 66.7mm	66.7mm	1
63600JJ0	CMG410 Medical Gas & Vacuum - Straight Coupling 76.1mm	76.1mm	1
63600JL0	CMG410 Medical Gas & Vacuum - Straight Coupling 108mm *	108mm	1
63600JM0	CMG410 Medical Gas & Vacuum - Straight Coupling 133mm *	133mm	1
63600JN0	CMG410 Medical Gas & Vacuum - Straight Coupling 159mm *	159mm	1

CMG411

Reducer

Male x Female



Code	Description	Size (OD)	Bag
63601BA0	CMG411 Medical Gas & Vacuum - Reducer M/F 15/12	15 x 12mm	1
63601DB0	CMG411 Medical Gas & Vacuum - Reducer M/F 22/15	22 x 15mm	1
63601EB0	CMG411 Medical Gas & Vacuum - Reducer M/F 28/15	28 x 15mm	1
63601ED0	CMG411 Medical Gas & Vacuum - Reducer M/F 28/22	28 x 22mm	1

* Please note: Sizes 15mm - 76.1mm are stocked by KE KELIT New Zealand. Sizes 108mm - 159mm are available via indent only. Subject to conditions. Contact KE KELIT for further information.

Code	Description	Size (OD)	Bag
63601FD0	CMG411 Medical Gas & Vacuum - Reducer M/F 35/22	35 x 22mm	1
63601FE0	CMG411 Medical Gas & Vacuum - Reducer M/F 35/28	35 x 28mm	1
63601GD0	CMG411 Medical Gas & Vacuum - Reducer M/F 42/22	42 x 22mm	1
63601GE0	CMG411 Medical Gas & Vacuum - Reducer M/F 42/28	42 x 28mm	1
63601GF0	CMG411 Medical Gas & Vacuum - Reducer M/F 42/35	42 x 35mm	1
63601HD0	CMG411 Medical Gas & Vacuum - Reducer M/F 54/22	54 x 22mm	1
63601HE0	CMG411 Medical Gas & Vacuum - Reducer M/F 54/28	54 x 28mm	1
63601HF0	CMG411 Medical Gas & Vacuum - Reducer M/F 54/35	54 x 35mm	1
63601HG0	CMG411 Medical Gas & Vacuum - Reducer M/F 54/42	54 x 42mm	1
63601IE0	CMG411 Medical Gas & Vacuum - Reducer M/F 66.7/28	66.7 x 28mm	1
63601IF0	CMG411 Medical Gas & Vacuum - Reducer M/F 66.7/35	66.7 x 35mm	1
63601IG0	CMG411 Medical Gas & Vacuum - Reducer M/F 66.7/42	66.7 x 42mm	1
63601IH0	CMG411 Medical Gas & Vacuum - Reducer M/F 66.7/54	66.7 x 54mm	1
63601JF0	CMG411 Medical Gas & Vacuum - Reducer M/F 76.1/35	76.1 x 35mm	1
63601JG0	CMG411 Medical Gas & Vacuum - Reducer M/F 76.1/42	76.1 x 42mm	1
63601JH0	CMG411 Medical Gas & Vacuum - Reducer M/F 76.1/54	76.1 x 54mm	1
63601JI0	CMG411 Medical Gas & Vacuum - Reducer M/F 76.1/66.7	76.1 x 66.7mm	1
63601LH0	CMG411 Medical Gas & Vacuum - Reducer M/F 108/54 *	108 x 54mm	1
63601LI0	CMG411 Medical Gas & Vacuum - Reducer M/F 108/66.7 *	108 x 66.7mm	1
63601LJ0	CMG411 Medical Gas & Vacuum - Reducer M/F 108/76.1 *	108 x 76.1mm	1
63601MI0	CMG411 Medical Gas & Vacuum - Reducer M/F 133/66.7 *	133 x 66.7mm	1
63601MJ0	CMG411 Medical Gas & Vacuum - Reducer M/F 133/76.1 *	133 x 76.1mm	1
63601ML0	CMG411 Medical Gas & Vacuum - Reducer M/F 133/108 *	133 x 108mm	1
63601NM0	CMG411 Medical Gas & Vacuum - Reducer M/F 159/133 *	159 x 133mm	1

CMG420**90° Elbow**

Female x Female



Code	Description	Size (OD)	Bag
63615BB0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 15mm	15mm	1
63615DD0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 22mm	22mm	1
63615EE0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 28mm	28mm	1
63615FF0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 35mm	35mm	1
63615GG0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 42mm	42mm	1
63615HH0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 54mm	54mm	1
63615II0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 66.7mm	66.7mm	1
63615JJ0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 76.1mm	76.1mm	1
63615LL0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 108mm *	108mm	1
63615MM0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 133mm *	133mm	1
63615NN0	CMG420 Medical Gas & Vacuum - Elbow 90° F/F 159mm *	159mm	1

* Please note: Sizes 15mm - 76.1mm are stocked by KE KELIT New Zealand. Sizes 108mm - 159mm are available via indent only. Subject to conditions. Contact KE KELIT for further information.

CMG425**45° Elbow**

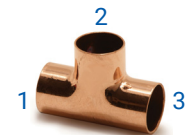
Female x Female



Code	Description	Size (OD)	Bag
63620BB0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 15mm	15mm	1
63620DD0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 22mm	22mm	1
63620EE0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 28mm	28mm	1
63620FF0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 35mm	35mm	1
63620GG0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 42mm	42mm	1
63620HH0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 54mm	54mm	1
63620II0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 66.7mm	66.7mm	1
63620JJ0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 76.1mm	76.1mm	1
63620LL0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 108mm *	108mm	1
63620MM0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 133mm *	133mm	1
63620NN0	CMG425 Medical Gas & Vacuum - Elbow 45° F/F 159mm *	159mm	1

CMG440**Equal Tee**

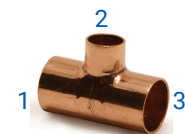
Female x Female x Female



Code	Description	Size (OD)	Bag
63630BBB	CMG440 Medical Gas & Vacuum - Tee 15/15/15	15mm	1
63630DDD	CMG440 Medical Gas & Vacuum - Tee 22/22/22	22mm	1
63630EEE	CMG440 Medical Gas & Vacuum - Tee 28/28/28	28mm	1
63630FFF	CMG440 Medical Gas & Vacuum - Tee 35/35/35	35mm	1
63630GGG	CMG440 Medical Gas & Vacuum - Tee 42/42/42	42mm	1
63630HHH	CMG440 Medical Gas & Vacuum - Tee 54/54/54	54mm	1
63630III	CMG440 Medical Gas & Vacuum - Tee 66.7/66.7/66.7	66.7mm	1
63630JJJ	CMG440 Medical Gas & Vacuum - Tee 76.1/76.1/76.1	76.1mm	1
63630LLL	CMG440 Medical Gas & Vacuum - Tee 108/108/108 *	108mm	1
63630MMM	CMG440 Medical Gas & Vacuum - Tee 133/133/133 *	133mm	1
63630NNN	CMG440 Medical Gas & Vacuum - Tee 159/159/159 *	159mm	1

CMG440**Unequal Tee**

Female x Female x Female



Code	Description	Size (OD)	Bag
63630DBD	CMG440 Medical Gas & Vacuum - Tee 22/15/22	22 x 15mm	1
63630EBE	CMG440 Medical Gas & Vacuum - Tee 28/15/28	28 x 15mm	1
63630EDE	CMG440 Medical Gas & Vacuum - Tee 28/22/28	28 x 22mm	1
63630FBF	CMG440 Medical Gas & Vacuum - Tee 35/15/35	35 x 15mm	1
63630FDF	CMG440 Medical Gas & Vacuum - Tee 35/22/35	35 x 22mm	1
63630FEF	CMG440 Medical Gas & Vacuum - Tee 35/28/35	35 x 28mm	1
63630GBG	CMG440 Medical Gas & Vacuum - Tee 42/15/42	42 x 15mm	1

* Please note: Sizes 15mm - 76.1mm are stocked by KE KELIT New Zealand. Sizes 108mm - 159mm are available via indent only. Subject to conditions. Contact KE KELIT for further information.

Code	Description	Size (OD)	Bag
63630GDG	CMG440 Medical Gas & Vacuum - Tee 42/22/42	42 x 22mm	1
63630GEG	CMG440 Medical Gas & Vacuum - Tee 42/28/42	42 x 28mm	1
63630GFG	CMG440 Medical Gas & Vacuum - Tee 42/35/42	42 x 35mm	1
63630HBH	CMG440 Medical Gas & Vacuum - Tee 54/15/54	54 x 15mm	1
63630HDH	CMG440 Medical Gas & Vacuum - Tee 54/22/54	54 x 22mm	1
63630HEH	CMG440 Medical Gas & Vacuum - Tee 54/28/54	54 x 28mm	1
63630HFH	CMG440 Medical Gas & Vacuum - Tee 54/35/54	54 x 35mm	1
63630HGH	CMG440 Medical Gas & Vacuum - Tee 54/42/54	54 x 42mm	1
63630IEI	CMG440 Medical Gas & Vacuum - Tee 66.7/28/66.7	66.7 x 28mm	1
63630IFI	CMG440 Medical Gas & Vacuum - Tee 66.7/35/66.7	66.7 x 35mm	1
63630IGI	CMG440 Medical Gas & Vacuum - Tee 66.7/42/66.7	66.7 x 42mm	1
63630IHI	CMG440 Medical Gas & Vacuum - Tee 66.7/54/66.7	66.7 x 54mm	1
63630JFJ	CMG440 Medical Gas & Vacuum - Tee 76.1/35/76.1	76.1 x 35mm	1
63630JGJ	CMG440 Medical Gas & Vacuum - Tee 76.1/42/76.1	76.1 x 42mm	1
63630JHJ	CMG440 Medical Gas & Vacuum - Tee 76.1/54/76.1	76.1 x 54mm	1
63630JIJ	CMG440 Medical Gas & Vacuum - Tee 76.1/66.7/76.1	76.1 x 66.7mm	1
63630LHL	CMG440 Medical Gas & Vacuum - Tee 108/54/108 *	108 x 54mm	1
63630LIL	CMG440 Medical Gas & Vacuum - Tee 108/66.7/108 *	108 x 66.7mm	1
63630LJL	CMG440 Medical Gas & Vacuum - Tee 108/76.1/108 *	108 x 76.1mm	1
63630MIM	CMG440 Medical Gas & Vacuum - Tee 133/66.7/133 *	133 x 66.7mm	1
63630MJM	CMG440 Medical Gas & Vacuum - Tee 133/76.1/133 *	133 x 76.1mm	1
63630MLM	CMG440 Medical Gas & Vacuum - Tee 133/108/133 *	133 x 108mm	1
63630NMN	CMG440 Medical Gas & Vacuum - Tee 159/133/159 *	159 x 133mm	1

CMG453

Straight Male Connector

BSP Taper Male Thread



Code	Description	Size (OD)	Bag
63704B02	CMG453 Medical Gas & Vacuum - Straight Connector Male 15x1/2"	15mm x 1/2"	1
63704D04	CMG453 Medical Gas & Vacuum - Straight Connector Male 22x3/4"	22mm x 3/4"	1
63704E05	CMG453 Medical Gas & Vacuum - Straight Connector Male 28x1"	28mm x 1"	1
63704F06	CMG453 Medical Gas & Vacuum - Straight Connector Male 35x1 1/4"	35mm x 1 1/4"	1
63704G07	CMG453 Medical Gas & Vacuum - Straight Connector Male 42x1 1/2"	42mm x 1 1/2"	1
63704H09	CMG453 Medical Gas & Vacuum - Straight Connector Male 54x2"	54mm x 2"	1

* Please note: Sizes 15mm - 76.1mm are stocked by KE KELIT New Zealand. Sizes 108mm - 159mm are available via indent only. Subject to conditions. Contact KE KELIT for further information.

CMG471
End Cap
Female



Code	Description	Size (OD)	Bag
63735B00	CMG471 Medical Gas & Vacuum - End Cap 15mm	15mm	1
63735D00	CMG471 Medical Gas & Vacuum - End Cap 22mm	22mm	1
63735E00	CMG471 Medical Gas & Vacuum - End Cap 28mm	28mm	1
63735F00	CMG471 Medical Gas & Vacuum - End Cap 35mm	35mm	1
63735G00	CMG471 Medical Gas & Vacuum - End Cap 42mm	42mm	1
63735H00	CMG471 Medical Gas & Vacuum - End Cap 54mm	54mm	1

2. Technical Data: Working Performance

Maximum Hydraulic Working Pressure for Medical Gas Fittings When Assembled with Copper Tube to EN13348 Using Hard Solder (Brazing Alloy) to BS EN 1044 (Formerly BS 1845) *						
	Service Temperature					
	Min. †					Max.
Size	- 196°C	65°C	120°C	150°C	175°C	200°C
6mm	81.1 bar	81.1 bar	76.2 bar	60.5 bar	46.0 bar	30.3 bar
8mm	62.5 bar	62.5 bar	58.8 bar	46.7 bar	35.5 bar	23.3 bar
10mm	50.9 bar	50.9 bar	47.9 bar	38.0 bar	28.9 bar	19.0 bar
12mm	42.9 bar	42.9 bar	40.3 bar	32.0 bar	24.3 bar	16.0 bar
14mm	42.4 bar	42.4 bar	39.9 bar	31.7 bar	24.0 bar	15.8 bar
15mm	40.3 bar	40.3 bar	37.9 bar	30.1 bar	22.8 bar	15.0 bar
16mm	37.5 bar	37.5 bar	35.3 bar	28.0 bar	21.3 bar	14.0 bar
18mm	38.6 bar	38.6 bar	36.3 bar	28.8 bar	21.9 bar	14.4 bar
22mm	35.6 bar	35.6 bar	33.5 bar	26.6 bar	20.2 bar	13.3 bar
28mm	28.2 bar	28.2 bar	26.5 bar	21.1 bar	16.0 bar	10.5 bar
35mm	25.2 bar	25.2 bar	23.7 bar	18.8 bar	14.3 bar	9.4 bar
42mm	23.2 bar	23.2 bar	21.8 bar	17.2 bar	13.1 bar	8.6 bar
54mm	19.8 bar	19.8 bar	18.6 bar	14.7 bar	11.2 bar	7.4 bar

Medical Gas Performance When Correctly Assembled with Copper Tube to EN13348 with Silver Brazing Alloy to BS EN 1044 (Formerly BS 1845)					
	Service Temperature				
	Min. †				Max.
Size	- 196°C	65°C	120°C	150°C	200°C
64mm	19.4 bar	19.4 bar	18.2 bar	14.4 bar	7.2 bar
67mm	18.6 bar	18.6 bar	17.5 bar	14.0 bar	6.9 bar
76mm	18.6 bar	18.6 bar	17.5 bar	14.0 bar	6.9 bar
89mm	18.0 bar	18.0 bar	16.9 bar	13.4 bar	6.7 bar
108mm	17.2 bar	17.2 bar	16.2 bar	12.9 bar	6.4 bar
133mm	10.5 bar	10.5 bar	8.5 bar	7.7 bar	4.1 bar
159mm	11.7 bar	11.7 bar	9.7 bar	8.6 bar	4.6 bar

* Not applicable to products containing non-metallic components

† Copper and gunmetal fittings only

2. Technical Data: System Design Considerations & Tube Expansion

System Design Considerations & Tube Expansion

Here are details of some of the specific design considerations it is important to take account of when designing and installing pipework systems containing MedBraze tubes and fittings.

Thermal Movement

Thermal movement is a major consideration when designing and installing plumbing and heating systems and should be taken into account. Pipework systems expand and contract with changes in temperature. If they are fixed too rigidly and their movement restricted the installation will be subject to stress. Stress concentrations between "fixed points" - typically found at radiators, valves and other fittings - should be avoided wherever possible.

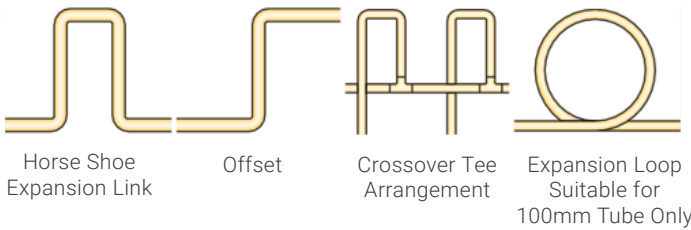
Correct Anchoring

Always ensure the free length of tube between the branch of the tee and the first anchor point (bracket or radiator valve) is long enough to allow normal thermal movement. Not doing this can lead to installation failure.

Expansion of Copper Tube

Copper has a coefficient of linear expansion of $17 \times 10^{-6} \text{ } ^\circ\text{C}$. For example, a 10 metre length of copper tube carrying hot water at 60°C will increase in length by almost 7mm when heated from 20°C. Assuming that temperature cycling of the system is 20°C, there will be a continuous cycle of expansion and contraction of 3.4mm. Refer to table on the following page.

Techniques for Expansion Stress Relief



Copper Tube Expansion										
Temp. Change	Tube Length									
	3m	4m	5m	6m	7m	8m	9m	10m	12m	25m
10°C	0.5mm	0.7mm	0.9mm	1.0mm	1.2mm	1.4mm	1.5mm	1.7mm	2.0mm	4.3mm
20°C	1.0mm	1.4mm	1.7mm	2.0mm	2.4mm	2.7mm	3.0mm	3.4mm	4.0mm	8.5mm
30°C	1.5mm	2.0mm	2.6mm	3.1mm	3.6mm	4.1mm	4.6mm	5.1mm	6.1mm	13.0mm
40°C	2.0mm	2.7mm	3.4mm	4.1mm	4.8mm	5.4mm	6.1mm	6.8mm	8.2mm	17.0mm
50°C	2.6mm	3.4mm	4.3mm	5.1mm	6.0mm	6.8mm	7.7mm	8.5mm	10.2mm	21.0mm
60°C	3.1mm	4.1mm	5.1mm	6.1mm	7.1mm	8.2mm	9.2mm	10.2mm	12.2mm	26.0mm
70°C	3.6mm	4.8mm	6.0mm	7.1mm	8.3mm	9.5mm	10.7mm	11.9mm	14.3mm	30.0mm
80°C	4.1mm	5.4mm	6.8mm	8.2mm	9.5mm	10.9mm	12.2mm	13.6mm	16.3mm	34.0mm
90°C	4.6mm	6.1mm	7.7mm	9.2mm	10.7mm	12.2mm	13.8mm	15.3mm	18.4mm	38.0mm
100°C	5.1mm	6.8mm	8.5mm	10.2mm	11.9mm	13.6mm	15.3mm	17.0mm	20.4mm	43.0mm
150°C	7.65mm	10.2mm	12.75mm	15.3mm	17.85mm	20.4mm	22.95mm	25.5mm	30.6mm	63.75mm
200°C	10.2mm	13.6mm	17.0mm	20.4mm	23.8mm	27.2mm	30.6mm	34.0mm	40.8mm	85.0mm

Pipeline Supports

Pipelines should always be assembled so that the joints are under neutral or compressive stress. Clipping to support the assembled pipeline is essential and tube manufacturer's recommendations should be adhered to. KE KELIT offers a wide range of pipe clips and brackets to ensure safe and secure installations. Pipe joist clips are also available and are designed to protect pipework against accidental piercing when nailing or screwing down floorboards. For the maximum spacing of supporting brackets refer to the table below.

Maximum Spacing of Support Brackets for Copper tube to BS EN 1057 R250 & R290			
Size	Wall Thickness	Horizontal Pitch	Vertical Pitch
6mm	0.6mm	0.40m	0.60m
8mm	0.6mm	0.60m	0.90m
10mm	0.6mm	0.80m	1.20m
12mm	0.6mm	1.00m	1.50m
14mm			
15mm	0.7mm	1.20m	1.80m
16mm			
18mm			
22mm, 28mm	0.9mm	1.80m	2.40m
35mm, 42mm	1.2mm	2.40m	3.00m
54mm	1.2mm	2.70m	3.00m
64mm			
67mm	1.2mm	3.00m	3.60m
76mm, 108mm	1.5mm	3.00m	3.60m
89mm			

3. Installation Instructions

The installation of MedBraze tubes and fittings shall be in accordance with the requirements of HTM02-01 Medical Gas Pipeline Systems. Please contact KE KELIT New Zealand for more information.

4. Specification: Medical Gas Degreased Copper Tube to EN 13348 & Fittings to EN 1254-1

Pipework

Manufacturing Standard:

- EN 13348
- Copper and copper alloys – Seamless, round copper tubes for medical gases or vacuum

Quality Control:

- ISO 9001

Product Material and Designation:

- Cu + Ag: min. 99.90 %;
- $0.015\% \leq P \leq 0.040\%$
- This copper grade is designated as either Cu-DHP or CW024A

Cleanliness

- The inner and outer surface of the tubes shall be clean and smooth. To avoid contamination of the gas passing through the pipeline, the inner surface shall not contain any detrimental residues.
- Tested in accordance with EN 723 (Combustion method for determination of the carbon content on the inner surface of copper tubes or fittings). Determining lubricant residue as total carbon content by measuring carbon dioxide generated, the lubricant residue on the inner surface of the tube shall conform to the following requirements:

Outside Diameter (mm)		Value (mg/dm ²)
Over	Up to and including	Maximum
6	133	0.20
133	219	0.38

Delivered State:

- Each tube is capped at both ends to maintain the internal cleanliness of the tube under normal conditions of handling and storage. Capped tubes are then bundled and wrapped prior to shipment from the supplier.
- Tubes delivered in 5.8m lengths.
- Permanently marked with the following at intervals no greater than 600mm: The number of the European Standard (EN 13348), Outside Diameter x Wall Thickness, Identification of Tube Hardness, Manufacturers Identification, Date of Production.

Fittings

Manufacturing Standard:

- EN 1254-1
- Copper and copper alloys – Plumbing fittings – Part 1: Fittings with end for capillary soldering or capillary brazing to copper tubes

Quality Control:

- ISO 9001

Product Material and Designation:

- Cu + Ag: min. 99.90 %;
- $0.015 \% \leq P \leq 0.040 \%$
- This copper grade is designated as either Cu-DHP or CW024A

Cleanliness

- EN 1254-1 dictates that the maximum total carbon level on the internal surfaces of the fitting shall not exceed 1.0 mg/dm². For this fitting range, additional steps are taken to be cleaned in accordance with the requirements of EN 13348.

Delivered State:

- All fittings are delivered in individual sealed bags to preserve the cleaned and degreased surface of the fittings.
- Fitting and packaging are marked with product information and identification for their specific use for medical gas installations.

Pipeline Jointing

Methodology:

- Guidelines detailed in the Health Technical Memorandum 02-01: Medical gas pipeline systems (HTM-02-01) are to be followed.

Brazing Material:

- When brazing copper to copper joints:
 - a. The brazing joint should be made using a silver-copper-phosphorous brazing alloy CP104 to BS EN 1044:1999. No flux should be used;
 - b. Ensure adequate protection of adjacent pipe runs and other surfaces



KE KELIT New Zealand Ltd

130 - 132 Hutt Road

Petone, Lower Hutt 5011

PHONE +64 4 568 4870

EMAIL info@kekelit.co.nz

WEB www.kekelit.co.nz

Revision: 5