



Copper Tube



MEDICAL GAS
COPPER TUBE
TO EUROPEAN
STANDARD
BSEN 13348

USAGE

- Medical Gas
- Vacuum Lines

www.kembla.com.au



Copper Tube

MM Kembla has been providing our customers with the highest quality and most reliable products and services for over 100 years. Established in 1916, MM Kembla is Australia's only copper tube manufacturer. Still operating from its original site at Port Kembla, NSW Australia, MM Kembla remains the most highly regarded supplier of copper products including tube, fittings and accessories. Extensive technical knowledge combined with stringent in-house quality controls and testing with an ISO 9001 certified quality management system, MM Kembla has developed a renowned reputation for quality, reliability and service.



MEDICAL GAS TUBE

KEMBLA® copper tube is manufactured to a variety of international standards, and included in the KEMBLA® range is Medical Gas tube manufactured to fully conform to EN 13348 specifications and is available from 8mm to 159mm diameter in the equivalent wall thicknesses of 'Table X'. EN 13348 copper tube is specified throughout Europe, the Middle East and Asia, and is the only copper tube specified in the Health Technical Memorandum 02-01 and ISO 7396-1, which dictate the current best practice for the installation of pipelines for compressed medical gas and vacuum systems.

The internal cleanliness of medical gas and oxygen tubes is critical in order to prevent gas contamination and potential explosions. MM Kembla has a unique manufacturing process to ensure the carbon cleanliness does not exceed 0.02g/m² total carbon, as specified in the Standard for sizes up to 54mm. Sizes over 54mm are not specified in EN 13348 but MM Kembla does supply these to the same internal cleanliness specifications. Tests are conducted by a certified laboratory using the combustion method as stipulated in EN 737. After cleaning, all tubes are individually end-capped to maintain their internal cleanliness, then bundled and wrapped in plastic for maximum protection.

All tubes are certified under a StandardsMark Licence and Test Certificates are provided for each product with all deliveries. Straight lengths of 5.8m are manufactured for ease of containerization.

Copper Tube

KEMBLA® MEDICAL GAS TUBE TO EN 13348

PRODUCT CODE	OUTSIDE DIAMETER (mm)	WALL THICKNESS (mm)	WEIGHT/ LENGTH (kg/5.8m)	SAFE WORKING PRESURE*		LENGTHS PER BUNDLE
				ANNEALED (kPa)	AS SUPPLIED (kPa)	
T11850	8.0	0.8	0.94	8,110	13,850	100
T11860	10.0	0.8	1.20	6,360	10,860	100
T11905	12.0	0.8	1.46	5,230	8,940	100
T20944	15.0 [#]	0.7	1.63	3,590	5,440 [#]	100
T14276	22.0 [#]	0.9	3.09	3,130	4,740 [#]	100
T14313	28.0 [#]	0.9	3.98	2,440	3,690 [#]	50
T14216	35.0	1.2	6.61	2,460	4,200	50
T63596	42.0	1.2	7.98	2,040	3,480	50
T21976	54.0	1.2	10.33	1,580	2,700	30
T74049	66.7	1.2	12.81	1,270	2,170	25
T78600	76.1	1.5	18.24	1,400	2,390	20
T64437	108.0	1.5	26.04	980	1,670	10
T84303	133.0	1.5	32.15	790	1,360	10
T13457 [†]	159.0	2.0	51.18	890	1,510	5

* Based on annealed temper after brazing for temperatures of 50°C # Manufactured in half-hard temper, all other sizes are hard drawn
[†] EN13348 only specifies up to 133mm diameter; 159mm will be supplied as EN1057 cleaned and capped to EN13348."

PROJECT REFERENCES

HONG KONG

- Hong Kong Adventist Hospital
- Precious Blood Hospital
- Queen Elizabeth Hospital
- North Lantau Island Hospital
- Pamela Youde Nethersole Hospital
- Yan Chai Hospital
- St. Teresa's Hospital
- Matilda International Hospital
- Harbour Building Dental Clinic
- Centro Hospitalar
- Tai Po Maxim's Food Factory
- Uni. of Science and Technology
- Hong Kong Baptist Hospital
- St. Paul Hospital
- Hong Kong Sanatorium & Hospital
- Hong Kong Adventist Hospital
- Tin Shui Wai Hospital
- Gleneagles HK Hospital
- Hong Kong Sanitarium & Hospital

MACAU

- Hospital Conde S. Januário

CHINA

- Nanjing Ming Ji Hospital, Nanjing
- Kiang Wu Hospital, Macau

SINGAPORE

- Alexandra Khoo Teck Puat Hospital
- Tan Tock Seng Hospital
- Novena Hospital
- National University Hospital
- Farrer Park Hospital
- National Heart Hospital
- Assisi Hospital
- Yishun Community Hospital
- Singapore General Hospital
- Changi General Hospital
- St. Luke Hospital
- Life Science Centre

MALAYSIA

- Petronas Hospital, Kuala Lumpur (KL)
- Ipoh Specialist Hospital, Ipoh Perak
- Tung Shin Hospital, KL

- Hospital Cancer, Nilai Hospital Army, KL
- Hospital Terangganu Wad I.C.U., Kuala Terangganu
- Columbia Asia Medical Centres in many locations
- Hospital Jantung, KL
- Hospital Hemodialysis, Seremban
- Hospital Sultan Aminah, Johor
- Seremban Specialist Hospital, Seremban
- Hospital Tropicana, KL
- Likas Medical Centre, Sabah
- Shah Alam Hospital

INDONESIA

- Gambiran Hospital, Surabaya
- Nganjuk RSUD Hospital, Surabaya
- SOA RSUD Hospital, Surabaya
- A.W Sjahranie RSUD Hospital, Samarinda

CAMBODIA

- Maternal Hospital
- Calmette Hospital

- Sunrise Hospital
- Russian Hospital

VIETNAM

- Nam Dinh General Hospital, Nam Dinh
- Dong Da General Hospital
- Hanoi Obstetrics Hospital
- National Pediatric Hospital
- Bac Ninh General Hospital
- 221 Army Hospital
- Lang Son General Hospital
- Hoa Binh General Provincial Hospital
- Phuong Chau International Hospital
- Binh Dinh General Hospital
- Cua Dong Hospital, Vinh City
- Ha Giang General Hospital
- Bia Chay General Hospital

JORDAN

- Jabal Al Zaitoon Hospital, Zarqa
- Princess Basma Hospital,
- Irbid Italian Hospital, Amman



TECHNICAL SUPPORT

MM Kembla is renowned as one of the world's leading experts for technical support regarding copper tube and fittings. We invite hydraulic consultants, engineers, distributors and installation contractors to visit our website where we provide a comprehensive range of technical information.



TEST REPORT 2322316/02-OYC

Date 02 JUN 2023

Singapore Test Lab Pte Ltd, 10B Enterprise Road, Singapore 629828, Tel: +65 6353 6393, Fax: +65 6353 6395

SUBJECT:

Copper pipe testing

TESTED FOR:

Liang Chew Hardware Pte Ltd
133 Kitchener Road
Singapore 208517

Attn: QC Department

SAMPLE RECEIVED DATE:

02 Mar 2023

TEST DATE:

03 Mar 2023

METHOD OF TEST:

BS EN 13348:2016 - European Standards - This European Standard specifies the requirements, sampling, test methods and conditions of delivery for copper tubes. It is applicable to seamless round copper.



The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council – Singapore Laboratory Accreditation Scheme.

Terms and conditions:

1. This report applies to the sample of the specific product given at the time of its testing. The results are not used to indicate or imply that they are applicable to other similar items. This report may not be used to indicate or imply that Singapore Test Lab endorses, approves or recommends the tested sample.
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5. The tests were carried out at Singapore Test Lab unless otherwise stated.



Singapore Test Lab is an ISO / IEC 17025 Accredited Laboratory.



DESCRIPTION OF SAMPLE:

One lot of "KEMBLA" brand copper tubes were received. The descriptions are as follow:

Product code	Descriptions	Markings
PIPCMG015K	½"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 15MM	KEMBLA MADE IN AUSTRALIA BSEN13348 15 X 0.7 HH MEDICAL GAS
PIPCMG020K	¾"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 22MM	KEMBLA MADE IN AUSTRALIA BSEN13348 22 X 0.90 HH MEDICAL GAS
PIPCMG025K	1"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 28MM	KEMBLA MADE IN AUSTRALIA BSEN13348 28 X 0.90 HH MEDICAL GAS
PIPCMG035K	1¼"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 35MM	KEMBLA MADE IN AUSTRALIA BSEN13348 35 X 1.2 R290 MEDICAL GAS
PIPCMG042K	1½"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 42MM	KEMBLA MADE IN AUSTRALIA BSEN13348 42 X 1.2 R290 MEDICAL GAS
PIPCMG050K	2"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 54MM	KEMBLA MADE IN AUSTRALIA BSEN13348 54 X 1.2 R290 MEDICAL GAS
PIPCMG065K	2½"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 67MM	KEMBLA MADE IN AUSTRALIA BSEN13348 66.7 X 1.2 R290 MEDICAL GAS
PIPCMG080K	3"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 76MM	KEMBLA MADE IN AUSTRALIA BSEN13348 76.1 X 1.5 R290 MEDICAL GAS
PIPCMG100K	4"X5.8M "KEMBLA" BSEN13348 MEDICAL GAS COPPER TUBE MADE IN AUSTRALIA 108MM	KEMBLA MADE IN AUSTRALIA BSEN13348 108 X 1.5 R290 MEDICAL GAS

TEST RESULTS:

Table 1a - Dimensional Measurements

Sample Reference	Results R250				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø15 X 0.7				Ø15
Wall thickness (mm)	0.64	0.68	0.68	0.67	0.7 ± 10%
Mean outside diameter (mm)	14.97		14.94		15 ± 0.09

Terms and conditions:

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TEST RESULTS (CONT'D):

Table 1b - Dimensional Measurements

Sample Reference	Results R250				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø22 x 0.90				Ø28
Wall thickness (mm)	0.88	0.83	0.87	0.89	0.9 ± 10%
Mean outside diameter (mm)	22.05		22.02		22 ± 0.10

Table 1c - Dimensional Measurements

Sample Reference	Results R250				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø28 x 0.90				Ø28
Wall thickness (mm)	0.87	0.85	0.87	0.86	0.9 ± 10%
Mean outside diameter (mm)	27.96		28.02		28 ± 0.11

Table 1d - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø35 x 1.2				Ø35
Wall thickness (mm)	1.11	1.11	1.06	1.09	1.2 ± 15%
Mean outside diameter (mm)	35.03		35.01		35 ± 0.07

Table 1e - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø42 x 1.2				Ø42
Wall thickness (mm)	1.10	1.09	1.10	1.09	1.2 ± 15%
Mean outside diameter (mm)	41.95		41.99		42 ± 0.07

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TEST RESULTS (CONT'D):

Table 1f - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø54 x 1.2				Ø54
Wall thickness (mm)	1.12	1.13	1.15	1.13	1.2 ± 15%
Mean outside diameter (mm)	54.02		54.00		54 ± 0.10

Table 1g - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø66.7 x 1.2				Ø66.7
Wall thickness (mm)	1.17	1.14	1.18	1.16	1.2 ± 15%
Mean outside diameter (mm)	66.68		66.62		66.7 ± 0.15

Table 1h - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø76.1 x 1.5				Ø76.1
Wall thickness (mm)	1.44	1.42	1.36	1.41	1.5 ± 15%
Mean outside diameter (mm)	76.14		76.11		76.1 ± 0.15

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TEST RESULTS (CONT'D):

Table 1i - Dimensional Measurements

Sample Reference	Results R290				BS EN 13348:2016 Requirements (Table 2, 3 & 4) Clause 6.3
Nominal diameter (mm)	Ø108 x 1.5				Ø108
Wall thickness (mm)	1.47	1.49	1.49	1.48	1.5 ± 15%
Mean outside diameter (mm)	107.88		107.96		108 ± 0.7

Table 2a - Hydrostatic Test

Sample Reference	Results R250		BS EN 13348:2016 Requirements
Nominal diameter (mm)	Ø15	Ø22	
The tube was subjected to an internal test pressure of 35 bar min.	Passed No sign of visible leakage was observed		Without evidence of leaking

Table 2b - Hydrostatic Test

Sample Reference	Results R250		BS EN 13348:2016 Requirements
Nominal diameter (mm)	Ø28	Ø35	
The tube was subjected to an internal test pressure of 35 bar min.	Passed No sign of visible leakage was observed		Without evidence of leaking

Table 2c - Hydrostatic Test

Sample Reference	Results R290		BS EN 13348:2016 Requirements
Nominal diameter (mm)	Ø42	Ø54	
The tube was subjected to an internal test pressure of 35 bar min.	Passed No sign of visible leakage was observed		Without evidence of leaking

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TEST REPORT 2322316/02-OYC

Date 02 JUN 2023

Singapore Test Lab Pte Ltd, 10B Enterprise Road, Singapore 629828, Tel: +65 6353 6393, Fax: +65 6353 6395

TEST RESULTS (CONT'D):

Table 2d - Hydrostatic Test

Sample Reference	Results R290		BS EN 13348:2016 Requirements
Nominal diameter (mm)	Ø66.7	Ø76.1	
The tube was subjected to an internal test pressure of 25 bar min.	Passed No sign of visible leakage was observed		Without evidence of leaking

Table 2e - Hydrostatic Test

Sample Reference	Results R290	BS EN 13348:2016 Requirements
Nominal diameter (mm)	Ø108	
The tube was subjected to an internal test pressure of 25 bar min.	Passed No sign of visible leakage was observed	Without evidence of leaking

Table 3a - Drift Expanding

Sample Reference	Results R250		BS EN 13348:2016 Clause 6.7 Requirements
Nominal diameter (mm)	Ø15	Ø22	
Outside diameter expanded by 30% using 45° conical mandrel	Passed		No crack, break or tearing of the metal shall be visible to the unaided eye.

Table 3b - Drift Expanding

Sample Reference	Results R250	BS EN 13348:2016 Clause 6.7 Requirements
Nominal diameter (mm)	Ø28	
Outside diameter expanded by 30% using 45° conical mandrel	Passed	No crack, break or tearing of the metal shall be visible to the unaided eye.

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TEST RESULTS (CONT'D):

Table 4 - Tensile Test (Full size)

Sample Reference	Results		BS EN 13348:2016 Clause 8.2 Requirements	
	Ø15 R250	Ø54 R290	Ø15 R250	Ø54 R290
Nominal diameter (mm)				
Sectional area (mm ²)	40.17	38.25	-	-
Ultimate tensile load (kN)	11.66	14.74	-	-
Ultimate tensile stress (MPa)	290.2	385	Min.250	Min.290
Elongation after Fracture (Lo=50mm) (%)	48.9	7	Min.30	Min.3
Position of Fracture	Broke within gauge length		-	-

Table 5a – Vickers hardness Test *

Sample Reference	Results R250			BS EN 13348:2016 Clause 8.3 Requirements
	Ø28			
Nominal diameter (mm)	Point 1	Point 2	Point 3	Ø28
	Vickers hardness Number (Test load applied:5 kgf)	88.4	89.0	

Table 5b – Vickers hardness Test *

Sample Reference	Results R290			BS EN 13348:2016 Clause 8.3 Requirements
	Ø54			
Nominal diameter (mm)	Point 1	Point 2	Point 3	Ø54
	Vickers hardness Number (Test load applied:5 kgf)	131	132	

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TEST RESULTS (CONT'D):

Table 6a – Chemical Analysis Test *

Sample Reference	Results R250		BS EN 13348:2016 Clause 8.1 Requirements	
	Nominal diameter (mm)	Ø22		Cu + Ag
Cu + Ag		P		
Composition (%)	99.9	0.032	99.90 min.	0.015-0.040

Table 6b – Chemical Analysis Test *

Sample Reference	Results R290		BS EN 13348:2016 Clause 8.1 Requirements	
	Nominal diameter (mm)	Ø54		Cu + Ag
Cu + Ag		P		
Composition (%)	99.9	0.030	99.90 min.	0.015-0.040

Note: "" Test conducted at Professional Testing Services Pte Ltd

Table 7 – Carbon Content Test **

Sample Reference	Results		BS EN 13348:2016 Clause 6.5 Requirements
	R250	R290	
Total Carbon Test (mg/dm ²)	Passed 0.15	Passed 0.12	0.20 Max (Over 6, up to and including 133)

Note: "" Test conducted at TUV SUD PSB Pte Ltd


 Ong Yeo Chuan
 Testing Officer


 Chua Peck Cheong
 Senior Manager

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