



# TEST REPORT 2322316/02-OYC

Date 02 JUN 2023

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**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.

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## 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

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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 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 <sup>2</sup> )	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 <sup>2</sup> )	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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