

# Medical Copper Tube Data Sheet



| Lawton Medical Tube             | Straight Length                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------|
| Applications                    | Medical Gas Piping Systems                                                            |
| Market Segment                  | Public and Commercial                                                                 |
| Outside Diameter                | 6 mm - 219 mm                                                                         |
| Wall Thickness                  | 0.6 mm - 3 mm                                                                         |
| Material Condition              | R250, R290                                                                            |
| Material                        | CW024A Copper                                                                         |
| Product Marking                 | Permanent and Inkjet Durable Markings to EN 13348                                     |
| Delivery Condition              | Nitrogen Purged and Capped Bundle or Individually Polyethylene bag wrapped and sealed |
| Standard                        | EN 13348, HTM 02-01, NHS Engineering Spec. C11                                        |
| Straight Lengths Form of Supply | Wooden Cases, Bundles                                                                 |
| Inner Surface Quality           | Clean and Smooth<br>Carbon Content to BS EN 13348 Tested per BS EN 723                |
| Guarantee                       | 75 Years (See website for full T&Cs)                                                  |

## Material Mechanical Properties

| Material Designation | Tensile strength min.<br>(N/mm <sup>2</sup>   MPa) | Elongation min.<br>(%)                     | Hardness (Indicative)<br>HV5 VPN |
|----------------------|----------------------------------------------------|--------------------------------------------|----------------------------------|
| R250 (half-hard)     | 250                                                | 30 (6mm - 66.7mm)<br>20 (> 66.7mm - 219mm) | 75 - 100                         |
| R290 (hard)          | 290                                                | 3                                          | > 100                            |

## Material Composition and Other Properties

|                                                  |                        |
|--------------------------------------------------|------------------------|
| Copper Content Including Silver                  | ≥ 99.90 %              |
| Phosphorus                                       | 0.015 - 0.040 %        |
| Total Impurities Excluding Phosphorus and Silver | < 0.060 %              |
| Melting Point                                    | 1083°C                 |
| Density                                          | 8.96 g/cm <sup>3</sup> |

## Carbon Content

Inner surface lubricant residue defined as carbon content to BS EN 13348 Tested per BS EN 723

| Outside Diameter |                     | Value<br>(mg/dm <sup>2</sup> ) |
|------------------|---------------------|--------------------------------|
| Over             | Up To and Including |                                |
| 6 <sup>a</sup>   | 133                 | 0.2                            |
| 133              | 219                 | 0.38                           |

<sup>a</sup> Including 6

## Copper Tube Expansion

Copper has a Coefficient of Linear Expansion of  $17 \times 10^{-6} / ^\circ\text{C}$

| Temperature Change | 3m     | 4m     | 5m     | 6m     | 7m     | 8m     | 9m     | 10m    | 12m    | 25m    |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 10°                | 0.5mm  | 0.7mm  | 0.9mm  | 1.0mm  | 1.2mm  | 1.4mm  | 1.5mm  | 1.7mm  | 2.0mm  | 4.3mm  |
| 20°                | 1.0mm  | 1.4mm  | 1.7mm  | 2.0mm  | 2.4mm  | 2.7mm  | 3.0mm  | 3.4mm  | 4.0mm  | 8.5mm  |
| 30°                | 1.5mm  | 2.0mm  | 2.6mm  | 3.1mm  | 3.6mm  | 4.1mm  | 4.6mm  | 5.1mm  | 6.1mm  | 13.0mm |
| 40°                | 2.0mm  | 2.7mm  | 3.4mm  | 4.1mm  | 4.8mm  | 5.4mm  | 6.1mm  | 6.8mm  | 8.2mm  | 17.0mm |
| 50°                | 2.6mm  | 3.4mm  | 4.3mm  | 5.1mm  | 6.0mm  | 6.8mm  | 7.7mm  | 8.5mm  | 10.2mm | 21.0mm |
| 60°                | 3.1mm  | 4.1mm  | 5.1mm  | 6.1mm  | 7.1mm  | 8.2mm  | 9.2mm  | 10.2mm | 12.2mm | 26.0mm |
| 70°                | 3.6mm  | 4.8mm  | 6.0mm  | 7.1mm  | 8.3mm  | 9.5mm  | 10.7mm | 11.9mm | 14.3mm | 30.0mm |
| 80°                | 4.1mm  | 5.4mm  | 6.8mm  | 8.2mm  | 9.5mm  | 10.9mm | 12.2mm | 13.6mm | 16.3mm | 34.0mm |
| 90°                | 4.6mm  | 6.1mm  | 7.7mm  | 9.2mm  | 10.7mm | 12.2mm | 13.8mm | 15.3mm | 18.4mm | 38.0mm |
| 100°               | 5.1mm  | 6.8mm  | 8.5mm  | 10.2mm | 11.9mm | 13.6mm | 15.3mm | 17.0mm | 20.4mm | 43.0mm |
| 150°               | 7.7mm  | 10.2mm | 12.8mm | 15.3mm | 17.9mm | 20.4mm | 23.0mm | 25.5mm | 30.6mm | 64.0mm |
| 200°               | 10.2mm | 13.6mm | 17.0mm | 20.4mm | 23.8mm | 27.2mm | 30.6mm | 34.0mm | 40.8mm | 85.0mm |

## Maximum Operating Pressure EN 13348

Maximum Operating Pressure (MOP) to BS 1306.

| O.D. (mm) | Wall (mm) | Material Condition | Max Working Pressure<br>bar up to 65°C | Thickness Tolerance | Outside Diameter Tolerance |                  |
|-----------|-----------|--------------------|----------------------------------------|---------------------|----------------------------|------------------|
|           |           |                    |                                        |                     | Mean                       | Any inc. Ovality |
| 6         | 0.6 (TX)  | R250               | 133.3                                  | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 6         | 0.8 (TY)  | R250               | 184.6                                  | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 8         | 0.6 (TX)  | R250               | 97.3                                   | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 8         | 0.8 (TY)  | R250               | 133.3                                  | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 10        | 0.6 (TX)  | R250               | 76.6                                   | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 10        | 0.8 (TY)  | R250               | 104.3                                  | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 12        | 0.6 (TX)  | R250               | 63.2                                   | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 12        | 0.8 (TY)  | R250               | 85.7                                   | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 15        | 0.7 (TX)  | R250               | 58.7                                   | ± 10%               | ± 0.04mm                   | ± 0.09mm         |
| 15        | 1.0 (TY)  | R250               | 85.7                                   | ± 13%               | ± 0.04mm                   | ± 0.09mm         |
| 22        | 0.9 (TX)  | R250               | 51.2                                   | ± 10%               | ± 0.05mm                   | ± 0.10mm         |
| 22        | 1.2 (TY)  | R250               | 69.2                                   | ± 15%               | ± 0.05mm                   | ± 0.10mm         |
| 28        | 0.9 (TX)  | R250               | 39.9                                   | ± 10%               | ± 0.05mm                   | ± 0.10mm         |
| 28        | 1.2 (TY)  | R250               | 53.7                                   | ± 15%               | ± 0.05mm                   | ± 0.10mm         |
| 35        | 1.0       | R290               | 42.9                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 35        | 1.2 (TX)  | R250               | 42.6                                   | ± 10%               | ± 0.06mm                   | ± 0.11mm         |
| 35        | 1.5 (TY)  | R290               | 65.4                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 42        | 1.0       | R290               | 35.6                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 42        | 1.2 (TX)  | R250               | 35.3                                   | ± 10%               | ± 0.06mm                   | ± 0.11mm         |
| 42        | 1.5 (TY)  | R290               | 54.1                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 54        | 1.0       | R290               | 27.5                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 54        | 1.2 (TX)  | R250               | 27.3                                   | ± 10%               | ± 0.06mm                   | ± 0.11mm         |
| 54        | 2.0 (TY)  | R290               | 56.2                                   | ± 15%               | ± 0.06mm                   | ± 0.07mm         |
| 66.7      | 1.2 (TX)  | R290               | 26.7                                   | ± 15%               | ± 0.07mm                   | ± 0.10mm         |
| 66.7      | 2.0 (TY)  | R290               | 45.1                                   | ± 15%               | ± 0.07mm                   | ± 0.10mm         |
| 76.1      | 1.5 (TX)  | R290               | 29.4                                   | ± 15%               | ± 0.07mm                   | ± 0.10mm         |
| 76.1      | 2.0 (TY)  | R290               | 39.4                                   | ± 15%               | ± 0.07mm                   | ± 0.10mm         |
| 108       | 1.5 (TX)  | R290               | 20.6                                   | ± 15%               | ± 0.07mm                   | ± 0.20mm         |
| 108       | 2.5 (TY)  | R290               | 34.6                                   | ± 15%               | ± 0.07mm                   | ± 0.20mm         |
| 133       | 1.5 (TX)  | R290               | 16.7                                   | ± 15%               | ± 0.20mm                   | ± 0.70mm         |
| 159       | 2.0 (TX)  | R290               | 18.6                                   | ± 15%               | ± 0.20mm                   | ± 0.70mm         |
| 219       | 3.0 (TX)  | R290               | 20.3                                   | ± 15%               | ± 0.60mm                   | ± 1.50mm         |

For more details, please refer to our website or contact us by e-mail at [technical@lawtontubes.co.uk](mailto:technical@lawtontubes.co.uk)