

TECHNICAL GUIDE

*Temper: Hard
Max Working Pressure: 35
Thickness Tolerance: $\pm 15\%$
Diameter Tolerance: $\pm 0.06\text{mm}$*

*Diameter
42mm*

*Wall
1.0mm*

5th Revision 2012

LAWTON
TUBES

The nations copper specialist

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'Maintaining a policy of continual product development, The Lawton Tube Co Ltd reserves the right to change specifications, design and materials of products listed in this publication without prior notice.'

Company Profile

Established in 1917 and based in Coventry, The Lawton Tube Company is the UK's largest independent copper tube maker. The Company is a Private Limited Company without any group associations with the freedom necessary to satisfy customer requirements and respond to product and process changes with the latest technical requirements.

We offer a wide range of quality assured copper tubes, complying with the latest specifications, to both the construction and engineering markets. Lawton Tube is able to supply a range of standard products or special one off orders. Plant developments and installations have kept pace with market demands for a high integrity product and employ the latest manufacturing techniques. A fully integrated production system based on high speed block drawing and semi automated benches form the core of our primary processing. From initial extrusion to finished tube, Lawton Tube ensures that diameter, thickness, temper and length are all controlled within predetermined limits with the most up-to date manufacturing and inspection standards.

Lawton Tube has been assessed and registered as a BSI Approved Company operating Quality Systems to meet the requirements of BS EN ISO 9001-2008 and qualifies for the KITEMARK EN 1057 (plumbing) and EN 13348 (medical). Lawton Tube was the first company in the United Kingdom to have the EN 13348 (medical) KITEMARK. From receipt of certified raw materials to final inspection and despatch the aim is to manufacture a tube fit for purpose.

During 2001, Lawton Tube acquired Dorset Tube in Poole, which added to the breadth of Engineering tube supplied by the Coventry unit and included the production of cupro-nickel brake pipe tube. Dorset Tube has been assessed and registered as a BSI Approved Company and are operating Quality Systems to meet the requirements of BS EN ISO 9001-2008.



Trade Bodies

Lawton Tube are proud to be associated and support the following



Quality Policy

Lawton Tube Company is committed to maintain, on a continuous basis, an effectively Quality Management System, which complies with the requirements of the BS EN ISO 9001:2008 System for Quality Management.

The QMS is a framework guiding Lawton Tube Management and Employees to focus on identifying and meeting customer requirements consistently in an environment in which people understand, and are fully involved in achieving the business objectives through effective communication and leadership.

Lawton Tube is committed to complying with the requirements of the QMS and continually improving its effectiveness.

Lawton Tube is committed to continually improve on the organisational performance, making use of appropriate decision making tools to establish, analyse and improve through monitoring of agreed quality objectives.

Lawton Tube is committed to ensuring that resources required for the QMS processes are provided, adequately maintained and improved in order to meet customer's requirements.

In the interest of complying with customer requirements, Lawton Tube will enter into, and develop mutually beneficial relationships with suppliers of services and goods where deemed appropriate.

Lawton Tube will make arrangements to comply with current statutory and regulatory requirements including Health and Safety Legislation.

The Company is committed to the Quality Management System Procedures stated in this Manual and all employees are responsible for meeting the requirements laid down.

The Works Manager is authorised to control and ensure the system is maintained. In the event of a major problem, which could have an adverse effect on the operation of the Quality System, this should be brought to the attention of the joint Managing Directors for resolution.

Company Environmental Policy

The Lawton Tube Company Limited is the UK's leading independent supplier of copper tube and fittings. We form an indispensable link between one of the world's most versatile metals and a wide variety of finished goods.

We recognise and understand that our business activities, products and services have an effect on the local, regional and the global environment.

As a consequence of this our business is committed to identifying our environmental hazards and risks and to manage them effectively by implementing and maintaining an environmental management system (EMS).

The scope of our EMS covers the manufacture and distribution of solid drawn copper alloy tubes to national, international standards, customer own specifications and the supply of refrigeration tubes and fittings and medical fittings.

Our environmental commitments are to:

- Implement and maintain an Environmental Management System (EMS) ISO14001.
- Comply with applicable environmental legal and other requirements which relate to the businesses environmental hazards and risks (aspects).
- Have a process for setting, monitoring and improving environmental objectives and targets.
- To encourage an ethos of preventing pollution, reducing waste and minimise the consumption of resources where practical.
- Educate, train and motivate employees to carry out tasks in an environmentally responsible manner.
- Encourage environmental protection and best practice among suppliers and subcontractors.
- The business is committed to continual improvement of environmental performance. This Policy will be communicated to all staff, and those who work for or on its behalf. The policy will also be made available to the public.

Health & Safety Policy

The Lawton Tube Co. Ltd recognises Health and Safety issues are an integral part of our business, and we are committed to ensuring the Health and Safety of all persons likely to be affected by activities on our premises. These include our employees, customers, contractors and self-employed persons working on our site, and visitors.

Our aim is to improve and promote health and safety at work throughout the organization, by using appropriate systems to implement the Health and Safety policy, its objectives and suitable safeguard arrangements.

The Managers and Employees are committed to the health and safety policy, and improving the health and safety performance of our business.

The policy is expressed in 'Key Commitments' that set the standards and practices that our businesses shall employ, in addressing health and safety issues.

All employees have a legal duty and obligation to co-operate, be involved and committed to ensuring the health and safety policy, objectives and safety arrangements are complied with for themselves and others.

The scope of the OH&S management system includes:

The scope of the OHSAS management system is covered by the company processes in section 4.1a which contributes to the manufacture and distribution of copper tube and fittings from the two company sites at Coventry and Poole.

KEY COMMITMENTS

1. Comply with relevant national Health and Safety Legislation & other requirements.
 - Identify and conform to, if not exceed, all current and applicable health and safety legislations and regulations and other requirements to which the business subscribes.
2. Keep up to date with developments in Health and Safety
 - Identify developments in health and safety and ensure these are integrated into the safety arrangements.
3. Identify and assess all significant risks to Health and Safety
 - Define and implement a formal programme of risk assessments.
4. Eliminate or introduce measures to adequately control these Risks
 - Establish a systematic approach to the identification of significant hazards, risk assessments and the allocation of resources to eliminate and or control these hazards.
 - Provide a safe and healthy working environment and implement appropriate measures to prevent accidents and incidents occurring.
5. Put in place appropriate Health and Safety Policies and Procedures
 - Introduce formal systems (i.e. OHSAS 18001) to implement the health and safety policy, objectives and arrangements.
6. Provide adequate resources to ensure our Policies and Procedures are implemented.
 - Provide sufficient resources to fulfil legal obligations.
7. Involve and consult with our employees
 - Establish a culture of employee involvement and cooperation to address issues affecting their health and safety.
8. Ensure all employees are informed of our Policies and Procedures
 - Promote health and safety awareness at all levels of management and throughout the Company.
9. Ensure all employees comply with our Safety Policies and Procedures
 - Clearly define health and safety responsibilities of all personnel and communicate these throughout the Company.
 - All employees have a legal duty and obligation to co-operate, be involved and committed to ensuring the health and safety policy, objectives and safety arrangements are complied with.
 - Ensure contractors comply with the Health and Safety Rules and Procedures for Contractors'.
10. Carry out periodic review of our Safety Policies and Procedures
 - Complete planned health and safety audits to review and check the effectiveness of each sites' management of the Health and Safety policy and arrangements.
11. Continually improve our Health and Safety performance
 - Monitor and improve safety performance alongside other management performance criteria.
 - Establish and maintain a 'Safety Committee' for discussing health and safety matters and identifying improvement opportunities.
 - Be committed to the prevention of injury and ill health.

Engineering Copper Tubes

Pipeline solutions for Engineering applications.

Made to order so contact our Sales department with FULL enquiry. Average manufacturing time is 4 weeks. We manufacture/distribute to the following European Specifications (American ASTM can also be offered):

BS EN 12449:1999 BS EN 12541:1999 BS EN 13600:2002

BS EN 12449 Seamless, round tubes for general purposes.

Material Analysis (C106)

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.

Minimum Copper Content 99.90 % (including silver)

Phosphorus 0.015-0.040 %

Total Impurity Maxima 0.060 % (excluding phosphorus and silver)

Mechanical Properties

BS EN 12449 Seamless, round tubes for general purposes



Material Temper	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R200 (soft)	200	40	40-65
R250 (Half Hard)	250	20	70-100
R290 (Hard)	290	5	95-120

BS EN 12451 Seamless, round tubes for heat exchangers

Material Analysis

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.

Minimum Copper Content 99.90 % (including silver)

Phosphorus 0.015-0.040 %

Total Impurity Maxima 0.060 % (excluding phosphorus and silver)

Mechanical Properties

BS EN 12451 Seamless, round tubes for heat exchangers



Material Temper	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R250 (Half Hard)	250	20	75-100
R290 (Hard)	290	5	Over 100

BS EN 13600 Seamless, round tubes for electrical purposes

Material Analysis (HC C101)

Material Grade Phosphorus de-oxidised copper; Cu-ETP or CW004A as defined in BS EN 1976.

Minimum Copper Content min 99.90 % (including silver)

Max Oxygen – 0.060 % is permitted, subject to agreement between the purchaser and Lawton Tubes

Max Lead – 0.005 %

Total Impurity Maxima 0.030 % (excluding oxygen, lead and silver)

Material Analysis (HC C103)

Material Grade Phosphorus de-oxidised copper; Cu-OF or CW008A as defined in BS EN 1976.

Minimum Copper Content min 99.95 % (including silver)

Max Lead – 0.005 %

Total Impurity Maxima 0.030 % (excluding lead and silver)

Mechanical Properties

BS EN 13600 Seamless, round tubes for electrical purposes



Material Temper	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R200 (soft)	200	40	35-65
R250 (Half Hard)	250	15	65-95
R290 (Hard)	290	5	90-110

Plumbing Copper Tubes

BS EN 1057

Material Analysis

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.

Minimum Copper Content 99.90 % (including silver)

Phosphorus 0.015-0.040 %

Total Impurity Maxima 0.060 % (excluding phosphorus and silver)

The melting point of copper is 1083°C and it has a density of 8.9 gm/cc

Packaging

All tubes are bundle tied, 15-28mm (TX) are Yellow end capped in tubes of 10 (UK market only).

Marking

Sizes 15 - 54mm copper tubes are stamped with:

- Tube size
- Kitemark
- EN 1057
- Temper
- Manufacturer
- Date (quarter)

Sizes 67mm and above are stamped at either end of the tube.



No KM05892



Mechanical Properties

BS EN 1057 Plumbing Copper Tubes

Dimensions and Tolerances (includes chrome plated and PVC covered)

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O.D. (mm)	Wall (mm)	Temper	Max Working Pressure bar up to 65°C	Thickness Tolerance	Diameter Tolerance	
					Mean	Including Ovality
6	0.6 (TX)	Half Hard	133	±10%	± 0.04mm	±0.09mm
6	0.6	Soft	90	±10%	± 0.04mm	Not applicable
6	0.8 (TY)	Half Hard	188	±10%	± 0.04mm	±0.09mm
8	0.6 (TX)	Half Hard	97	±10%	± 0.04mm	±0.09mm
8	0.6	Soft	66	±10%	± 0.04mm	Not applicable
8	0.8 (TY)	Half Hard	136	±10%	± 0.04mm	±0.09mm
10	0.6 (TX)	Half Hard	77	±10%	± 0.04mm	±0.09mm
10	0.7 (TY)	Soft	62	±10%	± 0.04mm	Not applicable
10	0.8 (TY)	Half Hard	106	±10%	± 0.04mm	±0.09mm
12	0.6 (TX)	Half Hard	63	±10%	± 0.04mm	±0.09mm
12	0.8 (TY)	Half Hard	87	±10%	± 0.04mm	±0.09mm
15	0.7 (TX)	Half Hard	58	±10%	± 0.04mm	±0.09mm
15	1.0 (TY)	Half Hard	87	±13%	± 0.04mm	±0.09mm
15	1.0 (TY)	Soft	67	±13%	± 0.04mm	Not applicable
22	0.9 (TX)	Half Hard	51	±10%	± 0.05mm	±0.10mm
22	1.2 (TY)	Half Hard	69	±15%	± 0.05mm	±0.10mm
22	1.2 (TY)	Soft	57	±15%	± 0.05mm	Not applicable
28	0.9 (TX)	Half Hard	40	±10%	± 0.05mm	±0.10mm
28	1.2 (TY)	Half Hard	55	±15%	± 0.05mm	±0.10mm
35	1.0 (LiteX)	Hard	42	±15%	± 0.06mm	±0.07mm
35	1.2 (TX)	Half Hard	42	±10%	± 0.06mm	±0.11mm
35	1.5 (TY)	Hard	64	±10%	± 0.06mm	±0.07mm
42	1.0 (LiteX)	Hard	35	±15%	± 0.06mm	±0.07mm
42	1.2 (TX)	Half Hard	35	±10%	± 0.06mm	±0.11mm
42	1.5 (TY)	Hard	53	±10%	± 0.06mm	±0.07mm
54	1.2 (LiteX)	Hard	33	±15%	± 0.06mm	±0.07mm
54	1.2 (TX)	Half Hard	27	±10%	± 0.06mm	±0.11mm
54	1.5 (TY)	Hard	55	±10%	± 0.06mm	±0.07mm
66.7	1.2 (TX)	Hard	26	±15%	± 0.07mm	±0.10mm
66.7	2.0 (TY)	Hard	45	±15%	± 0.07mm	±0.10mm
76.1	1.5 (TX)	Hard	29	±15%	± 0.07mm	±0.10mm
76.1	2.0 (TY)	Hard	39	±15%	± 0.07mm	±0.10mm
108	1.5 (TX)	Hard	20	±15%	± 0.07mm	±0.20mm
108	2.5 (TY)	Hard	34	±15%	± 0.07mm	±0.20mm
133	1.5 (TX)	Hard	16	±15%	± 0.20mm	±0.70mm
159	2.0 (TX)	Hard	18	±15%	± 0.20mm	±0.70mm
219	3.0 (TX)	Hard	20	±15%	± 0.60mm	±1.50mm

Working pressures are to BS 2871:part1:1971

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PLUMBING

Material Temper EN 1173	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R200 (soft)	220	40	40-70
R250 (Half Hard)	250	30 (TX) 20 (TY)	75-100
R290 (Hard)	290	3	Over 100

Expansion of copper tube

Copper has a coefficient of linear expansion of $17 \times 10^{-6}/^{\circ}\text{C}$. 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 below.

Copper Tube Expansion

Temperature change	Tube length									
	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°	7.65mm	10.2mm	12.75mm	15.3mm	17.85mm	20.4mm	22.95mm	25.5mm	30.6mm	63.75mm
200°	10.2mm	13.6mm	17.0mm	20.4mm	23.8mm	27.2mm	30.6mm	34.0mm	40.8mm	85.0mm

Water Capacity

Table W Microbore

O/D mm	Capacity kg/m
6	0.0169
8	0.0347
10	0.0558

Table X 6mm - 159mm

O/D mm	Capacity kg/m
6	0.0169
8	0.0347
10	0.0615
12	0.0890
15	0.1416
18	0.2063
22	0.3140
28	0.5308
35	0.8220
42	1.2163
54	2.0712
67	3.2134
76	4.1699
108	8.6107
133	13.2647
159	18.8351

Table Y 6mm - 108mm

O/D mm	Capacity kg/m
6	0.0139
8	0.0302
10	0.0529
12	0.0818
15	0.1280
18	0.1952
22	0.2943
28	0.5050
35	0.7888
42	1.1758
54	1.9317
67	3.2375
76	4.0438
108	8.2527

Plumbing Metric Endfeed Fittings

Copper end feed type fittings manufactured to:

BS EN 1254-1:1998 Part 1 Specification for copper and copper alloy fittings with capillary ends for soldering and brazing for use with copper tubes.

BS EN 1254-1:1998 Part 5 Specification for copper and copper alloy fittings with short ends for capillary brazing for use with copper tubes.

35mm plus size fittings are supplied in individually sealed protective polythene bags and are specifically designed for copper systems.

Specific Benefits Include:

Lawton tube endfeed fittings are guaranteed against manufacturing defects for 25 years.

All fittings supplied contain less than 100mg/m² (0.01mg/cm²) of hydrocarbons on the degreased surface.

Each fitting is engraved with unique branding together with the EN spec and fitting size where space permits.

All individually sealed protective polythene bags are product labelled.

Fittings are supplied in reinforced cardboard boxes, labelled with product information and outline drawing of fitting.

Each fitting is engraved with unique branding, space permitting



54mm sample



Working Temperatures and Pressure

Service Temperature*				
Size	Min -40°C	30°C	65°C	Max 110°C
8mm to 28mm	25 bar	25 bar	25 bar	16 bar
35mm to 54mm	25 bar	25 bar	16 bar	10 bar
67mm	16 bar	16 bar	16 bar	10 bar

*LTC Fittings performance when correctly assembled with Lawton Tube's EN1057 copper tube using tin/copper soft solder EN 29453 or tin/silver soft solder EN 29453

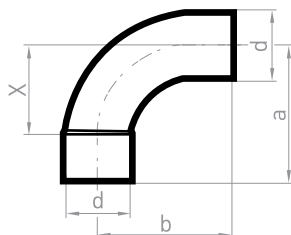
Service Temperature**						
Size	Min -196°C	65°C	120°C	150°C	175°C	Max 200°C
8mm	62.5 bar	62.5 bar	58.8 bar	46.7 bar	35.5 bar	23.3 bar
10mm	50.9 bar	50.9 bar	47.9 bar	38.0 bar	28.9 bar	19.0 bar
12mm	42.9 bar	42.9 bar	40.3 bar	32.0 bar	24.3 bar	16.0 bar
15mm	40.3 bar	40.3 bar	37.9 bar	30.1 bar	22.8 bar	15.0 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	17.3 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

** Max hydraulic working pressure for LTC fittings when assembled with Lawton Tube's EN1057 copper tube using hard solder (brazing alloy) to EN 1044

Service Temperature***					
Size	Min -196°C	65°C	120°C	150°C	Max 200°C
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
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

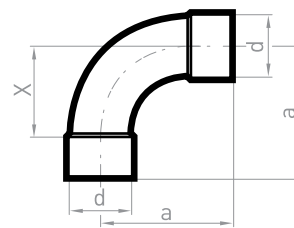
*** Max hydraulic working pressure for LTC fittings when assembled with Lawton Tube's EN1057 copper tube using hard solder (brazing alloy) to EN 1044

Mechanical Properties
EN1057 Copper end feed fitting



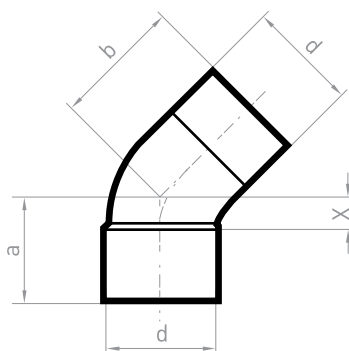
Bend 90° - MF

d	Dimensions (mm)			Product Code
	a	b	x	
12	23	25	14.4	EFELS012
15	29	31	18	EFELS015
22	42	44	26.4	EFELS022
28	52	54	33.6	EFELS028
35	65	67	42	EFELS035
42	77.5	79.5	50.4	EFELS042
54	97	99	64.8	EFELS054
67	117	120	84	EFELS067
76	125	128	91.3	EFELS076
108	177	180	129.6	EFELS108
133	212	215	177	EFELS133
159	262	265	227	EFELS159



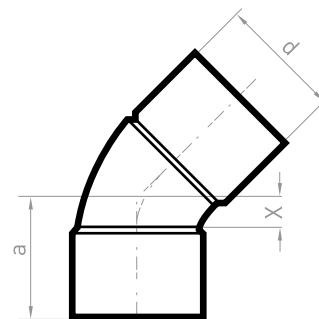
Bend 90° - FF

d	Dimensions (mm)		Product Code
	a	x	
12	23	14.4	EFEL012
15	29	18	EFEL015
22	42	26.4	EFEL022
28	52	33.6	EFEL028
35	65	42	EFEL035
42	77.5	50.4	EFEL042
54	97	64.8	EFEL054
67	117	84	EFEL067
76	125	91.3	EFEL076
108	177	129.6	EFEL108
133	212	177	EFEL133
159	262	227	EFEL159



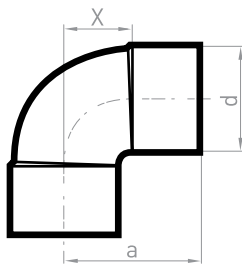
Elbow 45° - MF

d	Dimensions (mm)			Product Code
	a	b	x	
12	13.6	15.6	4.7	EFELS01245
15	16.9	18.9	6.1	EFELS01545
22	23.2	25.2	6.7	EFELS02245
28	28.6	30.6	10.6	EFELS02845
35	37	39	14	EFELS03545
42	42	44	15	EFELS04245
54	52	54	20	EFELS05445
67	65	58	28.5	EFELS06745
76	68	71	32	EFELS07645
108	110	113	60	EFELS10845
133	280	280	235	EFELS13345
159	335	335	290	EFELS05945



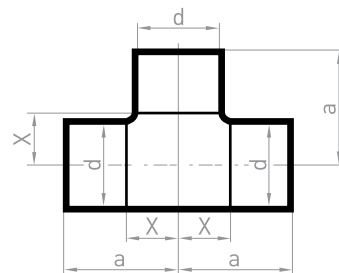
Elbow 45° - FF

d	Dimensions (mm)		Product Code
	a	x	
12	13.6	4.7	EFEL01245
15	16.9	6.1	EFEL01545
22	23.2	7.6	EFEL02245
28	28.6	10.6	EFEL02845
35	37	14	EFEL03545
42	42	15	EFEL04245
54	52	20	EFEL05445
67	65	28.5	EFEL06745
76	68	32	EFEL07645
108	110	60	EFEL10845
133	280	235	EFEL13345
159	335	290	EFEL15945
219	120	50	EFEL21945



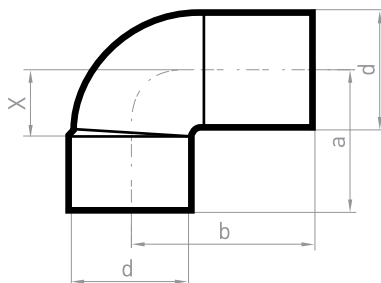
Elbow 90° - FF

Dimensions (mm)			Product Code
d	a	x	
12	16.2	7.6	EFEL012
15	29	18	EFEL015
22	28	12.6	EFEL015
28	35	16.6	EFEL028
35	46	23	EFEL035
42	55	28	EFEL042
54	70	38	EFEL054
67	83.5	50	EFEL067
76	91.5	58	EFEL076
108	127	79.5	EFEL108
133	127	79.5	EFEL133
159	160	100	EFEL159
219	200	130	EFEL219



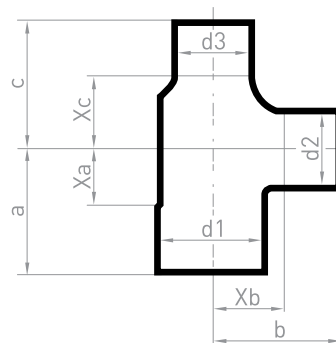
Equal Tee - FFF

Dimensions (mm)			Product Code
d	a	x	
12	18	9	EFTE012
15	20	9	EFTE015
22	28	12	EFTE022
28	34	15	EFTE028
35	42	20	EFTE035
42	50	23	EFTE042
54	61.5	29.5	EFTE054
67	78	42	EFTE067
76	80	46	EFTE076
108	112	64	EFTE108
133	135	85	EFTE133
159	160	100	EFTE159
219	178	115	EFTE219



Street Elbow 90° - MF

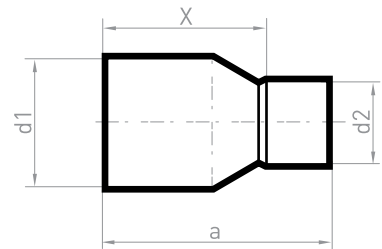
Dimensions (mm)				Product Code
d	a	b	x	
12	16.2	18.5	7.6	EFELS012
15	19.2	21.5	8.5	EFELS015
22	28	30.5	12.6	EFELS022
28	35	37.5	16.6	EFELS028
35	46	54	24	EFELS035
42	56	66	29	EFELS042
54	71	82	39	EFELS054
67	83.5	95	50	EFELS067
76	91.5	105	58	EFELS076
108	127	137	79.5	EFELS108
133	127	137	79.5	EFELS133
159	160	180	100	EFELS159



Reducing Tee - FFF

d1xd2xd3	Dimensions (mm)						Product Code
	a	b	c	Xa	Xb	Xc	
12x12x10	16	16	17.5	7	7	9.5	EFTE121210
15x12x12	18	18	18	7	9	9	EFTE151212
15x12x15	18	18	18	7	9	7	EFTE151215
15x15x12	19	19	19	8	8	10	EFTE151512
15x22x15	27	28	27	16	12	16	EFTE152215
22x15x12	25	23	22.5	9	12	30.5	EFTE221512
22x15x15	25	23	24	9	12	13	EFTE221515
22x15x22	25	23	25	9	12	9	EFTE221522
22x22x15	28	28	27	12	12	16	EFTE222215
28x15x15	28	26	26.5	9	15	15.5	EFTE281515
28x15x22	28	26	28.5	9	15	12.5	EFTE281522
28x22x15	31	31	30	12	15	19	EFTE282215
28x22x22	31	31	32	12	15	16	EFTE282222
28x22x28	31	31	31	12	15	12	EFTE282228
28x28x15	34	34	33	15	15	22	EFTE282815
35x15x28	32.5	30	34	9.5	19	15	EFTE351528
35x15x35	32.5	30	32.5	9.5	19	0.5	EFTE351535
35x22x22	36	35	37.5	13	19	21.5	EFTE352222
35x22x28	36	35	37	13	19	18	EFTE352228
35x22x35	36	35	36	13	19	13	EFTE352235
35x28x22	38	38	40	15	19	24	EFTE352822
35x28x28	38	38	40	15	19	21	EFTE352828
35x28x35	38	38	38	15	19	15	EFTE352835
35x35x15	42	41	42	19	18	31	EFTE353515
35x35x22	42	42	42.5	19	19	26.5	EFTE353522
35x35x28	42	42	42.5	19	19	23.5	EFTE353528
35x42x35	49.5	50	49.5	26.5	23	26.5	EFTE354235
42x15x42	36.5	34	36.5	9.5	23	9.5	EFTE421542
42x22x35	40.5	39	40.5	13.5	23	17	EFTE422235
42x22x42	40	39	40	13	23	13	EFTE422242
42x28x22	42.5	42	44	15.5	23	28	EFTE422822
42x28x28	42.5	42	43	15.5	23	24	EFTE422828
42x28x35	42.5	42	44	15.5	23	21	EFTE422835
42x28x42	43	42	43	16	23	16	EFTE422842

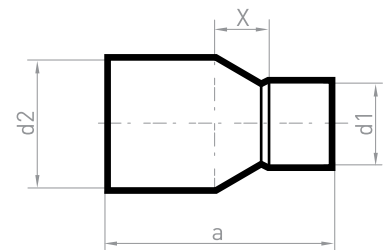
d1xd2xd3	Dimensions (mm)						Product Code
	a	b	c	Xa	Xb	Xc	
42x35x28	46	46	46	19	23	27	EFTE423528
42x35x35	46	46	46.5	19	23	23.5	EFTE423535
42x35x42	46.5	46	46.5	19.5	23	19.5	EFTE423542
42x42x28	50	50	50	23	23	31	EFTE424228
42x42x35	50	50	50	23	23	27	EFTE424235
42x54x42	62	61	62	35	29	35	EFTE425442
54x15x54	41.5	40	41.5	9.5	29	9.5	EFTE541554
54x22x42	46	45	47	14	29	20	EFTE542242
54x22x54	45	45	45	13	29	13	EFTE542254
54x28x42	49	48	49.5	17	29	22.5	EFTE542842
54x28x54	48	48	48	16	29	16	EFTE542854
54x35x35	52	52	51	20	29	28	EFTE543535
54x35x54	51.5	52	51.5	19.5	29	19.5	EFTE543554
54x42x42	55	56	56.5	23	29	23	EFTE544242
54x42x54	55	56	55	23	29	23	EFTE544254
67x28x67	54.5	61	54.5	21	42	35	EFTE672867
67x35x67	58.5	64	58.5	25	41	21	EFTE673567
67x42x67	61	67	61	27	41	27	EFTE674267
67x54x67	67	74	67	33.5	42	33.5	EFTE675467
67x67x54	74	74	73	40	40	41	EFTE676754
76x35x76	59	70	59.5	25.5	46	25.5	EFTE763576
76x42x76	63	74	63	29	46	29	EFTE764276
76x54x76	69	79	69	35	46	35	EFTE765476
76x67x76	78	81	78	44.5	48	44.5	EFTE766776
108x22x108	72	88	72	24.5	72	24.5	EFTE10822108
108x35x108	77	92	77	29.5	65	29.5	EFTE10835108
108x42x108	80	97	80	32.5	70	32.5	EFTE10842108
108x54x108	86	97	86	38.5	65	38.5	EFTE10845108
108x67x108	91	97	91	43.5	64	43.5	EFTE10867108
108x76x108	95	97	95	47.5	64	47.5	EFTE10876108
133x108x133	139	142	139	89	94.5	89	EFTE133108133
159x76x159	101	120	101	53.5	86.5	53.5	EFTE15976159
159x133x159	130	120	130	92.5	86.5	82.5	EFTE159133159
159x108x159	117	142	117	69.5	94.5	69.5	EFTE159108159



Reducer - MF

d	Dimensions (mm)		Product Code
	a	x	
12x8	21.5	14.5	EFRED0128
15x12	26	17.5	EFRED1512
22x12	33	25	EFRED2212
22x15	33	22	EFRED2215
28x12	41	32	EFRED2812
28x22	44	28	EFRED2822
35x15	50	39	EFRED3515
35x22	50	35	EFRED3522
35x28	50	32	EFRED3528
42x15	65	54	EFRED4215
42x18	59	46	EFRED4218
42x22	58	42	EFRED4222
42x28	58	40	EFRED4228
42x35	60	35	EFRED4235
54x15	70	60	EFRED5415
54x22	70	52	EFRED5422
54x28	70	45	EFRED5428
54x35	70	45	EFRED5435
54x42	70	45	EFRED5442
67x28	80	60	EFRED6728

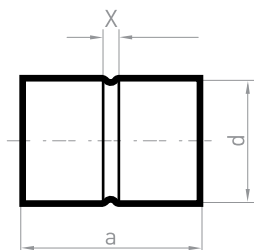
d	Dimensions (mm)		Product Code
	a	x	
67x35	80	60	EFRED6735
67x42	88	58	EFRED6742
67x54	80	48	EFRED6754
76x35	90	66	EFRED7635
76x42	90	60	EFRED7642
76x54	85	50	EFRED7654
76x64	80	50	EFRED7664
76x67	81	48.5	EFRED7667
108x35	116	84	EFRED10835
108x42	116	74	EFRED10842
108x54	116	84	EFRED10854
108x64	110	80	EFRED10864
108x67	112	80	EFRED10867
108x76	108	72	EFRED10876
133x76	119	82.5	EFRED13376
133x108	106	70	EFRED133108
159x76	150	110	EFRED15976
159x108	130	80	EFRED159108
159x133	123	70	EFRED159133
219x159	150	90	EFRED219159



Reducing Coupling - FF

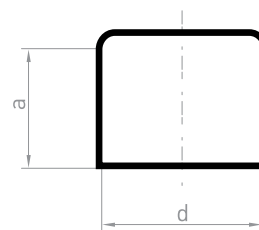
d	Dimensions (mm)		Product Code
	a	x	
12x10	20	3	EFCP1210
15x12	24	4	EFCP1512
22x12	32	8	EFCP2212
22x15	32	8	EFCP2215
28x15	38	12	EFCP2815
28x22	40	6	EFCP2822
35x22	48	8	EFCP3522
35x28	48	6	EFCP3528
42x15	54	16	EFCP4215
42x22	56	13	EFCP4222
42x28	56	10	EFCP4228
42x35	60	10	EFCP4235
54x22	70	20	EFCP5422
54x28	70	20	EFCP5428
54x35	70	10	EFCP5435

d	Dimensions (mm)		Product Code
	a	x	
54x42	70	10	EFCP5442
64x42	78	14	EFCP6442
64x54	78	12	EFCP6454
67x54	85	12	EFCP6754
76x54	84	18	EFCP7654
76x64	84	18	EFCP7664
76x67	85	18	EFCP7667
108x54	105	20	EFCP10854
108x76	105	20	EFCP10876
108x89	105	20	EFCP10889
133x76	110	35	EFCP13376
133x89	112	35	EFCP13389
133x108	100	25	EFCP133108
159x108	135	45	EFCP159108
159x133	120	50	EFCP159133



Straight Coupling with Stop - FF

d	Dimensions (mm)		Product Code
	a	x	
12	19	1.8	EFCP012
15	24.5	1.8	EFCP015
22	33	2.2	EFCP022
28	40	3	EFCP028
35	49	3	EFCP035
42	38	4	EFCP042
54	69	5	EFCP054
67	72	5	EFCP067
76	72	5	EFCP076
108	100	3	EFCP108
133	100	3	EFCP133
159	100	4	EFCP159
219	116	5	EFCP219



Stop End - F

d	Dimensions (mm)		Product Code
	a		
12	8.6		EFEC012
15	10.6		EFEC015
22	15.4		EFEC022
28	18.4		EFEC028
35	23		EFEC035
42	27		EFEC042
54	32		EFEC054
67	33.5		EFEC067
76	33.5		EFEC076
108	47.5		EFEC108
159	62.5		EFEC159



Slip Coupling - F

d	Dimensions (mm)		Product Code
	a		
15	24		EFSC015
22	33		EFSC022
28	38		EFSC028
35	48		EFSC035
42	58		EFSC042
54	66		EFSC054

Lawton Soldering Flux

Non-corrosive soft solder flux paste for soldering applications of copper to tin alloys. Water-soluble. With halogens. It complies with EN-ISO 9454 (2.1.2.C).



Packing

Supplied in plastic jars of 113g. Packed in boxes of 90 units.

Chemical Composition

20% Etoiled Fatty alcohol 5% Fatty acid 50% Amine chloride 25% Water

Hazards Identification

Human: This product is not dangerous for the health

Environment: It is not considered dangerous for the environment

First Aids Measures

After inhalation: Bring the operative to breathe fresh air and consult a doctor.

By contact with the skin: Wash with water and soap.

By contact with eyes: Rinse out with abundant clear water during 15 minutes keeping open eyes and consult a ophthalmologist in case of persistent irritation.

After ingestion: Wash out with abundant clear water during 15 minutes keeping open eyes and consult a ophthalmologist in case of persistent irritation.

Fire Fighting Measures

Extinction means: use powders, foams or pulverised water.

Peculiar danger by the exposure to the substance or its combustion: None; the product cannot explode and set on fire. **Special protecting kit:** Use a mask in closed locations

Accidental Release Measures

Personal precautions: Described prevention measures at point 8 **Cleaning method:** Absorb the product with sand or sawdust. Clean the soiled surface with abundant hot water.

Handling And Storage Handling: Avoid always, if it is possible, the contact with the skin; therefore it's recommended to use the applicator brush. Keep the bottle always tightly closed. Avoid the direct vapour's inhalation caused by the heating **Storage:** None, in normal conditions of use

Exposure Control / Personal Protection. Exposure limit: None **Breathing protection:** Use facemask if you work large period of time in small and poorly ventilated spaces. In open spaces or in open air it is no necessary. **Eye protection:** It is recommended to use safety goggles in order to avoid splashing **Skin protection:** Only in the event of hyper-sensibility or allergy to the product, it is necessary to use gloves of neoprene. Normally the use of the application brush avoids skin irritations.

Physical And Chemical Properties Physical state at 20° C: Paste **Freezing point:** -10 ° C **Odour:** None **Ignition point:** Not Determined (higher than 200°C) **Colour:** Yellowish Vapour pressure: N.D. pH: 6/7 **Density:** 1.10 gr/cc **Boiling point:** 110 liquid part **Water solubility:** Total

Stability & Reactivity Stability: Stable emulsion up to 65° and activity till 300°C **Conditions to be avoided:** None **Materials to be avoided:** None **Hazardous decomposition products:** None

Toxicological Information Severe Toxicity: DL50 oral rat. It is not toxic in its maximum dosage **Poisoning routes:** None **Acute effects / symptoms:** During the heating it may irritate slightly the eyes, the mucous nasal and the respiratory tract. Irritant to the skin if there are open wounds, making sting. There is not described any case of migraine, of spontaneous vomits or nausea produced by the local use of the product. **Chronic effects:** There is no described any case of chronic alteration produced by the local use of the product.

Ecological Information Ecological toxicity: None described

Waste Disposal Product Disposal: Respect local and national regulations. Dispose remaining product through an authorized waste disposal party. **Used container disposal:** Dispose container through an authorized waste disposal party.

Transport Information There is no special consideration necessary

Regulatory Information Classification: This product is not subject to classification as per the European Directive criteria regarding the control of dangerous substances and derivatives. The product has been adapted to the European Norm EN 29454 (2.1.2.C) of November 1993 about "Soft soldering fluxes" in substitution of the Norm DIN 8511

Leaded Solder Wire

Lawtons leaded soft solder is a leaded alloy developed for plumbing and industrial applications of non-potable water supplies, heating and gas installations.

Type of Alloy

Compliant to the European and international standard: EN-ISO 9453: 2006.

Alloy No. 136

Alloy Designation Pb74Sn25Sb1

Melting Temperature 185 - 263°C

Packing

Format: solid solder wire. Diameters: 0,35mm to 6mm. Delivered in reels of 500gr

Composition

25% Tin 74% Lead 1% Antimony

Hazards Identification

Eyes: Burns caused by the melted material **Skin:** Burns caused by the melted material

Ingestion: Harmful due to lead content. **Inhalation:** It may be harmful and damage health in case of inhalation of the fumes emitted when this product is heated. It must be only used in ventilated areas. The activators of the resin do not implied any hazard given its low concentration in the final product.

First Aid Measures

Eyes Flush immediately with water. Get dermatologist attention. **Skin** Wash with soap and water **Ingestion**

Wash mouth with water and seek medical attention. **Inhalation** Evacuate to fresh air and seek medical attention

Fire Fighting Measures

Specific hazards None, the product cannot explode or become inflamed.

Extinguishing media Use pulverised water or foam

Fire-fighting equipment Foresee breathing protection. Use face mask

Accidental Released Measures

The supplied state of the material, present no risk of spillage.

Individual precautions - Use gloves to avoid burns in case of contact with the product.

Environmental protection precautions - Avoid the product entering into underground water pipes or ground waters.

Cleaning methods - Collect the product by mechanical means, avoiding dust formation. To remove completely, clean the surface with plenty of water.

Handling and Storage

Handling Whenever it is possible, avoid contact with skin. Use in well ventilated areas. Avoid direct inhalation of fumes. Preventive instructions against explosions and fires: no special requirements.

Storage - Requirements to be met by premises with storerooms and containers:

No special requirements.

Remarks for combined storage: not required

Further instructions about storage conditions:

Keep container tightly sealed.

Store in tightly closed and dry environments.

Storage class: VFD Class (Regulation on fluid fuels): deleted

Exposure Controls / Personal Protection

Additional instructions for the fitting of technical facilities: With the molten material: use in ventilated environments, or well equipped with fume extraction. Components with acceptable limit values that require monitoring at the workplace: the product does not contain any relevant quantities of substances which limit values must be controlled in the workplace.

Additional instructions: the current lists at the time of preparation were used as basis.

Personal protective equipment.

General protective and hygienic measures: Keep away from food, drinks and animal food. Wash hands before breaks and after work. Avoid contact with eyes and skin.

Respiratory protection: Use mask in poorly ventilated places.

Skin Protection: Gloves, only during the heating process.

Eye protection: Wear safety goggles to prevent potential spills during the operational phase.

Exposure limit values:

Substance Name VLA-ED (mg/m³) VLA-EC (mg/m³)

Tin	2	-
Lead	0.15	-

Physical and Chemical Properties

Appearance Solid

Colour Silver grey

Odour None

Flash point Not applicable

Combustion properties Non oxidant

Ignition Not applicable

Danger of explosion Not applicable

Relative density 10,54 Gr/cc.

Stability and Reactivity

Stability

Heat: heating may cause oxides steams and metal fumes.

Humidity: Keep the product dry.

Duration: Product not expired.

Toxicological Information

Acute toxicity Tin: 40 µg/m³ Lead: 2,0 mg/ m³

Exposure ways Inhalation

Acute effects / symptoms During its heating may cause slight eye , nasal mucous and respiratory tract irritation.

Chronic effects Only after years of constant activity in unfavourable conditions, it may present risk of lung edema.

Ecological Information

General notes:

Level of damage to water 1 (self-classification): limited danger for water. Do not allow the undiluted product or in large quantities to infiltrate in ground waters, in water courses or in water pipes. It must not end up in sewages or drainage ditches.

Disposal Considerations

Storage and handling

Recommendation: Do not dispose of this substance with household waste. It should not reach sewer system.

Unclean packaging

Recommendation: Dispose of according to official regulations.

Information Concerning Transport

There is no special consideration in this regard.

Regulatory Information

Rating: This product is not subject to classification according to the criteria by the EC Directives on the Control of Dangerous Substances and Preparations.

R-Phrases: R 20/22 Harmful by inhalation and ingestion.

S-Phrases: S 2 Keep out of the reach of children.

S 13 Keep away from food, drinks and feed.

S 21 Do not smoke while using it.

S 26 In case of contact with eyes, rinse immediately with plenty water and consult a doctor.

WARNING: USE ONLY IN WELL VENTILATED AREAS

as when this product is heated may emit dangerous fumes for health if inhaled.

Lead Free Solder Wire

Lawtons lead free soft solder is a lead free alloy developed for plumbing and industrial applications of non-potable water supplies, heating and gas installations.

Type of Alloy

Compliant to the European and international standard: EN-ISO 9453: 2006.

Alloy No. 401

Alloy Designation Sn99,3 Cu0,7

Melting Temperature 220 eutectic

Packing

Format: solid solder wire. Diameters: 0,35mm to 6mm. Delivered in reels of 500gr

Composition

99.3% Tin 0.7% Copper

Hazards Identification

Eyes: Burns caused by the melted material **Skin:** Burns caused by the melted material

Ingestion: Not applicable. **Inhalation:** Evacuate to fresh air and seek medical attention

First Aid Measures

Eyes Flush immediately with water. Get dermatologist attention. **Skin** Wash with soap and water **Ingestion**

Wash mouth with water and seek medical attention. **Inhalation** Evacuate to fresh air and seek medical attention

Fire Fighting Measures

Specific hazards None, the product cannot explode or become inflamed.

Extinguishing media Not applicable

Fire-fighting equipment Not applicable

Accidental Released Measures

The supplied state of the material, present no risk of spillage.

Individual precautions - Use gloves to avoid burns in case of contact with the product.

Environmental protection precautions - Avoid the product entering into underground water pipes or ground waters.

Cleaning methods - Collect the product by mechanical means, avoiding dust formation. To remove completely, clean the surface with plenty of water.

Handling and Storage

Handling Whenever it is possible, avoid contact with skin. Use in well ventilated areas. Avoid direct inhalation of fumes. Preventive instructions against explosions and fires: no special requirements.

Storage - Requirements to be met by premises with storerooms and containers:

No special requirements.

Remarks for combined storage: not required

Further instructions about storage conditions:

Keep container tightly sealed.

Store in tightly closed and dry environments.

Storage class: VFD Class (Regulation on fluid fuels): deleted

Exposure Controls / Personal Protection

Additional instructions for the fitting of technical facilities: With the molten material: use in ventilated environments, or well equipped with fume extraction. Components with acceptable limit values that require monitoring at the workplace: the product does not contain any relevant quantities of substances which limit values must be controlled in the workplace.

Additional instructions: the current lists at the time of preparation were used as basis.

Personal protective equipment.

General protective and hygienic measures: Keep away from food, drinks and animal food. Wash hands before breaks and after work. Avoid contact with eyes and skin.

Respiratory protection: Use mask in poorly ventilated places.

Skin Protection: Gloves, only during the heating process.

Eye protection: Wear safety goggles to prevent potential spills during the operational phase.

Exposure limit values:

Substance Name VLA-ED (mg/m³) VLA-EC (mg/m³)

Tin	2	-
Copper	1	-

Physical and Chemical Properties

Appearance Solid

Colour Silver grey

Odour None

Flash point Not applicable

Combustion properties Non oxidant

Ignition Not applicable

Danger of explosion Not applicable

Relative density 7.33

Stability and Reactivity

Stability

Heat: heating may cause oxides steams and metal fumes.

Humidity: Keep the product dry.

Duration: Product not expired.

Toxicological Information

Acute toxicity Tin: 2 mg/ m³ Silver: 0,1 mg/ m³ Copper: 1 mg/ m³

Exposure ways Inhalation

Acute effects / symptoms During its heating may cause slight eye , nasal mucous and respiratory tract irritation.

Chronic effects Only after years of constant activity in unfavourable conditions, it may present risk of lung edema.

Ecological Information

General notes:

Level of damage to water 1 (self-classification): limited danger for water. Do not allow the undiluted product or in large quantities to infiltrate in ground waters, in water courses or in water pipes. It must not end up in sewers or drainage ditches.

Disposal Considerations

Storage and handling

Recommendation: Do not dispose of this substance with household waste. It should not reach sewer system.

Unclean packaging

Recommendation: Dispose of according to official regulations.

Information Concerning Transport

There is no special consideration in this regard.

Regulatory Information

Rating: This product is not subject to classification according to the criteria by the EC Directives on the Control of Dangerous Substances and Preparations.

R-Phrases: R 20/22 Harmful by inhalation and ingestion.

S-Phrases: S 2 Keep out of the reach of children.

S 13 Keep away from food, drinks and feed.

S 21 Do not smoke while using it.

S 26 In case of contact with eyes, rinse immediately with plenty water and consult a doctor.

WARNING: USE ONLY IN WELL VENTILATED AREAS

as when this product is heated may emit dangerous fumes for health if inhaled.

Medical Gas Tubes

BS EN 13348

Specifically designed for copper medical gas and vacuum systems. Superseding earlier 'hybridised' copper tube standards such as BS EN 1057 & BS 2871 Part 1 Table X

Conforms to HTM 02-01:2006 & NHS engineering spec. C11

Specific Benefits Include:

- Tighter limits on cleanliness determination.
- Improved identification to avoid confusion with similar sizes of water service tube.
- Lawton Tubes are the first British company to be awarded the kitemark licence to supply to this standard.

Material Analysis

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.

Minimum Copper Content 99.90 % (including silver)

Phosphorus 0.015-0.040 %

Total Impurity Maxima 0.060 % (excluding phosphorus and silver)

The melting point of copper is 1083°C and it has a density of 8.9 gm/cc

Cleanliness

Maximum total carbon content 0.20 mg/dm².

Packaging

Each tube individually end capped, tube bundles polythene wrapped* and sealed.

Marking

Sizes 12 - 108mm copper tubes are stamped with:

- Tube size
- Kitemark
- EN 13348
- Temper
- Manufacturer
- Date & Batch Code 12mm to 28mm sizes are also inkjet marked with additional data to enable traceability

Sizes above 108mm (133mm/159mm/219mm) are made to EN 1057 and cleaned to EN 13348



No KM66240

Mechanical Properties

Dimensions and Tolerances



O.D. (mm)	Wall (mm)	Temper	Max Working Pressure bar up to 65°C	Thickness Tolerance	Diameter Tolerance	
					Mean	Including Ovality
12	0.6 (TX)	Half Hard	63	±10%	± 0.04mm	±0.09mm
12	0.8 (TY)	Half Hard	87	±10%	± 0.04mm	±0.09mm
15	0.7 (TX)	Half Hard	58	±10%	± 0.04mm	±0.09mm
15	1.0 (TY)	Half Hard	87	±13%	± 0.04mm	±0.09mm
22	0.9 (TX)	Half Hard	51	±10%	± 0.05mm	±0.10mm
22	1.2 (TY)	Half Hard	69	±15%	± 0.05mm	±0.10mm
28	0.9 (TX)	Half Hard	40	±10%	± 0.05mm	±0.10mm
28	1.2 (TY)	Half Hard	55	±15%	± 0.05mm	±0.10mm
35	1.0	Hard	42	±15%	± 0.06mm	±0.07mm
35	1.2 (TX)	Half Hard	42	±10%	± 0.06mm	±0.11mm
35	1.5 (TY)	Hard	64	±10%	± 0.06mm	±0.07mm
42	1.0	Hard	35	±15%	± 0.06mm	±0.07mm
42	1.2 (TX)	Half Hard	35	±10%	± 0.06mm	±0.11mm
42	1.5 (TY)	Hard	53	±10%	± 0.06mm	±0.07mm
54	1.0	Hard	27	±15%	± 0.06mm	±0.07mm
54	1.2 (TX)	Half Hard	27	±10%	± 0.06mm	±0.11mm
54	2.0 (TY)	Hard	55	±10%	± 0.06mm	±0.07mm
66.7	1.2 (TX)	Hard	26	±15%	± 0.07mm	±0.10mm
66.7	2.0 (TY)	Hard	45	±15%	± 0.07mm	±0.10mm
76.1	1.5 (TX)	Hard	29	±15%	± 0.07mm	±0.10mm
76.1	2.0 (TY)	Hard	39	±15%	± 0.07mm	±0.10mm
108	1.5 (TX)	Hard	20	±15%	± 0.07mm	±0.20mm
108	2.5 (TY)	Hard	34	±15%	± 0.07mm	±0.20mm
133	1.5 (TX)	Hard	16	±15%	± 0.20mm	±0.70mm
159	2.0 (TX)	Hard	18	±15%	± 0.20mm	±0.70mm
219	3.0 (TX)	Hard	20	±15%	± 0.60mm	±1.50mm

Working pressures are to BS 2871:part1:1971

Medical Gas Tubes to BS EN 13348



Material Temper EN 1173	Tensile Strength min. (N/mm ²)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R250 (Half Hard)	250	30 (TX) 20 (TY)	75-100
R290 (Hard)	290	3	Over 100

Medical Gas Metric Endfeed Fittings

Degreased copper end feed type fittings manufactured to:

BS EN 1254-1:1998 Part 1 Specification for copper and copper alloy fittings with capillary ends for soldering and brazing for use with copper tubes.

BS EN 1254-1:1998 Part 5 Specification for copper and copper alloy fittings with short ends for capillary brazing for use with copper tubes.

All fittings are supplied in individually sealed protective polythene bags and are specifically designed for copper medical gas and vacuum systems.

Specific Benefits Include:

Complies to NHS (UK) Health Technical Memorandum 02-01:2006

All fittings supplied contain less than 100mg/m² (0.01mg/cm²) of hydrocarbons on the degreased surface.

Improved identification to avoid confusion with similar sizes of water service fittings.

All individually sealed protective polythene bags are product labelled.

Fittings are supplied in reinforced cardboard boxes, labelled with product information and outline drawing of fitting.

Each fitting is engraved with unique branding, where space permits.



54mm sample



No KM536466

LAWTON
MED FITTINGS

Working Temperatures and Pressure

Service Temperature*				
Size	Min -40°C	30°C	65°C	Max 110°C
8mm to 28mm	25 bar	25 bar	25 bar	16 bar
35mm to 54mm	25 bar	25 bar	16 bar	10 bar
67mm	16 bar	16 bar	16 bar	10 bar

*LTC Fittings performance when correctly assembled with Lawton Tube's EN13448 copper tube using tin/copper soft solder EN 29453 or tin/silver soft solder EN 29453

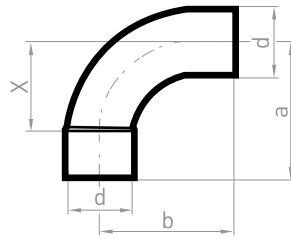
Service Temperature**						
Size	Min -196°C	65°C	120°C	150°C	175°C	Max 200°C
8mm	62.5 bar	62.5 bar	58.8 bar	46.7 bar	35.5 bar	23.3 bar
10mm	50.9 bar	50.9 bar	47.9 bar	38.0 bar	28.9 bar	19.0 bar
12mm	42.9 bar	42.9 bar	40.3 bar	32.0 bar	24.3 bar	16.0 bar
15mm	40.3 bar	40.3 bar	37.9 bar	30.1 bar	22.8 bar	15.0 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	17.3 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

** Max hydraulic working pressure for LTC fittings when assembled with Lawton Tube's EN13348 copper tube using hard solder (brazing alloy) to EN 1044

Service Temperature***					
Size	Min -196°C	65°C	120°C	150°C	Max 200°C
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
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

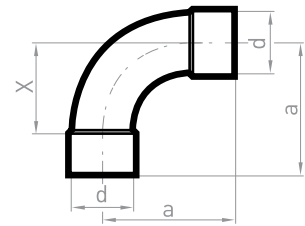
*** Max hydraulic working pressure for LTC fittings when assembled with Lawton Tube's EN13348 copper tube using hard solder (brazing alloy) to EN 1044

Mechanical Properties
EN3448 Copper end feed fitting



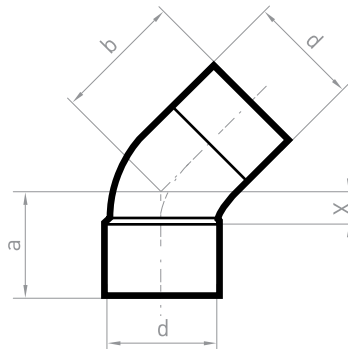
Bend 90° - MF

Dimensions (mm)				Product Code
d	a	b	x	
12	23	25	14.4	MEDELS012
15	29	31	18	MEDELS015
22	42	44	26.4	MEDELS022
28	52	54	33.6	MEDELS028
35	65	67	42	MEDELS035
42	77.5	79.5	50.4	MEDELS042
54	97	99	64.8	MEDELS054
67	117	120	84	MEDELS067
76	125	128	91.3	MEDELS076
108	177	180	129.6	MEDELS108
133	212	215	177	MEDELS133
159	262	265	227	MEDELS159



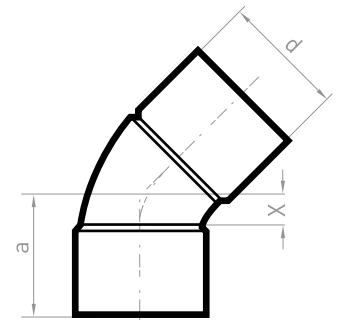
Bend 90° - FF

Dimensions (mm)			Product Code
d	a	x	
12	23	14.4	MEDEL012
15	29	18	MEDEL015
22	42	26.4	MEDEL022
28	52	33.6	MEDEL028
35	65	42	MEDEL035
42	77.5	50.4	MEDEL042
54	97	64.8	MEDEL054
67	117	84	MEDEL067
76	125	91.3	MEDEL076
108	177	129.6	MEDEL108
133	212	177	MEDEL133
159	262	227	MEDEL159



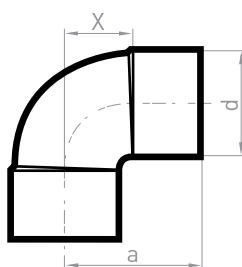
Elbow 45° - MF

Dimensions (mm)				Product Code
d	a	b	x	
12	13.6	15.6	4.7	MEDELS01245
15	16.9	18.9	6.1	MEDELS01545
22	23.2	25.2	6.7	MEDELS02245
28	28.6	30.6	10.6	MEDELS02845
35	37	39	14	MEDELS03545
42	42	44	15	MEDELS04245
54	52	54	20	MEDELS05445
67	65	58	28.5	MEDELS06745
76	68	71	32	MEDELS07645
108	110	113	60	MEDELS10845
133	280	280	235	MEDELS13345
159	335	335	290	MEDELS05945



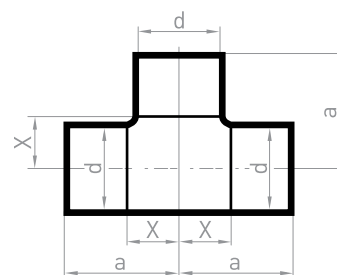
Elbow 45° - FF

Dimensions (mm)			Product Code
d	a	x	
12	13.6	4.7	MEDEL01245
15	16.9	6.1	MEDEL01545
22	23.2	7.6	MEDEL02245
28	28.6	10.6	MEDEL02845
35	37	14	MEDEL03545
42	42	15	MEDEL04245
54	52	20	MEDEL05445
67	65	28.5	MEDEL06745
76	68	32	MEDEL07645
108	110	60	MEDEL10845
133	280	235	MEDEL13345
159	335	290	MEDEL15945
219	120	50	MEDEL21945



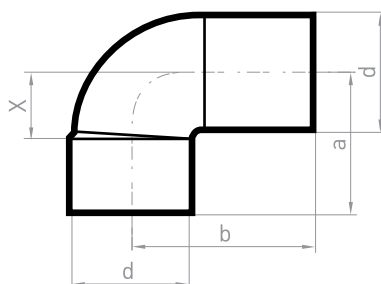
Elbow 90° - FF

d	Dimensions (mm)		Product Code
	a	x	
12	16.2	7.6	MEDEL012
22	28	12.6	MEDEL015
28	35	16.6	MEDEL028
35	46	23	MEDEL035
42	55	28	MEDEL042
54	70	38	MEDEL054
67	83.5	50	MEDEL067
76	91.5	58	MEDEL076
108	127	79.5	MEDEL108
133	127	79.5	MEDEL133
159	160	100	MEDEL159
219	200	130	MEDEL219



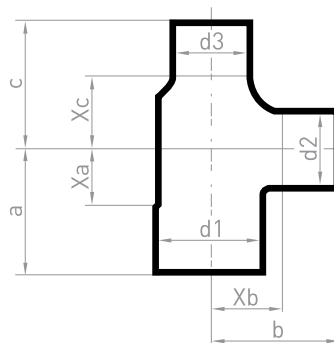
Equal Tee - FFF

d	Dimensions (mm)		Product Code
	a	x	
12	18	9	MEDTE012
22	28	12	MEDTE022
28	34	15	MEDTE028
35	42	20	MEDTE035
42	50	23	MEDTE042
54	61.5	29.5	MEDTE054
67	78	42	MEDTE067
76	80	46	MEDTE076
108	112	64	MEDTE108
133	135	85	MEDTE133
159	160	100	MEDTE159
219	178	115	MEDTE219



Street Elbow 90° - MF

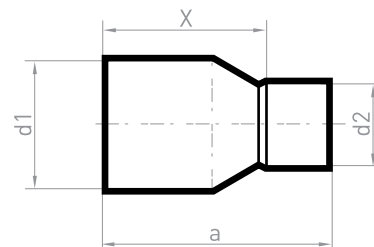
d	Dimensions (mm)			Product Code
	a	b	x	
12	16.2	18.5	7.6	MEELS012
15	19.2	21.5	8.5	MEELS015
22	28	30.5	12.6	MEELS022
28	35	37.5	16.6	MEELS028
35	46	54	24	MEELS035
42	56	66	29	MEELS042
54	71	82	39	MEELS054
67	83.5	95	50	MEELS067
76	91.5	105	58	MEELS076
108	127	137	79.5	MEELS108
133	127	137	79.5	MEELS133
159	160	180	100	MEELS159



Reducing Tee - FFF

d1xd2xd3	Dimensions (mm)						Product Code
	a	b	c	Xa	Xb	Xc	
12x12x10	16	16	17.5	7	7	9.5	MEDTE121210
15x12x12	18	18	18	7	9	9	MEDTE151212
15x12x15	18	18	18	7	9	7	MEDTE151215
15x15x12	19	19	19	8	8	10	MEDTE151512
15x22x15	27	28	27	16	12	16	MEDTE152215
22x15x12	25	23	22.5	9	12	30.5	MEDTE221512
22x15x15	25	23	24	9	12	13	MEDTE221515
22x15x22	25	23	25	9	12	9	MEDTE221522
22x22x15	28	28	27	12	12	16	MEDTE222215
28x15x15	28	26	26.5	9	15	15.5	MEDTE281515
28x15x22	28	26	28.5	9	15	12.5	MEDTE281522
28x22x15	31	31	30	12	15	19	MEDTE282215
28x22x22	31	31	32	12	15	16	MEDTE282222
28x22x28	31	31	31	12	15	12	MEDTE282228
28x28x15	34	34	33	15	15	22	MEDTE282815
35x15x28	32.5	30	34	9.5	19	15	MEDTE351528
35x15x35	32.5	30	32.5	9.5	19	0.5	MEDTE351535
35x22x22	36	35	37.5	13	19	21.5	MEDTE352222
35x22x28	36	35	37	13	19	18	MEDTE352228
35x22x35	36	35	36	13	19	13	MEDTE352235
35x28x22	38	38	40	15	19	24	MEDTE352822
35x28x28	38	38	40	15	19	21	MEDTE352828
35x28x35	38	38	38	15	19	15	MEDTE352835
35x35x15	42	41	42	19	18	31	MEDTE353515
35x35x22	42	42	42.5	19	19	26.5	MEDTE353522
35x35x28	42	42	42.5	19	19	23.5	MEDTE353528
35x42x35	49.5	50	49.5	26.5	23	26.5	MEDTE354235
42x15x42	36.5	34	36.5	9.5	23	9.5	MEDTE421542
42x22x35	40.5	39	40.5	13.5	23	17	MEDTE422235
42x22x42	40	39	40	13	23	13	MEDTE422242
42x28x22	42.5	42	44	15.5	23	28	MEDTE422822
42x28x28	42.5	42	43	15.5	23	24	MEDTE422828
42x28x35	42.5	42	44	15.5	23	21	MEDTE422835
42x28x42	43	42	43	16	23	16	MEDTE422842

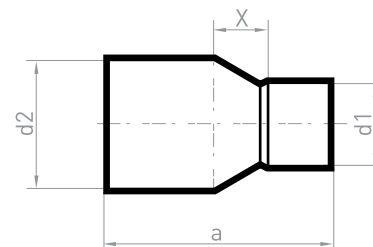
d1xd2xd3	Dimensions (mm)						Product Code
	a	b	c	Xa	Xb	Xc	
42x35x28	46	46	46	19	23	27	MEDTE423528
42x35x35	46	46	46.5	19	23	23.5	MEDTE423535
42x35x42	46.5	46	46.5	19.5	23	19.5	MEDTE423542
42x42x28	50	50	50	23	23	31	MEDTE424228
42x42x35	50	50	50	23	23	27	MEDTE424235
42x54x42	62	61	62	35	29	35	MEDTE425442
54x15x54	41.5	40	41.5	9.5	29	9.5	MEDTE541554
54x22x42	46	45	47	14	29	20	MEDTE542242
54x22x54	45	45	45	13	29	13	MEDTE542254
54x28x42	49	48	49.5	17	29	22.5	MEDTE542842
54x28x54	48	48	48	16	29	16	MEDTE542854
54x35x35	52	52	51	20	29	28	MEDTE543535
54x35x54	51.5	52	51.5	19.5	29	19.5	MEDTE543554
54x42x42	55	56	56.5	23	29	23	MEDTE544242
54x42x54	55	56	55	23	29	23	MEDTE544254
67x28x67	54.5	61	54.5	21	42	35	MEDTE672867
67x35x67	58.5	64	58.5	25	41	21	MEDTE673567
67x42x67	61	67	61	27	41	27	MEDTE674267
67x54x67	67	74	67	33.5	42	33.5	MEDTE675467
67x67x54	74	74	73	40	40	41	MEDTE676754
76x35x76	59	70	59.5	25.5	46	25.5	MEDTE763576
76x42x76	63	74	63	29	46	29	MEDTE764276
76x54x76	69	79	69	35	46	35	MEDTE765476
76x67x76	78	81	78	44.5	48	44.5	MEDTE766776
108x22x108	72	88	72	24.5	72	24.5	MEDTE10822108
108x35x108	77	92	77	29.5	65	29.5	MEDTE10835108
108x42x108	80	97	80	32.5	70	32.5	MEDTE10842108
108x54x108	86	97	86	38.5	65	38.5	MEDTE10845108
108x67x108	91	97	91	43.5	64	43.5	MEDTE10867108
108x76x108	95	97	95	47.5	64	47.5	MEDTE10876108
133x108x133	139	142	139	89	94.5	89	MEDTE133108133
159x76x159	101	120	101	53.5	86.5	53.5	MEDTE15976159
159x133x159	130	120	130	92.5	86.5	82.5	MEDTE159133159
159x108x159	117	142	117	69.5	94.5	69.5	MEDTE159108159



Reducer - MF

d	Dimensions (mm)		Product Code
	a	x	
12x8	21.5	14.5	MEDRED0128
15x12	26	17.5	MEDRED1512
22x12	33	25	MEDRED2212
22x15	33	22	MEDRED2215
28x12	41	32	MEDRED2812
28x22	44	28	MEDRED2822
35x15	50	39	MEDRED3515
35x22	50	35	MEDRED3522
35x28	50	32	MEDRED3528
42x15	65	54	MEDRED4215
42x18	59	46	MEDRED4218
42x22	58	42	MEDRED4222
42x28	58	40	MEDRED4228
42x35	60	35	MEDRED4235
54x15	70	60	MEDRED5415
54x22	70	52	MEDRED5422
54x28	70	45	MEDRED5428
54x35	70	45	MEDRED5435
54x42	70	45	MEDRED5442
67x28	80	60	MEDRED6728

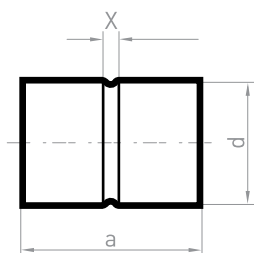
d	Dimensions (mm)		Product Code
	a	x	
67x35	80	60	MEDRED6735
67x42	88	58	MEDRED6742
67x54	80	48	MEDRED6754
76x35	90	66	MEDRED7635
76x42	90	60	MEDRED7642
76x54	85	50	MEDRED7654
76x64	80	50	MEDRED7664
76x67	81	48.5	MEDRED7667
108x35	116	84	MEDRED10835
108x42	116	74	MEDRED10842
108x54	116	84	MEDRED10854
108x64	110	80	MEDRED10864
108x67	112	80	MEDRED10867
108x76	108	72	MEDRED10876
133x76	119	82.5	MEDRED13376
133x108	106	70	MEDRED133108
159x76	150	110	MEDRED15976
159x108	130	80	MEDRED159108
159x133	123	70	MEDRED159133
219x159	150	90	MEDRED219159



Reducing Coupling - FF

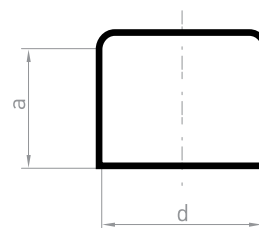
d	Dimensions (mm)		Product Code
	a	x	
12x10	20	3	MEDCP1210
15x12	24	4	MEDCP1512
22x12	32	8	MEDCP2212
22x15	32	8	MEDCP2215
28x15	38	12	MEDCP2815
28x22	40	6	MEDCP2822
35x22	48	8	MEDCP3522
35x28	48	6	MEDCP3528
42x15	54	16	MEDCP4215
42x22	56	13	MEDCP4222
42x28	56	10	MEDCP4228
42x35	60	10	MEDCP4235
54x22	70	20	MEDCP5422
54x28	70	20	MEDCP5428
54x35	70	10	MEDCP5435

d	Dimensions (mm)		Product Code
	a	x	
54x42	70	10	MEDCP5442
64x42	78	14	MEDCP6442
64x54	78	12	MEDCP6454
67x54	85	12	MEDCP6754
76x54	84	18	MEDCP7654
76x64	84	18	MEDCP7664
76x67	85	18	MEDCP7667
108x54	105	20	MEDCP10854
108x76	105	20	MEDCP10876
108x89	105	20	MEDCP10889
133x76	110	35	MEDCP13376
133x89	112	35	MEDCP13389
133x108	100	25	MEDCP133108
159x108	135	45	MEDCP159108
159x133	120	50	MEDCP159133



Straight Coupling with Stop - FF

d	Dimensions (mm)		Product Code
	a	x	
12	19	1.8	MEDCP012
15	24.5	1.8	MEDCP015
22	33	2.2	MEDCP022
28	40	3	MEDCP028
35	49	3	MEDCP035
42	38	4	MEDCP042
54	69	5	MEDCP054
67	72	5	MEDCP067
76	72	5	MEDCP076
108	100	3	MEDCP108
133	100	3	MEDCP133
159	100	4	MEDCP159
219	116	5	MEDCP219



Stop End - F

d	Dimensions (mm)		Product Code
	a		
12	8.6		MEDEC012
15	10.6		MEDEC015
22	15.4		MEDEC022
28	18.4		MEDEC028
35	23		MEDEC035
42	27		MEDEC042
54	32		MEDEC054
67	33.5		MEDEC067
76	33.5		MEDEC076
108	47.5		MEDEC108
159	62.5		MEDEC159



Slip Coupling - F

d	Dimensions (mm)		Product Code
	a		
15	24		MEDSC015
22	33		MEDSC022
28	38		MEDSC028
35	48		MEDSC035
42	58		MEDSC042
54	66		MEDSC054

Adhesive Identification Pipeline Tapes

All Lawton ID tapes conform to HTM 2022 Spec

General Construction

Pipeline tapes are made as a lamination of PVC tape printed on the upper surface and Polypropylene tape applied over the print. The individual specifications of each component are given below.

PVC layer - Opaque White Film

Backing: Callendered unplasticised PVC film
Adhesive: Natural rubber with tackifying resins

Film Thickness 0.035mm
Total thickness 0.058mm

Peel adhesion typical result 210gm/cm
Tensile typical result 139N/25mm

Polypropylene Layer = Clear film

Backing: Bi-Axially orientated Polypropylene
Adhesive: Water based Acrylic

Film Thickness 0.035mm
Total thickness 0.055mm

Peel adhesion typical result 180gm/cm
Tensile typical result 186N/25mm

Service Life

Very dependent on external conditions. Service Temperatures = 0°C to 45°C. Films and adhesives will not stand temperatures above 60°C. Rubber based adhesives are degraded by UV light. Typically in UK external inland conditions a service life in excess of 12 months will be achieved.

Colours

All colours and designs conform to BS 1710 : 1984, BS 4800.

Silver Brazing Rods

All Lawton solder rods conform to HTM 02 Spec

Type of Product

Silver Brazing Alloy

Composition

5% Silver

89% Copper

6% Phosphorous

BS 1845 1984 CP4

DIN 8513 L-Ag 5P

Melting Range

645 - 815°C

Appearance

Copper coloured metal

Occupational Health Data

TLV

Odour threshold

Silver	0.1mg/m ³ as fume
Phosphorous	1mg/m ³ as phosphoric acid
Copper	0.2mg/m ³ as fume

Refrigeration and Air Conditioning Tubes

Pipeline solutions for refrigeration and air conditioning, all to EN 12735-1.

Our copper tubing is designed specifically for refrigeration and air conditioning use and accordingly cleaned, nitrogen-purged and capped.

Material Analysis

Material Grade Phosphorus de-oxidised copper; Cu-DHP or CW024A as defined in BS EN 1976.

Minimum Copper Content 99.90 % (including silver)

Phosphorus 0.015-0.040 %

Total Impurity Maxima 0.060 % (excluding phosphorus and silver)

The melting point of copper is 1083°C and it has a density of 8.9 gm/cc

Mechanical Properties

BS EN 12735-1 Refrigeration and Air Conditioning Tubes



Material Temper EN 1173	Tensile Strength min. (N/mm2)	Elongation min. (%)	Hardness (Indicative) HV5 VPN
R220 (soft)	220	40	40-70
R250 (Half Hard)	250	30	75-100
R290 (Hard)	290	3	Over 100

The table below and on the next page give the maximum working pressure (MWP)

They have been calculated based on the requirements of EN378 using the stress values according to BS 1306.

Although straight tube is supplied in either half hard or fully hard condition, we have also quoted figures based on annealed condition which is representative of the tube in the area immediately surrounding brazed joints.

The maximum test pressure can be 1.5 times that of the (MWP)

Copper Coiled Tube to EN 12735-1 R220



O.D. (inches)	Wall (inches)	Gauge (SWG)	Max Working Pressure in annealed condition
1/4	0.028	22	92
5/16	0.028	22	72
5/16	0.036	20	94
3/8	0.032	21	68
1/2	0.032	21	50
5/8	0.036	20	45
3/4	0.040	19	39
7/8	0.040	19	33

Copper Straight Tube to EN 12735-1 R250/R290

O.D. (inches)	Wall (inches)	Gauge (SWG)	Max Working Pressure bar up to 65°C	Max Working Pressure in annealed condition
3/8	0.032	21	103	68
1/2	0.036	20	86	57
1/2	0.048	18	113	75
5/8	0.036	20	68	78
5/8	0.048	18	89	59
3/4	0.048	18	71	50
3/4	0.064	16	99	64
7/8	0.048	18	61	42
7/8	0.064	16	82	54
7/8	0.104	12	139	92
1 1/8	0.048	18	47	33
1 1/8	0.064	16	63	45
1 1/8	0.080	14	80	53
1 3/8	0.048	18	38	27
1 3/8	0.064	16	51	36
1 3/8	0.080	14	64	45
1 3/8	0.104	12	85	56
1 5/8	0.048	18	32	22
1 5/8	0.064	16	43	30
1 5/8	0.080	14	54	38
1 5/8	0.104	12	71	50
1 5/8	0.116	11	80	53
2 1/8	0.048	18	24	17
2 1/8	0.064	16	32	23
2 1/8	0.080	14	41	29
2 1/8	0.104	12	54	35
2 5/8	0.048	18	22	14
2 5/8	0.064	16	30	19
2 5/8	0.080	14	37	23
2 5/8	0.104	12	49	30
3 1/8	0.064	16	25	15
3 1/8	0.080	14	31	19
3 1/8	0.104	12	41	25
3 5/8	0.064	16	21	13
3 5/8	0.080	14	27	17
4 1/8	0.064	16	19	12
4 1/8	0.080	14	23	15
4 1/8	0.104	12	31	19

Working pressures are to BS 2871:part1:1971

Lawton Dual

Bimetallic seamless round composite copper and aluminium tubes for HVAC&R applications

Material:

Seamless composite round tubes made of high purity copper and aluminium outer, supplied in Level Wound Coils, PNC Coils, Pre-insulated Bunch Coils and Straight lengths.

Produced in accordance to product specification TB 01 and in compliance to EN 12735-1 regarding internal residue.

Annealed Temper - Mechanical Properties:

- o Tensile Strength (Rm) → 100 N/mm²
- o Yield Strength (Rp0.2) → 40 N/mm²
- o Elongation (A50mm) → 30 %

Mechanical Properties



Dimensions			Tolerances	
O.D. (inches)	O.D. (mm)	Wall (mm)	Mean Outside Diameter (mm)	Combined Wall Thickness at any point
1/4	6.35	0.80	± 0.04	± 10%
3/8	9.52	0.80	± 0.04	± 10%
1/2	12.70	1.00	± 0.04	± 13%
5/8	15.87	1.20	± 0.05	± 13%

Surface Quality & Cleanliness

Tubes are bright and smooth, free from cracks, slivers, seams, scales and other surface defects. The maximum residue on the inner surface of the tube is 0.38 mg/dm².

The ends of each tube are closed to prevent any contamination of the inner surface.

Freedom and Identification of Defects - Eddy Current Testing

The tubes are 100 % tested in an eddy current unit capable of detecting any defect detrimental to subsequent processing or the end use of the tube.

Drift Expanding

The outside diameter of the tube end can be expanded by at least 40%.

Internal Working Pressure

The tubes can endure at least a maximum internal working pressure of 5,5 MPa (55 Bar) at temperatures up to 120 °C with an actual burst pressure above 22 MPa (220 Bar).

Safety Factor of 4 / Factor of Safety (FoS) 4:1

Inspection Document

An inspection document / a mill test certificate according to EN 10204 / 3.1 or a Declaration of Conformity can be supplied with each dispatch.

Dual Solder

Non Corrosive Flux Cored Zinc-Aluminium Alloy

Nominal Composition

Al 22 % \pm 1

Zn SOLDE

Cd 0,005 % MAX

Pb 0,005 % MAX

Others Cd, Pb included 0,15 % MAX

Melting Point

Melting range : 415-475°C

Available On

Wires

Coils

Black Spools SD 300K of 5 kg

Rods Length : 13,0'' – 19,7'' – 29,6'' – 39,4'' packaged on 100g/250g/500g/1000g

Preform shapes

Rings

Diameters Available

0,047'' - 0,063'' - 0,079''

other diameters could be done

Utilisations

Low temperature alloy for brazing aluminium and its alloys – Stainless steel, Steel, Copper.

Composition Of The Flux

Non corrosives fluorides of caesium are the mainly compounds of the flux.

Amount of flux is 5 to 40% of total weight

Lawton K65

Lawton K65 is a high copper alloy with high mechanical strength.

Typical Applications

Tubes for air conditioning and refrigeration, heating and solar engineering, brake line tubing

Material designation

EN CuFe2P CW1076

UNS* C19400

* Unified numbering system

Physical Properties*

Thermal Conductivity W/(m-K) >260

DensityG/CM3 8.91

*Reference values at room temperature

Temper (DIN EN12449)

R300** soft annealed

R420** hard

According to DIN EN 12449

Chemical Composition		Mechanical properties (annealed)	
Fe	2.10-2.60 %	Rn	min.>300 N/mm2
Zn	0.05-0.20%	Rn	max.>250 N/mm2
P	0.015-0.15 %	A	min. >25%
Pb	max. 0.03 %		
Cu	balance		

**Conformity to PED 97/23/EC can be certified through product inspection by a technical inspection agency such as TUV.

Fabrication properties	
Cold working	excellent
Electroplating	excellent
Hot-dip tinning	excellent
Machinability	poor

Joining	
Brazing	excellent
Soft soldering	excellent
Inert gas shielded	
arc welding	excellent
Resistance	
welding	good
Laser welding	good

Corrosion resistance

Lawton K65 is insensitive to stress corrosion cracking. Lawton K65 exhibits good resistance in natural atmosphere (also marine atmosphere) and industrial atmosphere. It has a better resistance to erosion and pitting corrosion than Cu-DHP in different types of water and neutral saline solutions.

LAWTON
K65

Sizes available

Type of delivery		Outside diameter mm*	Manufacture	Temper
Straight lengths	plain	7-108	seamless	hard or annealed
(max. 7800 mm)	inner-grooved	7-16	seamless	hard or annealed
Level-wound coils (LWC)	plain	7-20	seamless	hard or annealed
(coil weight on request)	inner-grooved	7-16	seamless	hard or annealed

*Wall thicknesses and other sizes on request

Relevant standards and specifications

DIN EN 12449 Seamless, round tubes for general purposes

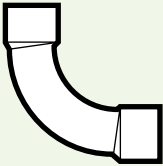
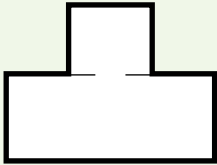
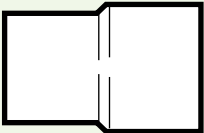
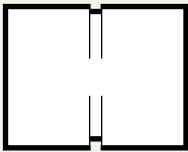

Wieland R-1084 Seamless drawn plain or inner-grooved tubes in K65 in LWC for pressure vessels and piping

Wieland R-1085 Seamless drawn plain or inner-grooved copper tubes in K65 in straight lengths for pressure vessels and piping

VdTUV-Werkstoffblatt, new draft 03.2010 Seamless drawn tubes in CuFe2P (CW107C) Wieland K65

Lawton K65 Fittings

LAWTON
CO2 FITTINGS

Fitting	Size	Max Working Pressure at 150°C	Bag Qty	Box Qty
<p>Long Radius Elbow</p> 	3/8	120bar	5	100
	1/2	120bar	5	100
	5/8	120bar	5	100
	3/4	120bar	5	100
	7/8	120bar	5	100
	1.1/8	120bar	5	100
	1.3/8	120bar	1	60
<p>Equal Tee</p> 	3/8	120bar	5	100
	1/2	120bar	5	100
	5/8	120bar	5	100
	3/4	120bar	5	100
	7/8	120bar	5	100
	1.1/8	120bar	5	100
	1.3/8	120bar	1	60
<p>Fitting Reducer</p> 	1/2 x 3/8	120bar	5	100
	5/8 x 1/2	120bar	5	100
	3/4 x 5/8	120bar	5	100
	7/8 x 3/4	120bar	5	100
	1.1/8 x 7/8	120bar	5	100
	1.3/8 x 1.1/8	120bar	1	60
<p>Coupler</p> 	3/8	120bar	5	100
	1/2	120bar	5	100
	5/8	120bar	5	100
	3/4	120bar	5	100
	7/8	120bar	5	100
	1.1/8	120bar	5	100
	1.3/8	120bar	1	60
<p>End Cap</p> 	3/8	120bar	5	100
	1/2	120bar	5	100
	5/8	120bar	5	100
	3/4	120bar	5	100
	7/8	120bar	5	100
	1.1/8	120bar	5	100
	1.3/8	120bar	1	60

All K65 end fittings are made from K65 tube

Refrigeration Grade Copper Fittings for Co₂

Degreased copper fittings specifically for ACR and manufactured to ASME B16.22-2001 which can be used in assemblies subject to the Pressure Equipment Directive.

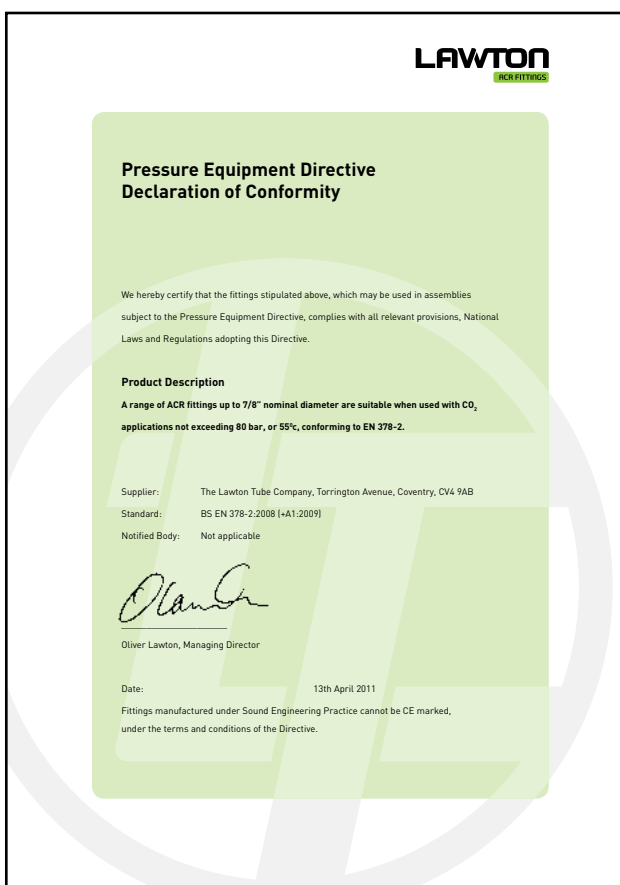
The burst pressure of each fitting size at 55°C has been determined and a safety factor of at least 3 has been applied to establish a recommended maximum working pressure.

All testing has been conducted in accordance with BS EN 378-2:2008 (+A1:2009).




Maximum Working Pressures

Size	Burst Pressure	Maximum Working Pressure at 55°C
1/4 "	500 bar	150 bar
3/8 "	360 bar	120 bar
1/2 "	320 bar	100 bar
5/8 "	300 bar	100 bar
3/4 "	280 bar	90 bar
7/8 "	240 bar	80 bar
1 1/8 "	220 bar	75 bar
1 3/8 "	220 bar	65 bar
1 5/8 "	180 bar	55 bar



Kitemark – BS EN 1057

 **Kitemark® Licence**

No. KM 05892

BS EN 1057 – Copper and copper alloys


1. Certified Product Range:

R250 Half-Hard	
Outside Diameter (mm)	Wall Thickness (mm)
6	0.6
6	0.8
8	0.6
8	0.8
10	0.6
10	0.8
12	0.6
12	0.8
15	0.7
15	1.0
22	0.9
22	1.2
28	0.9
28	1.2
35	1.2
35	1.5
42	1.2
42	1.5
54	1.2
54	2.0

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 **Kitemark® Licence**

No. KM 05892

1. Certified Product Range (continued)

R290 Hard	
Outside Diameter (mm)	Wall Thickness (mm)
35	1.0
35	1.5
42	1.0
42	1.5
54	1.0
54	1.2
54	2.0
66.7	1.2
66.7	2.0
76	1.5
76	2.0
108	1.5
108	2.5
133	1.5
159	2.0
219	3.0

2. Product Marking:

BS EN 1057:  LAWTON . O/D . WALL
H-H . MONTH . YEAR

First Issued: 1/11/1974 Latest Issue: 14/05/2012

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 **Kitemark® Licence**

No. KM 05892

The licence is granted to:

The Lawton Tube Company Limited
Torrington Avenue
Coventry
West Midlands
CV4 9AB
United Kingdom

In respect of:
BS EN 1057
Copper and copper alloys. Seamless, round copper tubes for water and gas in sanitary and heating applications

This issues the right and licence to use the Kitemark in accordance with the Kitemark Licence Conditions of Contract governing the use of the Kitemark, as may be updated from time to time by The British Standards Institution, and as approved by the Registrar under the Trade Marks Act 1994 (the "Conditions"). All defined terms in this Licence shall have the same meaning as in the Conditions.

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For and on behalf of BSI:


Gary Fenton, Global Assurance Director

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Kitemark – IS EN 1057

nsai
National Standards Authority of Ireland

Licence to use a Standard Mark

The National Standards Authority of Ireland,
in exercise of the power conferred on it by subsection (1) of Section 21
of the National Standards Authority Act (No. 28 of 1996), hereby grants to

The Lawton Tube Co. Ltd
Torrington Avenue
Coventry
West Midlands CV4 9AB

a license to use the Irish Standard Mark on or in connection with
**Copper & Copper Alloys: Seamless Round Copper Tubes for Water and Gas in
Sanitary and Heating Applications**
to indicate conformity to Irish Standard

IS EN 1057: 1996

An Irish Standard Mark License authorises the Licensee to use
the Irish Standard Mark in conjunction with the relevant Irish Standard
Number, on a product which is the subject of the license, and which
conforms to the relevant Irish Standard Specification.

The license is not assignable, and shall remain in force until revoked by,
or surrendered by the licensee to, the National Standards Authority of Ireland.

License Number: 1.7.19
Date of Issue: 05 October 2005
Revision Date: 05 October 2005

Signed: *Simon Kelly* Chief Executive Officer
Signed: *David O'Donnell* Chairperson

The validity of this certificate is maintained through on-going surveillance inspections.
National Standards Authority of Ireland, Glasnevin, Dublin 9, Ireland

ISM-NL-AA(3.1)

Kitemark – BS EN13348

 **Kitemark® Licence**

No. KM 66240

The British Standards Institution hereby grants to:

The Lawton Tube Company Limited
Torrington Avenue
Coventry
West Midlands
CV4 9AB
United Kingdom

In respect of:
Copper and copper alloys - Seamless, round copper tubes for medical gases or vacuum

This issues the right and licence to use the Kitemark in accordance with the Kitemark Licence Conditions of Contract governing the use of the Kitemark, as may be updated from time to time by The British Standards Institution, and as approved by the Registrar under the Trade Marks Act 1994 (the "Conditions"). All defined terms in this Licence shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Licence provided at or from the above address.

For and on behalf of The British Standards Institution:

David W. Ford
David W. Ford, Executive Director, Healthcare & Testing Services

First Issued: 8/05/2002 Latest Issue: 7/03/2011




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 **Kitemark® Licence**

No. KM 66240

**BS EN 13348: 2008 - Copper and copper alloys - Seamless, round copper tubes for
medical gases or vacuum**

Certified Range:

DIAMETER (mm)	WALL (mm)	TEMPER DESIGNATION
12	0.6	HALF-HARD R250
15	0.7	HALF-HARD R250
22	0.9	HALF-HARD R250
35	1.2	HALF-HARD R250
42	1.2	HALF-HARD R250
54	1.2	HALF-HARD R250
66.7	1.0	HALF-HARD R250
76.1	1.0	HALF-HARD R250
108	1.5	HALF-HARD R250
	1.5	HARD R290
	1.5	HARD R290
	1.5	HARD R290


Stamped Marking R250:
BS EN 13348 ∇ LAWTON DIA x WALL ∇ DATE CODE
BRITISH DEGREASED MEDICAL

Stamped Marking R290:
BS EN 13348 ∇ LAWTON DIA x WALL QUARTER YEAR
BRITISH DEGREASED MEDICAL

BS EN 13348 ∇ LAWTON HARD
DIA x WALL MM/YYYY MEDICAL

First Issued: 8/05/2002 Latest Issue: 7/03/2011 Page 2 of 2

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Quality System ISO 9001:2008



Affiliation Certificates





25 Year Guarantee

The Lawton Tube Company Limited ("Lawton") guarantees its plain copper tubes and its copper end feed fittings for water, heating, gas and sanitation purposes, for the period of 25 years from the date of purchase, against fault or defect due to defective materials or manufacture or failure to comply with the provision of the quality stamped on the tube/fitting.

If any tube/fitting shall fail this guarantee Lawton shall:

- Replace the faulty tube/fitting
- Pay the installer's costs of removing or replacing the faulty tube/fitting (up to an amount of £75,000 per claim.)
- Pay any costs or damages suffered/incurred as a result of the failure (up to an amount of £250,000 per claim.)

Lawton reserves the right to remedy the failure itself or by its own nominated contractor.

A handwritten signature in black ink, appearing to read 'Oliver Lawton'.

Oliver Lawton, Managing Director

Conditions

This guarantee is conditional upon:

Proper installation of the tube/fitting in accordance with all relevant practices and regulations.
Lawton being notified of the failure as soon as practicable but in any event within 14 days after the failure.

The claimant taking all appropriate or necessary measures to mitigate the damages or losses suffered.

Lawton being given the opportunity to inspect the faulty tube and the installation (with or without its own experts) to satisfy itself as to the failure of the tube, and if required to remove the faulty tube/fitting for testing. Lawton having no liability for any indirect or consequential losses.

Lawton's total liability under this guarantee not exceeding the sum of £250,000.

This guarantee extends only to the original purchaser/installer of the tube/fitting and is not capable of assignment and applies only to the tube/fitting sold and installed in the United Kingdom.

30 Year Guarantee

Enjoy the added bonus of an extra 5 year warranty with no additional premiums if Lawton's EN1057 15-219mm range is fitted with any flame-free jointed piping system. (contact us for full terms and conditions)

COSHH – Hazard data sheet for all other copper tubes

Copper CU and Its Salts

General Data – Grade 11 Chemical

Copper is reddish brown ductile malleable metal. It is highly conductive for heat and electricity. There are many alloys of copper, brass and bronze being the most common.

It forms two ranges of salts, cuprous and cupric – the latter being more stable.

Uses

- 1 The manufacture of a wide range of alloys e.g.
 - a. Brass which contains 37% zinc and other elements such as tin, manganese, nickel, iron and aluminium.
 - b. Bronze which contains tin, lead, nickel phosphorous and silicon.
 - c. High conductivity alloys containing silver, cadmium and chromium.
 - d. High strength alloys with beryllium, nickel, cobalt and silicon.
 - e. For machinability with tellurium.
 - f. When combined with 10%-30% nickel provides an alloy suitable for welding and capable of carrying corrosive liquids.
- 2 In the electricity industry for high conductivity.
- 3 Building industry for piping water and gas.
- 4 Copper Salts are colouring agents and fungicides.

Hazard

Copper itself is virtually non-toxic in its industrial application. Some of the salts however, and particular copper sulphate are toxic if swallowed. Inhalation of the fume from welding or melting of brass leads to metal fume fever but this effect is attributed to zinc oxide fume. Similarly the inhalation of powdered bronze can cause metal fume fever.

Acute Poisoning

In industrial practice acute poisoning may arise in 2 ways:-

- 1 By inhalation of fume from welding or brazing copper alloys. Metal fume fever develops some hours after exposure.
- 2 By swallowing copper sulphate solution which produces abdominal cramp, nausea, vomiting and diarrhoea.

Chronic Poisoning – Unknown

Occupational Exposure Limits HSE EH40/89

	Long Term Exposure Limit		Short Term Exposure Limit	
	PPM	Mg M3	PPM	Mg M3
Fume	-	0.2	-	-
Dust	-	1	-	1

Precautions

All melting, welding and brazing operations should be performed in controlled atmospheric conditions and should not be undertaken in enclosed spaces without exhaust ventilation and fresh airline respirators.

Personal Protective Equipment

A respirator to BS 2091 should be worn when other safety measures are not available.

First Aid

- 1 Inhalation of fume rarely causes immediate symptoms but if they occur remove from the fume. Oxygen and artificial respiration rarely called for.
- 2 Ingestion of solutions of copper salts, particularly copper sulphate – dilute the poison by giving copious quantities of water to drink.
- 3 Remove the patient to hospital immediately together with a sample of fluid drunk and preserving specimens of vomits.

Standard Conditions Of Sale

The buyer's attention is in particular drawn to the provisions of condition 12.4.

1. INTERPRETATION

1.1 The definitions and rules of interpretation in this condition apply in these conditions.

Buyer: The person, firm or company who purchases the Goods from the Company.

Company: The Lawton Tube Company Limited (CRN 00165130)

Contract: Any contract between the Company and the Buyer for the sale and purchase of the Goods, incorporating these conditions.

Delivery Point: The place where delivery of the Goods is to take place under condition 4.

Goods: Any goods agreed in the Contract to be supplied to the Buyer by the Company (including any part or parts of them).

1.2 A reference to a particular law is a reference to it as it is in force for the time being taking account of any amendment, extension, application or re-enactment and includes any subordinate legislation for the time being in force made under it.

1.3 Words in the singular include the plural and in the plural include the singular.

1.4 A reference to one gender includes a reference to the other gender.

1.5 Condition headings do not affect the interpretation of these conditions.

2. APPLICATION OF TERMS

2.1 Subject to any variation under condition 2.3 the Contract shall be on these conditions to the exclusion of all other terms and conditions (including any terms or conditions which the Buyer purports to apply under any purchase order, confirmation of order, specification or other document).

2.2 No terms or conditions endorsed on, delivered with or contained in the Buyer's purchase order, confirmation of order, specification or other document shall form part of the Contract simply as a result of such document being referred to in the Contract.

2.3 These conditions apply to all the Company's sales and any variation to these conditions and any representations about the Goods shall have no effect unless expressly agreed in writing and signed by a Director of the Company. The Buyer acknowledges that it has not relied on any statement, promise or representation made or given by or on behalf of the Company which is not set out in the Contract. Nothing in this condition shall exclude or limit the Company's liability for fraudulent misrepresentation.

2.4 Each order or acceptance of a quotation for Goods by the Buyer from the Company shall be deemed to be an offer by the Buyer to buy Goods subject to these conditions.

2.5 No order placed by the Buyer shall be deemed to be accepted by the Company until a written acknowledgement of order is issued by the Company or (if earlier) the Company delivers the Goods to the Buyer.

2.6 The Buyer shall ensure that the terms of its order and any applicable specification are complete and accurate.

2.7 Any quotation is given on the basis that no Contract shall come into existence until the Company despatches an acknowledgement of order to the Buyer.

3. DESCRIPTION

3.1 The quantity and description of the Goods shall be as set out in the Company's quotation or acknowledgement of order.

3.2 All samples, drawings, descriptive matter, specifications and advertising issued by the Company and any descriptions or illustrations contained in the Company's catalogues or brochures are issued or published for the sole purpose of giving an approximate idea of the Goods described in them. They shall not form part of the Contract and this is not a sale by sample.

3.3 If the Goods are to be manufactured or any process is to be applied to the Goods by the Seller in accordance with a specification submitted by the Buyer:-

(a) The Buyer shall supply such specification within sufficient time to enable the Company to complete delivery of the goods by the estimated delivery date.

(b) The Buyer shall indemnify the Company against all loss damages costs and expenses awarded against or incurred by the Company in connection with or paid or agreed to be paid by the Company in settlement of any claim for infringement of any patent, copyright, design, trade mark or other industrial or intellectual property rights of any other person which results from the Company's use of the Buyer's specification.

(c) The Company reserves the right to make any changes in the specification of the Goods which are required to conform with any applicable statutory or EC requirements.

(d) The Company shall be under no liability in respect of any defect in the Goods arising from any drawing design or other specification supplied by the Buyer

4. RAW MATERIALS AND SPECIAL TOOLS

4.1 Contracts and orders are accepted subject to the Company being able to obtain at all necessary times the raw materials and any special tools required to execute the order.

4.2 Any dies or tools made or obtained specially for an order remain the Seller's property, even when the Buyer has been charged with the cost or part cost.

5. DELIVERY

5.1 Unless otherwise agreed in writing by the Company, delivery of the Goods shall take place at the Buyer's place of business.

5.2 The Buyer shall take delivery of the Goods within 7 days of the Company giving it notice that the Goods are ready for delivery.

5.3 Any dates specified by the Company for delivery of the Goods are intended to be an estimate and time of delivery shall not be made of the essence by notice. If no dates are so specified, delivery shall be within a reasonable time.

5.4 Subject to the other provisions of these conditions the Company shall not be liable for any direct, indirect or consequential loss (all three of which terms include, without limitation, pure economic loss, loss of profits, loss of business, depletion of goodwill and similar losses), costs, damages, charges or expenses caused directly or indirectly by any delay in the delivery of the Goods (even if caused by the Company's negligence), nor shall any delay entitle the Buyer to terminate or rescind the Contract.

5.5 If for any reason the Buyer fails to accept delivery of any of the Goods when they are ready for delivery, or the Company is unable to deliver the Goods on time because the Buyer has not provided appropriate instructions, documents, licences or authorisations:

(a) risk in the Goods shall pass to the Buyer (including for loss or damage caused by the Company's negligence);

(b) the Goods shall be deemed to have been delivered; and

(c) the Company may store the Goods until delivery, whereupon the Buyer shall be liable for all related costs and expenses (including, without limitation, storage and insurance).

5.6 The Buyer shall provide at the Delivery Point and at its expense adequate and appropriate equipment and manual labour for unloading the Goods.

5.7 If the Company delivers to the Buyer a quantity of Goods of up to 10% more or less than the quantity ordered by the Buyer, the Buyer shall not be entitled to object to or reject the Goods or any of them by reason of the surplus or shortfall and shall pay for such goods at the pro rata Contract rate.

5.8 The Company may deliver the Goods by separate instalments. Each separate instalment shall be invoiced and paid for in accordance with the provisions of the Contract.

5.9 Each instalment shall be a separate Contract and no cancellation or termination of any one Contract relating to an instalment shall entitle the Buyer to repudiate or cancel any other Contract or instalment.

5.10 Where the Buyer has given firm instructions for the manufacture or delivery of Goods and subsequently requests the Seller to defer delivery, any Goods completed will be invoiced on completion, holding and storage charges at the reasonable cost of storage including delivery will be invoiced subsequently when applicable.

6. NON-DELIVERY

6.1 The quantity of any consignment of Goods as recorded by the Company on despatch from the Company's place of business shall be conclusive evidence of the quantity received by the Buyer on delivery unless the Buyer can provide conclusive evidence proving the contrary.

6.2 The Company shall not be liable for any loss or non-delivery of Goods (even if caused by the Company's negligence) unless the Buyer gives written notice and a complete claim to the Company (and to the carrier if applicable) of the non-delivery within 3 working days of the date when the Goods would in the ordinary course of events have been received.

6.3 Any liability of the Company for non-delivery of the Goods shall be limited to replacing the Goods within a reasonable time or issuing a credit note at the pro rata Contract rate against any invoice raised for such Goods.

7. EXPORT ORDERS

7.1 Unless the contract otherwise requires any term or expression which is defined in or given a particular meaning by the provisions of "Incoterms", the definition of meaning given by the Incoterms in force at the date when the contract is made, shall have the same meaning in these conditions or any contract for the sale or supply of Goods by the Company to the Buyer, but if there is any conflict between the provisions of Incoterms and these conditions, the latter shall prevail.

7.2 The Buyer shall be responsible for complying with any legislation or regulations governing the importation of the Goods into the country of destination and for the payment of any duties on them.

8. RISK/TITLE

8.1 Risk shall pass to the Buyer so that the Buyer is responsible for all loss, damage or deterioration to the Goods:

(a) If the Company delivers the Goods by its own transport at the time when the Goods or a relevant part thereof arrive at the place of delivery or,

(b) In all other circumstances at the time when the Goods or a relevant part thereof leave the premises of the Company whether or not the Company arranges transport and where the Goods are delivered by carrier any claims for loss or damage in transit must be made by the Buyer against the carrier in accordance with the carriers conditions.

8.2 Ownership of the Goods shall not pass to the Buyer until the Company has received in full (in cash or cleared funds) all sums due to it in respect of:

(a) the Goods; and

(b) all other sums which are or which become due to the Company from the Buyer on any account.

8.3 Until ownership of the Goods has passed to the Buyer, the Buyer shall:

(a) hold the Goods on a fiduciary basis as the Company's bailee;

(b) store the Goods (at no cost to the Company) separately from all other goods of the Buyer or any third party in such a way that they remain readily identifiable as the Company's property;

(c) not destroy, deface or obscure any identifying mark or packaging on or relating to the Goods; and

(d) maintain the Goods in satisfactory condition and keep them insured on the Company's behalf for their full price against all risks to the reasonable satisfaction of the Company. On request the Buyer shall produce the policy of insurance to the Company.

8.4 The Buyer may resell the Goods before ownership has passed to it solely on the following conditions:

(a) any sale shall be effected in the ordinary course of the Buyer's business at full market value; and

(b) any such sale shall be a sale of the Company's property on the Buyer's own behalf and the Buyer shall deal as principal when making such a sale.

8.5 The Buyer's right to possession of the Goods shall terminate immediately if:

(a) the Buyer has a bankruptcy order made against him or makes an arrangement or composition with his creditors, or otherwise takes the benefit of any statutory provision for the time being in force for the relief of insolvent debtors, or (being a body corporate) convenes a meeting of creditors (whether formal or informal), or enters into liquidation (whether voluntary or compulsory) except a solvent voluntary liquidation for the purpose only of reconstruction or amalgamation, or has a receiver and/or manager, administrator or administrative receiver appointed of its undertaking or any part thereof, or documents are filed with the court for the appointment of an administrator of the Buyer or notice of intention to appoint an administrator is given by the Buyer or its directors or by a qualifying floating charge holder (as defined in paragraph 14 of Schedule B1 to the Insolvency Act 1986), or a resolution is passed or a petition presented to any court for the winding-up of the Buyer or for the granting of an administration order in respect of the Buyer, or any proceedings are commenced relating to the insolvency or possible insolvency of the Buyer; or

(b) the Buyer suffers or allows any execution, whether legal or equitable, to be levied on his/its property or obtained against him/it, or fails to observe or perform any of his/its obligations under the Contract or any other contract between the Company and the Buyer, or is unable to pay its debts within the meaning of section 123 of the Insolvency Act 1986 or the Buyer ceases or threatens to cease to trade; or

(c) the Buyer encumbers or in any way charges any of the Goods.

8.6 The Company shall be entitled to recover payment for the Goods notwithstanding that ownership of any of the Goods has not passed from the Company.

8.7 The Buyer grants the Company, its agents and employees an irrevocable licence at any time to enter any premises where the Goods are or may be stored in order to inspect them, or, where the Buyer's right to possession has terminated, to recover them.

8.8 Where the Company is unable to determine whether any Goods are the goods in respect of which the Buyer's right to possession has terminated, the Buyer shall be deemed to have sold all goods of the kind sold by the Company to the Buyer in the order in which they were invoiced to the Buyer.

8.9 On termination of the Contract, howsoever caused, the Company's (but not the Buyer's) rights contained in this condition 7 shall remain in effect.

9. PRICE

9.1 Unless otherwise agreed by the Company in writing, the price for the Goods shall be the price set out in the order acknowledgement or if no price is stated the Company's price list published on the date of delivery or deemed delivery.

9.2 Notwithstanding clause 9.1, where the date for delivery of the Goods (or any part of them) is more than three months after the date of the order acknowledgement, the Company reserves the right to increase the price for the Goods to take account of any increase in the price of copper on the London Metal Exchange between the date of acknowledgement and the date of delivery.

9.3 The price for the Goods shall be exclusive of any value added tax and all costs or charges in relation to packaging, loading, unloading, carriage and insurance, all of which amounts the Buyer shall pay in addition when it is due to pay for the Goods.

10. PAYMENT

10.1 Subject to condition 10.4 and to any terms for payment contained in the order acknowledgement, payment of the price for the Goods is due in pounds sterling.

10.2 Time for payment shall be of the essence.

10.3 No payment shall be deemed to have been received until the Company has received cleared funds.

10.4 All payments payable to the Company under the Contract shall become due immediately on its termination despite any other provision.

10.5 The Buyer shall make all payments due under the Contract in full without any deduction whether by way of set-off, counterclaim, discount, abatement or otherwise unless the Buyer has a valid court order requiring an amount equal to such deduction to be paid by the Company to the Buyer.

10.6 If the Buyer fails to pay the Company any sum due pursuant to the Contract, the Buyer shall be liable to pay interest to the Company on such sum from the due date for payment at the annual rate of 8% above the base lending rate from time to time of Barclays Bank Plc, accruing on a daily basis until payment is made, whether before or after any judgment.

11. QUALITY

11.1 The Goods shall be manufactured and supplied in accordance with the description contained in the Company's specification (if any) and shall be of normal industrial quality.

11.2 The Company may from time to time make changes in the specification of the Goods which are required to comply with any applicable safety or statutory requirements or which do not materially affect the quality of fitness for the purpose of the Goods.

11.3 The Company shall not be liable for a breach of any express or implied warranty unless:

(a) the Buyer gives written notice of the defect to the Company, and, if the defect is as a result of damage in transit to the carrier, within 3 days of the date of delivery followed by a complete claim in writing within 5 days of the date of delivery; and

(b) the Company is given a reasonable opportunity after receiving the notice of examining such Goods and the Buyer permits the Goods to be collected by the Company or (if asked to do so by the Company) returns such Goods to the Company's place of business at the Company's cost for the examination to take place there. Where Goods are accepted from the carrier concerned without being checked, the delivery book of the carrier concerned must be signed "not examined".

11.4 The Company shall not be liable for any breach of warranty if:

(a) the Buyer makes any further use of such Goods after giving such notice; or

(b) the defect arises because the Buyer failed to follow the Company's oral or written instructions as to the storage, installation, commissioning, use or maintenance of the Goods or (if there are none) good trade practice; or

(c) the Buyer alters or repairs such Goods without the written consent of the Company.

11.5 Subject to condition 11.3 and condition 11.4, if any of the Goods do not conform with any warrant the Company shall at its option repair or replace such Goods (or the defective part) or refund the price of such Goods at the pro rata Contract rate provided that, if the Company so requests, the Buyer shall, at the Company's expense, return the Goods or the part of such Goods which is defective to the Company.

11.6 If the Company complies with condition 11.5 it shall have no further liability for a breach of warranty in respect of such Goods.

12. LIMITATION OF LIABILITY

12.1 Subject to condition 4, condition 6 and condition 11, the following provisions set out the entire financial liability of the Company (including any liability for the acts or omissions of its employees, agents and sub-contractors) to the Buyer in respect of:

(a) any breach of these conditions;

(b) any use made or resale by the Buyer of any of the Goods, or of any product incorporating any of the Goods; and

(c) any representation, statement or tortious act or omission including negligence arising under or in connection with the Contract.

12.2 All warranties, conditions and other terms implied by statute or common law (save for the conditions implied by section 12 of the Sale of Goods Act 1979) are, to the fullest extent permitted by law, excluded from the Contract.

12.3 Nothing in these conditions excludes or limits the liability of the Company:

(a) for death or personal injury caused by the Company's negligence; or

(b) for any matter which it would be illegal for the Company to exclude or attempt to exclude its liability; or

(c) for fraud or fraudulent misrepresentation.

12.4 Subject to condition 12.2 and condition 12.3:

(a) the Company's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation, restitution or otherwise, arising in connection with the performance or contemplated performance of the Contract shall be limited to the Contract price; and

(b) the Company shall not be liable to the Buyer for loss of profit, loss of business, or depletion of goodwill in each case whether direct, indirect or consequential, or any claims for consequential compensation whatsoever (howsoever caused) which arise out of or in connection with the Contract.

13. ASSIGNMENT

13.1 The Company may assign the Contract or any part of it to any person, firm or company.

13.2 The Buyer shall not be entitled to assign the Contract or any part of it without the prior written consent of the Company.

14. FORCE MAJEURE

The Company reserves the right to defer the date of delivery or to cancel the Contract or reduce the volume of the Goods ordered by the Buyer (without liability to the Buyer) if it is prevented from or delayed in the carrying on of its business due to circumstances beyond the reasonable control of the Company including, without limitation, acts of God, governmental actions, war or national emergency, acts of terrorism, strikes, riot, civil commotion, fire, explosion, flood, epidemic, lock-outs, strikes or other labour disputes (whether or not relating to either party's workforce), or restraints or delays affecting carriers or inability or delay in obtaining supplies of adequate or suitable materials or import or export regulations or embargoes, power failure or breakdown in machinery.

15. NOTICE OF TERMINATION OR PARTIAL DELIVERY

In the event of an outbreak of hostilities (whether war is declared or not) in which Great Britain is involved, or in the event of national emergency, or if the Company's works should become whether directly or indirectly so engaged on the Government orders or orders under priority directions as to prevent or delay work on other orders, the Company shall be entitled at any time, on notice to the Buyer, to make partial deliveries only or to determine the contract, without prejudice in any case to rights accrued in respect of deliveries already made.

16. TERMINATION OF CONTRACT

Without prejudice to any other right or remedy available to the Company, the Company shall be entitled to cancel the contract or suspend any further deliveries under the contract without any liability to the Buyer and if the Goods have been delivered but not paid for, the price shall become immediately due and payable notwithstanding any previous agreement or arrangement to the contrary if:-

16.1 The Buyer fails to make any payment of the purchase price on the due date or commits any other breach of the terms of the contract or

16.2 Any of the events or circumstances referred to in condition 8.5 shall occur

17. INDEMNITY

The Buyer will indemnify the Company against all damages, penalties, costs and expenses to which the Company may become liable as a result of work done in accordance with the Buyer's specification which involves the infringement of any letters patent or registered design or copyright.

18. CANCELLATION

No order or contract may be cancelled by the Buyer except with the agreement in writing of the Company and on terms that the Buyer shall indemnify the Company in full against all loss (including loss of profit costs, including the costs of all labour and materials used, damages charges and expenses incurred by the Company as a result of cancellation).

19. GENERAL

19.1 Each right or remedy of the Company under the Contract is without prejudice to any other right or remedy of the Company whether under the Contract or not.

19.2 If any provision of the Contract is found by any court, tribunal or administrative body of competent jurisdiction to be wholly or partly illegal, invalid, void, voidable, unenforceable or unreasonable it shall to the extent of such illegality, invalidity, voidness, voidability, unenforceability or unreasonableness be deemed severable and the remaining provisions of the Contract and the remainder of such provision shall continue in full force and effect.

19.3 Failure or delay by the Company in enforcing or partially enforcing any provision of the Contract shall not be construed as a waiver of any of its rights under the Contract.

19.4 Any waiver by the Company of any breach of, or any default under, any provision of the Contract by the Buyer shall not be deemed a waiver of any subsequent breach or default and shall in no way affect the other terms of the Contract.

19.5 The parties to the Contract do not intend that any term of the Contract shall be enforceable by virtue of the Contracts (Rights of Third Parties) Act 1999 by any person that is not a party to it.

19.6 This Contract and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with English law, and the parties submit to the exclusive jurisdiction of the English courts.

20. COMMUNICATIONS

20.1 All communications between the parties about the Contract shall be in writing and delivered by hand or sent by pre-paid first class post or sent by fax or email:

(a) (in case of communications to the Company) to its registered office or in the case of fax or email to the relevant fax number or email address specified in the order acknowledgement or such changed number or address as shall be notified to the Buyer by the Company; or

(b) (in the case of the communications to the Buyer) to the registered office of the addressee (if it is a company) or (in any other case) to any address of the Buyer set out in any document which forms part of the Contract and in the case of fax or email to the relevant fax number or email address specified in any such document or such other address or fax number as shall be notified to the Company by the Buyer.

20.2 Communications shall be deemed to have been received:

(a) if sent by pre-paid first class post, two days (excluding Saturdays, Sundays and bank and public holidays) after posting (exclusive of the day of posting); or

(b) if delivered by hand, on the day of delivery; or

(c) if sent by fax on a working day prior to 4.00 pm, at the time of transmission and otherwise on the next working day.

(d) if sent by email, 3 hours after an email is sent and in proving the service of any notice it will be sufficient to provide that the email was sent to the specified email address of the addressee.

LAWTON

TUBES

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