

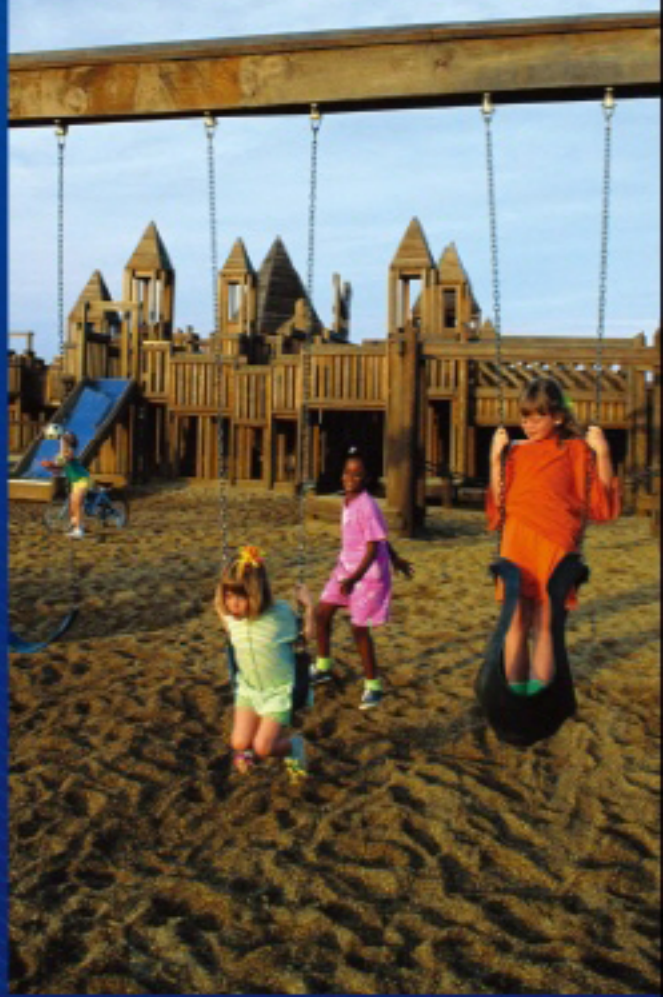
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COPPER PIPE & TUBE FOR PLUMBING OR INDUSTRIAL USE

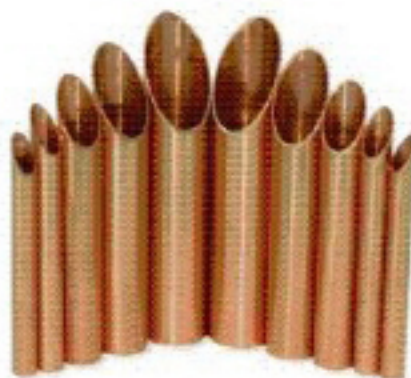


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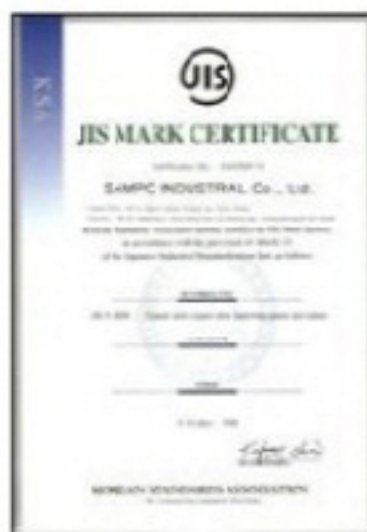
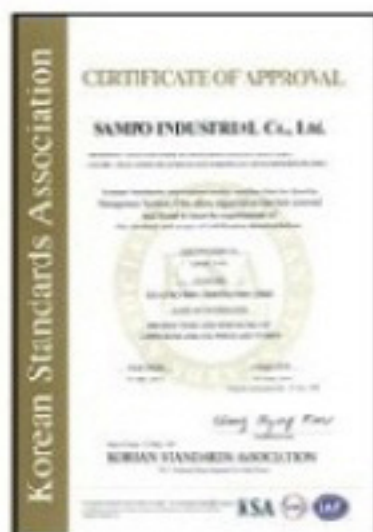


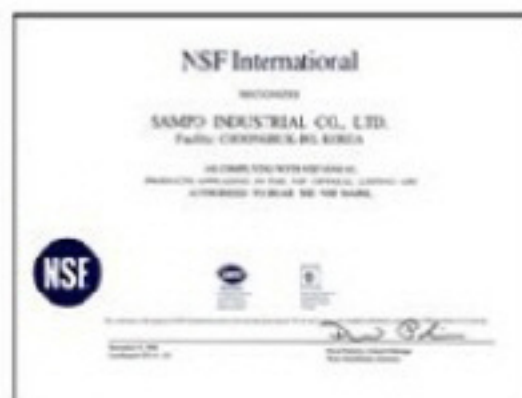
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Certificates





ASTM B

280

Seamless Copper Tube for Airconditioning and Refrigeration Field Service

Sampo Industrial manufactures a range of seamless copper tube in soft and hard drawn straight lengths supplied for use in manufacture, installation and maintain of refrigeration & air-conditioning field service. This tube is dehydrated, cleaned & capped to reduce refrigerant contamination.



Coil type	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(mm)	lb/ft	kg/m
	$\frac{1}{4}$ "	0.25	6.35	0.002	0.03	0.762	0.003	0.0804	0.12
	$\frac{5}{16}$ "	0.312	7.92	0.002	0.032	0.813	0.003	0.109	0.162
	$\frac{3}{8}$ "	0.375	9.52	0.002	0.032	0.813	0.003	0.134	0.199
	$\frac{1}{2}$ "	0.5	12.7	0.002	0.032	0.813	0.003	0.182	0.271
	$\frac{5}{8}$ "	0.625	15.9	0.002	0.036	0.889	0.004	0.251	0.373
	$\frac{3}{4}$ "	0.75	19.1	0.0025	0.036	0.889	0.004	0.305	0.454
	$\frac{7}{8}$ "	0.75	19.1	0.0025	0.042	1.07	0.004	0.362	0.539
	$\frac{7}{8}$ "	0.875	22.2	0.003	0.045	1.14	0.004	0.455	0.677

Straight type	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(mm)	lb/ft	kg/m
	$\frac{3}{8}$ "	0.375	9.52	0.001	0.03	0.762	0.003	0.126	0.187
	$\frac{1}{2}$ "	0.5	12.7	0.001	0.036	0.889	0.004	0.196	0.295
	$\frac{5}{8}$ "	0.625	15.9	0.001	0.04	1.02	0.004	0.265	0.424
	$\frac{3}{4}$ "	0.75	19.1	0.001	0.042	1.07	0.004	0.362	0.539
	$\frac{7}{8}$ "	0.875	22.2	0.001	0.045	1.14	0.004	0.455	0.677
	$1\frac{1}{8}$ "	1.125	28.6	0.0015	0.06	1.27	0.006	0.655	0.975
	$1\frac{3}{8}$ "	1.375	34.9	0.0015	0.065	1.4	0.006	0.884	1.32
	$1\frac{5}{8}$ "	1.625	41.3	0.002	0.08	1.62	0.008	1.14	1.7
	$2\frac{1}{8}$ "	2.125	54	0.002	0.07	1.78	0.007	1.75	2.6
	$2\frac{5}{8}$ "	2.625	66.7	0.002	0.08	2.03	0.008	2.48	3.69
	$3\frac{1}{8}$ "	3.125	79.4	0.002	0.09	2.29	0.009	3.33	4.96
	$3\frac{5}{8}$ "	3.625	92.1	0.002	0.1	2.54	0.01	4.29	6.38
	$4\frac{1}{8}$ "	4.125	106	0.002	0.11	2.79	0.011	5.38	8.01

A The average outside diameter of a tube is the average of the maximum and minimum outside diameters as determined at any one cross section of the tube.

B The tolerances listed represent the maximum deviation at any point denotes tube made to order where minimum order quantities required.

* Physical Properties of this copper tube is same as determined from ASTM B88.

Capping & Ink Marking

The standard air-conditioning and refrigeration grade copper tube is distinguished by blue colored capping. The tube is also continuously identified with blue ink-marking along its lengths indicating "ACR", manufacturer's name, country of origin, conforming standard, size and lot number which enable to the tubing to be traced back to the origin of manufacture.

■ END- CAP BLUE

■ INK MARKING (1) PANCAKE COIL - NO MARK (2) STRAIGHT - BLUE

■ INCISION Trademark of the manufacturer + ACR

SMARTCO COPPER TUBE TO AS/NZS 1571 : 1995

Seamless copper tubes for airconditioning and refrigeration

These tubes are supplied in both hard drawn straight lengths and annealed coils, after meticulous cleaning, dehydrating and capping, to ensure that the internal cleanliness standards are fully met. The intended use for this product is in airconditioning and refrigeration applications.

STRAIGHT LENGTHS

O.D. (inch)	O.D. (mm)	W/T (mm)	Nominal kg/m	Safe Working Pressure KPa		
				50°C < 75°C	75°C < 125°C	125°C < 150°C
1/4"	6.35	0.71	0.12	8,680	8,309	8,067
	6.35	0.81	0.13	9,942	9,650	9,367
5/16"	7.94	0.81	0.17	7,725	7,498	7,271
	9.52	0.71	0.18	5,480	5,319	5,168
3/8"	9.52	0.81	0.20	6,324	6,138	5,962
	12.70	0.71	0.24	4,027	3,908	3,790
1/2"	12.70	0.81	0.28	4,832	4,498	4,360
	16.88	0.81	0.36	3,865	3,647	3,440
5/8"	16.88	1.02	0.43	4,868	4,630	4,393
	19.05	0.91	0.46	3,333	3,235	3,137
3/4"	19.05	1.02	0.52	3,847	3,734	3,621
	19.05	1.14	0.58	4,328	4,201	4,074
7/8"	22.22	0.91	0.56	2,904	2,818	2,733
	22.22	1.4	0.82	4,673	4,438	4,304
1"	26.40	0.91	0.63	2,627	2,452	2,378
	26.40	1.22	0.83	3,431	3,330	3,229
1 1/8"	26.40	1.63	1.09	4,883	4,526	4,389
	28.58	0.91	0.71	2,238	2,171	2,106
1 1/4"	28.58	1.22	0.94	3,032	2,943	2,854
	28.58	1.83	1.38	4,862	4,516	4,378
1 1/2"	31.75	0.91	0.79	2,006	1,947	1,888
	31.75	1.22	1.06	2,717	2,637	2,557
1 3/8"	31.75	2.03	1.70	4,845	4,508	4,371
	34.92	0.91	0.87	1,819	1,766	1,712
1 1/2"	34.92	1.22	1.16	2,482	2,389	2,317
	34.92	2.03	1.88	4,197	4,047	3,960
1 5/8"	38.10	1.22	1.27	2,249	2,183	2,117
	38.10	2.29	2.31	4,349	4,221	4,093
2"	41.28	0.91	1.04	1,633	1,488	1,443
	41.28	1.22	1.38	2,071	2,010	1,949
2 1/8"	41.28	2.41	2.64	4,216	4,092	3,968
	60.80	1.22	1.70	1,873	1,824	1,676
2 1/4"	60.80	0.91	1.38	1,188	1,132	1,097
	60.80	1.22	1.81	1,672	1,628	1,480
2 3/8"	66.88	1.22	2.26	1,287	1,230	1,193
	76.20	1.83	3.42	1,488	1,443	1,399
3"	101.60	1.83	4.68	1,109	1,076	1,044
	104.78	2.79	8.00	1,880	1,805	1,761

SMARTCO COPPER TUBE COMPLY TO
AS/NZS 1571 : 1995

ANNEALED COIL

OD(Inch)	OD(mm)	Wall thickness	Nominal kg/m	Safe Working Pressure KPa		
				50°C < 75°C	75°C < 125°C	125°C < 150°C
1/4"	6.35	1.22	0.18	16,172	15,696	15,220
	6.35	0.81	0.13	11,376	11,040	10,708
	6.35	0.71	0.12	8,680	8,309	8,067
	6.35	0.68	0.10	6,677	6,383	6,190
5/16"	7.94	0.81	0.18	8,802	8,543	8,284
	7.94	0.71	0.16	6,678	6,481	6,286
	7.94	0.68	0.12	5,180	5,008	4,868
3/8"	9.52	0.81	0.20	7,187	6,976	6,764
	9.52	0.71	0.18	5,480	5,319	5,168
	9.52	0.68	0.16	4,260	4,126	4,000
1/2"	12.70	1.02	0.33	5,249	5,094	4,940
	12.70	0.81	0.28	4,632	4,496	4,360
	12.70	0.71	0.24	4,027	3,908	3,790
	12.70	0.68	0.20	3,137	3,044	2,962
5/8"	16.88	0.91	0.39	4,134	4,012	3,890
	16.88	0.81	0.36	3,666	3,547	3,440
	16.88	0.71	0.31	3,183	3,089	2,996
	16.88	0.68	0.26	2,488	2,413	2,339
3/4"	19.05	0.91	0.47	3,411	3,311	3,211
	19.05	0.71	0.37	2,632	2,556	2,478
7/8"	22.22	0.91	0.66	2,904	2,818	2,733

- Safe working pressures calculated for annealed copper.
- The average outside diameter of a tube is the average of the maximum and minimum outside diameters as determined at any one cross section of the tube.
- The tolerances listed represent the maximum deviation at any point denotes tube made to order where minimum order quantities required.

Specified outside diameter	Tolerance*	
	Straight lengths	Coils
> 3.18 ≤ 12.70	+0, -0.08	+0, -0.13
> 12.70 ≤ 19.05	+0, -0.08	+0, -0.20
> 19.05 ≤ 25.40	+0, -0.08	+0, -0.31
> 25.40 ≤ 31.75	+0, -0.08	+0, -0.38
> 31.75 ≤ 60.80	+0, -0.08	+0, -0.48
> 60.80 ≤ 101.60	+0, -0.15	—
> 101.60 ≤ 166.68	+0, -0.30	—

* Allowable deviation of mean outside diameter.

HARDNESS REQUIREMENTS		
Temper	Vickers hardness, HV	
	Min.	Max.
H	100	—
1/2H	75	100
O	—	75

physical properties

Composition	Alloy C12200 Copper=99.90% min Phosphorus = 0.016-0.040%
Melting point	981°F (1083°C)
Density	668lb/ft ³ (8.94X10 ³ kg/m ³)
Thermal Expansion	0.00118in/10°F ft(0.177mm/10°C, m)
Modulus of Elasticity	2.48 10 ⁶ psi(17,000N/m ²)



Seamless, Round Copper Tubes for Water and Gas in Sanitary and Heating Applications

EN 1057

EN 1057 (formerly BS 2871) specifies the requirements, sampling, test methods and conditions of delivery for seamless round copper tubes.

It is applicable to tubes having an outside diameter from 6mm up to and including 267mm for:

- Distributing networks for hot water and cold water
- Hot water heating systems, including panel heating systems (under-floor, wall, overhead)
- Domestic gas and liquid fuel distribution
- Waste water sanitation

It also applies to seamless round copper tubes intended to be pre-insulated before use for any of the above purposes.

size mm	Nominal Diameter (Outside) mm	Nominal Wall Thickness mm			Hard Maximum Working Pressure* Bar		
		Type Y	Type X	Type Z	Type Y	Type X	Type Z
15	15	1.0	0.7	0.5	104.0	71.0	50.0
18	18	1.0	0.8	0.6	85.0	67.0	50.0
22	22	1.2	0.9	0.6	84.0	62.0	41.0
28	28	1.2	0.9	0.6	65.0	48.0	32.0
35	35	1.5	1.2	0.7	65.0	51.0	30.0
42	42	1.5	1.2	0.8	54.0	43.0	28.0
54	54	2.0	1.2	0.9	56.0	33.0	25.0
66.7	66.7	2.0	1.2	1.0	45.0	27.0	20.0
76.1	76.1	2.0	1.5	1.2	39.0	29.0	19.0
108	108	2.5	1.5	1.2	34.0	20.0	17.0
133	133	-	1.5	1.5	-	17.0	16.0
159	159	-	2.0	1.5	-	18.0	15.0

For more details for half hard and annealed maximum working pressure, please consult our sales office

* Based on material in hard drawn condition at 65 °C

* 1 Bar = 0.1 N/mm² = 105 N/m²

Copper Tube for construction applications

ASTM B88

This is the original copper tube for plumbing, air conditioning and refrigeration applications in residential, commercial and institutional installations. We provide a complete range of sizes and types, engineered to exact specifications to meet the highest standards of performance.

All tubing is manufactured from phosphorus deoxidized copper (DHP) complying with UNS C12200

Typical uses includes:

- Type K** underground residential, commercial and industrial uses.
(Sizes range from 1/4" – 8" diameter)
- Type L** residential and commercial uses.
(Sizes range from 1/4" – 8" diameter)
- Type M** above ground residential and light commercial uses.
(Sizes range from 3/8" – 8" diameter)



Physical Properties of Copper Tube

Composition	Alloy C12200 Copper = 99.90% min Phosphorus = 0.015–0.040%
Melting Point	0981°F (1083°C)
Density	558lb/ft³ (8.94 × 10³ kg/m³)
Thermal Expansion	0.00118 in/10°F .ft (0.177mm/10°C .m)
Modulus of Elasticity	2.46 10⁶ psi (17,000 MPa)

Type K (STRAIGHT, DRAWN)

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(inch)	lb/ft	kg/m
1/4"	3/8"	0.875	9.52	0.001	0.035	0.89	0.0035	0.145	0.218
3/8"	1/2"	0.600	12.7	0.001	0.049	1.24	0.005	0.289	0.4
1/2"	5/8"	0.625	16.9	0.001	0.049	1.24	0.005	0.344	0.512
5/8"	3/4"	0.760	19.1	0.001	0.049	1.24	0.005	0.419	0.624
3/4"	7/8"	0.875	22.2	0.001	0.065	1.65	0.008	0.639	0.953
1"	1 1/8"	1.125	28.6	0.0015	0.065	1.65	0.008	0.838	1.25
1 1/4"	1 3/8"	1.375	34.9	0.0015	0.065	1.65	0.008	1.034	1.54
1 1/2"	1 5/8"	1.625	41.3	0.002	0.072	1.83	0.007	1.359	2.03
2"	2 1/8"	2.125	54.0	0.002	0.083	2.11	0.008	2.080	3.07
2 1/2"	2 5/8"	2.625	66.7	0.002	0.096	2.41	0.01	2.922	4.36
3"	3 1/8"	3.125	79.4	0.002	0.109	2.77	0.011	3.996	5.96
3 1/2"	3 5/8"	3.625	92.1	0.002	0.120	3.05	0.012	5.112	7.62
4"	4 1/8"	4.125	104.8	0.002	0.134	3.40	0.013	6.500	9.69
5"	5 1/8"	5.125	130.2	0.002	0.160	4.06	0.016	9.654	14.4
6"	6 1/8"	6.125	155.6	0.002	0.192	4.88	0.019	13.843	20.64

Type L (STRAIGHT, DRAWN)

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(kwh)	inch	mm	Tolerance(kwh)	lb/ft	kg/m
$\frac{1}{4}$ "	$\frac{3}{8}$ "	0.375	9.52	0.001	0.030	0.76	0.003	0.126	0.187
$\frac{3}{8}$ "	$\frac{1}{2}$ "	0.500	12.7	0.001	0.035	0.89	0.004	0.198	0.296
$\frac{1}{2}$ "	$\frac{5}{8}$ "	0.625	15.9	0.001	0.040	1.02	0.004	0.286	0.426
$\frac{5}{8}$ "	$\frac{3}{4}$ "	0.750	19.1	0.001	0.042	1.07	0.004	0.362	0.54
$\frac{3}{4}$ "	$\frac{7}{8}$ "	0.875	22.2	0.001	0.045	1.14	0.004	0.463	0.676
1"	1 $\frac{1}{8}$ "	1.125	28.6	0.0016	0.050	1.27	0.006	0.664	0.976
1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	1.375	34.9	0.0016	0.055	1.40	0.006	0.881	1.31
1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "	1.625	41.3	0.002	0.060	1.52	0.006	1.142	1.7
2"	2 $\frac{1}{8}$ "	2.125	54.0	0.002	0.070	1.78	0.007	1.749	2.61
2 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "	2.625	66.7	0.002	0.080	2.03	0.008	2.476	3.69
3"	3 $\frac{1}{8}$ "	3.125	79.4	0.002	0.090	2.29	0.009	3.32	4.95
3 $\frac{1}{2}$ "	3 $\frac{5}{8}$ "	3.625	92.1	0.002	0.100	2.54	0.01	4.284	6.39
4"	4 $\frac{1}{8}$ "	4.125	104.8	0.002	0.114	2.79	0.011	5.968	8.01
5"	5 $\frac{1}{8}$ "	5.125	130.2	0.002	0.125	3.18	0.012	7.696	11.33
6"	6 $\frac{1}{8}$ "	6.125	155.6	0.002	0.140	3.56	0.014	10.183	15.19

Type M (STRAIGHT, DRAWN)

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(kwh)	inch	mm	Tolerance(kwh)	lb/ft	kg/m
$\frac{3}{8}$ "	$\frac{1}{2}$ "	0.500	12.7	0.001	0.025	0.64	0.002	0.144	0.216
$\frac{1}{2}$ "	$\frac{5}{8}$ "	0.625	15.9	0.001	0.028	0.71	0.003	0.203	0.303
$\frac{3}{4}$ "	$\frac{7}{8}$ "	0.875	22.2	0.001	0.032	0.81	0.003	0.327	0.488
1"	1 $\frac{1}{8}$ "	1.125	28.6	0.0016	0.035	0.89	0.004	0.464	0.692
1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	1.375	34.9	0.0016	0.042	1.07	0.004	0.66	1.01
1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "	1.625	41.3	0.002	0.049	1.24	0.006	0.939	1.4
2"	2 $\frac{1}{8}$ "	2.125	54.0	0.002	0.068	1.47	0.006	1.467	2.17
2 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "	2.625	66.7	0.002	0.065	1.66	0.006	2.023	3.02
3"	3 $\frac{1}{8}$ "	3.125	79.4	0.002	0.072	1.83	0.007	2.672	3.98
3 $\frac{1}{2}$ "	3 $\frac{5}{8}$ "	3.625	92.1	0.002	0.083	2.11	0.008	3.673	5.33
4"	4 $\frac{1}{8}$ "	4.125	104.8	0.002	0.095	2.41	0.01	4.663	6.94
5"	5 $\frac{1}{8}$ "	5.125	130.2	0.002	0.109	2.77	0.011	6.644	9.91
6"	6 $\frac{1}{8}$ "	6.125	155.6	0.002	0.122	3.01	0.012	8.9	13.27

LENGTH of STRAIGHT TYPE DRAWN COPPER TUBE

The standard length for drawn temper ASTM B88 tube is 6.096 meters (20ft). However, it is available in 6.000 meter and 5.800 meter lengths. Also, custom made length is available as by order quantities.

Also, annealed copper tube - coil type is available. (K,L,M type, Nominal : $\frac{1}{4}$ " ~ $1\frac{1}{4}$ ", Length:15~30m)
If you have any question or need more specific information, feel free to contact us.

ASTM B 306

Copper Drainage Tube (DWV)

Sampo Industrial manufactures a range of seamless copper tubes supplied for use in sanitary drainage, waste, vent piping, soil and other non-pressure uses.

Standard Dimensions, Weights and Tolerances in Diameter and Wall Thickness



NOTE- All tolerances in this table are plus and minus except where otherwise noted

Nominal Size	Actual Size	Outside diameter ^A			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(inch)	lb/ft	kg/m
1 1/4"	1 3/8"	1.375	34.9	0.0016	0.040	1.02	0.003	0.660	0.967
1 1/2"	1 5/8"	1.625	41.3	0.002	0.042	1.07	0.003	0.809	1.200
2"	2 1/8"	2.125	54.0	0.002	0.042	1.07	0.004	1.070	1.590
3"	3 1/8"	3.125	79.4	0.002	0.046	1.14	0.004	1.690	2.510
4"	4 1/8"	4.125	106	0.002	0.068	1.47	0.007	2.870	4.270
5"	5 1/8"	5.125	130	0.002	0.072	1.83	0.008	4.430	6.690
6"	6 1/8"	6.125	156	0.002	0.083	2.11	0.008	6.100	9.080
8"	8 1/8"	8.125	206	0.002	0.109	2.77	0.011	10.600	15.800

^A The average outside diameter is the average, at any one cross section, of the maximum and minimum measured diameters(usually at or very close 90° to each other)

Nominal Size	Actual Size	Dimentions			Calculated Values				nominal weight lb/ft
		Diameter		Wall Thickness	Up to 150°F		300°F		
		inch	mm		Anealed	Hard Drawn	Anealed	Hard Drawn	
1 ¹ / ₄ "	1 ³ / ₈ "	1.375	34.9	0.040	280	621	268	604	0.650
1 ¹ / ₂ "	1 ⁵ / ₈ "	1.625	41.3	0.042	249	522	230	537	0.809
2"	2 ¹ / ₈ "	2.125	54.0	0.042	186	410	170	399	1.070
3"	3 ¹ / ₈ "	3.125	79.4	0.046	136	299	124	281	1.690
4"	4 ¹ / ₈ "	4.125	106	0.058	128	226	117	218	2.870
5"	5 ¹ / ₈ "	5.125	130	0.072	128	227	118	220	4.430
6"	6 ¹ / ₈ "	6.125	158	0.083	128	223	116	216	6.100
8"	8 ¹ / ₈ "	8.125	206	0.109	124	219	114	209	10.600

Working Pressures

Safe working pressures for copper tube are calculated on the basis of annealed temper tube with the maximum allowable outside diameter and minimum wall thickness, thus allowing for softening of the tube due to brazing or heating. All safe working pressures are based on the following formula:

$$P_{sw} = \frac{2000 \times S_D \times t_m}{D - t_m}$$

where

P_{sw} = safe working pressure (MPa)

S_D = maximum allowable design stress for annealed copper (MPa)

t_m = minimum wall thickness of tube (mm)

D = outside diameter of tube (mm)

Annealed

150°F S = 5,100psi, sizes 1 1/4" to 8"

300°F S = 4,700psi, sizes 1 1/4" to 8"

Hard Drawn

150°F S = 11,800psi, sizes 1 1/4" to 2", S = 9,000psi sizes 3" to 8"

300°F S = 11,000psi, sizes 1 1/4" to 2", S = 8,700psi sizes 3" to 8"

The figures provided are for guidance only, based on the indicated temperatures.

The standard drainage grade copper tube is identified with continuously ink-marking along its lengths indicating "DWV", manufacturer's name, country of origin, conforming standard, size and lot number which enable to the tubing to be traced back to the origin of manufacture.

- END- CAP NO END-CAP
- INK MARKING YELLOW
- INCISION Trademark of the manufacturer + DWV

SMARTCO COPPER TUBE TO AS 1432 : 2004

Copper tubing for plumbing, gasfitting and drainage applications

TYPE A

NOMINAL SIZE	NOM. DIA. (OUTSIDE)	NOM. WALL THICKNESS	Safe Working Pressure	Annealed	Hard drawn	Bendable
DN 6	6.35	0.91	11,990			
DN 8	7.94	0.91	9,320			
DN 10	9.52	1.02	8,670			
DN 15	12.70	1.02	6,330			
DN 18	16.88	1.22	6,040			
DN 20	19.05	1.42	5,680			
DN 25	25.40	1.63	5,040			
DN 32	31.75	1.63	3,980			
DN 40	38.10	1.63	3,290			
DN 50	50.80	1.63	2,440			
DN 65	63.50	1.63	1,940			
DN 80	76.20	2.03	2,020			
DN 90	88.90	2.03	1,720			
DN 100	101.60	2.03	1,600			
DN 125	127.00	2.03	1,200			
DN 150	152.40	2.64	1,300			
DN 200	203.20	2.64	910			

TYPE B

NOMINAL SIZE	NOM. DIA. (OUTSIDE)	NOM. WALL THICKNESS	Safe Working Pressure	Annealed	Hard drawn	Bendable
DN 6	6.35	0.71	8,710			
DN 8	7.94	0.71	6,820			
DN 10	9.52	0.91	7,630			
DN 15	12.70	0.91	6,590			
DN 18	16.88	1.02	4,980			
DN 20	19.05	1.02	4,110			
DN 25	25.40	1.22	3,680			
DN 32	31.75	1.22	2,920			
DN 40	38.10	1.22	2,420			
DN 50	50.80	1.22	1,800			
DN 65	63.50	1.22	1,430			
DN 80	76.20	1.63	1,610			
DN 90	88.90	1.63	1,380			
DN 100	101.60	1.63	1,200			
DN 125	127.00	1.63	960			
DN 150	152.40	2.03	1,000			
DN 200	203.20	2.03	720			

TYPE C

NOMINAL SIZE	NOM. DIA. (OUTSIDE)	NOM. WALL THICKNESS	Safe Working Pressure	Annealed	Hard drawn	Bendable
DN 10*	9.52	0.71	5,520			
DN 15*	12.70	0.71	4,070			
DN 18*	16.88	0.91	4,180			
DN 20*	19.05	0.91	3,460			
DN 25*	25.40	0.91	2,580			

SMARTCO COPPER TUBE TO
AS 1432 : 2004

TYPE D

NOMINAL SIZE	NOM. DIA. (OUTSIDE)	NOM. WALL THICKNESS	Safe Working Pressure	Annealed	Hard drawn	Bendable
DN 32	31.75	0.81	2,150			
DN 40	38.10	0.81	1,780			
DN 50	50.80	0.81	1,330			
DN 65	63.50	0.81	1,080			
DN 80	76.20	1.22	1,190			
DN 90	88.90	1.22	1,020			
DN 100	101.60	1.22	890			
DN 125	127.00	1.42	830			
DN 150	152.40	1.63	800			

DN = DIAMETER NUMBER

Safe Working Pressures

The safe working pressures for varying temperatures may be calculated from the following equation:

$$P_{sw} = \frac{2000 \times S_o \times t}{D - t}$$

where

S_o = maximum allowable design tensile stress for annealed copper (kPa)

t = wall thickness (mm)

D = Outside diameter of tube (mm)

Annealed

150°F S = 5,100psi, sizes $1\frac{1}{4}"$ to 8"

300°F S = 4,700psi, sizes $1\frac{1}{4}"$ to 8"

Hard Drawn

150°F S = 11,800psi, sizes $1\frac{1}{4}"$ to 2", S = 9,00psi sizes 3" to 8"

300°F S = 11,000psi, sizes $1\frac{1}{4}"$ to 2", S = 8,70psi sizes 3" to 8"

The figures provided are for guidance only, based on the indicated temperatures.

Quality Certified: Smartco copper tube is Korean made, and is certified to comply with AS1432 - Copper tube for plumbing, gasfitting and drainage applications.

► **Internal Surface Quality:** Smartco Copper Tube uses special manufacturing processes to provide enhanced internal bore characteristics that offer improved corrosion resistance and levels of carbon residue well below the values set by the Standard.

► **Inherent Strength:** Copper tube has inherent strength, providing good resistance to external damage, puncture, abrasion, vibration bumps, and has a wide operating range for pressure and vacuum.

► **Impervious:** Copper tube is impervious to oxygen, insecticide, solvents and toxins.

► **Non-Flammable:** Copper tube is non-flammable and does not emit toxic fumes during fire.

► **Full Flow Joints:** Copper tube jointing does not reduce the bore of the tube.

► **Low Friction Loss:** Copper tube provides high flow rates with minimal external dimensions.

► **U.V. Resistant:** Copper tube does not degrade from direct sunlight or become brittle with age.

► **Resists Rodent Attack:** Copper tube is not prone to damage due to rodent attack.

► **Multi Applications:** Copper tube is made to universal size not a unique brand size.

► **Stability:** Copper tube does not creep with age and has 7 to 15 times less lineal expansion than other materials with heat, and continue to perform at high temperatures.

► **Healthier & Non-Tainting:** Copper tube does not adversely affect the taste of water, and *reduces the number of harmful microorganisms in water.

* Study conducted by INCRA under project NF-348-1984 using water contaminated with coliforms.

► **Proven Track Record:** Smartco copper tube is part of a superior system with a proven track record.

► **Add Value For Life:** Copper tube adds to home's resale value.

► **Recyclable:** Copper tube is a valuable recyclable material.

Classification
Copper tube is classified into four different specification types based on wall thickness for a specific outside diameter. Products are colour coded as follows:

• Type A : Green • Type B : Blue • Type C : Red • Type D : Black



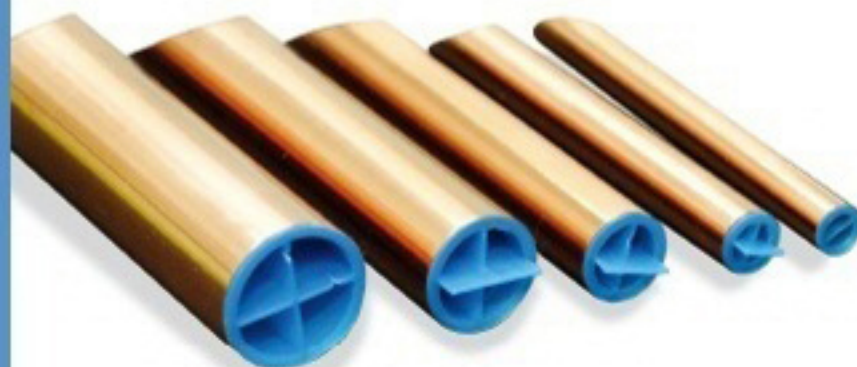
ASTM B 819

Standard Specification for Seamless Copper Tube for Medical Gas Systems

Sampo Industrial manufactures a range of seamless copper tube supplied for use in medical gas systems, identified as type K & L - fitted with plastic caps after cleaning to maintain the clean interior surface. Our type K & L (cleaned and capped) is also specially cleaned for use in medical gas systems and meets the same allowable residue limit of 0.038g/m² of interior tube surface area.

Physical Properties of Copper Tube

Composition	Alloy C12200 Copper = 99.90% min Phosphorus = 0.015 - 0.040%
Melting Point	981°F (1083°C)
Density	558lb/ft ³ (8.94x10 ³ kg/m ³)
Thermal Expansion	0.00118 in/10°F .ft (0.177mm/10°C .m)
Modulus of Elasticity	2.46 10 ⁶ psi (17,000MPa)



Type K

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(inch)	lb/ft	kg/m
$\frac{1}{4}$ "	$\frac{3}{8}$ "	0.375	9.53	0.001	0.035	0.89	0.003	0.16	0.22
$\frac{3}{8}$ "	$\frac{1}{2}$ "	0.500	12.7	0.001	0.049	1.25	0.004	0.28	0.41
$\frac{1}{2}$ "	$\frac{5}{8}$ "	0.625	15.88	0.001	0.049	1.25	0.004	0.35	0.52
$\frac{5}{8}$ "	$\frac{3}{4}$ "	0.750	19.05	0.001	0.049	1.25	0.004	0.43	0.63
$\frac{3}{4}$ "	$\frac{7}{8}$ "	0.875	22.23	0.001	0.065	1.65	0.004	0.65	0.98
1"	1 $\frac{1}{8}$ "	1.125	28.58	0.0015	0.065	1.65	0.006	0.85	1.28
1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	1.375	34.93	0.0015	0.065	1.65	0.008	1.05	1.58
1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "	1.625	41.28	0.002	0.072	1.83	0.008	1.37	2.03
2"	2 $\frac{1}{8}$ "	2.125	53.98	0.002	0.083	2.11	0.007	2.07	3.08
2 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "	2.625	66.68	0.002	0.095	2.42	0.008	2.94	4.37

Type L

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(inch)	inch	mm	Tolerance(inch)	lb/ft	kg/m
$\frac{1}{4}$ "	$\frac{3}{8}$ "	0.375	9.53	0.001	0.030	0.77	0.003	0.13	0.19
$\frac{3}{8}$ "	$\frac{1}{2}$ "	0.500	12.7	0.001	0.035	0.89	0.004	0.21	0.3
$\frac{1}{2}$ "	$\frac{5}{8}$ "	0.625	15.88	0.001	0.040	1.02	0.004	0.29	0.43
$\frac{5}{8}$ "	$\frac{3}{4}$ "	0.750	19.05	0.001	0.042	1.07	0.004	0.37	0.55
$\frac{3}{4}$ "	$\frac{7}{8}$ "	0.875	22.23	0.001	0.045	1.15	0.004	0.47	0.69
1"	1 $\frac{1}{8}$ "	1.125	28.58	0.0015	0.060	1.27	0.006	0.68	0.98
1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	1.375	34.93	0.0015	0.065	1.40	0.008	0.89	1.32
1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "	1.625	41.28	0.002	0.060	1.53	0.008	1.15	1.71
2"	2 $\frac{1}{8}$ "	2.125	53.98	0.002	0.070	1.78	0.007	1.78	2.61
2 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "	2.625	66.68	0.002	0.080	2.04	0.008	2.5	3.71

capping & ink marking

The medical gas copper tube is plugged with blue inner cap and identified with continuously ink marking along its length indicating the manufacturer's name, country of origin, conforming standard, size and lot number which enable to the tubing to be traced back to the origin of manufacture.

- END- CAP BLUE
- INK MARKING (1) L TYPE - BLUE (2) K TYPE - GREEN
- INCISION Trademark of the manufacturer + TYPE K or L / ACR

ASTM B 837

Standard Specification for Seamless Copper Tube for Natural Gas and Liquefied Petroleum Gas Fuel Distribution Systems

Sampo Industrial manufactures a range of seamless copper tubes supplied for use in above ground and indoor Natural Gas and Liquefied Petroleum (LP) Gas Fuel distribution systems installed in conformance with the requirements of National Fire Protection Association (NFPA) 54, National Fuel Gas Code and various state and regional codes that recognize and list this standard. These systems are commonly assembled with flare fitting or brazed fitting and special marked as Type GAS.

Some Advantages of using copper in fuel gas piping include

- Flexibility
- Ease of jointing
- Ease of bending
- Compact sizing

Nominal Size	Actual Size	Outside diameter			Wall Thickness			Theoretical Weight	
		inch	mm	Tolerance(+/-)	inch	mm	Tolerance(+/-)	lb/ft	kg/m
$\frac{1}{4}"$ G	$\frac{3}{8}"$	0.375	9.53	0.0025	0.030	0.77	0.003	0.13	0.190
$\frac{3}{8}"$ G	$\frac{1}{2}"$	0.500	12.7	0.0025	0.036	0.89	0.004	0.21	0.300
$\frac{1}{2}"$ G	$\frac{5}{8}"$	0.625	15.88	0.0025	0.040	1.02	0.004	0.29	0.430
$\frac{5}{8}"$ G	$\frac{3}{4}"$	0.750	19.05	0.003	0.042	1.07	0.004	0.37	0.550

SampoTube supplies Certified Tube to meet all requirements of the applicable ASTM specification.



Please note : The standard Type Gas grade copper tube is distinguished by yellow colored capping and identified with continuously ink-marking along its lengths indicating manufacturer's name, country of origin, conforming standard, size and lot number which enable to the tubing to be traced back to the origin of manufacture.

- END- CAP YELLOW
- INK MARKING (1) ANNEALED - NO MARK (2) HARD DRAWN - YELLOW
- INCISION Trademark of the manufacturer + Type GAS



SAMPO
INDUSTRIAL Co., Ltd

12F Hyungin Tower, 23-2 Bangi-dong, Songpa-gu, Seoul, Korea
phone 82.2.573.5151 fax 82.2.571.5156 <http://www.sampotube.com>

Paircoil

Pair Coil Specifications

Sampo Industrial manufactures a range of insulated copper tube supplied for use in field connection split system air-conditioners and heat pumps.

The insulated copper tube is extruded to ensure close tube contact to enhance dew point proofing properties.

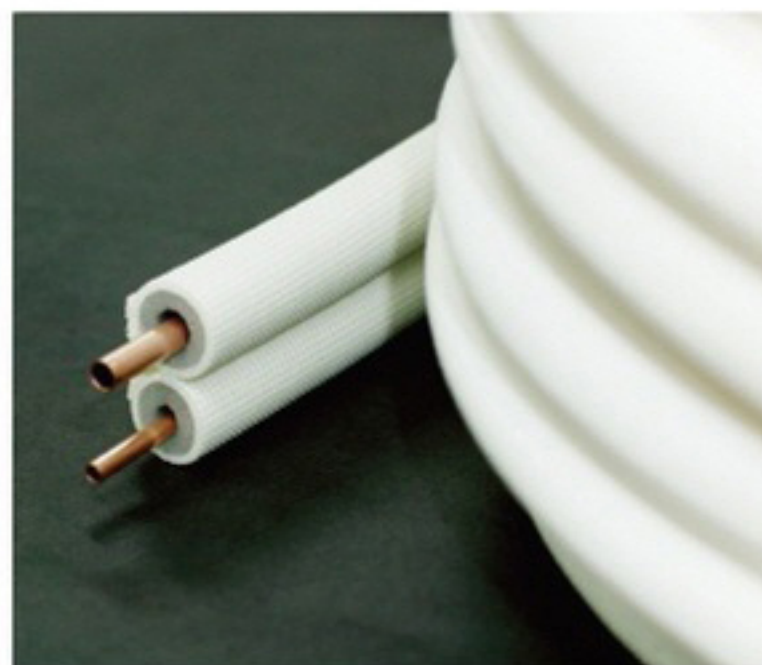
The insulation is covered with embossed polyethylene film to prevent foam creasing. The polyethylene film contains UV protection additives built for the harsh conditions.

Benefits

- Easy and quick to install
- Save time and money on installation
- No seams which can open to allow moisture entry, bothersome dripping
- Easy to transport

Reaction to fire classification : D-s3-d0

This classification has been carried out in accordance with EN 13501-1:2007



Tube 1			Tube 2			Length	Coils per carton	Weight per coil (kg)
Outside diameter		Wall Thickness	Outside diameter		Wall Thickness			
inch	mm	mm	inch	mm	mm			
$\frac{1}{4}$ "	6.35	0.8	$\frac{3}{8}$ "	9.52	0.8	20	1	6.41
$\frac{1}{4}$ "	6.35	0.8	$\frac{1}{2}$ "	12.7	0.8	20	1	7.83
$\frac{1}{4}$ "	6.35	0.8	$\frac{5}{8}$ "	15.88	1	20	1	10.86
$\frac{3}{8}$ "	9.52	0.8	$\frac{1}{2}$ "	12.7	0.8	20	1	9.26
$\frac{3}{8}$ "	9.52	0.8	$\frac{5}{8}$ "	15.88	1	20	1	12.27
$\frac{3}{8}$ "	9.52	0.8	$\frac{3}{4}$ "	19.05	1	20	1	14.06
$\frac{1}{2}$ "	12.7	0.8	$\frac{3}{4}$ "	19.05	1	20	1	16.48
$\frac{1}{4}$ "	6.35	0.8	$\frac{3}{8}$ "	9.52	0.8	20	1	6.41
$\frac{1}{4}$ "	6.35	0.8	$\frac{1}{2}$ "	12.7	0.8	20	1	7.83
$\frac{3}{8}$ "	9.52	0.8	$\frac{5}{8}$ "	15.88	1	20	1	12.27
$\frac{3}{8}$ "	9.52	0.8	$\frac{5}{8}$ "	15.88	0.8	20	1	10.69
$\frac{1}{4}$ "	6.35	0.8	$\frac{3}{8}$ "	9.52	0.8	20	1	6.41
$\frac{1}{4}$ "	6.35	0.8	$\frac{1}{2}$ "	12.37	0.8	20	1	7.69

Insulation Properties

Tube 1		Tube 2		Thermal Conductivity kcal/mhrC	Surface Heat Tensile Coefficient kcal/m ² hrC	Tensile Strength	Water Absorption	Shrinkage (120+5°C)
Outer diameter inch	Wall Thickness	Outer diameter inch	Wall Thickness					
$\frac{1}{4}$ "	0.8	$\frac{3}{8}$ "	0.8	0.048 Max	7	24.5 Min	0.01 Max	7% Max
$\frac{1}{4}$ "	0.8	$\frac{1}{2}$ "	0.8					
$\frac{1}{4}$ "	0.8	$\frac{5}{8}$ "	1					
$\frac{3}{8}$ "	0.8	$\frac{1}{2}$ "	0.8					
$\frac{3}{8}$ "	0.8	$\frac{5}{8}$ "	1					
$\frac{3}{8}$ "	0.8	$\frac{3}{4}$ "	1					
$\frac{1}{2}$ "	0.8	$\frac{3}{4}$ "	1					
$\frac{1}{4}$ "	0.8	$\frac{3}{8}$ "	0.8					
$\frac{1}{4}$ "	0.8	$\frac{1}{2}$ "	0.8					
$\frac{3}{8}$ "	0.8	$\frac{5}{8}$ "	1					
$\frac{3}{8}$ "	0.8	$\frac{5}{8}$ "	0.8					
$\frac{1}{4}$ "	0.8	$\frac{3}{8}$ "	0.8					
$\frac{1}{4}$ "	0.8	$\frac{1}{2}$ "	0.8					

Sampo Copper Tube Pair Coil insulation is heat resistant to 120°C and superior pre-insulated copper tube ideal for rapid cost effective split air-conditioning installation. Pair Coil uses soft annealed copper tube, and flexible and easily bent for quick and easy installation.

Precision Copper Tube Linesets

Sampo linesets are designed especially for the HVAC market. We offer over 1,000 different linesets combinations for quick, cost-efficient field installation of split system air conditioners and heat pumps.

Product	Temper	Lengths	Uses	Specifications	End finishing
Standard Linesets	060-080 (soft anneal) Annealed to customer specification	Available from 10'-80' using 6' intervals. Other lengths are available upon customer request	Split system air conditioning, Chilled water systems, Warm water systems	Currently there is no ASTM specification for insulated copper tube	Swaged end 90degree bend Plain end
Specialty Linesets	060-080 (soft anneal) Annealed to customer specification	Available from 10'-80' using 6' intervals. Other lengths are available upon customer request	split system air conditioning, Ice Makers, Chilled water systems	Currently there is no ASTM specification for insulated copper tube	Brazed fittings with or without refrigerant charge. Flared ends 37.6 degree with flare nuts

Copper Tube Sizes			Refrigerant	Insulation Thickness		
Product	Suction Line	Liquid Line	Specialty	Product	Suction Line	Liquid Line
Standard Linesets	$\frac{5}{8}" - 1\frac{1}{8}"$	$\frac{1}{4}" - \frac{5}{16}"$	R-22 404-A	Standard	$\frac{3}{16}" - \frac{3}{4}"$	Not insulated on standard lineset
Specialty Linesets	$\frac{1}{4}" - 1\frac{1}{8}"$	$\frac{1}{4}" - \frac{5}{8}"$	R-602 R-134-A	Specialty	$\frac{1}{2}" - \frac{5}{8}"$ $\frac{3}{4}"$	$\frac{1}{2}" - \frac{5}{8}"$ $\frac{1}{2}" - \frac{5}{8}"$ $\frac{3}{4}"$



Sampo Linesets Advantages include

- Quick, efficient and economical field installation
- Increased system efficiency using factory applied insulation
- Correct lengths for reducing waste
- Quality, consistency and economy

Precision Copper Tube Linesets



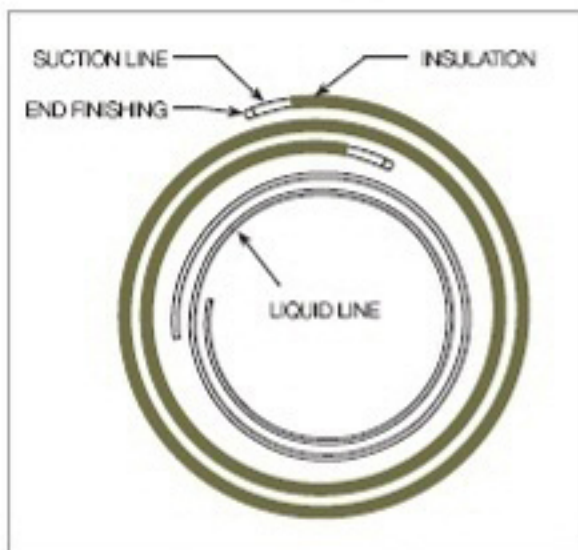
Sampo offers over 1,000 different linesets combinations based on:

- Length
- Diameter
- Refrigerants
- End Finish
- Insulation Thickness

Lineset Packaging

Standard Linesets Individual linesets are packaged in cardboard inserts and packaged in a master carton.

Specialty Linesets Individual packaging and bulk packaging available.



The illustration shows a standard linesets with suction line insulated (see lower chart on front for available insulation thickness). The liquid line is normally not insulated, but can be special ordered to be insulated. All of our standard linesets are purged with dry nitrogen and capped to ensure a clean and non-oxidized tube prior to installation. Our standard end finishing is available in three different options(see upper chart on front). For your special needs, we can charge brazed fitting linesets with the refrigerant that will be used in your application(see lower chart on front for refrigerants that are offered).

Multi-Tube

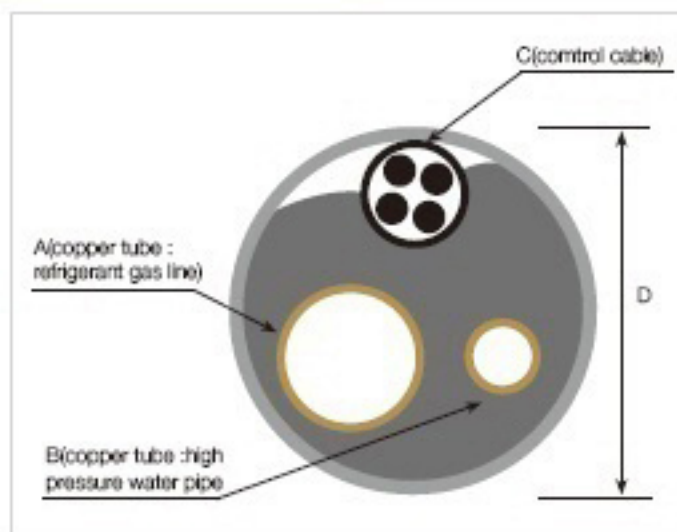


When manufactured, copper pipes and electric wires are finished with the insulation work, so it does not cost you for the insulation and enables you to shorten a work period 70%. It is excellent in the insulation effect (dewing) than other existing construction method and easy to install. The quality of this product is even due to our automated system production.

The power supply and communications part are separated not to interfere a communications wire by a magnetic field. It is easy to move it, for it is a standardized product. It is easy to process it into any length according to the situation of each site.

CD PIPE is made of a fire-retardant foam (first domestically). Because it is a standardized product, its external appearance is sleek. It is easy to install it for a concrete buried piping.

After completing a construction, a finishing work is simple. Because it doesn't need an insulation work, there are less scrapped material, so it results in a cost reduction.



Model	A	B	C	D
SPMT022	16.88	9.62	VCTF1.6x4C	ø 40~66
SPMT028	12.70	8.95	VCTF1.6x4C	
SPMT024	12.70	8.95	VCTF1.6x4C	
SPMT026	9.62	8.95	VCTF1.6x4C	

Pipe length : From 1.5m

Copper Tube Thickness: ø15.88→0.8T, Others→0.7T



SAMPO
INDUSTRIAL Co., Ltd.

12F Hyungin Tower, 23-2 Bangi-dong, Songpa-gu, Seoul, Korea
phone 82.2.573.5151 fax 82.2.571.5156 <http://www.sampotube.com>