

Brief of Enterprise

HAILIANG GROUP was founded in August of 1989. Presently, Hailiang has more than 5500 staff with a total asset of USD 6.2 million, and covers 38 subordinate enterprises.

In 2006, Hailiang's comprehensive competence has ascended to NO. 186th among the top 500 enterprises in China, NO. 29th among the top 500 private-owned enterprises in China, and NO. 7th among the top 100 private-owned enterprises in Zhejiang. And, its operation revenue 2006 is up to USD 2.7 billion, among which USD 8.026 million is the industrial sales revenue, USD 79.7 million for tax and USD 407million for exporting.

In 2007, Hailiang will follow its direction of make super fines, make strong, make large endeavoring to be the most competitive copper- processing multinational enterprises in the world.



Hailiang

Having a capacity of water from hundreds of rivers;
Illuminating the five continents



AILIANG
Enterprise Attestation

TABLE OF CONTENTS

1. CERTIFICATE OF REGISTRATION AND COMPLAINT

2. AMERICAN STANDARD

ASTM B 280—SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION FIELD SERVICE

ASTM B88—SEAMLESS FOR COPPER WATER TUBE

ASTM B68—SEAMLESS FOR COPPER TUBE SUITABLE FOR USE IN REFRIGERATION, OIL LINES, GASOLINE LINES AND SO FORTH

ASTM B75—SEAMLESS, ROUND, RECTANGULAR, AND SQUARE COPPER TUBE SUITABLE FOR GENERAL ENGINEERING APPLICATIONS

ASTM B251—COPPER AND COPPER-ALLOY TUBE SUPPLIED UNDER SPECIFICATIONS B68 B75

3. JIS H3300 STANDARD—COPPER AND COPPER-ALLOY SEAMLESS PIPES

4. BRITISH—EUROPEAN STANDARD

BS EN 12735-1—THE TUBE SYSTEM (SUCH AS FITTING) WITH THE FORM OF HARD STRAIGHT TUBES OR ANNEALED COILS (INCLUDING PAN CAKE COIL)

BS EN 12735-2—SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION FIELD SERVICE

BS2871, BS12449—ARE AVAILABLE AS PER CUSTOMER'S REQUIREMENTS

EN 1057—SEAMLESS, ROUND COPPER TUBES FOR WATER AND GAS IN SANITARY AND HEATING APPLICATIONS

6. AUSTRALIAN STANDARD

AS1432—COPPER TUBE FOR PLUMBING, GAS FITTING AND DRAINAGE APPLICATIONS

AS1571—REFRIGERATION QUALITY COPPER TUBE

7. PACKING WAYS

8. OTHER STANDARDS AS PER CUSTOMER'S REQUIREMENTS

ASTM B280

AMERICAN STANDARD ASTM B280—SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION FIELD SERVICE

*CHEMICAL COMPOSITION

All tubing manufactured from phosphorus deoxidized copper high residual phosphorus complying with UNS C12200.

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

*ASTM B280

TABLE 1 Standard Dimensions and Weights, and Tolerances in Diameter and Wall Thickness for Coil Lengths

Standard Size, in.	Outside Diameter, in.(mm)	Wall Thickness, in.(mm)	Weight, lb/ft(kg/m)	Tolerances ^a	
				Average ^b Outside Diameter, Plus and Minus, in.(mm)	Wall Thickness, Plus and Minus, in.(mm)
1/8	0.125 (3.18)	0.030 (0.762)	0.0347 (0.0516)	0.002 (0.051)	0.003 (0.08)
3/16	0.187 (4.75)	0.030 (0.762)	0.0575 (0.0856)	0.002 (0.051)	0.003 (0.08)
1/4	0.250 (6.35)	0.030 (0.762)	0.0804 (0.120)	0.002 (0.051)	0.003 (0.08)
5/16	0.312 (7.92)	0.032 (0.813)	0.109 (0.162)	0.002 (0.051)	0.003 (0.08)
3/8	0.375 (9.52)	0.032 (0.813)	0.134 (0.199)	0.002 (0.051)	0.003 (0.08)
1/2	0.500 (12.7)	0.032 (0.813)	0.182 (0.271)	0.002 (0.051)	0.003 (0.08)
5/8	0.625 (15.9)	0.035 (0.889)	0.251 (0.373)	0.002 (0.051)	0.004 (0.11)
3/4	0.750 (19.1)	0.035 (0.889)	0.305 (0.454)	0.0025 (0.064)	0.004 (0.11)
7/8	0.875 (22.3)	0.042 (1.07)	0.362 (0.539)	0.0025 (0.064)	0.004 (0.11)
1	1.000 (25.4)	0.045 (1.14)	0.455 (0.677)	0.003 (0.076)	0.004 (0.11)
1 1/8	1.125 (28.6)	0.050 (1.27)	0.665 (0.975)	0.0035 (0.089)	0.005 (0.13)

A: The tolerances listed represent the maximum deviation at any point.

B: 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.

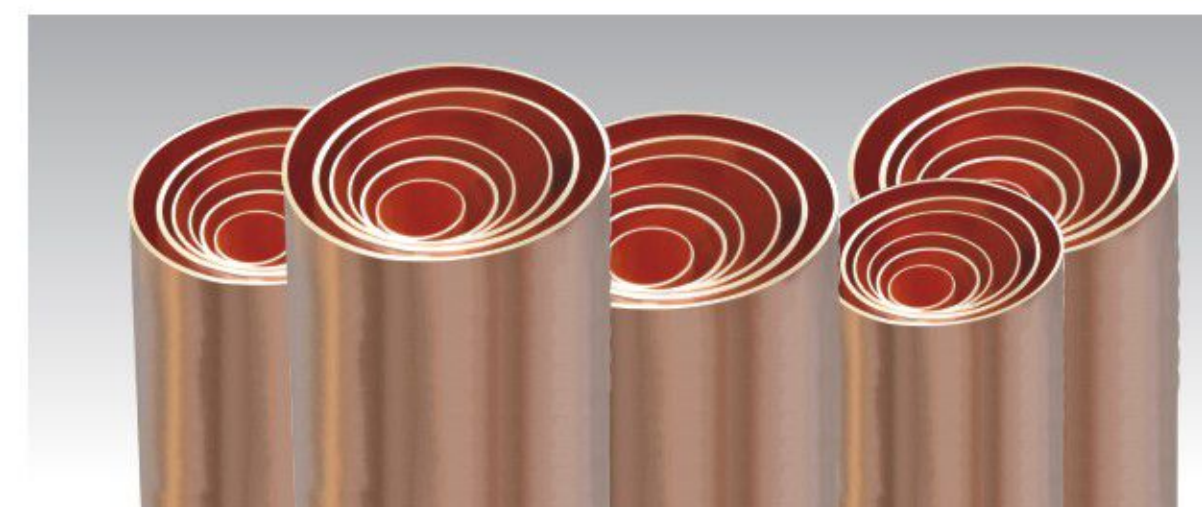


TABLE 2 Standard Dimensions and Weights, and Tolerances in Diameter and Wall Thickness for Straight Lengths

Note 1—Applicable to drawn temper tube only

Standard Size, in.	Outside Diameter, in. (mm)	Wall Thickness, in. (mm)	Weight, lb/ft (kg/m)	Tolerances	
				Average Outside Diameter, Plus and Minus, in. (mm)	Wall Thickness, Plus and Minus, in. (mm)
3/8	0.375 (9.52)	0.030 (0.762)	0.126 (0.187)	0.001 (0.025)	0.003 (0.08)
1/2	0.500 (12.7)	0.035 (0.889)	0.198 (0.295)	0.001 (0.025)	0.004 (0.09)
5/8	0.625 (15.9)	0.040 (1.02)	0.285 (0.424)	0.001 (0.025)	0.004 (0.10)
3/4	0.750 (19.1)	0.040 (1.07)	0.362 (0.539)	0.001 (0.025)	0.004 (0.11)
7/8	0.875 (22.3)	0.045 (1.14)	0.455 (0.677)	0.001 (0.025)	0.004 (0.11)
1 1/8	1.125 (28.6)	0.050 (1.27)	0.655 (0.975)	0.0015 (0.038)	0.004 (0.13)
1 3/8	1.375 (34.9)	0.055 (1.40)	0.884 (1.32)	0.0015 (0.038)	0.006 (0.14)
1 5/8	1.625 (41.3)	0.060 (1.52)	1.14 (1.70)	0.002 (0.051)	0.006 (0.15)
2 1/8	2.125 (54.0)	0.070 (1.78)	1.75 (2.60)	0.002 (0.051)	0.007 (0.18)
2 5/8	2.625 (66.7)	0.080 (2.03)	2.48 (3.69)	0.002 (0.051)	0.008 (0.20)
3 1/8	3.125 (79.4)	0.090 (2.29)	3.33 (4.96)	0.002 (0.051)	0.009 (0.23)
3 5/8	3.625 (92.1)	0.100 (2.54)	4.29 (6.38)	0.002 (0.051)	0.010 (0.25)
4 1/8	4.125 (105)	0.110 (2.79)	5.38 (8.01)	0.002 (0.051)	0.011 (0.28)

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

B: The tolerances listed represent the maximum deviation at any point.

*REQUIREMENTS FOR THE CLEANNESS OF INNER FACE: $\leq 38\text{MG/M}^2$

ASTM B88

AMERICAN STANDARD ASTM B88 SEAMLESS COPPER WATER TUBE

*CHEMICAL COMPOSITION

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

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

*TEMPERS

TEMPER	TUBE FORM	ROCKWELL HARDNESS	
		Scale	Value
050-annealed	Coils	F	55max.
H-DRAWN	Straights	30T	30min.

STANDARD LENGTHS

The standard lengths for drawn temper ASTM B 88 tube are 3.658 (12ft), 5.800m (19.03ft) and 6.096m (20ft). Annealed tube, in 60ft coils (18.288m), is available in nominal 3/8", 1/2", 5/8" and 3/4" diameters, and Type K and Type L wall thickness.



*MARK OR ENGRAVE TERMS

*ASTM B88

TABLE 1. Dimensions and Physical Characteristics of Copper Tube: TYPE M

Nominal or Standard Size, inches	Nominal Dimensions, inches			Calculated Values (based on nominal dimensions)				
	Outside Diameter	Inside Diameter	Wall Thickness	Cross Sectional Area of Bore, sq inches	Weight of Tube Only, pounds per linear ft	Weight of Tube & Water, pounds per linear ft	Contents of Tube per linear ft	
3/8	.500	.450	.025	.159	.145	.214	.00110	.00826
1/2	.625	.569	.028	.254	.204	.314	.00176	.0132
3/4	.875	.811	.032	.517	.328	.551	.00359	.0269
1	1.125	1.055	.035	.874	.465	.843	.00607	.0454
1 1/8	1.375	1.291	.042	1.31	.682	1.25	.00910	.0681
1 1/2	1.625	1.527	.049	1.83	.940	1.73	.0127	.0951
2	2.125	2.009	.058	3.17	1.46	2.83	.0220	.165
2 1/2	2.625	2.495	.065	4.89	2.03	4.14	.0340	.254
3	3.125	2.981	.072	6.98	2.68	5.70	.0485	.363
3 1/2	3.625	3.459	.083	9.40	3.58	7.64	.0653	.488
4	4.125	3.935	.095	12.2	4.66	9.83	.0847	.634
5	5.125	4.907	.109	18.9	6.66	14.8	.131	.982
6	6.125	5.881	.122	27.2	8.92	20.7	.189	1.41
8	8.125	7.785	.170	47.6	16.5	37.1	.331	2.47
10	10.125	9.701	.212	73.9	25.6	57.5	.513	3.84
12	12.125	11.617	.254	106	36.7	82.5	.736	5.51

*ASTM B88

TABLE 2. Dimensions and Physical Characteristics of Copper Tube: TYPE K

Nominal or Standard Size, inches	Nominal Dimensions, inches			Calculated Values (based on nominal dimensions)				
	Outside Diameter	Inside Diameter	Wall Thickness	Cross Sectional Area of Bore, sq inches	Weight of Tube Only, pounds per linear ft	Weight of Tube & Water, pounds per linear ft	Contents of Tube per linear ft	
							Cu ft	Gal
1/4	.375	.305	.035	.073	.145	.177	.00051	.00379
3/8	.500	.402	.049	.127	.269	.324	.00088	.00660
1/2	.625	.527	.049	.218	.344	.438	.00151	.0113
5/8	.750	.652	.049	.334	.418	.562	.00232	.0174
3/4	.875	.745	.065	.436	.641	.829	.00303	.0227
1	1.125	.995	.065	.778	.839	1.18	.00540	.0404
1 1/4	1.375	1.245	.065	1.22	1.04	1.57	.00847	.0634
1 1/2	1.625	1.481	.072	1.72	1.36	2.10	.0119	.0894
2	2.125	1.959	.083	3.01	2.06	3.36	.0209	.156
2 1/2	2.625	2.435	.095	4.66	2.93	4.94	.0324	.242
3	3.125	2.907	.109	6.64	4.00	6.87	.0461	.345
3 1/2	3.625	3.385	.120	9.00	5.12	9.01	.0625	.468
4	4.125	3.857	.134	11.7	6.51	11.6	.0813	.608
5	5.125	4.805	.160	18.1	9.67	17.5	.126	.940
6	6.125	5.741	.192	25.9	13.9	25.1	.180	1.35
8	8.125	7.583	.271	45.2	25.9	45.4	.314	2.35
10	10.125	9.449	.338	70.1	40.3	70.6	.487	3.64
12	12.125	11.315	.405	101	57.8	101	.701	5.25

TABLE 3. Dimensions and Physical Characteristics of Copper Tube: TYPE L

Nominal or Standard Size, inches	Nominal Dimensions, inches			Calculated Values (based on nominal dimensions)				
	Outside Diameter	Inside Diameter	Wall Thickness	Cross Sectional Area of Bore, sq inches	Weight of Tube Only, pounds per linear ft	Weight of Tube & Water, pounds per linear ft	Contents of Tube per linear ft	
							Cu ft	Gal
1/4	.375	.315	.030	.078	.126	.160	.00054	.00405
3/8	.500	.430	.035	.145	.198	.261	.00101	.00753
1/2	.625	.545	.040	.233	.285	.386	.00162	.0121
5/8	.750	.666	.042	.348	.362	.512	.00242	.0181
3/4	.875	.785	.045	.484	.455	.664	.00336	.0251
1	1.125	1.025	.050	.825	.655	1.01	.00573	.0429
1 1/4	1.375	1.265	.055	1.26	.884	1.43	.00875	.0655
1 1/2	1.625	1.505	.060	1.78	1.14	1.91	.0124	.0925
2	2.125	1.985	.070	3.09	1.75	3.09	.0215	.161
2 1/2	2.625	2.465	.080	4.77	2.48	4.54	.0331	.248
3	3.125	2.945	.090	6.81	3.33	6.27	.0473	.354
3 1/2	3.625	3.425	.100	9.21	4.29	8.27	.0640	.478
4	4.125	3.905	.110	12.0	5.38	10.6	.0833	.623
5	5.125	4.875	.125	18.7	7.61	15.7	.130	.971
6	6.125	5.845	.140	26.8	10.2	21.8	.186	1.39
8	8.125	7.725	.200	46.9	19.3	39.6	.326	2.44
10	10.125	9.625	.250	72.8	30.1	61.6	.506	3.78
12	12.125	11.565	.280	105	40.4	85.8	.729	5.45

*Weight for reference only

ASTM B68

SEAMLESS FOR COPPER TUBE SUITABLE FOR USE IN REFRIGERATION, OIL LINES, GASOLINE LINES AND SO FORTH

*CHEMICAL COMPOSITION

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

* TEMPER DESIGNATION: 060 (SOFT ANNEALED) 050 (LIGHT ANNEALED)

* OUTSIDE DIAMETER, WALL THICKNESS, LENGTH AND THE TOLERANCE: PRACTICED BY ASTM B251. (PAGE 06)

ASTM B75

SEAMLESS, ROUND, RECTANGULAR, AND SQUARE COPPER TUBE SUITABLE FOR GENERAL ENGINEERING APPLICATIONS

*CHEMICAL COMPOSITION

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

* TEMPER DESIGNATION: 060 055 H55 H58 H80

* DIMENSIONS AND TOLERANCE: PRACTICED BY ASTM B251 (PAGE 06)



ASTM B251

COPPER AND COPPER-ALLOY TUBE SUPPLIED UNDER SPECIFICATIONS
B68 B75TABLE 1 Wall Thickness Tolerances for Copper and Copper-Alloy Tube
(Applicable to Specifications B 68,B75,B135,and B743)

Maximum Deviation at Any Point: The following tolerances are plus and minus. If tolerances all plus or all minus are desired, double the values given.

Wall Thickness, in.	Outside Diameter, in. ^A						
	1/23 to 1/8, incl	Over 1/8 to 5/8, incl	Over 5/8 to 1, incl	Over 1 to 2, incl	Over 2 to 4, incl	Over 4 to 7, incl	Over 7 to 10, incl
Up to 0.017, incl	0.002	0.001	0.0015	0.002	...	...	...
Over 0.017-0.024, incl	0.003	0.002	0.002	0.0025	...	...	...
Over 0.024-0.034, incl	0.003	0.0025	0.0025	0.003	0.004	...	...
Over 0.034-0.057, incl	0.003	0.003	0.0035	0.0036	0.005	0.007	...
Over 0.057-0.082, incl	...	0.0035	0.004	0.004	0.006	0.008	0.010
Over 0.082-0.119, incl	...	0.004	0.005	0.005	0.007	0.009	0.011
Over 0.119-0.164, incl	...	0.005	0.006	0.006	0.008	0.010	0.012
Over 0.164-0.219, incl	...	0.007	0.009	0.009	0.011	0.012	0.014
Over 0.219-0.283, incl	...	...	0.011	0.012	0.014	0.015	0.016
Over 0.283-0.379, incl	...	...	0.014	8%	8%	7%	7%
Over 0.379	...	...	...	8%	8%	7%	7%

A: When round tube is ordered by outside and inside diameters, the maximum plus and minus deviation of the wall thickness from the nominal at any point shall not exceed the values given in the table by more than 50 percent.

B: Percent of specified wall expressed to the nearest 0.001 in.

TABLE 2 Average Diameter Tolerances for Copper and Copper-Alloy Tube^A
(Applicable to Specifications B68, B75, B135, and B743)

Specified Diameter, in.	Tolerance, Plus and Minus, in.
Up to 1/8, incl	0.002
Over 1/8-5/8, incl	0.002
Over 5/8-1, incl	0.0025
Over 1-2, incl	0.003
Over 2-3, incl	0.004
Over 3-4, incl	0.005
Over 4-5, incl	0.006
Over 5-6, incl	0.007
Over 6-8, incl	0.008
Over 8-10, incl	0.010

^A Applicable to inside or outside diameter.

JIS H3300 STANDARD

COPPER AND COPPER-ALLOY SEAMLESS PIPES

*CHEMICAL COMPOSITION

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

*TEMPER DESIGNATION

Temper	O (soft)	OL (light soft)	1/2H (half hard)
Tensile Strength Mpa	≥205	≥205	≥245~325

*LENGTH: 0-6.1M

*TOLERANCES ON AVERAGE DIAMETER OF COPPER TUBES FOR ORDINARY PIPING

TABLE 1 Tolerances on wall thickness (Special grade)

Unit: mm

Outside Diameter	Wall Thickness	Tolerance					
		0.25 and over up to and incl 0.4	Over 0.4 up to and incl 0.6	Over 0.6 up to and incl 0.8	Over 0.8 up to and incl 1.4	Over 1.4 up to and incl 2	Over 2 up to and incl 3
4 and Over up to and incl 15		±0.03	±0.05	±0.06	±0.08	±0.09	±0.10
Over 15, up to and incl 25		±0.04	±0.05	±0.06	±0.09	±0.10	±0.13
Over 25, up to and incl 50		—	±0.06	±0.08	±0.09	±0.10	±0.13
Over 50, up to and incl 100		—	—	±0.10	±0.13	±0.15	±0.18

Remarks:

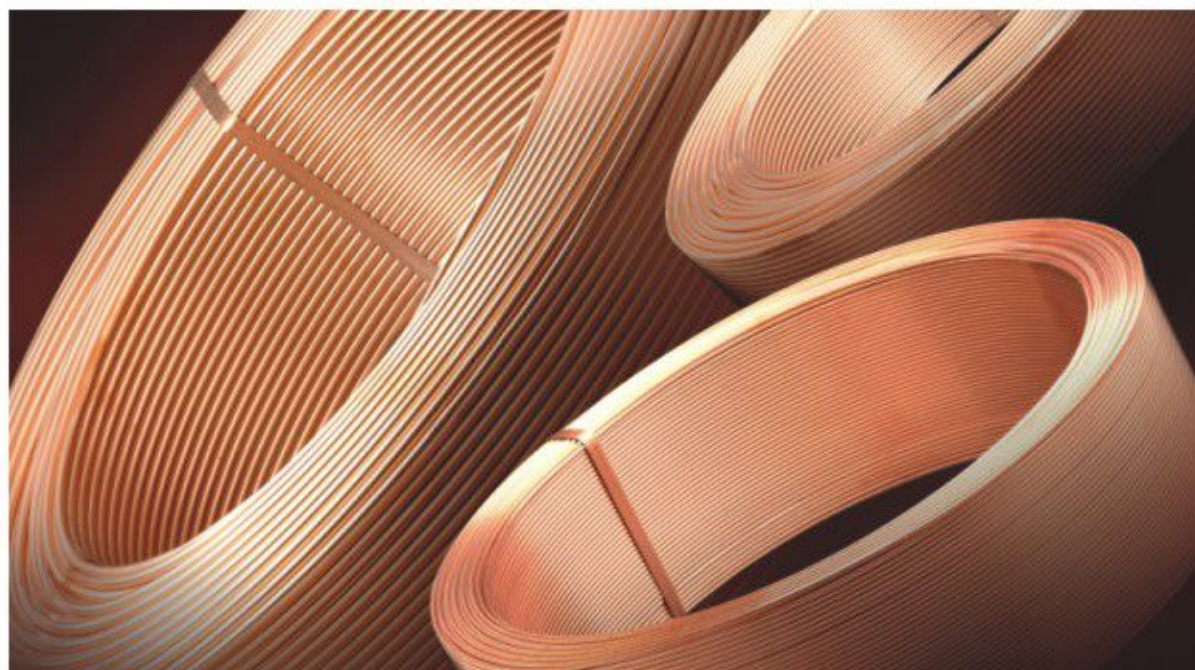
- 1: When the tolerance is specified by only either plus or minus side, the value in Table 1 shall be doubled.
- 2: When the inside diameter is specified, Table 1 shall be so applied that the outside diameter equals the inside diameter plus twice the wall thickness.
- 3: The applicable tolerances for tubes having a dimension exceeding the range of specified dimensions shall be those for common grade.

Table 2 Tolerances on wall thickness (Common grade)

Unit:mm

Outside Diameter	Wall Thickness	Tolerance									
		0.25 and over, up to and incl 0.4	Over 0.4, up to and incl 0.6	Over 0.6, up to and incl 0.8	Over 0.8, up to and incl 1.4	Over 1.4, up to and incl 2	Over 2, up to and incl 3	Over 3, up to and incl 4	Over 4, up to and incl 5.5	Over 5.5, up to and incl 7	Over 7
4 and over, up to and incl 15		±0.06	±0.07	±0.10	±0.13	±0.15	±0.18	—	—	—	—
Over 15, up to and incl 25		±0.07	±0.08	±0.10	±0.15	±0.18	±0.20	±0.30	±0.40	±0.45	—
Over 25, up to and incl 50		—	±0.09	±0.11	±0.15	±0.18	±0.20	±0.30	±0.40	±0.45	±8%
Over 50, up to and incl 100		—	—	±0.15	±0.18	±0.22	±0.25	±0.30	±0.40	±0.45	±8%
Over 100, up to and incl 175		—	—	—	±0.22	±0.25	±0.30	±0.35	±0.42	±0.45	±9%
Over 175, up to and incl 250		—	—	—	—	±0.30	±0.35	±0.40	±0.45	±0.50	±9%

- Remarks**
1. When the tolerance is specified by only either plus or minus side, the value in Table 2 shall be doubled.
 2. When the inside diameter is specified, Table 2 shall be so applied that the outside diameter equals the inside diameter plus twice the wall thickness.
 3. The tolerances for tubes having a dimensions exceeding the range of the specified dimensions shall be as agreed upon between the purchaser and the supplier.

**BS EN 12735-1****THE TUBE SYSTEM (SUCH AS FITTING) WITH THE FORM OF HARD STRAIGHT TUBES OR ANNEALED COILS (INCLUDING PANCAKE COIL)*****CHEMICAL COMPOSITION**

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

***TEMPER DESIGNATION AND PROPERTY**

Form	R220 (annealed)	R250 (half hard)	R290 (hard)	R360 (hard)
Tensile Strength Mpa	200~250	250~300	300~360	≥360

*REQUIREMENTS FOR THE CLEANNESS OF INNER FACE: ≤38MG/M²;

*SPECIFICATIONS: AS PER CUSTOMER'S REQUIREMENTS

BS EN 12735-2**SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION FIELD SERVICE*****CHEMICAL COMPOSITION**

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

***TEMPER DESIGNATION**

Temper	Y080 (Skin hard)	Y04 (Light annealed)	Y03 (Soft annealed)
Tensile Strength Mpa	≥220	≥220	≥210

***OUTSIDE DIAMETER AND WALL THICKNESS**

Outside Diameter (mm)	Wall Thickness (mm)	
	≤0.4	>0.4
φ 6~13	±0.04	±0.04
φ 13~16	±0.05	±0.04
φ 16~24	-----	±0.05

*REQUIREMENTS FOR THE CLEANNESS OF INNER FACE: ≤38MG/M²

EN1057**SEAMLESS, ROUND COPPER TUBES FOR WATER AND GAS IN SANITARY AND HEATING APPLICATIONS*****CHEMICAL COMPOSITION**

All tubing manufactured from phosphorus deoxidized copper designates as either Cu-DHP or CW024A

ELEMENT	%MINIMUM	%MAXIMUM
Copper	99.90	
Phosphorus	0.015	0.040

***TABLE (XYZ TYPE)**

Outside Diameter	Wall thickness			Temper
	X	Y	Z	
6	0.6	0.8	0.5	R220 (soft) R250 (half hard) R290 (hard)
8	0.6	0.8	0.5	
10	0.6	0.8	0.5	
12	0.6	0.8	0.5	
15	0.7	1.0	0.5	
18	0.8	1.0	0.6	
22	0.9	1.2	0.6	
28	0.9	1.2	0.6	
35	1.2	1.5	0.7	
42	1.2	1.5	0.8	
54	1.2	2.0	0.9	
66.7	1.5	2.0	1.0	
76.1	1.5	2.0	1.2	
108	1.5	2.5	1.2	
133	1.5		1.5	
159	2.0		1.5	

**AS 1432****AUSTRALIAN STANDARD
COPPER TUBE FOR PLUMBING, GASFITTING AND DRAINAGE APPLICATIONS*****CHEMICAL COMPOSITION**

All tubing is manufactured from phosphorus deoxidized copper, alloy designation C12200.

ELEMENT	%MINIMUM	%MAXIMUM
Copper ¹	99.90	
Phosphorus	0.015	0.040

¹ Including Silver

***TEMPER AND FORM**

THICKNESS TYPE	TEMPER	SIZE RANGE		FORM
		MINIMUM	MAXIMUM	
A	Hard drawn	DN 6	DN 200	Straight lengths
	Bendable	DN 15	DN 20	Straight lengths
	Annealed	DN 6	DN 40	Coils
B	Hard drawn	DN 6	DN 200	Straight lengths
	Bendable	DN 15	DN 20	Straight lengths
	Annealed	DN 6	DN 40	Coils
C	Hard drawn	DN 10	DN 25	Straight lengths
	Bendable	DN 15	DN 20	Straight lengths
	Annealed	DN 10	DN 25	Coils
D	Hard drawn	DN 32	DN 150	Straight lengths

***TUBE HARDNESS**

TEMPER	HARDNESS HV	
	MINIMUM	MAXIMUM
Hard drawn	100	—
Bendable	80	100
Annealed	—	70

***DIMENSIONS AND TOLERANCES**

Appropriate tolerances for mean outside diameter and wall thickness are shown in each size table.

***LENGTH TOLERANCES**

PRODUCT	SPECIFIED LENGTH M	TOLERANCES
Straight lengths	≤ 3	+12, -0 mm
	> 3 ≤ 6	+24, -0 mm
Coils	≤ 15	+300, -0 mm
	> 15	+2, -0 %

***SPECIAL SIZES**

Large Diameter DN225 (228.60mm) and DN250 (254.00mm) tubes are available with wall thicknesses of 2.03mm, 2.64mm or 3.25mm. These tubes are manufactured to Australian Standard AS1572. Full technical details are available upon application.

AS 1432

*TYPE A.

NOMINAL SIZE	MEAN OUTSIDE DIAMETER,mm			OVALITY:mm	THICKNESS,mm		
	MINIMUM		MAXIMUM	MAXIMUM FOR STRAIGHT LENGTHS	MINIMUM AT ANY POINT	STANDARD	MAXIMUM AT ANY POINT
	COILS	STRAIGHT LENGTHS					
DN 6	6.25	6.27	6.35	0.04	0.81	0.91	1.01
DN 8	7.84	7.86	7.94	0.06	0.81	0.91	1.01
DN 10	9.42	9.44	9.52	0.08	0.91	1.02	1.13
DN 15	12.57	12.62	12.70	0.10	0.91	1.02	1.13
DN 18	15.72	15.80	15.88	0.16	1.09	1.22	1.35
DN 20	18.85	18.97	19.05	0.20	1.27	1.42	1.57
DN 25	25.09	25.30	25.40	0.28	1.47	1.63	1.79
DN 32	31.37	31.65	31.75	0.38	1.47	1.63	1.79
DN 40	37.64	38.00	38.10	0.48	1.47	1.63	1.79
DN 50	—	50.67	50.80	0.64	1.47	1.63	1.79
DN 65	—	63.35	63.50	0.88	1.47	1.63	1.79
DN 80	—	76.02	76.20	1.08	1.83	2.03	2.23
DN 90	—	88.70	88.90	1.24	1.83	2.03	2.23
DN 100	—	101.35	101.60	1.42	1.83	2.03	2.23
DN 125	—	126.75	127.00	1.78	1.83	2.03	2.23
DN 150	—	152.10	152.40	2.12	2.38	2.64	2.90
DN 200	—	202.80	203.20	2.84	2.24	2.64	3.04

*TYPE B.

NOMINAL SIZE	MEAN OUTSIDE DIAMETER,mm			OVALITY:mm	THICKNESS,mm		
	MINIMUM		MAXIMUM	MAXIMUM FOR STRAIGHT LENGTHS	MINIMUM AT ANY POINT	STANDARD	MAXIMUM AT ANY POINT
	COILS	STRAIGHT LENGTHS					
DN 6	6.25	6.27	6.35	0.04	0.61	0.71	0.81
DN 8	7.84	7.86	7.94	0.06	0.61	0.71	0.81
DN 10	9.42	9.44	9.52	0.08	0.81	0.91	1.01
DN 15	12.57	12.62	12.70	0.10	0.81	0.91	1.01
DN 18	15.72	15.80	15.88	0.16	0.91	1.02	1.13
DN 20	18.85	18.97	19.05	0.20	0.91	1.02	1.13
DN 25	25.09	25.30	25.40	0.28	1.09	1.22	1.35
DN 32	31.37	31.65	31.75	0.38	1.09	1.22	1.35
DN 40	37.64	38.00	38.10	0.48	1.09	1.22	1.35
DN 50	—	50.67	50.80	0.64	1.09	1.22	1.35
DN 65	—	63.35	63.50	0.88	1.09	1.22	1.35
DN 80	—	76.02	76.20	1.08	1.47	1.63	1.79
DN 90	—	88.70	88.90	1.24	1.47	1.63	1.79
DN 100	—	101.35	101.60	1.42	1.47	1.63	1.79
DN 125	—	126.75	127.00	1.78	1.47	1.63	1.79
DN 150	—	152.10	152.40	2.12	1.83	2.03	2.23
DN 200	—	202.80	203.20	2.84	1.78	2.03	2.28

AS 1432

*TYPE C.

NOMINAL SIZE	MEAN OUTSIDE DIAMETER,mm			OVALITY:mm	THICKNESS,mm		
	MINIMUM		MAXIMUM	MAXIMUM FOR STRAIGHT LENGTHS	MINIMUM AT ANY POINT	STANDARD	MAXIMUM AT ANY POINT
	COILS	STRAIGHT LENGTHS					
DN 10	9.42	9.44	9.52	0.08	0.61	0.71	0.81
DN 15	12.57	12.62	12.70	0.10	0.61	0.71	0.81
DN 18	15.72	15.80	15.88	0.16	0.81	0.91	1.01
DN 20	18.85	18.97	19.05	0.20	0.81	0.91	1.01
DN 25	25.09	25.30	25.40	0.28	0.81	0.91	1.01

*TYPE D.

NOMINAL SIZE	MEAN OUTSIDE DIAMETER,mm			OVALITY:mm	THICKNESS,mm		
	MINIMUM		MAXIMUM	MAXIMUM FOR STRAIGHT LENGTHS	MINIMUM AT ANY POINT	STANDARD	MAXIMUM AT ANY POINT
	COILS	STRAIGHT LENGTHS					
DN 32	—	31.65	31.75	0.38	0.81	0.91	1.01
DN 40	—	38.00	38.10	0.48	0.81	0.91	1.01
DN 50	—	50.67	50.80	0.64	0.81	0.91	1.01
DN 65	—	63.35	63.50	0.88	0.81	0.91	1.01
DN 80	—	76.02	76.20	1.08	1.09	1.22	1.35
DN 90	—	88.70	88.90	1.24	1.09	1.22	1.35
DN 100	—	101.35	101.60	1.42	1.09	1.22	1.35
DN 125	—	126.75	127.00	1.78	1.27	1.42	1.57
DN 150	—	152.10	152.40	2.12	1.47	1.63	1.79

*SAFE WORKING PRESSURE (PSW) AND TESTING PRESSURE (P_T) FOR TEMPERATURES UP TO AND INCLUDING 50°C

NOMINAL SIZE	PRESSURE, Kpa							
	TYPE A		TYPE B		TYPE C		TYPE D	
	P_{sw}	P_T	P_{sw}	P_T	P_{sw}	P_T	P_{sw}	P_T
DN 6	11 990	17 980	8 710	13 070	—	—	—	—
DN 8	9 320	13 970	6 820	10 240	—	—	—	—
DN 10	8 670	13 000	7 630	11 440	5 610	8 420	—	—
DN 15	6 330	9 490	5 590	8 380	4 140	6 210	—	—
DN 18	6 040	9 060	4 980	7 480	4 410	6 610	—	—
DN 20	5 860	8 790	4 110	6 170	3 640	5 460	—	—
DN 25	5 040	7 560	3 680	5 520	2 700	4 050	—	—
DN 32	3 980	5 970	2 920	4 370	—	—	2 150	3 220
DN 40	3 290	4 940	2 420	3 620	—	—	1 780	2 670
DN 50	2 440	3 670	1 800	2 700	—	—	1 330	1 990
DN 65	1 940	2 910	1 430	2 150	—	—	1 060	1 590
DN 80	2 020	3 030	1 610	2 420	—	—	1 190	1 780
DN 90	1 720	2 590	1 380	2 070	—	—	1 020	1 530
DN 100	1 500	2 260	1 200	1 800	—	—	890	1 330
DN 125	1 200	1 800	960	1 440	—	—	830	1 240
DN 150	1 300	1 950	1 000	1 500	—	—	800	1 200
DN 200	910	1 370	720	1 090	—	—	—	—

AS/NZS 1571**AUSTRALIAN STANDARD****SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERATION*****CHEMICAL COMPOSITION**

All tubing is manufactured from phosphorus deoxidized copper, alloy designation C12200 complying with AS2783 Part 2.

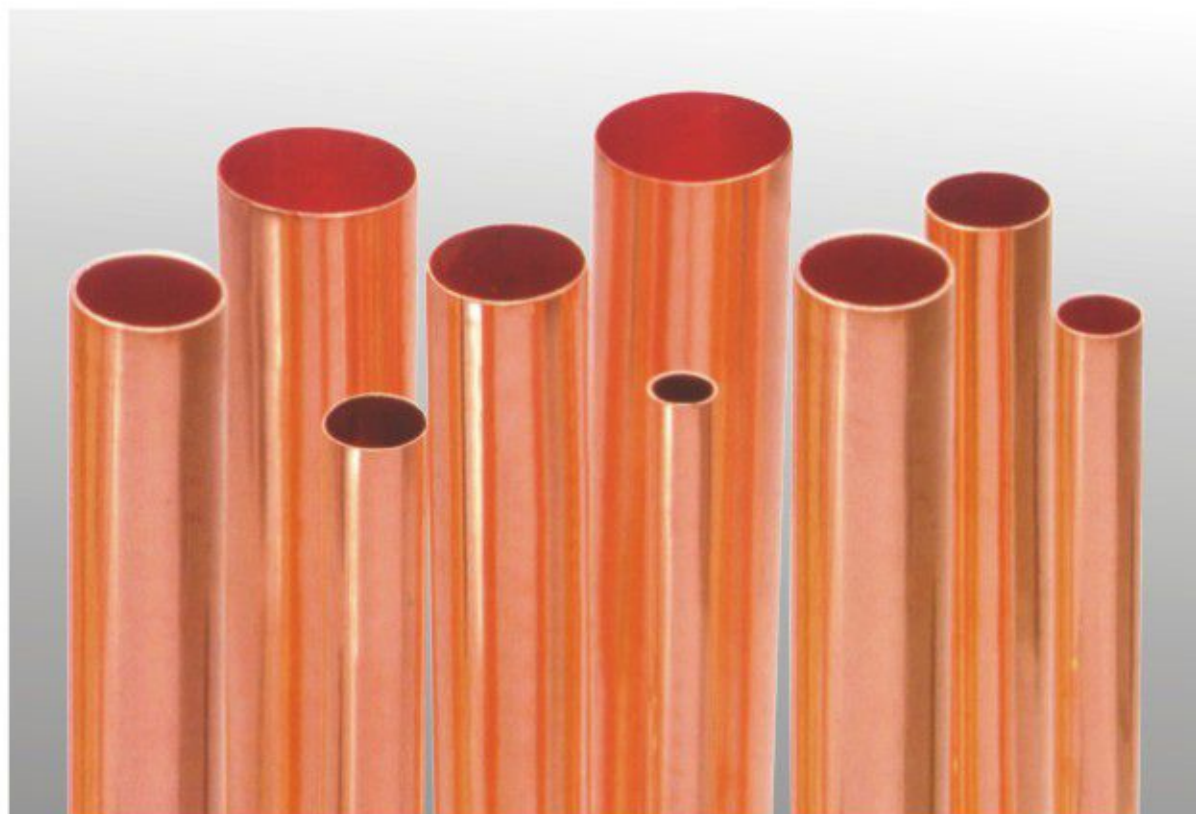
ELEMENT	%MINIMUM	%MAXIMUM
Copper [†]	99.90	
Phosphorus	0.015	0.040

[†]Including silver

***TEMPERS**

TEMPER	VICKERS HARDNESS HV
Annealed-U	75 maximum
Hard drawn-H	100 minimum
Half hard-HH	75-100
Special temper-†	48-56

† Usually specified for applications where straight lengths are expanded into crossfin coils

***DIMENSIONS AND TOLERANCES*****OUTSIDE DIAMETERS(OD)**

The mean outside diameter for tube in all tempers, either coiled or in straight lengths should not vary from the specified diameter by more than the tolerance specified.

SPECIFIED OD(mm)		TOLERANCE ON OD PLUS NIL, MINUS (mm)	
OVER	UP TO AND INCLUDING	STRAIGHT LENGTHS	COILS
3.18	12.70	0.08	0.13
12.70	19.05	0.08	0.20
19.05	25.40	0.08	0.31
25.40	31.75	0.08	0.38
31.75	50.80	0.08	0.46
50.80	101.60	0.15	—
101.60	155.58	0.30	—

***THICKNESS**

The standard thickness at any point tolerance for tube either coiled or in straight lengths is $\pm 10\%$ of the specified thickness

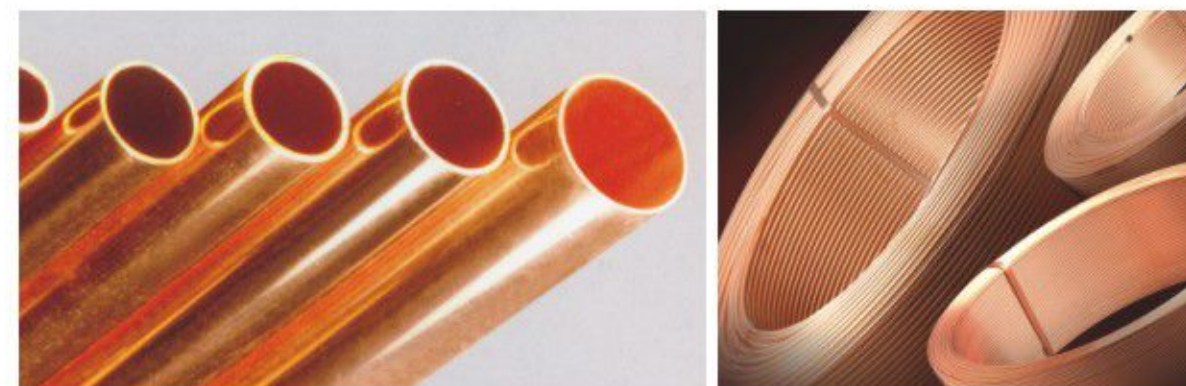
***LENGTH**

Tube ordered to a specified length should not vary from that length by more than tolerances specified.

PRODUCT	SPECIFIED LENGTH(m)		TOLERANCE ON LENGTH MINUS NIL, PLUS (mm)
	OVER	UP TO AND INCLUDING	
Straight lengths	—	2	12mm
	2	10	24mm
Coils	—	15	300mm
	15	—	2%

***CLEANNESS**

Tubes are manufactured to meet the internal residue requirement of 0.038g/m^2



REFRIGERATION QUALITY COPPER TUBE

*AS/NZS1571

*STANDARD SIZES ,TEMPERS AND LENGTHS

STANDARD SIZES, TEMPER S & LENGTHS											
ACTUAL TUBE SIZE				SAFE WORKING PRESSURE (KPa)		NO MINAL TUBE MASS (kg/m)	TEMPER				
IMPERIAL (inch)		METRIC (mm)		SERVICE TEMPERATURE (°C)			ANNEALED			HARD	
							LENGTH (m)				
OUTSIDE DIAMETER	WALL THICKNESS	OUTSIDE DIAMETER	WALL THICKNESS	UPTO 50	OVER 50 UPTO 75		15	18	30	5.8	6
3/16	0.028	4.76	0.71	12715	10545	0.081			●		
3/16	0.036	4.76	0.91	17040	14130	0.098			●		
1/4	0.022	6.35	0.56	7135	5920	0.091	●				
1/4	0.024	6.35	0.61	7635	6330	0.098	●				
1/4	0.028	6.35	0.71	9175	7610	0.113	●		●		
1/4	0.030	6.35	0.76	9900	8210	0.119	●				
1/4	0.036	6.35	0.91	12140	10075	0.139	●		●	● ●	
5/16	0.022	7.94	0.56	5555	4610	0.116	●				
5/16	0.028	7.94	0.71	7175	5950	0.144	●		●		
5/16	0.036	7.94	0.91	9430	7820	0.180	●		●		
3/8	0.022	9.52	0.56	4585	3800	0.141	●				
3/8	0.024	9.52	0.61	5020	4160	0.153	●				
3/8	0.028	9.52	0.71	5900	4895	0.176	●	●		●	
3/8	0.032	9.52	0.81	6800	5640	0.198	●				
3/8	0.036	9.52	0.91	7720	6400	0.220	●	●		● ●	
1/2	0.022	12.70	0.56	3390	2810	0.191	●				
1/2	0.024	12.70	0.61	3705	3070	0.207	●				
1/2	0.026	12.70	0.66	4025	3335	0.223	●				
1/2	0.028	12.70	0.71	4345	3605	0.239	●			● ●	
1/2	0.032	12.70	0.81	4995	4140	0.271	●				
1/2	0.036	12.70	0.91	5650	4690	0.302	●	●		1/2H 1/2H	
5/8	0.022	15.88	0.56	2690	2230	0.241	●				
5/8	0.024	15.88	0.61	2935	2435	0.262	●				
5/8	0.026	15.88	0.66	3185	2640	0.282	●				
5/8	0.028	15.88	0.71	3440	2850	0.303	●				
5/8	0.032	15.88	0.81	3945	3270	0.343	●				
5/8	0.036	15.88	0.91	4460	3700	0.383	●	●		1/2H 1/2H	
5/8	0.064	15.88	1.63	8345	6920	0.653	●				
3/4	0.022	19.05	0.56	2230	1850	0.291	●				
3/4	0.028	19.05	0.71	2845	2360	0.366	●				
3/4	0.036	19.05	0.91	3685	3055	0.464	●	●		1/2H 1/2H	
3/4	0.040	19.05	1.02	4150	3445	0.517				1/2H 1/2H	
3/4	0.042	19.05	1.07	4375	3630	0.541				● ●	
3/4	0.048	19.05	1.22	5015	4160	0.611	●				
7/8	0.036	22.22	0.91	3140	2600	0.545	●	●		● ●	
7/8	0.045	22.22	1.14	4030	3345	0.675				● ●	
7/8	0.048	22.22	1.22	4265	3535	0.720				● ●	
7/8	0.064	22.22	1.63	5795	4805	0.943				● ●	

REFRIGERATION QUALITY COPPER TUBE

*AS/NZS1571

*STANDARD SIZES ,TEMPERS AND LENGTHS

STANDARD SIZES, TEMPER & LENGTHS											
ACTUAL TUBE SIZE				SAFE WORKING PRESSURE (KPa)		NOMINAL TUBE MASS (kg/m)	TEMPER				
IMPERIAL (inch)		METRIC (mm)		SERVICE TEMPERATURE (°C)			ANNEALED			HARD	
							LENGTH (m)				
OUTSIDE DIAMETER	WALL THICKNESS	OUTSIDE DIAMETER	WALL THICKNESS	UPTO 50	OVER 50 UPTO 75		15	18	30	5.8	6
1	0.036	25.40	0.91	2730	2265	0.626				●	●
1	0.048	25.40	1.22	3705	3070	0.829				●	●
1	0.064	25.40	1.63	5025	4170	1.089				●	●
1 1/8	0.036	28.58	0.91	2420	2005	0.708				●	●
1 1/8	0.048	28.58	1.22	3275	2720	0.938				●	●
1 1/8	0.050	28.58	1.27	3415	2835	0.975				●	●
1 1/8	0.064	28.58	1.63	4435	3680	1.234				●	●
1 1/8	0.072	28.58	1.83	5015	4160	1.376				●	●
1 1/4	0.036	31.75	0.91	2170	1800	0.789				●	●
1 1/4	0.048	31.75	1.22	2935	2435	1.047				●	●
1 1/4	0.080	31.75	2.03	5005	4150	1.695				●	●
1 3/8	0.036	34.92	0.91	1970	1635	0.870				●	●
1 3/8	0.048	34.92	1.22	2660	2210	1.156				●	●
1 3/8	0.055	34.92	1.40	3070	2545	1.319				●	●
1 3/8	0.064	34.92	1.63	3595	2980	1.525				●	●
1 3/8	0.080	34.92	2.03	4525	3755	1.876				●	●
1 1/2	0.036	38.10	0.91	1800	1495	0.951				●	●
1 1/2	0.048	38.10	1.22	2435	2020	1.265				●	●
1 1/2	0.090	38.10	2.29	4690	3890	2.304				●	●
1 5/8	0.036	41.28	0.91	1660	1380	1.032				●	●
1 5/8	0.048	41.28	1.22	2240	1860	1.373				●	●
1 5/8	0.060	41.28	1.52	2820	2335	1.698				●	●
1 5/8	0.072	41.28	1.83	3415	2835	2.029				●	●
2	0.048	50.80	1.22	1810	1500	1.700				●	●
2	0.064	50.80	1.63	2440	2020	2.253				●	●
2 1/8	0.036	53.98	0.91	1265	1045	1.357				●	●
2 1/8	0.048	53.98	1.22	1700	1410	1.809				●	●
2 1/8	0.064	53.98	1.63	2290	1900	2.399				●	●
2 1/8	0.070	53.98	1.78	2510	2080	2.611				●	●
2 1/8	0.083	53.98	2.11	3000	2490	3.075				●	●
2 1/8	0.104	53.98	2.64	3775	3130	3.809				●	●
2 5/8	0.048	66.68	1.22	1375	1140	2.244				●	●
2 5/8	0.064	66.68	1.63	1845	1530	2.981				●	●
2 5/8	0.080	66.68	2.03	2315	1920	3.688				●	●
3	0.064	76.20	1.63	1610	1335	3.417				●	●
3 1/8	0.090	79.38	2.29	2180	1810	4.961				●	●
4	0.064	101.60	1.63	1200	995	4.581				●	●
4 1/8	0.110	104.78	2.79	2015	1670	7.996				●	●

PACKING WAYS

1.LWC

	Packing ways	Wooden pallets	Plates		Way of placing strings		Winding way		Hailiang	Neutral
			Cardboard Reels	Reels (ID Payout)	Draw from I.D.	Draw from O.D.	Clockwise	Anti-Clockwise		
Hailiang	General packing	☐	☐	☐		☐	☐	☐	☐	
	Simple Packing	☐						☐	☐	
	Draw from I.D. Packing	☐		☐	☐		☐	☐	☐	
	General double pallet packing	☐	☐	☐			☐	☐	☐	
Neutral	General packing	☐	☐	☐		☐	☐	☐		☐
	Simple Packing	☐		☐			☐	☐		☐
	Draw from I.D. Packing	☐			☐			☐		☐
	General double pallet packing	☐	☐	☐			☐	☐		☐



General Packing



General Doubled Pallets Packing(X+X)

2.PANCAKE COILS



2.STRAIGHT TUBES

