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TABLE 2: Common Standard Dimensions and Weights, and Tolerances in Diameter and Wall Thickness for Coil Lengths. *(Just for reference only.)*

Note 1_Applicable to drawn temper tube only.

Standard Size	Outside Diameter		Wall Thickness		Weight		Tolerance			
	inch	inch (mm)	inch	(mm)	kg/m	Tolerance, ± kg/m	Average ^A Outside diameter, Plus and Minus, in.(mm)		Wall ^B Thickness, Plus and Minus, in.(mm)	
3/8	0.375	(9.53)	0.030	(0.76)	0.187	(0.009)	0.001	(0.025)	0.003	(0.08)
1/2	0.500	(12.70)	0.035	(0.89)	0.294	(0.015)	0.001	(0.025)	0.004	(0.10)
5/8	0.625	(15.88)	0.040	(1.02)	0.423	(0.021)	0.001	(0.025)	0.004	(0.10)
3/4	0.750	(19.05)	0.040	(1.02)	0.513	(0.026)	0.001	(0.025)	0.004	(0.10)
7/8	0.875	(22.23)	0.045	(1.14)	0.675	(0.034)	0.001	(0.025)	0.004	(0.10)
1 1/8	1.125	(28.58)	0.050	(1.27)	0.971	(0.049)	0.015	(0.381)	0.004	(0.10)
1 3/8	1.375	(34.93)	0.055	(1.40)	1.311	(0.066)	0.015	(0.381)	0.006	(0.15)
1 5/8	1.625	(41.28)	0.060	(1.52)	1.696	(0.085)	0.002	(0.051)	0.006	(0.15)
2 1/8	2.125	(53.98)	0.070	(1.78)	2.599	(0.130)	0.002	(0.051)	0.007	(0.18)
2 5/8	2.625	(66.68)	0.080	(2.03)	3.678	(0.184)	0.002	(0.051)	0.008	(0.20)
3 1/8	3.125	(79.38)	0.090	(2.29)	4.934	(0.247)	0.002	(0.051)	0.009	(0.23)
3 5/8	3.625	(92.08)	0.100	(2.54)	6.368	(0.318)	0.002	(0.051)	0.010	(0.25)
4 1/8	4.125	(104.78)	0.110	(2.79)	7.978	(0.399)	0.002	(0.051)	0.011	(0.28)

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

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

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

ASTM B88

AMERICAN STANDARD ASTM B 88 - SEAMLESS COPPER TUBE FOR WATER

* CHEMICAL COMPOSITION

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

ELEMENT	% MINIMUM	% MAXIMUM
Copper	99.9	
Phosphorus	0.015	0.040

* TEMPERS

TEMPER	TUBE FORM	ROCKWELL HARDNESS	
		Scale	Value
O50-Annealed	Coils	F	55max.
H-Drawn	Straights	30T	35min.

STANDARD LENGTHS

The standard lengths for drawn temper ASTM B88 tube are 3.658m (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.

TABLE 2: Dimension and Physical Characteristic 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	0.375	0.305	0.035	0.073	0.145	0.177	0.00051	0.00379
3/8	0.500	0.402	0.049	0.127	0.269	0.324	0.00088	0.00660
1/2	0.625	0.527	0.049	0.208	0.344	0.438	0.00151	0.0113
5/8	0.750	0.652	0.049	0.334	0.418	0.562	0.00232	0.0174
3/4	0.875	0.745	0.065	0.436	0.641	0.829	0.00303	0.0227
1	1.125	0.995	0.065	0.778	0.839	1.18	0.0054	0.0404
1 1/4	1.375	1.245	0.065	1.22	1.04	1.57	0.00847	0.0634
1 1/2	1.625	1.481	0.072	1.72	1.36	2.10	0.0119	0.0894
2	2.125	1.959	0.083	3.01	2.06	3.36	0.0209	0.156
2 1/2	2.625	2.435	0.095	4.66	2.93	4.94	0.0324	0.242
3	3.125	2.907	0.109	6.64	4.0	6.87	0.0461	0.345
3 1/2	3.625	3.385	0.120	9.0	5.1	9.01	0.0625	0.468
4	4.125	3.857	0.134	11.7	6.5	11.6	0.0813	0.608
5	5.125	4.805	0.160	18.1	9.7	17.5	0.126	0.940
6	6.125	5.741	0.192	25.9	13.9	25.1	0.180	1.35
8	8.125	7.583	0.271	45.2	25.9	45.4	0.314	2.35
10	10.125	9.449	0.338	70.1	40.3	70.6	0.487	3.64
12	12.125	11.315	0.405	101.0	57.8	101.0	0.701	5.25

TABLE 3: Dimension and Physical Characteristic 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	0.375	0.315	0.030	0.078	0.126	0.160	0.00054	0.00405
3/8	0.500	0.430	0.035	0.145	0.198	0.261	0.00101	0.007575
1/2	0.625	0.545	0.040	0.233	0.285	0.386	0.00162	0.01215
5/8	0.750	0.666	0.042	0.348	0.362	0.512	0.00242	0.01815
3/4	0.875	0.785	0.045	0.484	0.455	0.664	0.00336	0.0252
1	1.125	1.025	0.050	0.825	0.655	1.010	0.00573	0.042975
1 1/4	1.375	1.265	0.055	1.260	0.884	1.430	0.00875	0.065625
1 1/2	1.625	1.505	0.060	1.780	1.140	1.910	0.0124	0.093
2	2.125	1.985	0.070	3.090	1.750	3.090	0.0215	0.16125
2 1/2	2.625	2.465	0.080	4.770	2.480	4.540	0.0331	0.24825
3	3.125	2.945	0.090	6.810	3.330	6.270	0.0473	0.35475
3 1/2	3.625	3.425	0.100	9.210	4.290	8.270	0.064	0.48
4	4.125	3.905	0.110	12.000	5.380	10.600	0.0833	0.62475
5	5.125	4.875	0.125	18.700	7.610	15.700	0.13	0.975
6	6.125	5.845	0.140	26.800	10.200	21.800	0.186	1.395
8	8.125	7.725	0.200	46.900	19.300	39.600	0.326	2.445
10	10.125	9.625	0.250	72.800	30.100	61.600	0.506	3.795
12	12.125	11.565	0.280	105.0	40.4	85.8	0.729	5.45

* Weight for reference only.

ASTM B251

COPPER AND COPPER-ALLOY TUBE SUPPLIED UNDER SPECIFICATIONS
B68, B75**TABLE 1: Wall Thickness Tolerance for Copper and Copper-Alloy Tube**
(Applicable to Specification B68, B75, 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	0.01	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	8B%	8B%	7B%	7B%
Over 0.379	...	...	...	8B%	8B%	7B%	7B%

^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%.

^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 Specification B68, B75, and B743)

Specified Diameter	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

TABLE 2: Tolerances on wall thickness (common grade)

Unit: mm

Wall Thickness	Tolerance									
	Over 0.25 and over, up to 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
Outside Diameter										
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%

Remark:

- 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 dimension exceeding the range of specified dimensions shall be as agreed upon between the purchaser and supplier.



EN 1057**SEAMLESS, ROUND COPPER TUBE FOR WATER AND GAS IN SANITARY AND HEATING APPLICATIONS***** CHEMICAL COMPOSITION**

All tubing manufactured from phosphorus deoxidized designates as either Cu-DHP or CW 024/

ELEMENT	% MINIMUM	% MAXIMUM
Copper	99.9	
Phosphorus	0.015	0.040

*** TABLE (X, Y, Z TYPE)**

Outside Diameter	Wall thickness			Temper
	X	Y	Z	
6	0.6	0.8	0.5	R 220 (soft) R 250 (half hard) R 290 (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	



* 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/NZS 1571 AUSTRALIAN STANDARD

SEAMLESS COPPER TUBE FOR AIR CONDITIONING AND REFRIGERANT

* CHEMICAL COMPOSITION

All tubing manufactured from phosphorus deoxidized designates as either Cu-DHP or CW 024A.

ELEMENT	% MINIMUM	% MAXIMUM
Copper ¹	99.9	
Phosphorus	0.015	0.040

¹: 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.



REFRIGERATION QUALITY COPPER TUBE

* AS/NZS 1571

* COMMON STANDARD SIZES, TEMPER AND LENGTHS. *(Just for reference only.)*

STANDARD SIZES, TEMPER & LENGTHS											
ACTUAL TUBE SIZE				SAFE WORKING PRESSURE (Bar)		NOMINAL TUBE MASS (kg/m ± tolerances)	TEMPER				
OUTSIDE DIAMETER		WALL THICKNESS		SERVICE TEMPERATURE (°C)			ANNEALED			HARD	
inch	(mm)	mm ± tolerances		UP TO 50	OVER 50 UP TO 75		LENGTH (m)				
						15	18	30	5.8	6	
3/16	(4.76)	0.71	± 0.04	127	105	0.081±0.004			●		
3/16	(4.76)	0.91	± 0.05	170	141	0.098±0.005			●		
1/4	(6.35)	0.56	± 0.03	71	59	0.091±0.005	●				
1/4	(6.35)	0.61	± 0.03	76	63	0.098±0.005	●				
1/4	(6.35)	0.71	± 0.04	92	76	0.112±0.006	●		●		
1/4	(6.35)	0.76	± 0.04	99	82	0.119±0.006	●				
1/4	(6.35)	0.91	± 0.05	121	101	0.139±0.007	●		●	●	
5/16	(7.94)	0.56	± 0.03	56	46	0.116±0.006	●				
5/16	(7.94)	0.71	± 0.04	72	60	0.179±0.009	●		●		
5/16	(7.94)	0.91	± 0.05	94	78	0.140±0.007	●		●		
3/8	(9.52)	0.56	± 0.03	46	38	0.140±0.003	●				
3/8	(9.52)	0.61	± 0.03	50	42	0.152±0.008	●				
3/8	(9.52)	0.71	± 0.04	59	49	0.175±0.009	●	●		●	
3/8	(9.52)	0.81	± 0.04	68	56	0.198±0.010	●				
3/8	(9.52)	0.91	± 0.05	77	64	0.219±0.011	●	●		●	
1/2	(12.70)	0.56	± 0.03	34	28	0.190±0.010	●				
1/2	(12.70)	0.61	± 0.03	37	31	0.206±0.010	●				
1/2	(12.70)	0.66	± 0.03	40	33	0.222±0.011	●				
1/2	(12.70)	0.71	± 0.04	43	36	0.238±0.012	●		●	●	
1/2	(12.70)	0.81	± 0.04	50	41	0.270±0.013	●				
1/2	(12.70)	0.91	± 0.05	57	47	0.300±0.015	●	●		1/2 H 1/2 H	
5/8	(15.88)	0.56	± 0.03	27	22	0.240±0.012	●				
5/8	(15.88)	0.61	± 0.03	29	24	0.261±0.013	●				
5/8	(15.88)	0.66	± 0.03	32	26	0.281±0.014	●				
5/8	(15.88)	0.71	± 0.04	34	29	0.302±0.015	●				
5/8	(15.88)	0.81	± 0.04	39	33	0.342±0.017	●				
5/8	(15.88)	0.91	± 0.05	45	37	0.381±0.019	●	●		1/2 H 1/2 H	
5/8	(15.88)	1.63	± 0.08	83	69	0.650±0.033	●				
3/4	(19.05)	0.56	± 0.03	22	19	0.290±0.014	●				
3/4	(19.05)	0.71	± 0.04	28	24	0.365±0.018	●				
3/4	(19.05)	0.91	± 0.05	37	31	0.462±0.023	●	●		1/2 H 1/2 H	
3/4	(19.05)	1.02	± 0.05	42	34	0.515±0.026				1/2 H 1/2 H	
3/4	(19.05)	1.07	± 0.05	44	36	0.539±0.027			●	●	
3/4	(19.05)	1.22	± 0.06	50	42	0.609±0.030					
7/8	(22.22)	0.91	± 0.05	31	26	0.543±0.027		●		●	
7/8	(22.22)	1.14	± 0.06	40	33	0.673±0.034			●	●	
7/8	(22.22)	1.22	± 0.06	43	35	0.717±0.036			●	●	
7/8	(22.22)	1.63	± 0.08	58	48	0.940±0.047			●	●	



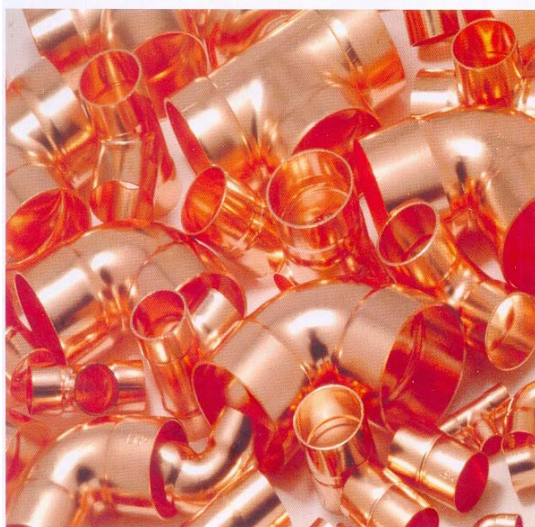
* AS ME B16.22

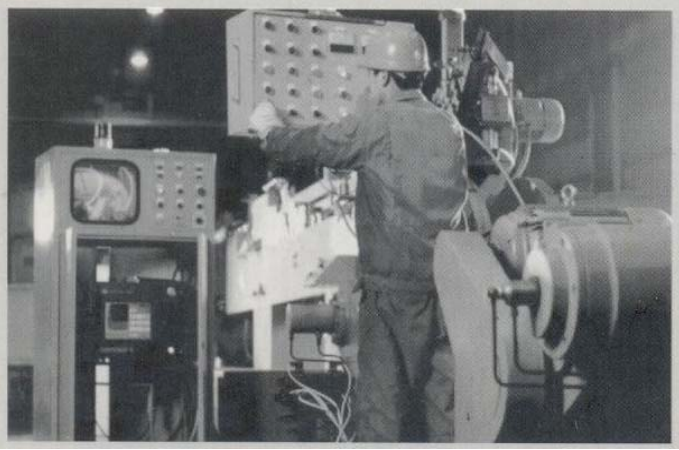
45° EQUAL ELBOW	90° EQUAL ELBOW	180° EQUAL ELBOW
L 16 L 19 L 22 L 25 L 28	L 16 L 19 L 22 L 25 L 28	L 16 L 19 L 22 L 25 L 28
L 35 L 42 L 54 L 67 L 76	L 35 L 42 L 54 L 67 L 76	L 35 L 42 L 54
L 108 L 133 L 159 L 219	L 108 L 133 L 159 L 219	

REDUCING CROSS	STRAIGHT COUPLING	CROSS
16 X 19 X 22 X 25 X	S 16 S 19 S 22 S 25 S 28	16 22 38 25
28 X 35 X 42 X 25 X	S 35 S 42 S 54 S 67 S 76	35 42 54
54 X 67 X 76 X 108 X	S 108 S 133 S 159 S 219	

CROSSOVER	EQUAL TEE	CAP
16 X 19 X 22 X 25 X	T 16 T 19 T 22 T 25 T 28	16 22 25 28
28 X 35 X 42 X 25 X	T 35 T 42 T 54 T 67 T 76	35 42 54
54 X 67 X 76 X 108 X	T 108 T 133 T 159 T 219	

REDUCING TEE			REDUCING COUPLING		
T 22 X 16	T 42 X 28	T 76 X 67	S 22 X 16	S 42 X 28	S 76 X 67
T 22 X 18	T 42 X 35	T 108 X 67	S 22 X 18	S 42 X 35	S 108 X 67
T 28 X 16	T 54 X 28	T 108 X 76	S 28 X 16	S 54 X 28	S 108 X 76
T 28 X 18	T 54 X 35	T 133 X 108	S 28 X 18	S 54 X 35	S 133 X 108
T 28 X 22	T 54 X 42	T 159 X 108	S 28 X 22	S 54 X 42	S 159 X 108
T 35 X 16	T 67 X 35	T 159 X 133	S 35 X 16	S 67 X 35	S 159 X 133
T 35 X 18	T 67 X 42	T 219 X 108	S 35 X 18	S 67 X 42	S 219 X 108
T 35 X 22	T 67 X 54	T 219 X 133	S 35 X 22	S 67 X 54	S 219 X 133
T 35 X 28	T 76 X 42	T 219 X 159	S 35 X 28	S 76 X 42	S 219 X 159
T 42 X 22	T 76 X 54		S 42 X 22	S 76 X 54	





THAILAI

TRADING TECHNICAL SERVICE CO., LTD.

Addr.: 207/52/22 Nguyen Van Dau, Ward 11,
Binhthanh Dist., Hochiminh City, Vietnam

Tel.: (+84 8) 6 2905 065 - 6 2678 438

Fax.: (+84 8) 6 2905 065

Email.: thailai@thailai.biz - thailaihvacr@yahoo.co.uk

Website: <http://www.thailai.biz>