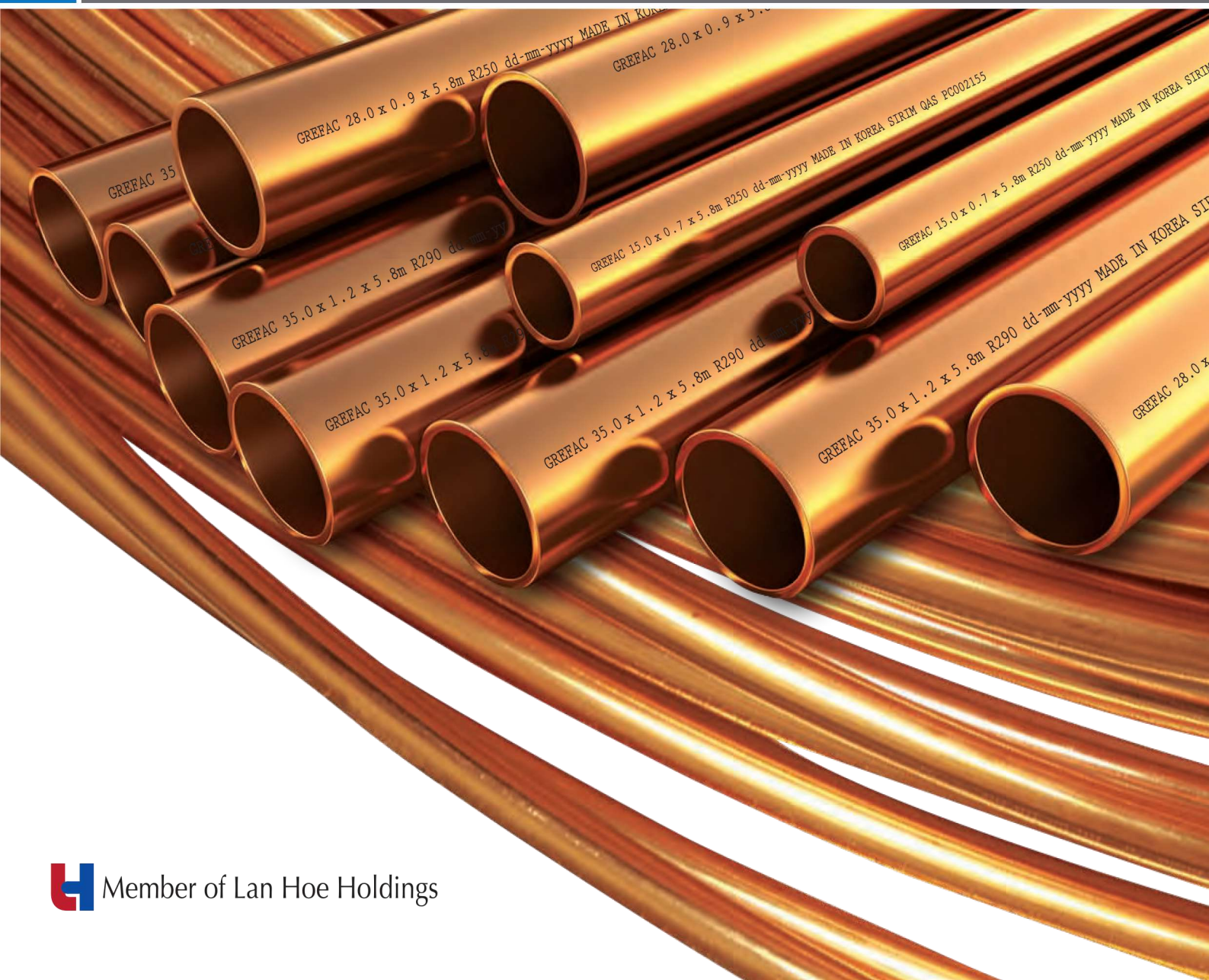


SEAMLESS ROUND COPPER PIPING

AS/NZS 1571:1995 for Air Conditioning & Refrigeration

EN1057 for Water & Gas in Sanitary & Heating

ASTM B 280 for Air Conditioning and Refrigeration Field Service





Message from Mr. C.H. Tan,
Group Managing Director

Lan Hoe Group of Companies believe firmly that "Integrity & Sincerity" hold the key to sustainable growth for our partners and associates. As a pioneer in the HVAC & Refrigeration Industry, we want to lead the industry with good business ethics and to convince our business partners to work together in transforming into the industry's most trustworthy & reputable entities

By "Integrity", we assure our clients that only genuine products are supplied by us. We take extensive measures to ensure all products supplied by us are genuine and this explains the continuous and strong support we had received from the industry's most reputable players.

Apart from genuine products, we are also committed to genuine relationship and cooperation with our clients. When we make a promise on our service and delivery, we always do our utmost best to deliver. Besides services to our clients, social responsibilities are equally important for industry leaders like Lan Hoe. For this reason, we allocate continuous efforts & resources to source for products that are energy efficient and also that could potentially reduce carbon footprint. We need to be ensure our future generations can enjoy a healthy & sustainable environment. All of these are what "Sincerity" meant for us in Lan Hoe Group.

Air-Conditioning, Heating & Refrigeration

For Air-Conditioning & Refrigeration System, what we need to really take note is about the pressure of the various type of refrigerants (freons) in any applications that our copper tubes or pipes are being used. Below is an extremely useful table for references :



Pressure-Temperature Conversion Chart

The table below gives values of saturated vapour pressures of some of the most common refrigerants. This table is supplied for guidance purposes only. Operating pressures for specific refrigerants should be obtained from your refrigerant supplier.

Temperature	°C °F	45.0 113.0	50.0 122.0	55.0 131.0	60.0 140.0	65.0 149.0	70.0 158.0
R134a	kPa psig	1054.0 152.8	1234.0 178.9	1383.0 200.5	1571.0 227.8	1789.0 259.4	2016.0 292.3
R22	kPa psig	1649.0 239.1	1855.0 269.0	2095.0 303.8	2345.0 340.0	2592.0 375.8	2895.0 419.8
R404A	kPa psig	1967.0 285.2	2224.0 322.5	2503.0 362.9	2805.0 406.7	3093.0 448.5	3292.0 477.3
R407C	kPa psig	1735.0 251.6	1970.0 285.7	2235.0 324.1	2520.0 365.4	2933.0 425.3	3262.0 473.0
R408A	kPa psig	1822.0 264.2	2060.0 298.7	2319.0 336.3	2600.0 377.0	2842.0 412.1	3160.0 458.2
R409A	kPa psig	1037.0 150.4	1191.0 172.7	1363.0 197.6	1550.0 224.8	1990.0 288.6	2217.0 321.5
R410A	kPa psig	2609.0 378.3	2945.0 427.0	3308.0 479.7	3702.0 536.8	4131.0 599.0	4599.0 666.9
R502	kPa psig	1766.0 256.1	1977.0 286.7	2215.0 321.2	2475.0 358.9	2865.0 415.4	3090.0 448.1
R507	kPa psig	2021.0 293.0	2281.0 330.7	2572.0 372.9	2890.0 419.1	3236.0 469.2	3566.0 517.1

Water, Gas, Chemicals & Sanitary

Why Copper ?

The benefits and advantages that copper has against many other available materials to handle water, chemicals and gas are so extensive that it is indisputable to be the best material we should be using. Compliance to the stringent quality standards BS EN 1057 further justify question : "Why Copper ?"

- ✓ **Value For Money**
A Superior Plumbing Material, Pays Better Even When Scapped
- ✓ **High Flow Rate & Proven Record**
- ✓ **Strong, Durable & Impermeable Characteristics**
- ✓ **Healthier**
Proven Studies by Copper Development Association (CDA, UK) - <Copper in Human Health>
- ✓ **Ultraviolet Resistant**
Eliminates Brittleness & Degradation
- ✓ **Non Flamable**
No Toxic Fumes During Fire
- ✓ **Quality Certified**
EN 1057 Approved by SIRIM


Now, That's Why It Has To Be COPPER !



Seamless Copper Tubes for AIR CONDITIONING & REFRIGERATION APPLICATIONS

These tubes are supplied in both hard drawn straight pipes 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 Air-Conditioning & Refrigeration applications.

Straight Pipes	OUTER DIAMETER (inch)	OUTER DIAMETER (mm)	WALL THICKNESS (mm)	NOMINAL WEIGHT (kg/m)	SAFE WORKING PRESSURE (Bar)		
					50° C < 75° C	75° C < 125° C	125° C < 150° C
	3/8"	9.52	0.71	0.176	120	120	110
			0.81	0.198	140	140	130
			0.91	0.220	160	160	150
			1.02	0.244	180	180	170
			1.22	0.285	220	220	210
	1/2"	12.7	0.71	0.239	90	90	80
			0.81	0.271	100	100	100
			0.91	0.301	110	110	110
			1.02	0.335	130	130	120
			1.22	0.394	160	160	150
	5/8"	15.88	0.71	0.303	70	70	70
			0.81	0.343	80	80	80
			0.91	0.383	90	90	90
			1.02	0.426	100	100	100
			1.22	0.503	120	120	120
	3/4"	19.05	0.71	0.366	60	60	50
			0.81	0.415	60	60	60
			0.91	0.464	70	70	70
			1.02	0.517	80	80	80
			1.22	0.611	100	100	100
	7/8"	22.22	0.71	0.429	50	50	50
			0.81	0.485	50	50	50
			0.91	0.545	60	60	60
			1.02	0.608	70	70	70
			1.22	0.720	80	80	80
	1 1/8"	28.58	0.71	0.556	30	30	30
			0.81	0.632	40	40	40
			0.91	0.708	50	50	40
			1.02	0.790	50	50	50
			1.22	0.938	60	60	60
	1 3/8"	34.92	0.71	0.683	30	30	30
			0.81	0.776	30	30	30
			0.91	0.870	40	40	40
			1.02	0.972	40	40	40
			1.22	1.155	50	50	50
	1 5/8"	41.28	0.81	0.921	30	30	30
			0.91	1.032	30	30	30
			1.02	1.154	30	30	30
			1.22	1.373	40	40	40
	2 1/8"	53.98	0.91	1.357	20	20	20
			1.02	1.518	30	30	20
			1.22	1.809	30	30	30
			1.63	2.394	40	40	40
	2 5/8"	66.68	1.22	2.244	20	20	20
			1.63	2.979	30	30	30
	3 1/8"	79.4	1.22	2.680	20	20	20
			1.63	3.562	30	30	30
			1.83	3.989	30	30	30

Annealed Coil	OUTER DIAMETER (inch)	OUTER DIAMETER (mm)	WALL THICKNESS (mm)	NOMINAL WEIGHT (kg/m)	SAFE WORKING PRESSURE (Bar)		
					50°C < 75°C	75°C < 125°C	125°C < 150°C
	1/4"	6.35	0.51	0.084	60	50	50
			0.56	0.091	60	60	60
			0.61	0.098	70	60	60
			0.71	0.113	80	80	70
			0.81	0.126	100	90	90
			0.91	0.139	110	100	100
			1.02	0.153	130	120	110
	3/8"	9.52	1.22	0.176	160	150	140
			0.51	0.129	40	30	30
			0.56	0.141	40	40	40
			0.61	0.153	40	40	40
			0.71	0.176	50	50	50
			0.81	0.198	60	60	50
			0.91	0.220	70	60	60
	1/2"	12.7	1.02	0.244	80	70	70
			1.22	0.285	100	90	90
			0.51	0.175	20	20	20
			0.56	0.191	30	30	30
			0.61	0.207	30	30	30
			0.71	0.239	40	30	30
			0.81	0.271	40	40	40
	5/8"	15.88	0.91	0.301	50	50	40
			1.02	0.335	60	50	50
			1.22	0.394	70	60	60
			0.56	0.241	20	20	20
			0.61	0.262	20	20	20
			0.71	0.303	30	30	30
			0.81	0.343	30	30	30
	3/4"	19.05	0.91	0.383	40	40	30
			1.02	0.426	40	40	40
			1.22	0.503	50	50	50
			0.61	0.316	20	20	20
			0.71	0.366	20	20	20
			0.81	0.415	30	20	20
			0.91	0.464	30	30	30
			1.02	0.517	30	30	30
			1.22	0.611	40	40	40

- Safe working pressures calculated for annealed copper.
- The average outside diameter of the 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 maximum order quantities required.

Specified outside diameter	Tolerance*	
	Straight Pipes	Annealed 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 ≤ 50.80	+0, -0.08	+0, -0.46
> 50.80 ≤ 101.60	+0, -0.15	-
> 101.60 ≤ 155.58	+0, -0.30	-

Hardness Requirements		
Temper	Vickness hardness, HV	
	Minimum	Maximum
H	100	-
1/2H	75	100
O	-	75

Physical Properties

Composition	Alloy C 12200 Copper = 99,90% min Phosphorus = 0.015~0.040%
Melting Point	981°F (1083°C)
Density	558 lb/ft ³ (8.94 x 10 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 (17000 MPa)

Cleaness

Tubes are manufactured to meet the internal residue requirement of 0.038g/M² maximum as specified in AS 1571 and unless otherwise requested, are supplied with ends sealed to prevent ingress of dirt and moisture.

*AS1571 seamless copper tube for air-conditioning & refrigeration

Seamless, Round Copper Tubes for WATER & GAS IN SANITARY & HEATING APPLICATIONS

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.



GREFAC AIRSHIELD PRO

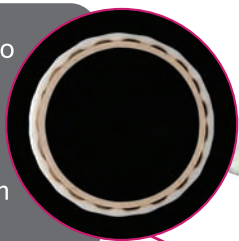
Grefac EN1057 Copper Pipes Can Also Come With AirShield Pro Plastic Sleeve Insulation With Air Gaps.

The Advantage Of Having AirShield Includes:

- Air Gaps Provide Thermal Barrier To Insulate Against Heat Loss
- Protection Against Corrosion When Concealed In Concrete
- Reduces Time & Cost To Prepare Base Pipes For Insulation
- Reduces Noise When Water, Chemical Or Gas Passes Through



With a plastic sleeve over quality to provides the benefits of fast installation plus improved thermal insulation, reduced noise transmission, condensation and protection from corrosion.



Size (mm)	Nominal Outside Diameter (mm)	Type X				Type Y			
		Nominal Wall Thickness (mm)	Nominal Weight (kg/length)	Temper	Safe Working Pressure (Bar) up to 65°C	Nominal Wall Thickness (mm)	Nominal Weight (kg/length)	Temper	Safe Working Pressure (Bar) up to 65°C
15	15	0.7	1.63	HH (R250)	58.7	1.0	2.28	HH (R250)	85.7
22	22	0.9	3.09	HH (R250)	51.2	1.2	4.07	HH (R250)	69.2
28	28	0.9	3.97	HH (R250)	39.9	1.2	5.24	HH (R250)	53.7
35	35	1.2	6.61	HD (R290)	51.5	1.5	8.18	HD (R290)	64.9
42	42	1.2	7.97	HD (R290)	42.6	1.5	9.89	HD (R290)	53.7
54	54	1.2	10.32	HD (R290)	33.0	2.0	16.94	HD (R290)	55.8
67	67	1.2	12.86	HD (R290)	26.6	2.0	21.17	HD (R290)	44.8
76	76	1.5	18.20	HD (R290)	29.2	2.0	24.10	HD (R290)	39.1
108	108	1.5	26.02	HD (R290)	20.4	2.5	42.96	HD (R290)	34.4
133	133	1.5	32.13	HD (R290)	16.5	-	-	-	-
159	159	2.0	51.14	HD (R290)	18.5	-	-	-	-

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

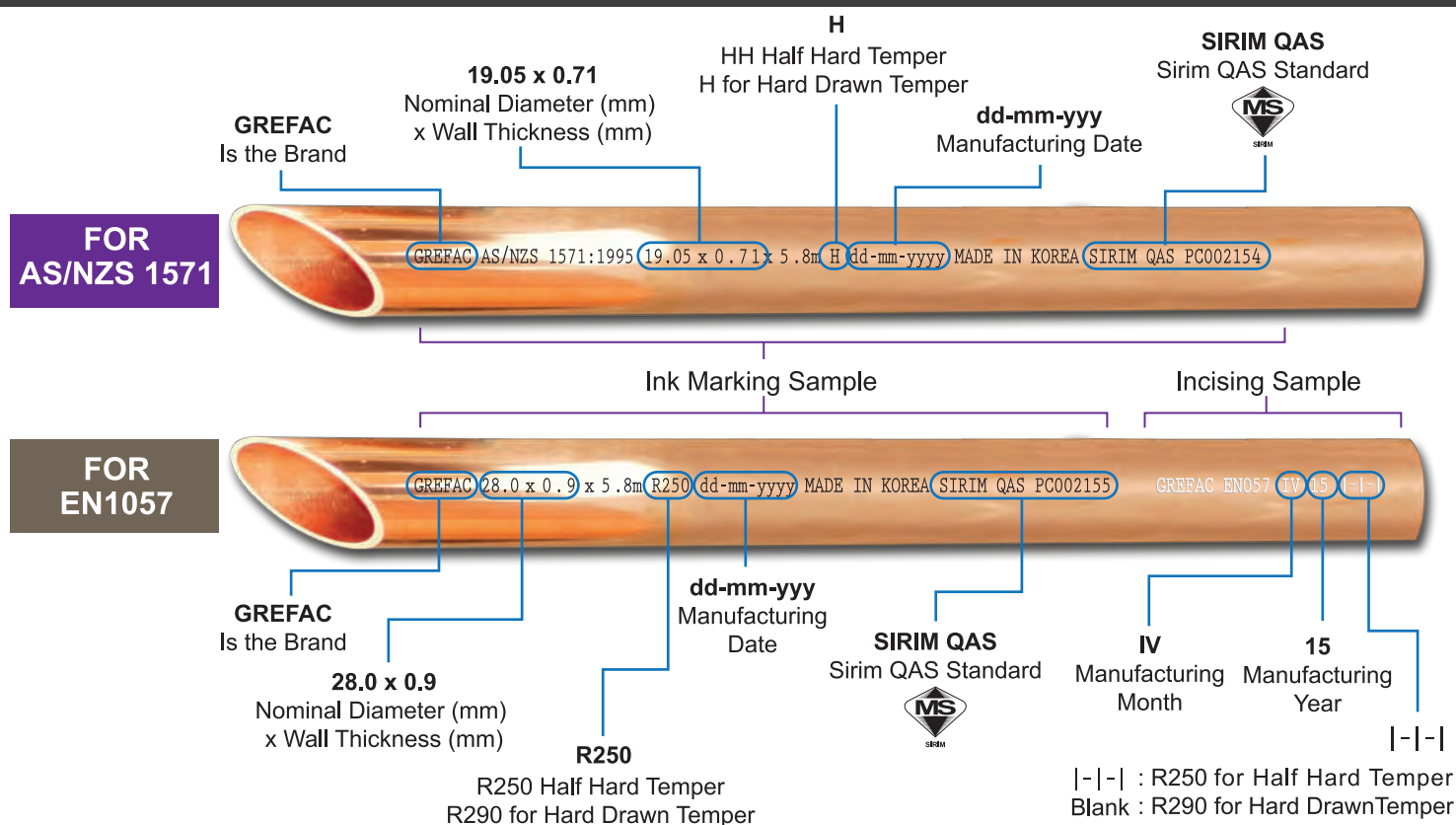
* Based on material in hard drawn condition at 65°C

* 1 Bar = 0.1N/mm² = 10⁵ Nm²

Mechanical Properties

Material Condition		Nominal Outside Diameter		Tensile Strength	Elongation	Hardness (Indicative)
Designation in Accordance with EN 1173	Common Term	d mm		R_m MPa	A %	HV/5
		Min	Max	Min	Min	
R250	Half Hard	15	28	250	30	75 to 100
R290	Hard	35	159	290	3	min 100

INK MARKING & INCISING INDICATION



Straight type	Actual	Outside Diameter			Wall Thickness			Theoretical Weight	
	Size	Inch	mm	Tolerance (inch)	Inch	mm	Tolerance (inch)	lb/ft	kg/m
	3/8"	0.375	9.52	0.001	0.03	0.762	0.003	0.126	0.187
	1/2"	0.5	12.7	0.001	0.035	0.889	0.004	0.198	0.295
	5/8"	0.625	15.9	0.001	0.04	1.02	0.004	0.285	0.424
	3/4"	0.75	19.1	0.001	0.042	1.07	0.004	0.362	0.539
	7/8"	0.875	22.2	0.001	0.045	1.14	0.004	0.455	0.677
	1 1/8"	1.125	28.6	0.0015	0.05	1.27	0.005	0.655	0.975
	1 3/8"	1.375	34.9	0.0015	0.055	1.4	0.006	0.884	1.32
	1 5/8"	1.625	41.3	0.002	0.06	1.52	0.006	1.14	1.7
	2 1/8"	2.125	54	0.002	0.07	1.78	0.007	1.75	2.6
	2 5/8"	2.625	66.7	0.002	0.08	2.03	0.008	2.48	3.69
	3 1/8"	3.125	79.4	0.002	0.09	2.29	0.009	3.33	4.96
	3 5/8"	3.625	92.1	0.002	0.1	2.54	0.01	4.29	6.38
	4 1/8"	4.125	105	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 Copper Tube

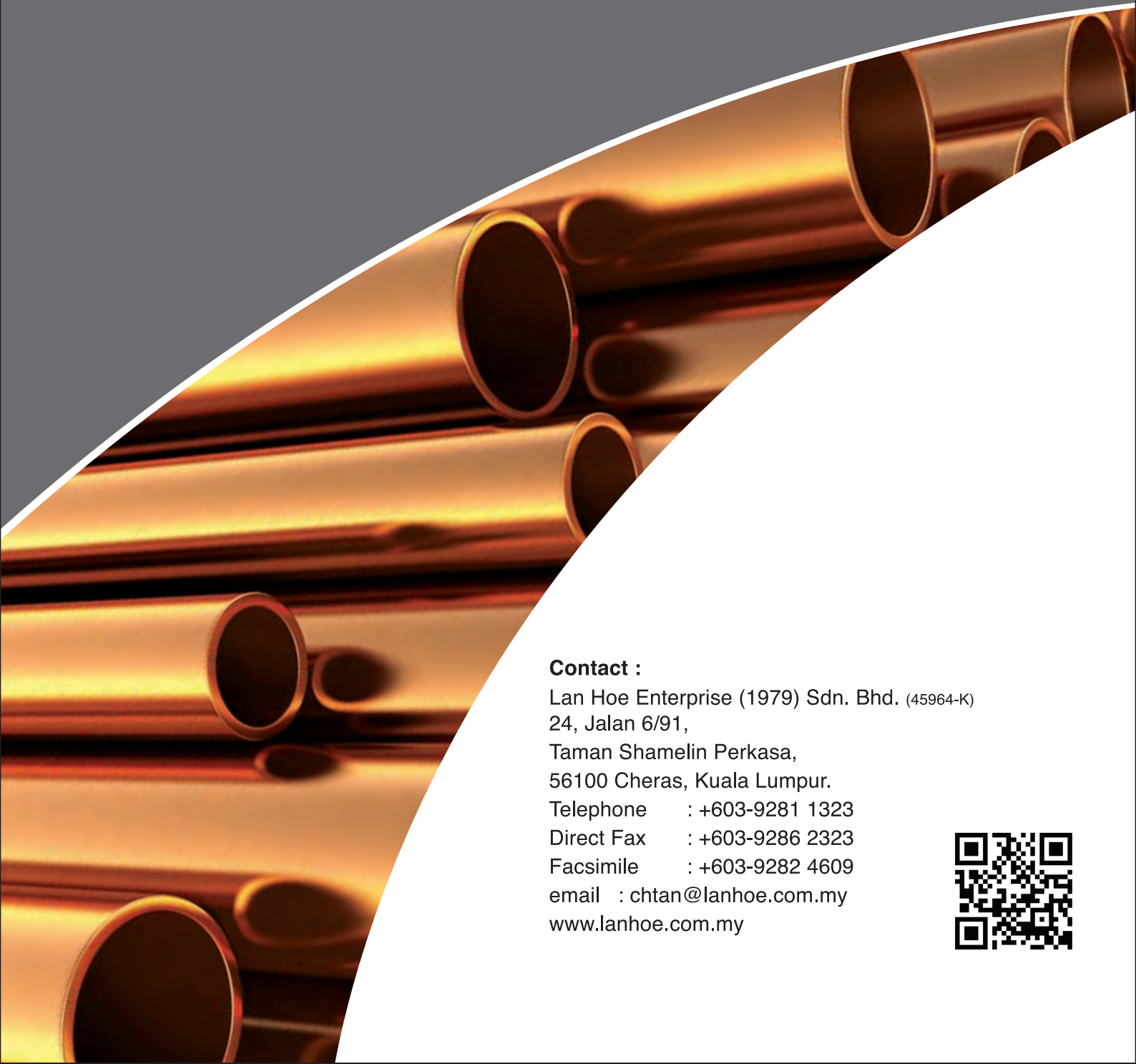
Composition	Alloy C12200 Copper = 99.90% min Phosphorus = 0.015~0.040%
Melting Point	0981°F (1083°C)
Density	558lb/ft³ (8.94 × 10³ kg/m³)
Thermal Expansion	0.00118 in/10°F .ft (0.177mm/10°C.m)
Modulus of Elasticity	2.46 10⁶ psi (17,000MPa)

Cleanness

Tubes are manufactured to meet the internal residue requirement of 0.038g/M² maximum as specified in ASTM B 280 and unless otherwise requested, are supplied with ends sealed to prevent ingress of dirt and moisture.

Keeping you Cool and Healthy





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