LAN HOE

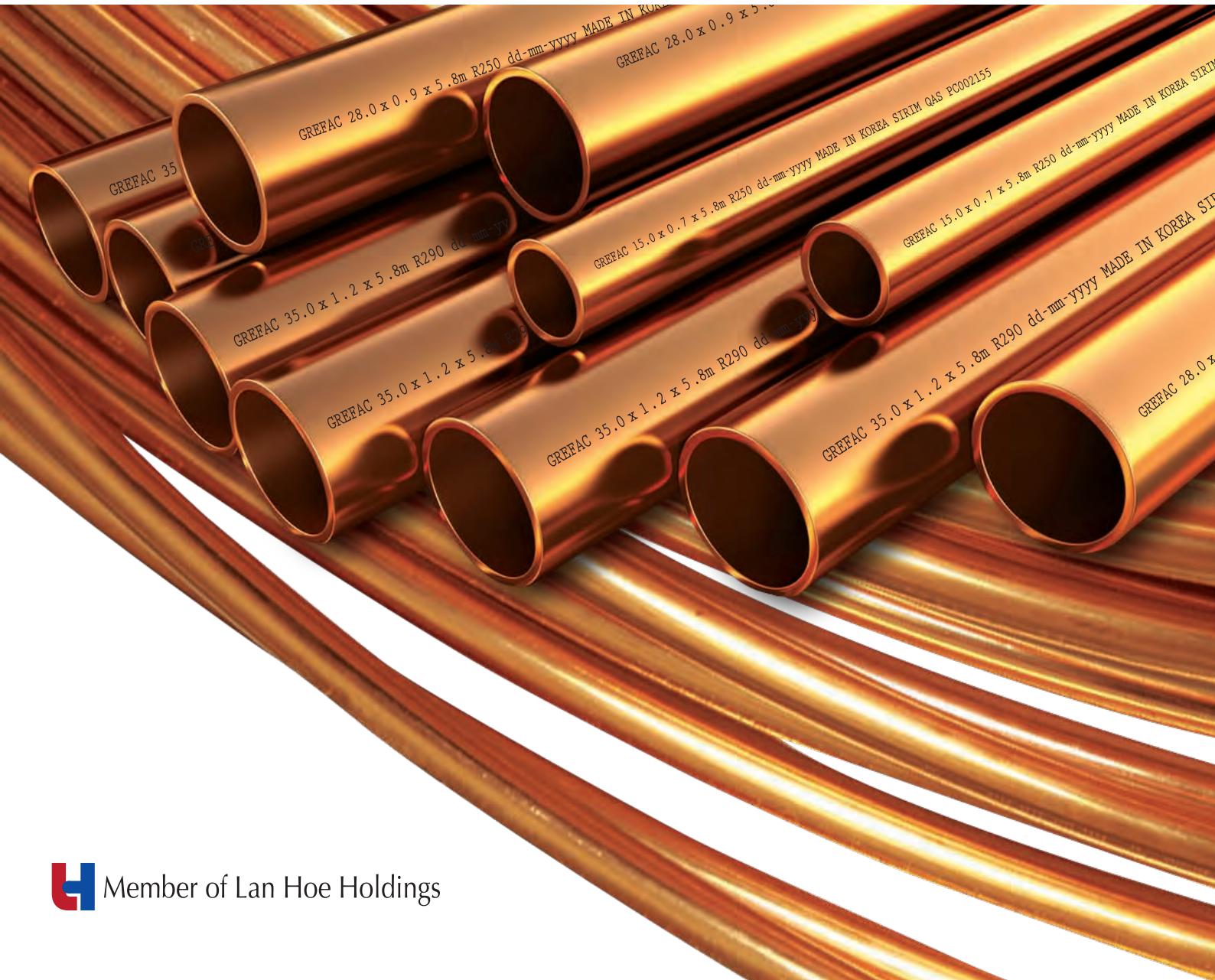
grefac®
Refrigeration Solutions

# SEAMLESS ROUND COPPER PIPING

**AS/NZS 1571:1995** for Air Conditioning & Refrigeration

**EN1057** for Water & Gas in Sanitary & Heating

MS
SIRIM




Member of Lan Hoe Holdings

# INTRODUCTION

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<br>°F | 45.0<br>113.0 | 50.0<br>122.0 | 55.0<br>131.0 | 60.0<br>140.0 | 65.0<br>149.0 | 70.0<br>158.0 |
|---|---|---|---|---|---|---|---|
| R134a | kPa<br>psig | 1054.0<br>152.8 | 1234.0<br>178.9 | 1383.0<br>200.5 | 1571.0<br>227.8 | 1789.0<br>259.4 | 2016.0<br>292.3 |
| R22 | kPa<br>psig | 1649.0<br>239.1 | 1855.0<br>269.0 | 2095.0<br>303.8 | 2345.0<br>340.0 | 2592.0<br>375.8 | 2895.0<br>419.8 |
| R404A | kPa<br>psig | 1967.0<br>285.2 | 2224.0<br>322.5 | 2503.0<br>362.9 | 2805.0<br>406.7 | 3093.0<br>448.5 | 3292.0<br>477.3 |
| R407C | kPa<br>psig | 1735.0<br>251.6 | 1970.0<br>285.7 | 2235.0<br>324.1 | 2520.0<br>365.4 | 2933.0<br>425.3 | 3262.0<br>473.0 |
| R408A | kPa<br>psig | 1822.0<br>264.2 | 2060.0<br>298.7 | 2319.0<br>336.3 | 2600.0<br>377.0 | 2842.0<br>412.1 | 3160.0<br>458.2 |
| R409A | kPa<br>psig | 1037.0<br>150.4 | 1191.0<br>172.7 | 1363.0<br>197.6 | 1550.0<br>224.8 | 1990.0<br>288.6 | 2217.0<br>321.5 |
| R410A | kPa<br>psig | 2609.0<br>378.3 | 2945.0<br>427.0 | 3308.0<br>479.7 | 3702.0<br>536.8 | 4131.0<br>599.0 | 4599.0<br>666.9 |
| R502 | kPa<br>psig | 1766.0<br>256.1 | 1977.0<br>286.7 | 2215.0<br>321.2 | 2475.0<br>358.9 | 2865.0<br>415.4 | 3090.0<br>448.1 |
| R507 | kPa<br>psig | 2021.0<br>293.0 | 2281.0<br>330.7 | 2572.0<br>372.9 | 2890.0<br>419.1 | 3236.0<br>469.2 | 3566.0<br>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 & Degrading
- **Non Flamable**
  No Toxic Fumes During Fire
- **Quality Certified**
  EN 1057 Approved by SIRIM

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

# AS/NZS 1571 : 1995

## 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 |

*Artwork images are subject to change based on Authority Approval

# AS/NZS 1571 : 1995

## 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 |
| | | 1.22 | 0.176 | 160 | 150 | 140 |
| 3/8” | 9.52 | 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 |
| | | 1.02 | 0.244 | 80 | 70 | 70 |
| | | 1.22 | 0.285 | 100 | 90 | 90 |
| 1/2” | 12.7 | 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 |
| | | 0.91 | 0.301 | 50 | 50 | 40 |
| | | 1.02 | 0.335 | 60 | 50 | 50 |
| | | 1.22 | 0.394 | 70 | 60 | 60 |
| 5/8” | 15.88 | 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 |
| | | 0.91 | 0.383 | 40 | 40 | 30 |
| | | 1.02 | 0.426 | 40 | 40 | 40 |
| | | 1.22 | 0.503 | 50 | 50 | 50 |
| 3/4” | 19.05 | 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 |
| | Phosphurus = 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) |

## Cleanness

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

*Artwork images are subject to change based on Authority Approval

# EN 1057

## 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 :

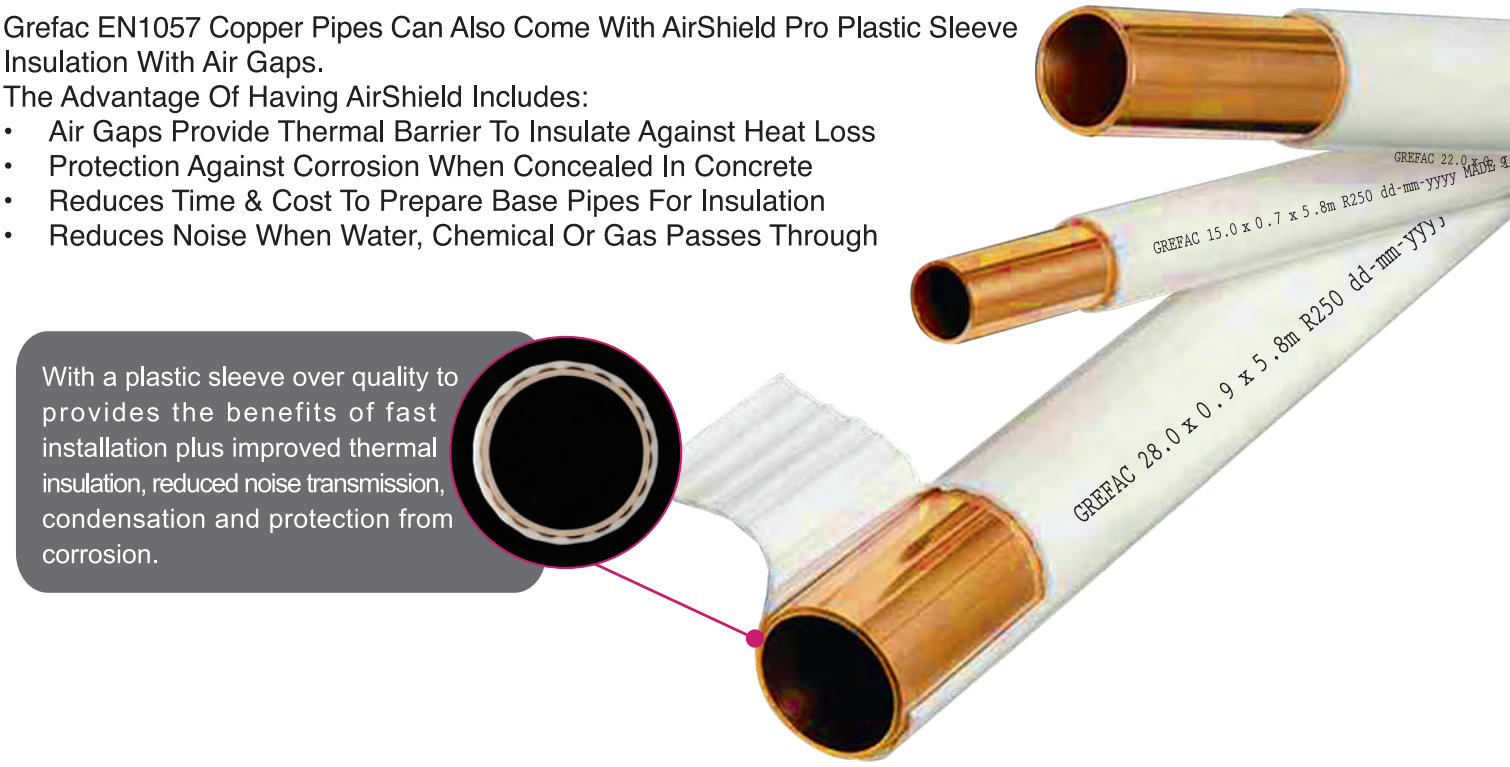
- Distributing networks for hot water and cold water
- Hot water heating systems, including panel heating systems (under-floor, wall, overhead)
- Domestic gas and liquid fuel distribution
- Waste water sanitation

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

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# EN 1057

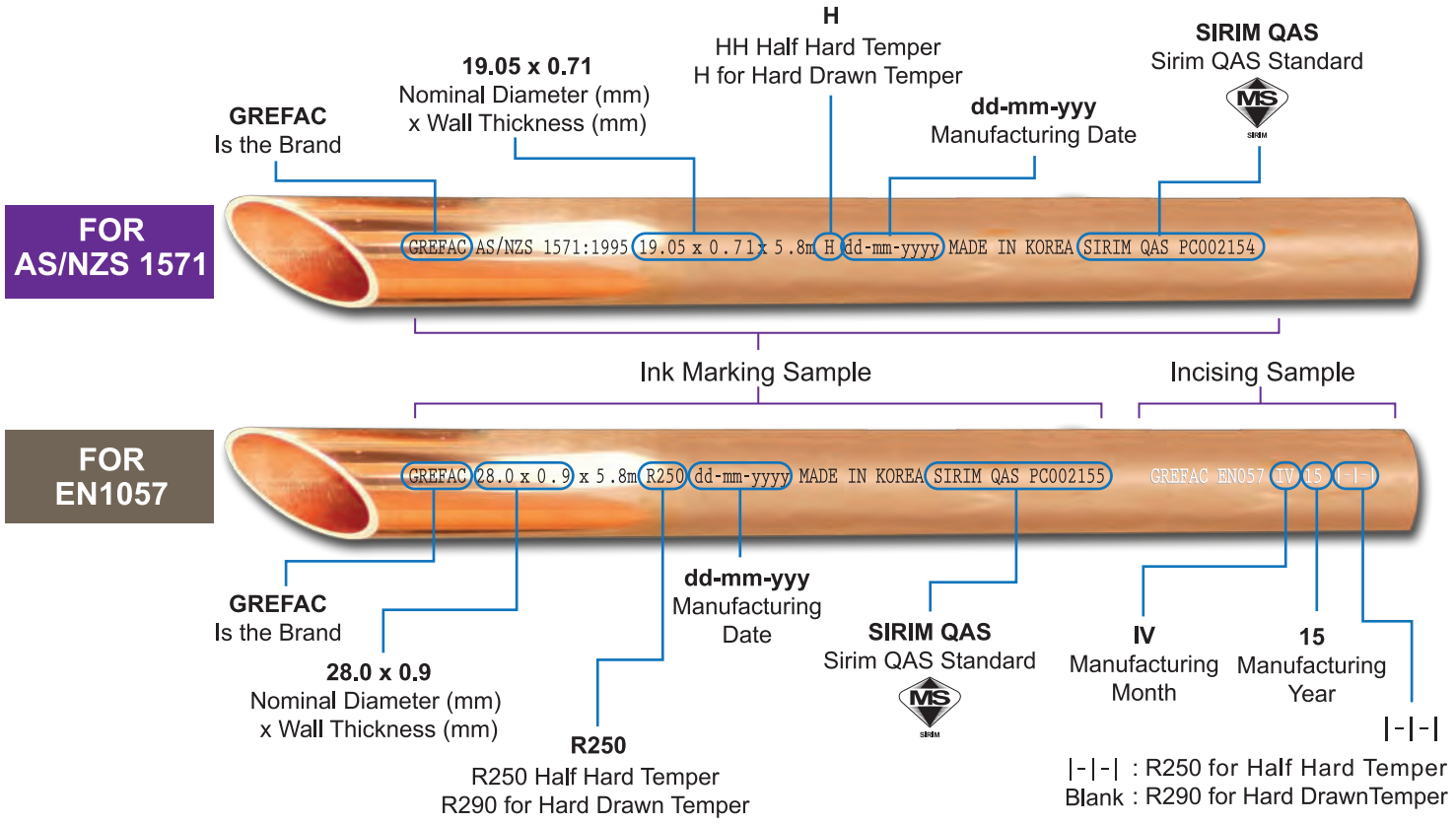
| Size (mm) | Nominal Outside Diameter (mm) | Type X | | | | Type Y | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Nominal Wall Thickness (mm) | Nominal Weight (kg/length) | Temper | Safe Working Pressure (Bar) up to 65˚C | Nominal Wall Thickness (mm) | Nominal Weight (kg/length) | Temper | 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/mm$^2$ = 10$^5$ Nm$^2$

## Mechanical Properties

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

## INK MARKING & INCISING INDICATION

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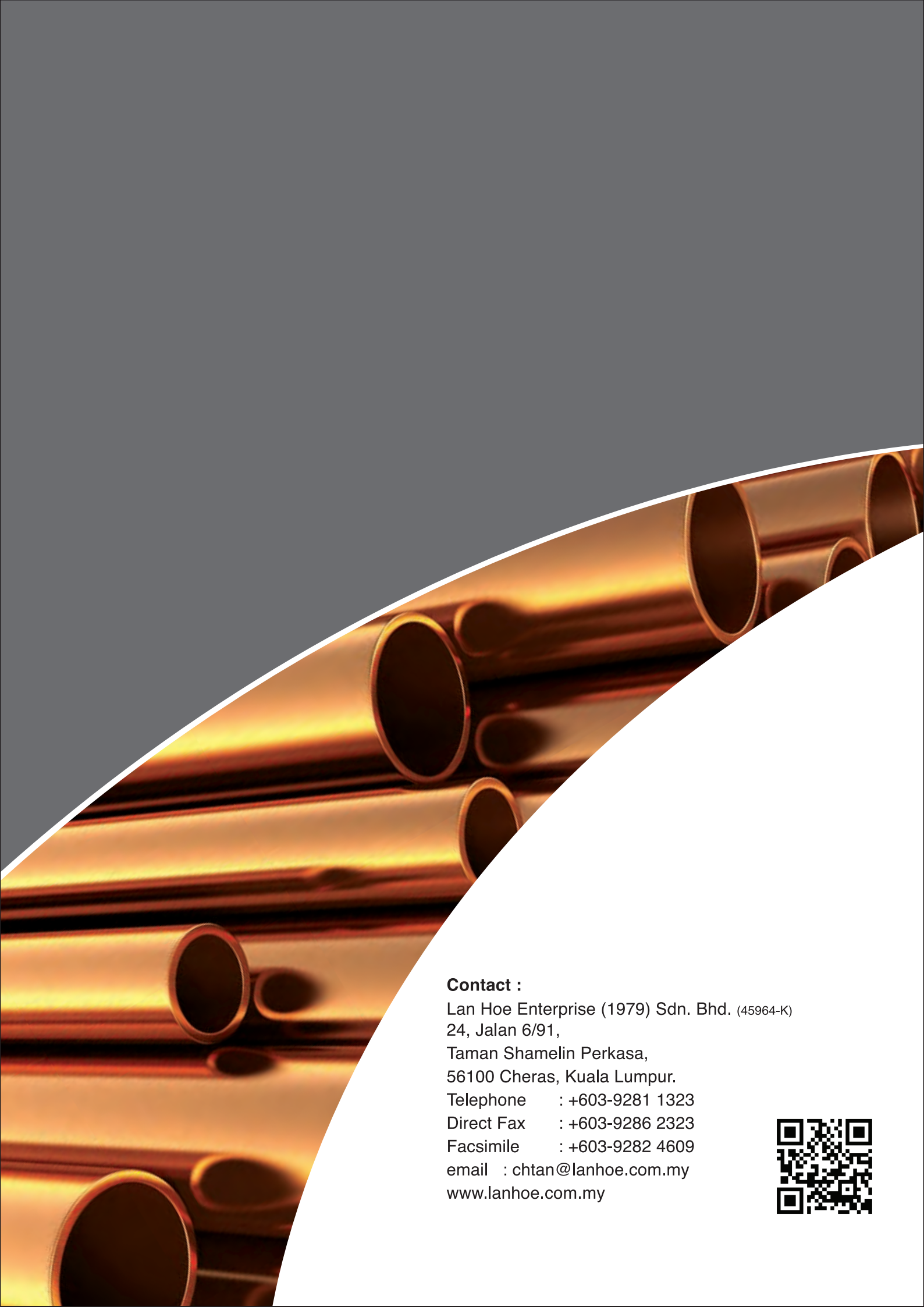

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