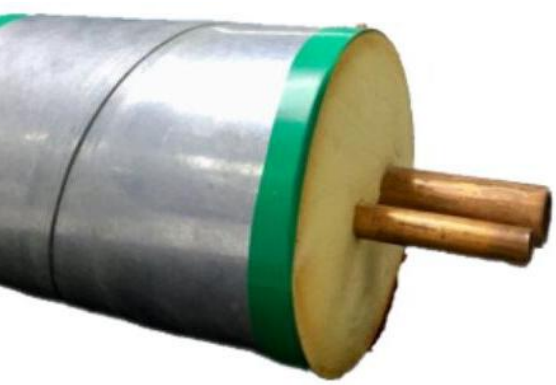
INSAFOAM

INSACOPPER PREINSULATED COPPER PIPE

Catalogue



REFRIGERATION GRADE COPPER TUBES

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InsaCopper Pipes are proud of their ability to supply a wide range of refrigeration and air conditioning tubes. These tubes are supplied in both hard drawn straight length and annealed coils, after meticulous cleaning, dehydrating and capping, to ensure that the internal cleanliness standards are fully met.

Standard Export Lengths

Form	Temper	Length (m)
Straight	Half Hard - HH	5.8
Straight	Hard Drawn - H	5.8
Pancake Coil	Annealed - O	15

Highly effective and economical loading of 20 feet containers can be achieved, using 5.8 metre lengths for straight tubes. Lengths of 20 feet can be supplied, however this requires the use of 40 feet containers and possibly less effective loading.

Manufacturing Standards

Code	Copper Alloy No.	Chemical Requirement
American ASTM B280	UNS. C12200	Cu99.9% min. P 0.015-0.040%
Australian AS1571 / JIS H 3300	C12200	Cu99.9% min. P 0.015% min. 0.040% max.

Cleanness Requirements

All tubes are cleaned and sample tested to meet the residual requirements as specified by the codes at 0.038g/m^2(0.035g/ft^2).

Tube Integrity

All tubes are electronically tested by Eddy Current method, to the requirements of ASTM E 243.

Tolerances: Thickness

The standard thickness at any point tolerance for tube either coiled or in straight length is ±10% of the specified thickness.

COMMERCIAL GRADE
JAPAN STANDARD JIS H3300
AMERICAN STANDARD ASTM B280

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Copper Refrigeration tubes, soft temper to ASTM B280 or JIS H3300, in coil, end capped, in plastic (or shrink wrapped) bag in cardboard box - 15 meter length.

Coil type

Standard Size		Wall Thickness		Nominal Tube Weight (kg/m)	Safety Working Pressure			
OD		tm	SWG		PSW			
Inch	mm	mm			kPa(50 °C)	kPa(75 °C)	Psi(50 °C)	Psi(75 °C)
3/16	4.76	0.51	25	0.061	8746	7253	1268	1052
		0.56	24	0.066	9705	8048	1407	1167
		0.61	23	0.071	10684	8860	1549	1285
1/4	6.35	0.51	25	0.083	6389	5298	926	768
		0.56	24	0.091	7069	5862	1025	850
		0.61	23	0.098	7760	6435	1125	933
		0.71	22	0.112	9175	7608	1330	1103
		0.81	21	0.126	10635	8819	1542	1279
		0.91	20	0.139	12142	10069	1761	1460
5/16	7.94	0.51	25	0.106	5033	4174	730	605
		0.56	24	0.116	5560	4610	806	669
		0.61	23	0.125	6093	5053	883	733
		0.71	22	0.144	7179	5954	1041	863
		0.81	21	0.162	8293	6877	1202	997
		0.91	20	0.179	9434	7824	1368	1134
3/8	9.53	0.51	25	0.129	4152	3443	602	499
		0.56	24	0.141	4581	3799	664	551
		0.61	23	0.152	5015	4159	727	603
		0.71	22	0.175	5897	4890	855	709
		0.81	21	0.198	6796	5636	985	817
		0.91	20	0.220	7714	6397	1119	928
1/2	12.70	0.51	25	0.174	3075	2550	446	370
		0.56	24	0.190	3389	2810	491	407
		0.61	23	0.206	3705	3072	537	445
		0.71	22	0.238	4344	3603	630	522
		0.81	21	0.270	4994	4141	724	600
		0.91	20	0.302	5653	4689	820	680
		1.20	18	0.386	7621	6320	1105	916
5/8	15.88	0.56	24	0.240	2689	2230	390	323
		0.61	23	0.261	2937	2436	426	353
		0.71	22	0.302	3439	2852	499	414
		0.81	21	0.342	3947	3273	572	475
		0.91	20	0.381	4461	3699	647	536
		1.02	19	0.424	5033	4174	730	605
3/4	19.05	0.61	23	0.315	2433	2018	353	293
		0.71	22	0.365	2846	2360	413	342
		0.81	21	0.414	3263	2706	473	392
		0.91	20	0.462	3684	3055	534	443
		1.22	18	0.609	5015	4159	727	603

AUSTRALIA STANDARD AS 1571 - 1985
JAPAN STANDARD JIS H3300

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Straight copper seamless tube for Air Conditioning and Refrigeration.
As 1571 / JIS H3300 copper pipe x 5.8 meter length wall (Straight Hard Drawn).

Straight type

Standard Size OD		Thickness		Weight	Safety Working Pressure			
Inch	mm	tm	swg	(kg/m)	kPa(50 °C)	kPa(75 °C)	Psi(50 °C)	Psi(75 °C)
1/4	6.35	0.71	22	0.113	9175	7608	1330	1130
		0.81	21	0.125	10635	8819	1542	1279
		0.91	20	0.139	12142	10069	1761	1460
		1.22	18	0.175	17143	14216	2486	2061
3/8	9.53	0.71	22	0.175	5897	4890	855	709
		0.81	21	0.197	6796	5636	985	817
		0.91	20	0.220	7714	6397	1119	928
		1.22	18	0.283	10684	8860	1549	1285
1/2	12.7	0.71	22	0.239	4344	3603	630	522
		0.81	21	0.269	4994	4141	724	600
		0.91	20	0.302	5653	4687	820	680
		1.22	18	0.392	7760	6435	1125	933
5/8	15.88	0.71	22	0.303	3439	2852	499	414
		0.81	21	0.341	3947	3273	572	475
		0.91	20	0.383	4461	3699	647	536
		1.02	19	0.424	5033	4174	730	605
		1.22	18	0.500	6093	5053	883	733
3/4	19.05	0.71	22	0.366	2846	2360	413	342
		0.81	21	0.413	3263	2706	473	392
		0.91	20	0.464	3684	3055	534	443
		1.07	L	0.541	4366	3621	633	525
		1.22	18	0.609	5015	4159	727	603
7/8	22.23	0.71	22	0.427	2427	2013	352	292
		0.81	21	0.485	2781	2306	403	334
		0.91	20	0.545	3137	2602	455	377
		1.14	L	0.673	3969	3291	575	477
		1.22	18	0.717	4260	3533	617	512

Safe working pressures calculated for annealed copper

$$PSW = \frac{1800 \times SD \times tm}{D - 0.9tm}$$

SD = Max Allowable Design Stress for Annealed Copper in Mega Pascal
tm = Min Thickness Any Point, mm
D = Max Mean Outside Diameter, mm
T = Temperature Factor

Temperature Range (°C)	Max Allowable Design Tensile Stress (S_D) (MPa)	T
Up to 50	41	1.00
Over 50-75	34	0.83
Over 75-125	33	0.80
Over 125-150	32	0.78
Over 150-175	28	0.68
Over 175-200	21	0.51

The testing pressures for copper plumbing installations should not exceed 1.5 times the safe working pressure.
Note: 1 kPa = 0.145 psi & 100 kPa = 1 bar.

Standard Size OD		Thickness		Weight	Safety Working Pressure			
Inch	mm	tm	swg	(kg/m)	kPa(50 °C)	kPa(75 °C)	Psi(50 °C)	Psi(75 °C)
1 1/8	28.58	0.71	22	0.554	1876	1555	272	226
		0.81	21	0.629	2147	1780	311	258
		0.91	20	0.708	2420	2006	351	291
		1.22	18	0.934	3277	2717	475	394
		1.27	L	0.971	3416	2802	495	406
1 3/8	34.93	0.71	22	0.680	1528	1268	222	184
		0.81	21	0.775	1728	1450	253	210
		0.91	20	0.870	1969	1633	286	237
		1.07	M	1.014	2325	1928	337	280
		1.22	18	1.157	2662	2208	386	320
		1.40	17	1.314	3069	2545	445	369
1 5/8	41.28	0.81	21	0.917	1474	1222	213	177
		0.91	20	1.029	1660	1377	241	200
		1.22	18	1.369	2279	1880	330	274
		1.52	L	1.692	2811	2331	408	338
2 1/8	53.98	1.02	19	1.517	1419	1177	206	171
		1.22	18	1.803	1709	1412	247	205
		1.78	L	2.601	2508	2080	364	302
		1.47	M	2.161	2060	1708	298	247
2 5/8	66.68	1.22	18	2.236	1371	1139	199	165
		1.50	16	3.004	1868	1549	271	225
		2.03	L	3.674	2310	1916	335	278
3 1/8	79.38	1.22	18	2.680	1150	954	167	138
		1.50	-	3.270	1419	1177	206	171
		1.83	M	3.980	1738	1441	252	209
		2.29	L	4.950	2186	1813	317	263
3 5/8	92.08	1.50	-	3.804	1220	1012	177	147
		2.11	M	5.330	1727	1432	250	208
		2.54	L	6.390	2088	1731	303	251
4 1/8	104.78	1.50	-	4.337	1070	888	155	129
		2.41	M	6.930	1733	1437	251	208
		2.79	L	7.990	2013	1670	292	242

Imperial Standard Wire Gauges (SWG)

SWG NO.	in	mm	SWG NO.	in	mm	SWG NO.	in	mm
14	0.088	20.3	19	0.040	1.02	24	0.022	0.56
15	0.072	1.83	20	0.036	0.91	25	0.020	0.51
16	0.064	1.63	21	0.032	0.81			
17	0.056	1.42	22	0.028	0.71			
18	0.048	1.22	23	0.024	0.61			

PRESSURE-TEMPERATURE DATA FOR COMMON REFRIGERANTS

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

Temp	°C	45°C	50°C	55°C	60°C	65°C	70°C
	°F	113°F	122°F	131°F	140°F	149°F	158°F
R11	kPa	105.0	140.0	176.0	212.0	252.0	307.0
	psig	15.2	20.3	25.5	30.7	36.5	44.5
R12	kPa	981.0	1120.0	1268.0	1428.0	1586.0	1784.0
	psig	142.2	162.4	183.9	207.1	230.0	258.7
R123	kPa	78.0	114.0	147.0	182.0	228.0	276.0
	psig	11.3	16.5	21.3	26.4	33.1	40.0
R134A	kPa	1054.0	1234.0	1383.0	1571.0	1789.0	2016.0
	psig	152.8	178.9	200.5	227.8	259.4	292.3
R22	kPa	1649.0	1855.0	2095.0	2345.0	2592.0	2895.0
	psig	239.1	269.0	303.8	340.0	375.8	419.8
R404A	kPa	1967.0	2224.0	2503.0	2805.0	3093.0	3292.0
	psig	285.2	322.5	362.9	406.7	448.5	477.3
R407C	kPa	1735.0	1970.0	2235.0	2520.0	2933.0	3262.0
	psig	251.6	285.7	324.1	365.4	425.3	473.0
R408A	kPa	1822.0	2060.0	2319.0	2600.0	2842.0	3160.0
	psig	264.2	298.7	336.3	377.0	412.1	458.2
R409A	kPa	1037.0	1191.0	1363.0	1550.0	1990.0	2217.0
	psig	150.4	172.7	197.6	224.8	288.6	321.5
R410A	kPa	2609.0	2945.0	3308.0	3702.0	4131.0	4599.0
	psig	378.3	427.0	479.7	536.8	599.0	666.9
R502	kPa	1766.0	1977.0	2215.0	2475.0	2865.0	3090.0
	psig	256.1	286.7	321.2	358.9	415.4	448.1
R507	kPa	2021.0	2281.0	2572.0	2890.0	3236.0	3566.0
	psig	293.0	330.7	372.9	419.1	469.2	517.1

SUPER POWER PRE - INSULATED INSACOPPER DUAL COPPER PIPES

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Introduction

Super Power Pre-Insulated InsaCopper Dual Copper Pipes is a fully factory fabricated, insulated and jacketed copper piping system for distribution of Refrigeration and Air conditioning systems

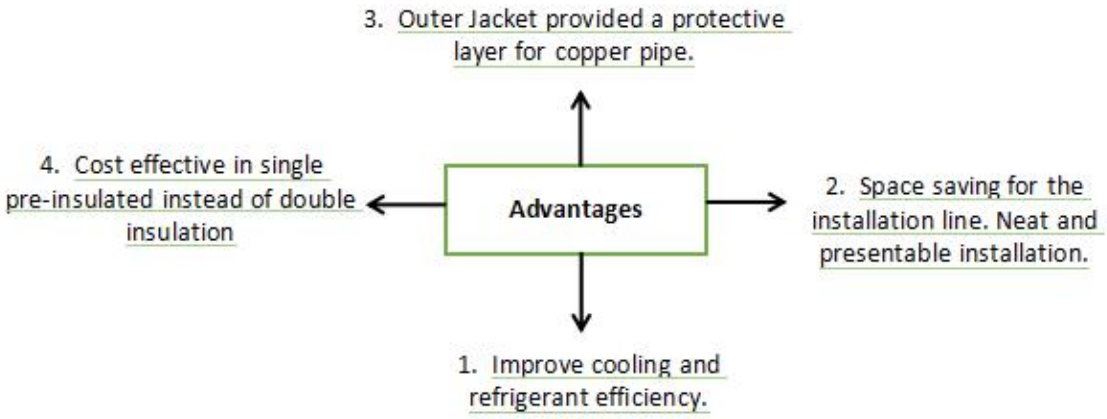
INSAFOAM INSULATION SDN. BHD.
ISO Approval Certificated No: 2174

Super Power Pre-Insulated InsaCopper Dual Copper Pipes consisted of:

Application Field

- Ice Plants
- Pharmaceutical Plants
- Wineries
- VRV Air Conditioning System
- Food Processing Facilities
- Cold Storages and Blast Freezers
- Hypermarkets and Supermarkets
- Airport

Advantages of Super Power



Technical Specification

Component 1: Carrier Pipes: InsaCopper Copper Pipes

The carrier pipe shall be distribution of Refrigerants R22, R410, R404A, R507A and 407C.

Copper Pipes Standards and Mechanical Properties

Code	Copper Alloy No.	Chemical Requirement
American ASTM B280	UNS. C12200	Cu 99.9% min. P 0.015-0.040%
Australian AS 1571	C12200	Cu 99.9% min.
JIS H3300		P 0.015% min. 0.040% max

Copper Standard Export Length

Form	Temper	Length (m)
Straight	Hard Drawn	5.8

Note: Selection of refrigerant and air conditioning piping wall thickness.
To select a copper pipe with thickness that corresponds to the refrigerant and can withstand the working pressure. For safety purpose, kindly refer to pressure-temperature data for common refrigerant chart as attached.

Component 2: Insulation of rigid Polyurethane foam and physical properties:

Unit	Value
Density	**45 kg/m³**
Thermal Conductivity	**Max 0.024 W/m°C @ 24°C mean**
Compressive Strength	**Min 200 kPa**
Closed Cell Content	**Min 90% by volume**

Insulation thickness shall be determined taking into consideration of the condensation foaming on the outer jacket under the following climatic condition.

Ambient temp.	RH%	Refrigerant media temp (°C)
35°C	80	Refer to system
30°C	85	Refer to system

Minimum Polyurethane insulation thickness shall be as follows:

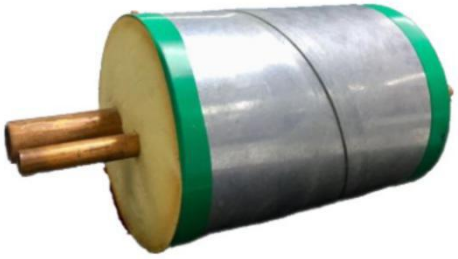
Minimum Polyurethane wall thickness	Copper pipe sizes
25 mm	3/8'', 1/2'', 5/8'', 3/4''
35 mm - 42 mm	7/8'', 1 1/8'', 1 3/8'', 1 5/8''
50 mm	2 1/8'', 2 5/8'', 3 1/8'', 4 1/8''

Component 3: Jacket

The jacket material shall be sufficiently sized to allow for desired insulation thickness for optimum performance of system.

Jacket available material:

1. Galvanized Iron (Internal Lockseamed)
2. HDPE
3. Aluminium (Internal Lockseamed)
4. Stainless Steel (Internal Lockseamed)



Galvanized Iron Outer Jacket.

REFRIGERATION & VRV / VRF SYSTEMS SUPER POWER PRE-INSULATED INSACOPPER PAIR COPPER PIPES

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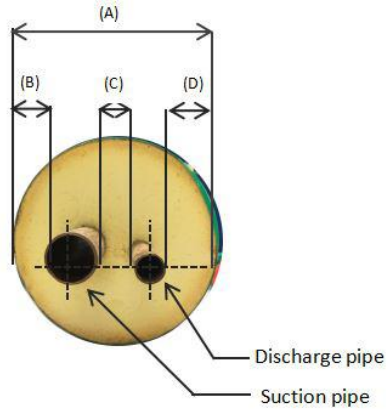

CARRIER PIPE
1. COPPER PIPE TO ASTM B88; TYPE K, L & M
2. COPPER PIPE TO AS 1571
3. COPPER PIPE TO ASTM B88; TYPE K, L & M

PU DENSITY → ± 45 KG/m³ C5 BLOWN PU (CFC FREE)

JACKET → GALVANIZED STEEL INTERNAL LOCKSEAM

AMBIENT TEMPERATURE → 32 °C

WORKING/FLUID TEMPERATURE → +20 °C TO -50 °C

Suction Line		Discharge Line		Jacket Size	Distance		
N.D.	O.D.	N.D.	O.D.	MM	INCH		
Inch	Inch	Inch	Inch	(A)	(B)	(C)	(D)
3/8	9.53	1/4	6.35	80	1	5/8	1
1/2	12.70	1/4	6.35	80	1	5/8	1
		3/8	9.53		1	5/8	1
5/8	15.88	1/4	6.35	100	1	5/8	1
		3/8	9.53		1	5/8	1
		1/2	12.70		1	5/8	1
3/4	19.05	1/4	6.35	100	1	5/8	1
		3/8	9.53		1	5/8	1
		1/2	12.70		1	5/8	1
		5/8	15.88		1	5/8	1
7/8	22.23	3/8	9.53	100	1	5/8	1
		1/2	12.70	115	1 - 1/4	5/8	1 - 1/4
		5/8	15.88		1 - 1/4	5/8	1 - 1/4
		3/4	19.05		1 - 1/4	5/8	1 - 1/4
1 - 1/8	28.58	3/8	9.53	125	1 - 1/4	5/8	1 - 1/4
		1/2	12.70		1 - 1/4	5/8	1 - 1/4
		5/8	15.88		1 - 1/4	5/8	1 - 1/4
		3/4	19.05		1 - 1/4	5/8	1 - 1/4
		7/8	22.23		1 - 1/4	5/8	1 - 1/4
1 - 3/8	34.93	1/2	12.70	125	1 - 1/4	5/8	1 - 1/4
		5/8	15.88		1 - 1/4	5/8	1 - 1/4
		3/4	19.05		1 - 1/4	5/8	1 - 1/4
		7/8	22.23		1	5/8	1
		1 - 1/8	28.53	150	1 - 1/4	5/8	1 - 1/4
1 - 5/8	41.28	5/8	15.88	150	1 - 1/4	5/8	1 - 1/4
		3/4	19.05		1 - 1/4	5/8	1 - 1/4
		7/8	22.23		1 - 1/4	5/8	1 - 1/4
		1 - 1/8	28.58		1 - 1/4	5/8	1 - 1/4
		1 - 3/8	34.93	178	1 - 1/2	5/8	1 - 1/2
2 - 1/8	53.98	3/4	19.05	200	2	5/8	2
		7/8	22.23		2	5/8	2
		1 - 1/8	28.58		2	5/8	2
		1 - 3/8	34.93		1 - 1/2	5/8	1 - 1/2
		1 - 5/8	41.28		1 - 1/2	5/8	1 - 1/2
2 - 5/8	66.68	7/8	22.23	200	1 - 1/2	5/8	1 - 1/2
		1 - 1/8	28.58		1 - 1/2	5/8	1 - 1/2
		1 - 5/8	41.28		1 - 1/2	5/8	1 - 1/2
		2 - 1/8	53.98	228	1 - 1/2	5/8	1 - 1/2
3 - 1/8	79.38	1 - 3/8	34.93	228	1 - 1/2	5/8	1 - 1/2
		1 - 5/8	41.28		1 - 1/2	5/8	1 - 1/2
		2 - 1/8	53.98		1 - 1/2	5/8	1 - 1/2
		2 -5/8	66.68	250	1 - 1/2	5/8	1 - 1/2