marcon engineering

TANK HEATING COIL SYSTEMS AND RELATED NON-FERROUS TUBES, PIPES AND FITTINGS

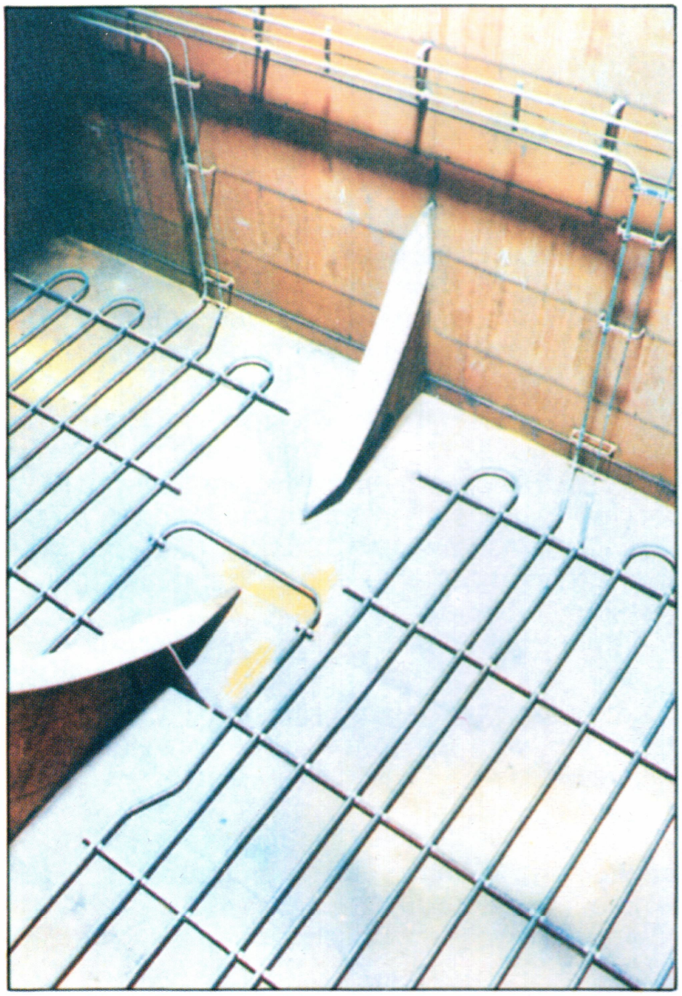
INTRODUCTION

TANK HEATING COIL SYSTEMS AND RELATED INSTALLATION/REPAIR FITTINGS

Marcon Engineering has several years of experience In supplying heating coil systems for all major worldwide oil and shipping companies in aluminium brass, copper nickel iron, stainless steel (all grades), and mild steel to owners specified requirements.

We hold the largest stock of metric and imperial non-ferrous tubes/pipes, sil-braze, and compression fittings, aluminium brass pipe-clips and base plates, condensate/exhaust lift fittings, steam traps (in stainless steel), control valves and manifolds.

We offer a full service consisting of: survey, design, drafting, pre-fabrication, installation, commissioning, and testing of tank heating systems.



Applications

Aluminium Brass has been used over a period of nearly 30 years, and is the best material for heating coil systems for a wide variety of cargoes including crude and fuel oils and many other petroleum, petrochemical and chemical products. It has excellent resistance to corrosion by such products and by seawater carried as ballast. Other advantages are good thermal conductivity and the relative ease with which it can be fabricated and installed. For bitumen and similar cargoes C.N.I. 90/10 is the recommended heating coil material.
Thermal fluids (heat transfer oils) suitable for use with copper alloys are available.

Design Data

Manufactured to dimensional tolerances given in BS 2871: Part 2 tank heating tubes are supplied in the temper annealed condition. A list of tube sizes normally carried in stock is given on pages 16 and 17. Our exclusive range of pipe clips are shown on page 15.

Jointing

For applications requiring brazed joints the “MARCON” Marine range of high duty fittings is available. These are capillary type fittings with integral rings of silver-brazing alloy designed to meet the service requirements of temperature and pressure experienced in tank heating installations.
Flameless compression type union fittings for new or repair work are also available in metric and imperial sizes.
Details of both ranges are shown on pages 1 to 14.

MARINE HIGH DUTY FITTINGS

Pipe Fittings

Marcon manufacture Pipe Fittings for the following pipe sizes of aluminium brass and copper nickel iron tubes.

Metric 6 mm to 57 mm

Outside Diameter

6	8	10	12	16	20	25	30	38	44.5	57

Imperial 1/2" to 2"

Outside Diameter

1/2" - 15.14	3/4" - 21.49	1" - 28.25	1 1/4" - 34.60	1 1/2" - 40.95	2" - 54.05

METRIC CONVERSION IN BLUE

In accordance with International Pipe standards
DIN 86007
BS 2871 Part 2 and Table 3
ASTM B. 466. ASTM SB. 466.

* Fittings can be manufactured to suit <u>Metric tube</u> at one end and <u>Imperial tube</u> at the other.

Material

All fittings are made from seamless tubes or forged material

	Material	DIN Composition Number	DIN Material Number	BS Material	BS Material Number	US Material	US Material Number
Aluminium Brass	CuZn20Al2	17660	2.0460	BS 2871 : 1972	CZ 110	ASTM B 111	C 68700
Copper Nickel Iron 90/10	CuNi10Fe1Mn	17664	2.0872	BS 2871 : 1972	CN 102	ASTM B 466	C 70 600
Copper Nickel Iron 70/30	CuNi30Mn1Fe	17664	2.0882	BS 2871 : 1972	CN 107	ASTM B 466	C 71500

Field of Application

All fittings are suitable for operating temperatures up to 200°C

Operating Temperatures and Pressures

High Duty Marine Fittings - Maximum Test Pressure 2 x Working Pressure
For Metal Temperatures not Exceeding:

50°C (122°F) bar (lbf/in²)	75°C (167°F) bar (lbf/in²)	100°C (212°F) bar (lbf/in²)	125°C (257°F) bar (lbf/in²)	150°C (300°F) bar (lbf/in²)	175°C (350°F) bar (lbf/in²)	200°C (400°F) bar (lbf/in²)
48 (700)	47 (695)	46 (680)	45 (660)	43 (630)	29 (430)	17 (250)

High Duty Marine Fittings

Maximum Test Pressure 1.5 x Working Pressure

Size mm	For Metal Temperatures not Exceeding:		
	Up to 100°C (212°F) bar (lbf/in²)	Up to 177°C (350°F) bar (lbf/in²)	200°C (405°F) bar (lbf/in²)
6	180–(2610)	150–(2190)	61–(885)
8	157–(2275)	125–(1825)	51–(740)
10	144–(2090)	112–(1625)	45–(655)
12	130–(1885)	98–(1435)	39–(580)
16	113–(1635)	84–(1230)	33–(490)
20	102–(1475)	75–(1100)	30–(440)
25	92–(1340)	68–(1000)	27–(400)
30	86–(1245)	63–(925)	25–(370)
38	79–(1145)	58–(855)	23–(340)
44.5	75–(1085)	55–(810)	22–(325)
57	70–(1000)	52–(755)	20–(300)

Silver Solder Alloy Rings
Fittings are incorporated with high silver content rings to alloy specifications:-
DIN 8513 Type L-Ag 55 Sn
BS 1845 : 1984 Type AG 14
A.S.M.E. SFA - 5.8 (AWS) Type BAg - 7
Working Temperatures 660°C

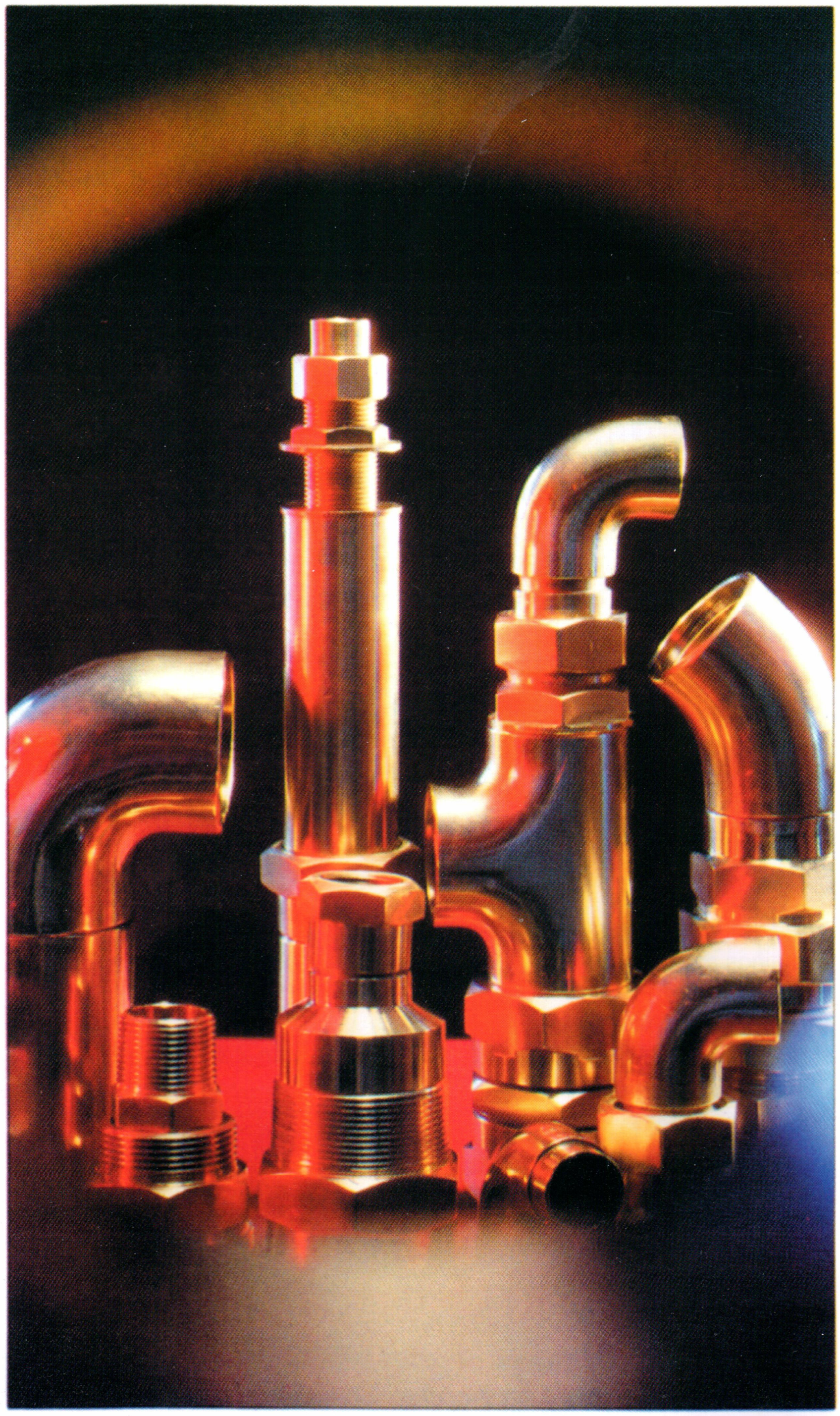
Threads
The thread connections of the fittings can be carried out in accordance to:-
DIN - NPT - API - BSP or other standards.
The overall length of the components may therefore change slightly.

Versatility
The high duty marine range of fittings are recommended for jointing aluminium brass and copper nickel iron tubes for use on heating coil systems, sea/salt water systems, steam pipelines, and numerous items of auxiliary plants on-board ships.
* For Hydraulic pipework we manufacture the same fittings but with thicker wall dimensions to suit the working pressure of the pipework system.

Inspection
Visual inspection, dimensional check.

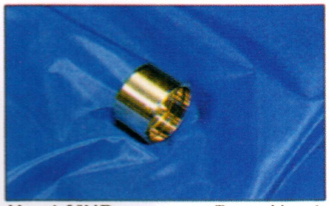
Ordering
When ordering, please state the following:
Type and Marcon fitting number
Size
Material (standard alloy number)
Quantity
Inspection Authority
Certification Requirements
Delivery Requirements
Packing

* For further safety measures state which pipework system fittings would be required, so our sales department can check to make sure fittings are suitable for the correct temperatures and pressures.



SILVER SOLDER BRAZING PIPE FITTINGS

The Marcon comprehensive range of Silver Solder Brazing Pipe Fittings. For more information on dimensional, technical details and part numbers please refer to the pages indicated.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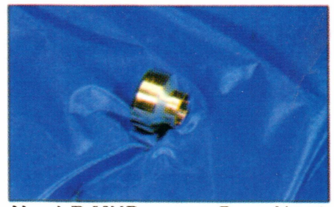
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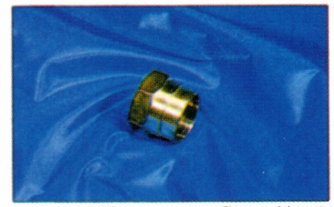
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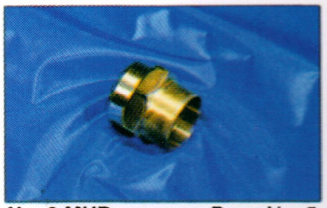
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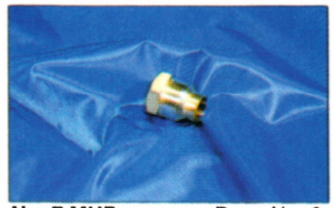
No. 6 MHD Page No. 5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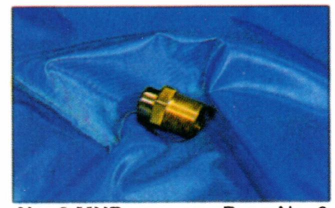
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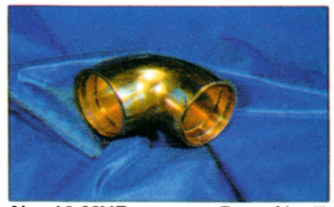
No. 9 MHD Page No. 12


No. 11 MHD Page No. 6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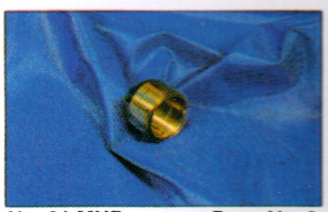
No. 12 S MHD Page No. 7


No. 21 MHD Page No. 7


No. 24 MHD Page No. 8


No. 25 MHD Page No. 8


No. 30 MHD Page No. 8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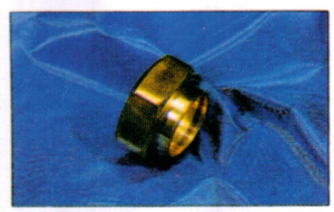
No. 65 MHD Page No. 9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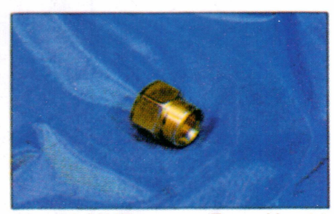
No. 69 MHD Page No. 10


No. 69 F MHD Page No. 10


No. 70 MHD Page No. 11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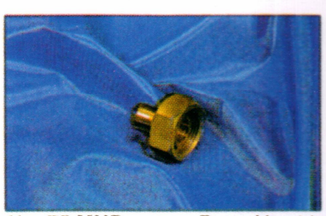
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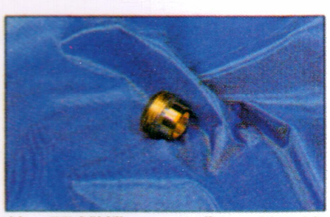

No. 77 MHD Page No. 12


No. 150 MHD Page No. 12

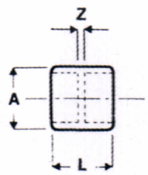

No. 1 L MHD Page No. 13

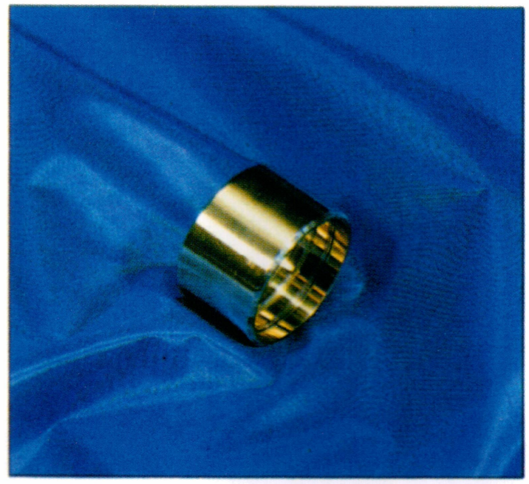
MAR 1 MHD
Straight couplings

with incorporated silver solder capillary x capillary ends
Material: CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Outside diameter of pipe mm	A mm	L mm	Z mm	weight kg/piece
6	10	18	2	0.010
8	12	18	2	0.010
10	15	18	2	0.015
12	17	20	2	0.015
14	20	20	2	0.020
16	21	21	2	0.025
20	26	22	2	0.040
25	30	24	2	0.050
30	35	26	2	0.070
38	45	30	2	0.110
44.5	52	33	2	0.170
57	65	35	2	0.200

Straight couplings in sizes other than the above are also available.
** See below.



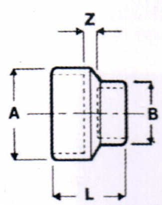


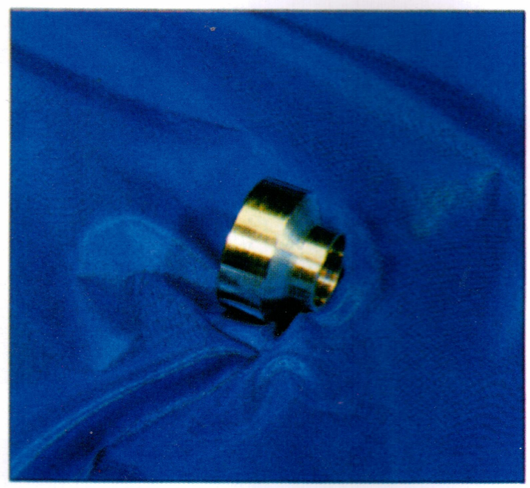
MAR 1R MHD
Reducing couplings

with incorporated silver solder capillary x capillary ends
Material: CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Outside diameter of pipe mm	A mm	B mm	L mm	Z mm	weight kg/piece
10 x 8	15	12	20	4	0.010
12 x 8	17	12	20	4	0.015
12 x 10	17	15	20	4	0.020
14 x 8	20	12	24	8	0.025
14 x 10	20	15	24	8	0.030
16 x 10	21	15	27	8	0.030
16 x 12	21	17	27	8	0.030
20 x 12	26	17	27	8	0.040
20 x 16	26	21	30	8	0.080
25 x 16	30	21	30	8	0.050
25 x 20	30	26	30	8	0.090
30 x 16	35	21	30	8	0.070
30 x 20	35	26	30	8	0.080
30 x 25	35	30	30	8	0.170
38 x 16	45	21	35	9	0.140
38 x 20	45	26	35	9	0.140
38 x 25	45	30	35	9	0.120
38 x 30	45	35	35	9	0.200
44.5 x 16	52	21	45	19	0.180
44.5 x 20	52	26	45	19	0.200
44.5 x 25	52	30	35	19	0.170
44.5 x 30	52	35	35	19	0.230
44.5 x 38	52	45	35	5	0.230
57 x 16	65	21	60	34	0.280
57 x 20	65	26	60	34	0.290
57 x 25	65	30	50	24	0.290
57 x 30	65	35	50	24	0.300
57 x 38	65	45	40	10	0.240
57 x 44.5	65	52	40	10	0.270

Reducing couplings in sizes other than the above are also available.
** See below.



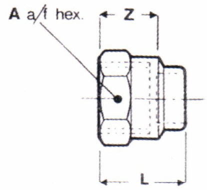


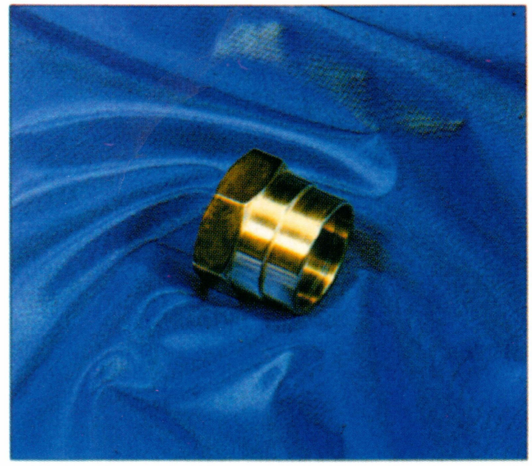
** Imperial/Imperial, and Imperial/Metric combinations are available upon request.

MAR 2 MHD
Straight female connectors
Parallel female thread x capillary end
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x BSP	A mm	L mm	Z mm	Weight kg/piece
8 x 1/4"	17	25	16.5	0.02
12 x 3/8"	22	26	17	0.03
16 x 1/2"	27	32	22	0.08
20 x 3/4"	32	34	23.5	0.11
25 x 1"	41	39	28	0.20
30 x 1 1/4"	50	44	32	0.23
38 x 1 1/2"	55	46	32	0.26
44.5 x 1 1/2"	55	48	32	0.41
57 x 2"	70	50	35	0.75

Straight female connectors in sizes other than the above are also available.
Thread connections available BSP. API. NPT. DIN Standards.
** See below.

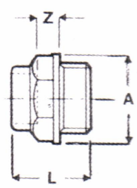


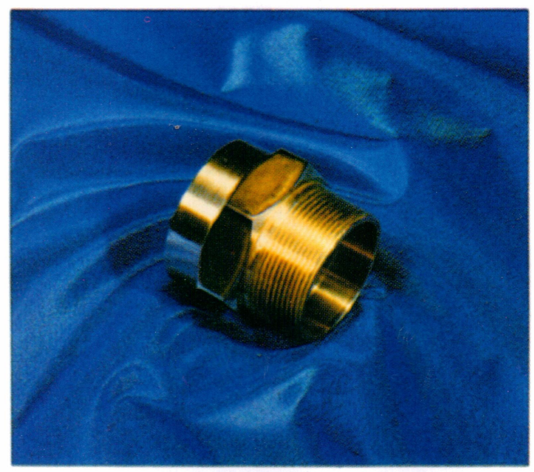


MAR 3 MHD
Straight male connectors
Parallel capillary end x male thread
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm BSP	A mm	L mm	Z mm	Weight kg/piece
8 x 1/4"	19	25	10	0.03
12 x 3/8"	22	28.5	11	0.07
16 x 1/2"	28	27	7.5	0.11
20 x 3/4"	35	32	10.5	0.18
25 x 1"	42	38	14	0.26
30 x 1 1/4"	51	41	14.5	0.30
38 x 1 1/2"	57	46	15.5	0.37
44.5 x 1 1/2"	62	50	17.5	0.48
57 x 2"	70	55	20	0.75

Straight male connectors in sizes other than the above are also available.
Thread connections available BSP. API. NPT. DIN Standards.
** See below.

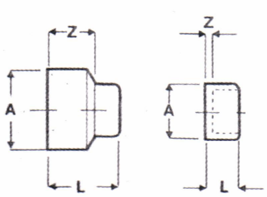




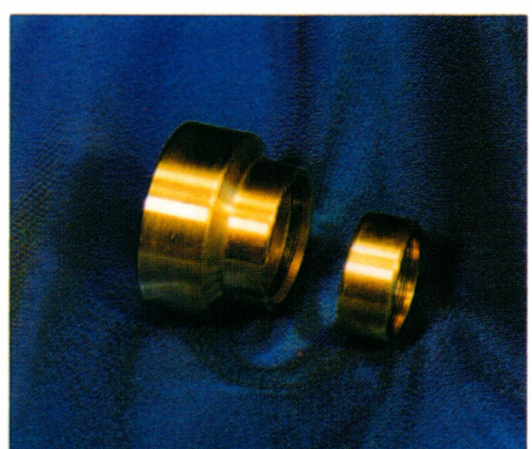
MAR 6 MHD
Large end male for insertion into fittings
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x mm	A mm	L mm	Z mm	Type	Weight kg/piece
8 x 6	10	19	11.5	1	0.03
12 x 8	12	10	2.5	2	0.02
16 x 8	16	20	12.5	1	0.04
16 x 12	16	11	2.5	2	0.03
20 x 16	20	13	3	2	0.04
25 x 16	25	13	2.5	2	0.04
25 x 20	25	13	2.5	2	0.08
30 x 16	30	26	16.5	1	0.08
30 x 20	30	25	15	1	0.12
30 x 25	30	14	2.5	2	0.10
38 x 16	38	30	20.5	1	0.10
38 x 20	38	29	19.5	1	0.14
38 x 25	38	29	18	1	0.15
38 x 30	38	16	3.5	2	0.11
44.5 x 16	44.5	33	23.5	1	0.12
44.5 x 30	44.5	31	19	1	0.15
44.5 x 38	44.5	17	3	2	0.12
57 x 30	57	37	25	1	0.17
57 x 38	57	37	23	1	0.19
57 x 44.5	57	20	4.5	2	0.15

Reducers in sizes other than the above are also available.
** See below.



Type 1 Type 2



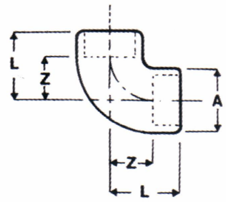
** Imperial/Imperial, and Imperial/Metric combinations are

MAR 12 MHD
Elbow 90°

Capillary end x capillary end
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm	A mm	L mm	Z mm	Weight kg/piece
6	10	16	8.5	0.07
8	12	16	8.5	0.08
12	16	25	16	0.10
16	20	24	14.5	0.15
20	26	29	18.5	0.25
25	30	37	26	0.30
30	35	38	25.5	0.35
38	44	45	31.5	0.45
44.5	51	52	36.5	0.60
57	65	64	46	0.85

Elbows in sizes other than those above are also available.
** See below.

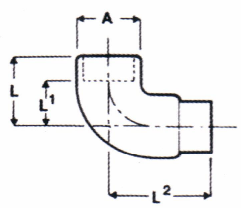


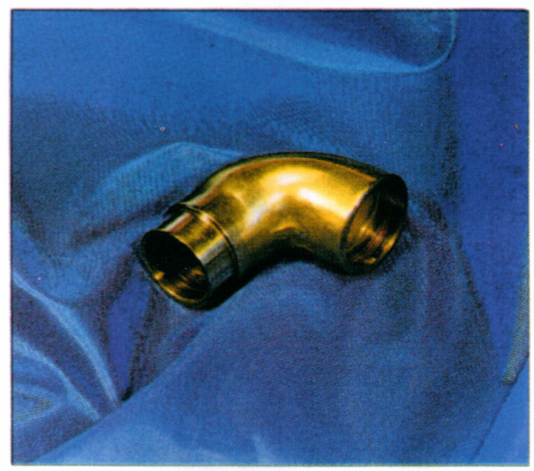
MAR 12 S MHD
Street Elbow

Capillary end x male end for insertion into fitting.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm	A mm	L mm	L[1] mm	L[2] mm	Weight kg/piece
16	20	24	14.5	35.5	0.07
20	26	29	18.5	40.5	0.16
30	35	37	25.5	51.5	0.19

Street Elbows in sizes other than those above are also available.
** See below.



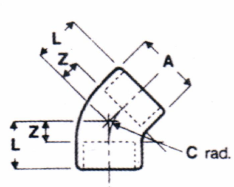


MAR 21 MHD
Obtuse Elbows 45°

Capillary end x capillary end
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm	A mm	C mm	L mm	Z mm	Weight kg/piece
16	20	14	19	9.5	0.12
20	26	18	24	14	0.16
25	30	23	24	13.5	0.28
30	35	25	25	13.5	0.32
38	45	30	34	19	0.39
44.5	55	35	37	22	0.44

Obtuse Elbows in sizes other than those above are also available.
** See below.



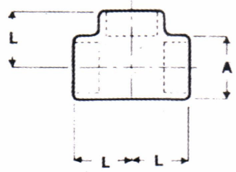
** Imperial/Imperial, and Imperial/Metric combinations

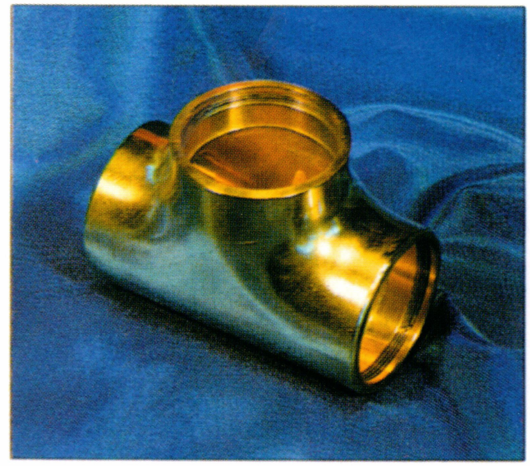
MAR 24 MHD
Equal Tee

Capillary end x capillary end x capillary end.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm	A mm	L mm	Weight kg/piece
6	10	13	0.020
8	13	14	0.025
10	15	16	0.030
12	17	18	0.040
16	21	20	0.080
20	25	23	0.120
25	31	27	0.190
30	36	29	0.250
38	45	35	0.470
44.5	52	40	0.570
57	66	49	0.860

Equal Tees in sizes other than those above are also available.
** See below.



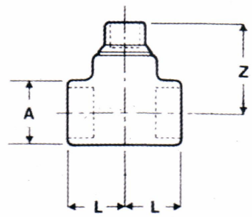


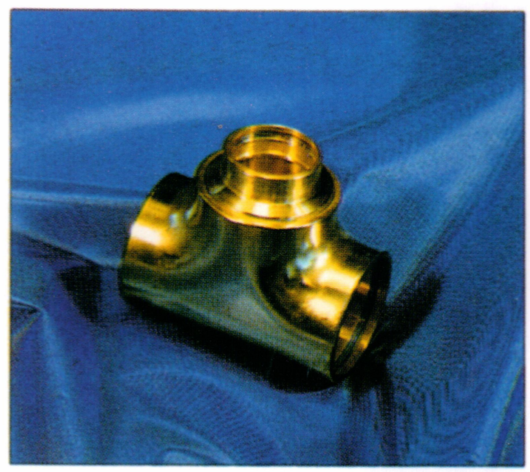
MAR 25 MHD
Reducing Tee

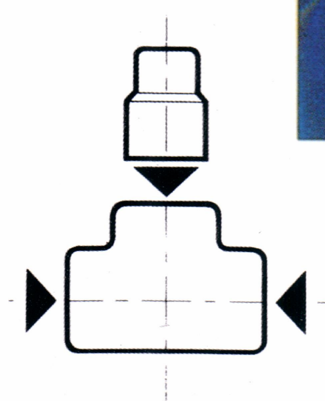
All ends capillary, branch reduced.
Supplied as two fittings.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x mm x mm	A mm	L mm	Z mm	Weight kg/piece
8 x 8 x 6	13	13	25	0.035
12 x 12 x 8	17	18	28	0.050
16 x 16 x 8	21	20	31	0.095
16 x 16 x 12	21	20	33	0.120
20 x 20 x 16	25	23	40	0.150
25 x 25 x 16	31	28	44	0.230
25 x 25 x 20	31	28	42	0.260
30 x 30 x 16	36	29	44	0.310
30 x 30 x 20	36	29	42	0.320
30 x 30 x 25	36	29	44	0.320
38 x 38 x 16	45	35	51	0.590
38 x 38 x 20	45	35	49	0.690
38 x 38 x 25	45	35	50	0.690
38 x 38 x 30	45	35	54	0.685
44.5 x 44.5 x 16	52	40	58	0.760
44.5 x 44.5 x 30	52	40	56	0.830
44.5 x 44.5 x 38	52	40	60	0.815
57 x 57 x 38	66	49	68	1.140
57 x 57 x 44.5	66	49	72	1.240

Reducing Tees in sizes other than those above are also available.
** See below.





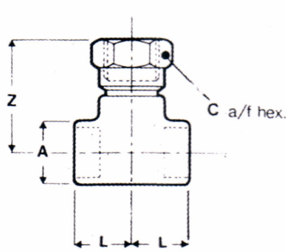


MAR 30 MHD
Tee

Branch parallel female thread x capillary ends.
Supplied as two fittings.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm mm BSP	A mm	C mm	L mm	Z mm	Weight kg/piece
16 x 16 x 1/2"	21	27	44.5	10	0.180
20 x 20 x 3/4"	25	32	50	12.5	0.210

Tees in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.



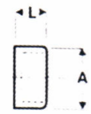
** Imperial/Imperial, and Imperial/Metric combinations

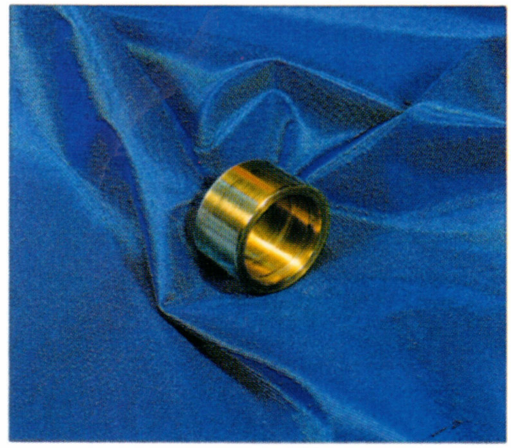
MAR 61 MHD
Stop end

For use with tube.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm	A mm	L mm	Weight kg/piece
16	20	14	0.025
20	25	15	0.030
30	35	17	0.040

Stop Ends in sizes other than those above are also available.
** See below.



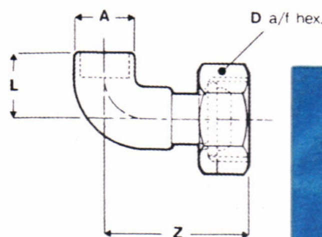


MAR 64 MHD
Bent Union Adaptor

Union nut x capillary end.
Round Nose
Material CuZn20Al2 - aluminium brass,
or CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x BSP	A mm	D mm	L mm	Z mm	Weight kg/piece
8 x 3/8"	12	22	25	39.5	0.085
12 x 1/2"	17	27	35	46	0.090
16 x 3/4"	21	30	41	50	0.110
20 x 1"	27	41	41	55	0.200
25 x 1 1/4"	34	46	50	68	0.275
30 x 1 1/4"	35	46	37	71	0.450
38 x 1 3/4"	44	60	45	81	0.650

Union Adaptors in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.

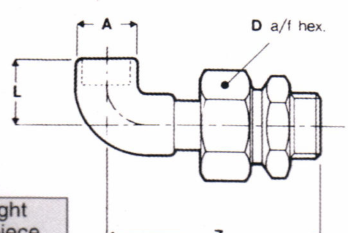


MAR 65 MHD
Bent male union connector

Capillary end x parallel male thread.
Round nose to cone joint
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x BSP	A mm	D mm	L mm	Z mm	Weight kg/piece
8 x 1/4"	12	22	16	56	0.150
12 x 3/8"	17	27	35	68	0.210
16 x 1/2"	21	30	41	72	0.375
20 x 3/4"	27	41	41	82	0.620
25 x 1"	34	46	50	100	0.725
30 x 1 1/4"	35	46	37	106	0.850
38 x 1 1/2"	44	60	45	118	1.150

Union connectors in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.



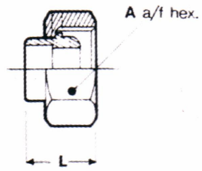
** Imperial/Imperial, and Imperial/Metric combinations available upon request.

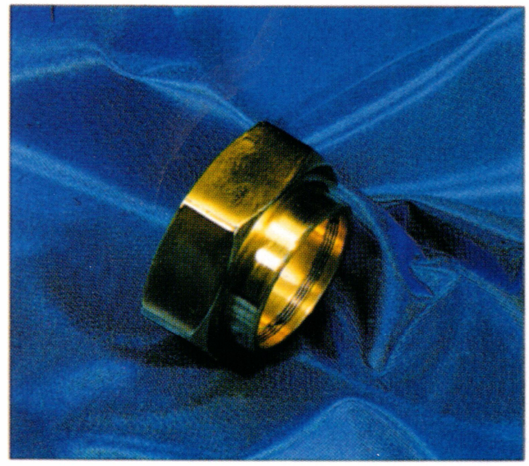
MAR 68 MHD
Straight Union Adaptor

Capillary end x union nut.
Round nose.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x BSP	A mm	L mm	Weight kg/piece
6 x 1/4"	19	19	0.030
8 x 3/8"	22	18	0.050
10 x 1/2"	25	21	0.120
12 x 1/2"	27	22	0.160
16 x 3/4"	30	23	0.240
20 x 1"	41	26	0.325
20 x 1 1/4"	46	27	0.360
25 x 1 1/4"	46	27	0.545
25 x 1 1/2"	53	29	0.785
30 x 1 1/4"	46	27	0.765
38 x 1 3/4"	60	31	0.910
44.5 x 2"	65	32	1.055
57 x 2 1/2"	85	35	1.250

Union adaptors in sizes other than those above are also available.
** See below.



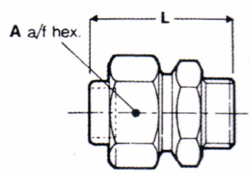


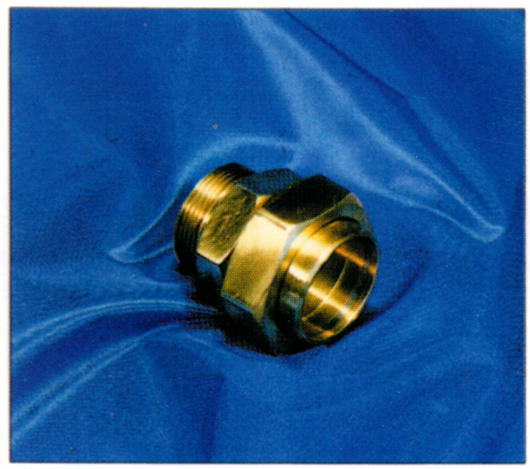
MAR 69 MHD
Straight Male Union Connector

Capillary end x parallel male thread.
Round nose to cone joint.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron

Size mm x BSP	A mm	L mm	Weight kg/piece
6 x 1/8"	19	35	0.155
8 x 1/4"	22	37	0.175
10 x 3/8"	25	40	0.205
12 x 3/8"	27	43	0.245
16 x 1/2"	30	45	0.375
20 x 3/4"	41	53	0.545
20 x 1"	46	58	0.585
25 x 1"	46	58	0.695
25 x 1 1/4"	53	61	0.785
30 x 1 1/4"	46	61	0.875
38 x 1 1/2"	46	68	1.575
44.5 x 1 1/2"	60	70	1.985
57 x 2"	85	79	2.350

Union connectors in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.



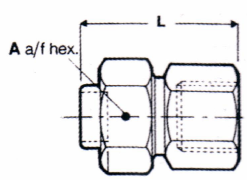


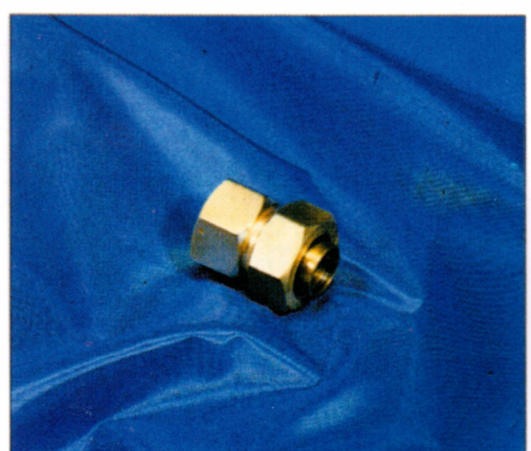
MAR 69F MHD
Straight Female Union Connector

Capillary end x parallel female thread.
Round nose to cone joint.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron.

Size mm x BSP	A mm	L mm	Weight kg/piece
8 x 1/4"	22	37	0.210
12 x 3/8"	27	41	0.300
16 x 1/2"	30	49	0.450

Union connectors in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.

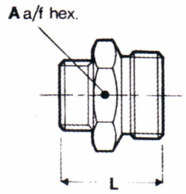


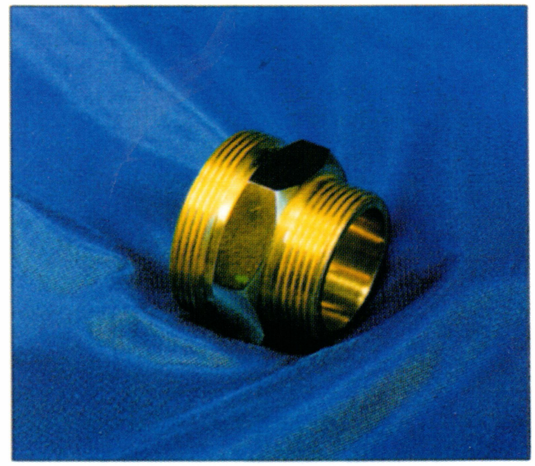


** Imperial/Imperial, and Imperial/Metric combinations

MAR 70 MHD
Male Nipple

Union thread x parallel male thread.
60° cone.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron



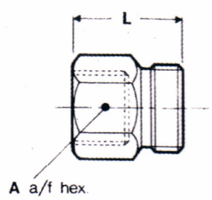


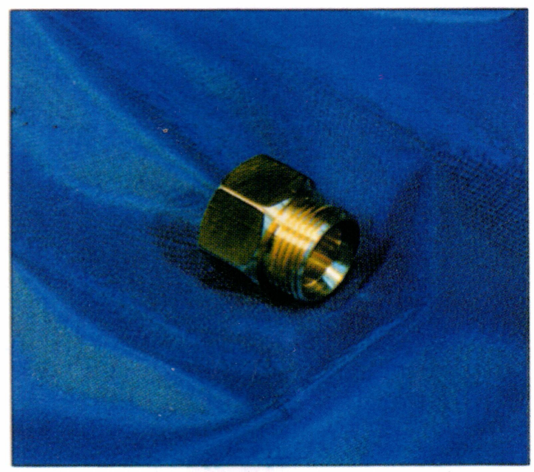
Size BSP		BSP	A mm	L mm	Weight kg/piece
1/4"	x	1/8"	17	22	0.030
3/8"	x	1/4"	19	24	0.050
1/2"	x	3/8"	22	29	0.090
3/4"	x	1/4"	27	30	0.140
3/4"	x	1/2"	27	30	0.200
1"	x	1/2"	36	37	0.275
1"	x	3/4"	36	37	0.485
1 1/4"	x	3/4"	46	41	0.585
1 1/4"	x	1"	46	41	0.595
1 1/2"	x	1 1/4"	50	42	0.600
1 3/4"	x	1 1/4"	50	43	0.725
1 3/4"	x	1 1/2"	55	43	0.800
2"	x	1"	55	47	0.850
2"	x	1 1/2"	55	47	0.960
2 1/2"	x	2"	70	53	1.040

Nipples in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.

MAR 72 MHD
Female Nipple

Union thread x parallel female thread.
60° cone.
Material CuZn20Al2 - aluminium brass, or
CuNi10Fe1Mn - 90/10 copper-nickel-iron



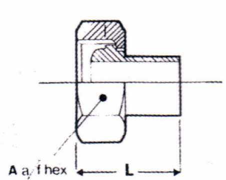


Size BSP	x	BSP	A mm	L mm	Weight kg/piece
3/8"	x	1/4"	17	25	0.050
1/2"	x	3/8"	22	27.5	0.090
3/4"	x	1/2"	27	33	0.200
1"	x	3/4"	36	44	0.490
1 1/4"	x	1"	41	52	0.600
1 1/2"	x	1 1/4"	48	60	0.620

Nipples in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.

MAR 75 MHD
Nut and lining

Male copper lining with loose union nut.
Round nose.
Material CuZn20Al2 - aluminium brass, or
CuNi10FelMn - 90/10 copper-nickel-iron



Size mm		BSP	A mm	L mm	Weight kg/piece
8	x	3/8"	22	32	0.030
12	x	1/2"	27	37	0.050
16	x	3/4"	30	38	0.075
20	x	1"	41	43	0.150
25	x	1 1/4"	46	45	0.250
30	x	1 1/4"	46	46	0.370
38	x	1 3/4"	60	50	0.420

Nut and lining in sizes not shown above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.

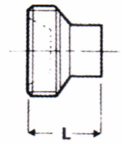
** Imperial/Imperial, and Imperial/Metric combinations
available upon request.

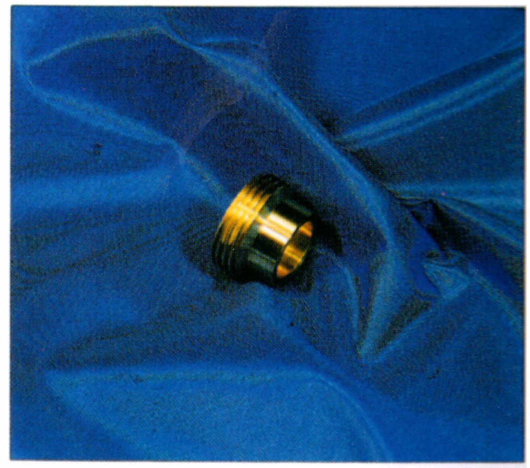
MAR 77 MHD
Union adaptor

Male end x union thread.
60° cone.
Material CuZn20Al2 - aluminium brass, or
CuNi10FelMn - 90/10 copper-nickel-iron

Size mm	x	BSP	L mm	Weight kg/piece
10	x	1/2"	20	0.020
12	x	1/2"	21	0.025
16	x	3/4"	22	0.030
20	x	1"	24.5	0.050
25	x	1 1/4"	27	0.070
30	x	1 1/4"	26.5	0.090
30	x	1 1/2"	28	0.120

Union adaptors in sizes other than those above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.



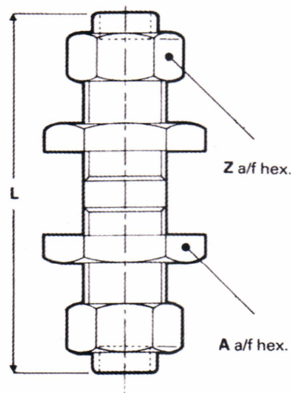


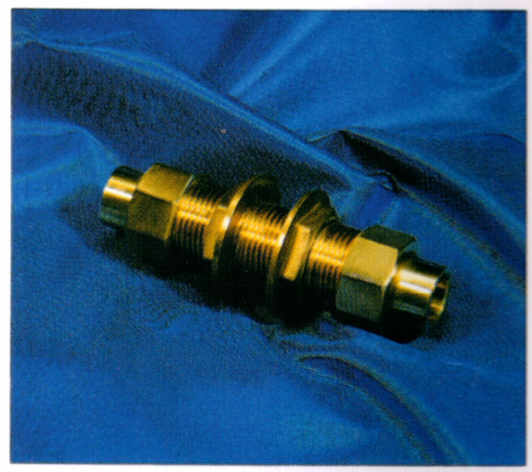
MAR 150 MHD
Straight union connectors

Capillary end x capillary end.
Round nose to cone joint both ends.
Material CuZn20Al2 - aluminium brass, or
CuNi10FelMn - 90/10 copper-nickel-iron

Size mm	x	BSP	A mm	L mm	Z mm	Weight kg/piece
12	x	1/2"	36	100	27	0.45
16	x	3/4"	41	109	30	0.65
20	x	1"	50	111	41	0.95
25	x	1 1/4"	60	118	46	1.25
30	x	1 1/4"	60	119	46	1.50

Union connectors in sizes not shown above are also available.
Thread connections available BSP. API. NPT. DIN standards.
** See below.



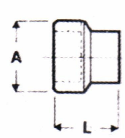


MAR 9 MHD
Imperial to metric adaptor

To connect imperial tube to metric fitting.
Material CuZn20Al2 - aluminium brass, or
CuNi10FelMn - 90/10 copper-nickel-iron

Size Tube ins	x	mm	A mm	L mm	Weight kg/piece
3/8"	x	12	16	21	0.030
1/2"	x	16	20	24	0.045
3/4"	x	20	27	25	0.055
1"	x	25	34	28	0.085
1 1/4"	x	30	41	33	0.120
1 1/2"	x	38	48	38	0.160
1 1/2"	x	44.5	48	34	0.185
2"	x	57	61	43	0.280

Adaptors in sizes other than those shown above are also available.



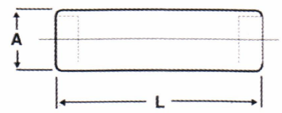
** Imperial/Imperial, and Imperial/Metric combinations available upon request.

MAR 1L MHD
Elongated straight coupling

Capillary end x capillary end.
Material CuZn20Al2 - aluminium brass, or CuNi10FelMn - 90/10 copper-nickel-iron

Size 'A' available as per MAR 1MHD.
Length 'L' to customer's requirements

** Imperial/Imperial, and Imperial/Metric combinations available upon request.



Copper Nickel Iron Fittings

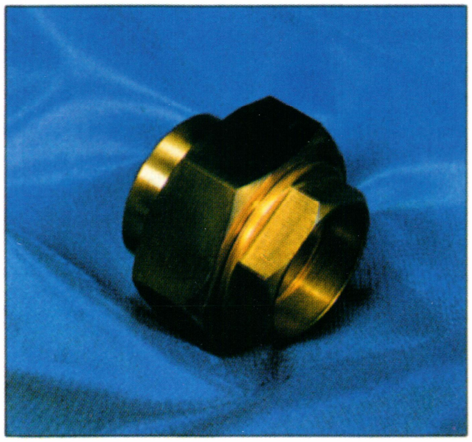
Photograph shows some of the marine high duty range of 90/10 copper nickel iron fittings we carry in stock.

The full range is available from stock or on a short term delivery.

Compression type union fittings for new or repair work are also available in metric & imperial sizes

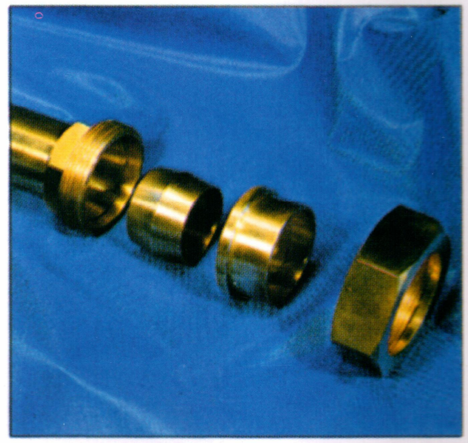
Compression Fittings

Repairs to existing tank heating coil installations when cargo tanks are not gas freed (flameless repairs).

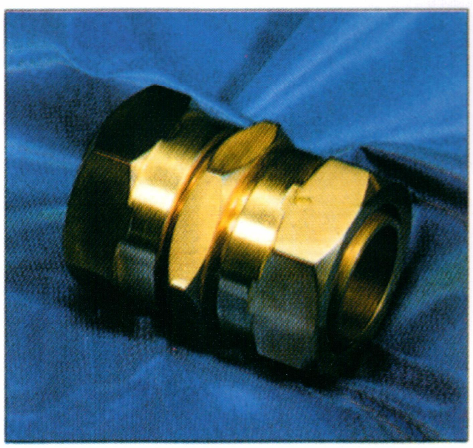


MAR - 11 - TU
(Tanker Union)

This is a compression fitting with one centre located olive/ferrel that seals on the inside of the tube/pipe. The tube/pipe must be flared using a non-spark flaring tool.
Note we require wall thickness of tube/pipe when ordering.

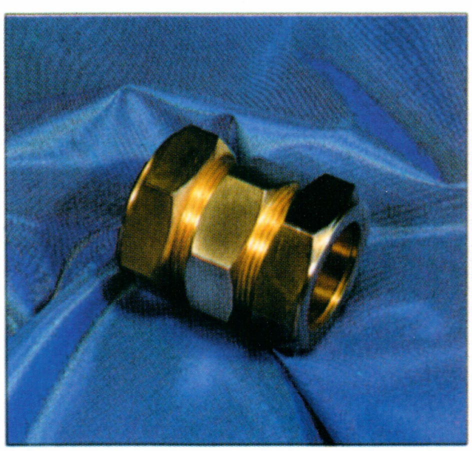


Non spark flaring tool



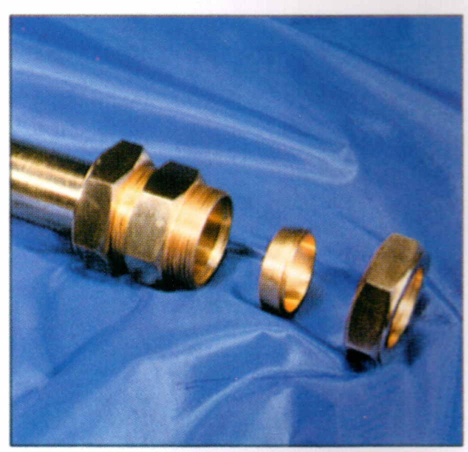
MAR - 11 - SU Fitting
(Straight Taper Union)

The tube/pipe ends are to be flared in a similar way to the MAR-11-TU. The MAR-11-SU has a large centre body with the sealing tapers at each end. This fitting also seals on the inside of the tube/pipe.
The sealing tapers on the MAR-11-SU have the additional feature of high temperature teflon 'O' rings which are groove-fitted into the end tapers.
Note we require wall thickness of tube/pipe when ordering.



MAR - 11 - FC Fitting
Full Compression
(External Seal)

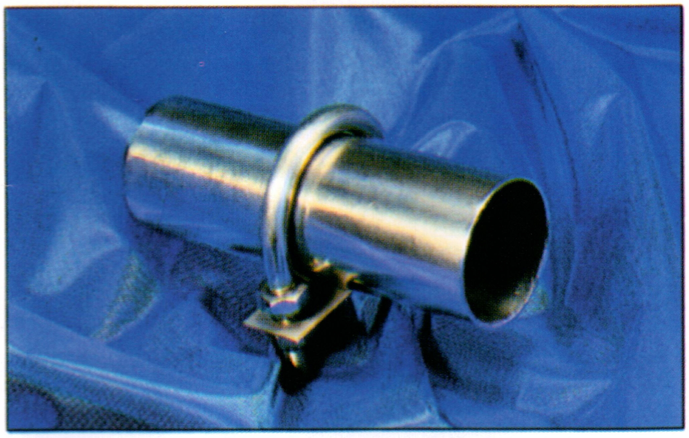
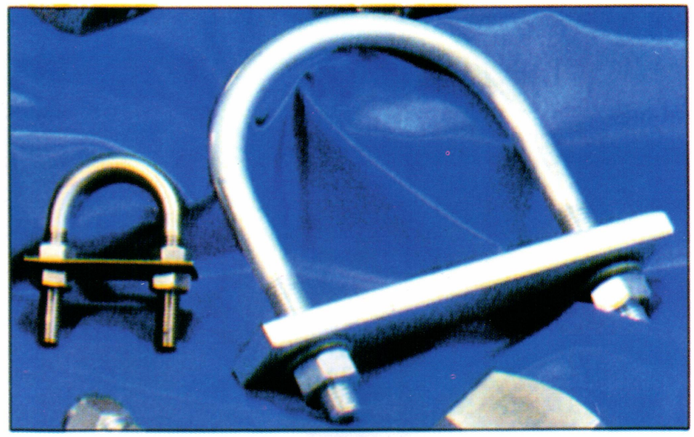
The MAR-11-FC has two olives/ferrels which seal externally on the tube/pipe. No flaring of the tube/pipe is necessary for installation of this fitting but the external surface of the tube/pipe must be in good condition and free of pitting to ensure a positive seal is achieved.



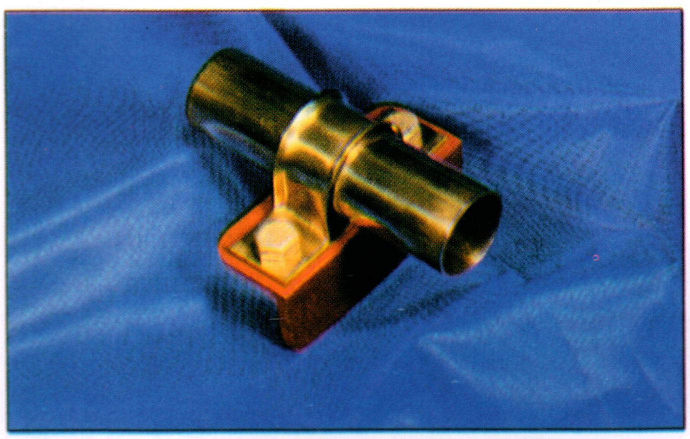
Pipe Clips

MARCON NON-FERROUS PIPE CLIPS AND FIXING SYSTEMS

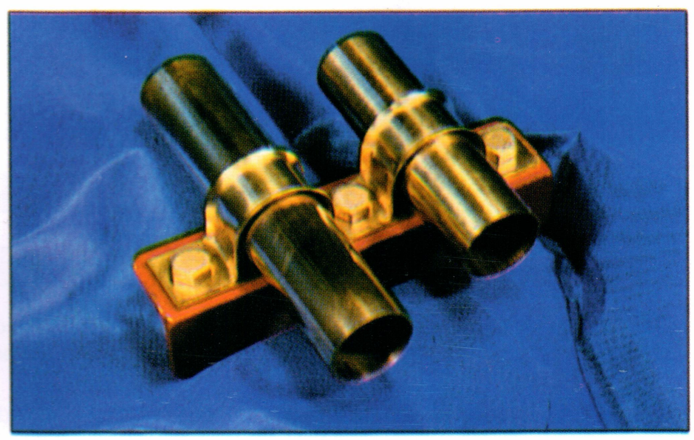
Marcon Engineering offer a full range of PIPE CLIPS and FIXING systems to suit your requirements, we can manufacture/fabricate these products in both METRIC and IMPERIAL sizes from 1/4" (6mm) through 2 1/4" (57mm). Outside Diameter Pipe/Tube as STANDARD supply sizes
We can supply these PIPE CLIPS & FIXINGS in SINGLE, DOUBLE, and MULTIPLE units manufactured fromAl-Brass, Copper Nickel Iron 90/10, Copper, and any grade of Stainless Steel, all of our FIXINGS are supplied as STANDARD with a BASE PLATE manufactured from the same material as the PIPE CLIP.

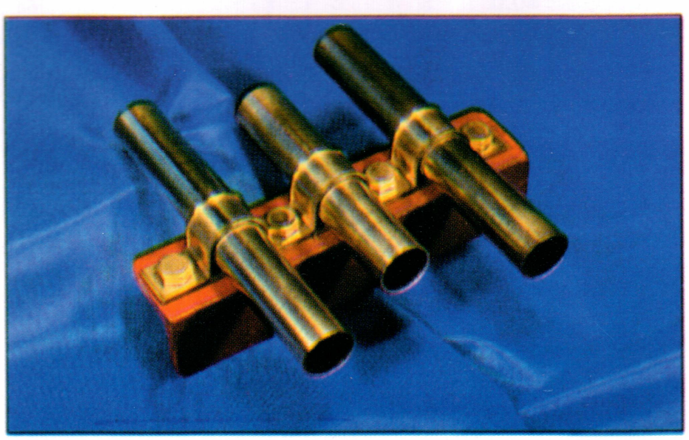
Stainless Steel 'U' Bolt Type Pipe Clips with Base Plate and Backing Nuts.
The Backing Nuts prevent "Over-Torque" of the Bolt which may damage the Pipe.



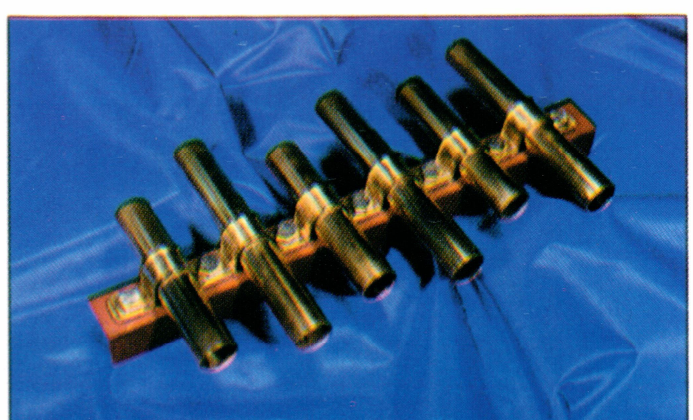
AL-BRASS SINGLE PIPE CLIP



AL-BRASS DOUBLE PIPE CLIP



AL-BRASS TRI-CLIP



AL-BRASS * MULTI-CLIP

*** Multi-Clip:** We can manufacture the Multi-Clip to accomodate any number of pipes being run together, the Multi-Clip is normally used when running heating coil steam and exhaust riser pipes up the in-tank bulkhead.

Metric Tube Sizes

Aluminium Brass and 90/10 Copper Nickel Iron Tube Metric sizes to B.S. 2871 Part 2 Table 3 for Sea Water Pipelines and other Engineering purposes.

Equivalents: Aluminium Brass ASTM B111; CZ110. Copper Nickel Iron ASTM C70600; CN102.

Tube Size mm	O.D. MAX mm	O.D. MIN mm	Preferred standard thickness mm	Other standard thickness mm	Other* standard thickness mm	Theoretical of preferred Al Brass kilos per metre	Weights standard 90/10 cni kilos per metre	Working Pressures For Al/Brass and CNI 90/10 @ 100°C kg/cm²	psi	@ 50°C kg/cm²	psi
6	6.045	5.965	0.8	1.0	0.6	0.109	0.117	11.4	162	11.8	168
8	8.045	7.965	0.8	1.0	0.6	0.151	0.162	8.6	122	8.8	125
10	10.045	9.965	0.8	1.0	0.6	0.193	0.207	6.9	98	7.1	101
12	12.045	11.965	0.8	1.0	0.6	0.235	0.252	5.7	81	5.9	84
16	16.045	15.965	1.0	1.5	–	0.393	0.420	21.4	305	22.0	313
20	20.055	19.975	1.0	2.0	–	0.498	0.532	17.1	244	17.6	250
25	25.055	24.975	1.5	2.0	–	0.924	0.987	41.1	585	42.3	602
30	30.055	29.975	1.5	2.0	–	1.120	1.197	34.2	487	35.3	502
38	38.07	37.99	1.5	2.0	–	1.434	1.533	27.0	385	27.8	395
44.5	44.57	44.49	1.5	2.0	–	1.690	1.806	23.1	328	23.8	338
57	57.20	57.12	1.5	2.0	–	2.181	2.331	18.0	256	18.6	264
76.1	76.30	76.15	2.0	2.5	–	3.878	4.144	22.5	320	23.2	330
88.9	89.15	89.00	2.5	3.0	–	5.666	6.055	27.0	384	27.8	395
108	108.25	108.00	2.5	3.0	–	6.910	7.385	22.2	316	22.8	324
133	133.50	133.25	2.5	3.0	–	8.548	9.135	18.0	256	18.6	265
159	159.50	159.25	2.5	3.0	–	10.251	10.955	15.1	215	15.5	220
193.7	194.50	194.25	3.0	3.5	–	15.013	16.044	15.9	226	16.4	233
219.1	219.90	218.30	3.0	4.0	–	16.978	18.144	14.1	200	14.5	206
267	268.00	266.40	3.0	4.0	–	20.750	22.176	11.5	164	11.9	169
323.9	324.90	323.30	4.0	4.5	–	33.536	35.840	13.7	196	14.1	201
368	369.00	367.40	4.0	4.5	–	38.147	40.768	12.1	172	12.5	178
419	420.00	418.40	4.0	4.5	–	43.492	46.480	10.6	151	10.9	155
457.2	458.20	455.20	4.0	4.5	–	47.495	50.758	9.7	139	10.0	142
508	509.00	506.00	4.5	5.0	–	58.876	63.028	10.1	144	10.4	148

NOTE. Tubes for pipelines are usually stress relieved suitable for cold bending or other fabrication processes and unless otherwise specified, are supplied in either the TA, ½H, or O condition appropriate to material and size at the manufacturer's discretion.

*the working pressure (in line with stated temperatures) are based on the "preferred wall thickness" dimensions, thicker wall tube/pipe are available upon request.

Metric Aluminium Brass Heating Coils

Outside Diameter	Wall Thickness	Weight per metre/kg	W/Pressure @ 150°C Al/Brass kg/cm²	psi	CNI 90/10 kg/cm²	psi
16 mm	1.5	0.570	59.5	846	60.5	860
16 mm	2.0	0.734	99.2	1411	100.8	1433
20 mm	1.5	0.727	47.6	677	48.4	688
30 mm	1.5	1.120	31.8	452	32.3	459
38 mm	2.0	1.886	41.8	594	42.4	603
44.5 mm	2.0	2.227	35.7	508	36.2	515
57 mm	2.0	2.882	27.9	397	28.3	402

Imperial Tube Sizes

Aluminium Brass and 90/10 Copper Nickel Iron Tube Imperial sizes to B.S. 2871 for Sea Water Pipelines and other Engineering purposes.

Equivalents: Aluminium Brass ASTM B111; CZ110. Copper Nickel ASTM C70600; CN102.

Nominal Bore	External Diameter		*Wall Thickness			Theoretical Weights				Working Pressures For Al/Brass and CNI 90/10			
						Al Brass		90/10 cni		100°C		50°C	
(ins.)	(ins.)	(mm)	S.W.G.	(ins.)	(mm.)	lb./ft	kg./m	lb./ft	kg./m.	kg/cm²	psi	kg/cm²	psi
0.5	0.596	15.14	18	0.048	1.22	0.30	0.44	0.32	0.47	42.5	604	43.8	623
0.75	0.846	21.49	18	0.048	1.22	0.44	0.65	0.46	0.69	30.0	427	30.8	438
1.0	1.112	28.25	17	0.056	1.42	0.67	1.00	0.72	1.07	32.5	462	33.4	475
1.25	1.362	34.60	17	0.056	1.42	0.83	1.24	0.89	1.32	26.5	377	27.3	388
1.5	1.612	40.95	17	0.056	1.42	0.99	1.47	1.06	1.57	22.4	319	23.1	328
2.0	2.128	54.05	16	0.064	1.63	1.50	2.23	1.60	2.39	22.3	317	23.0	327
2.5	2.628	66.75	16	0.064	1.63	1.86	2.77	1.99	2.96	18.1	257	18.6	264
3.0	3.144	79.86	15	0.072	1.83	2.51	3.74	2.68	3.99	18.5	263	19.1	272
3.5	3.660	92.96	14	0.080	2.03	3.25	4.84	3.48	5.17	18.9	269	19.4	276
4.0	4.184	106.27	13	0.092	2.34	4.28	6.36	4.57	6.80	20.5	292	21.1	300
4.5	4.684	118.97	13	0.092	2.34	4.80	7.14	5.13	7.63	18.3	260	18.8	267
5.0	5.184	131.67	13	0.092	2.34	5.32	7.92	5.69	8.46	16.5	235	17.0	242
6.0	6.208	157.68	12	0.104	2.64	7.21	10.73	7.70	11.47	16.4	233	16.9	240
7.0	7.208	183.08	12	0.104	2.64	8.39	12.49	8.97	13.34	14.1	201	14.6	208
8.0	8.208	208.48	12	0.104	2.64	9.57	14.25	10.23	15.22	12.4	176	12.8	182
9.0	9.232	234.49	11	0.116	2.95	12.01	17.87	12.83	19.09	12.9	183	13.2	188
10.0	10.256	260.50	10	0.128	3.25	14.73	21.91	15.73	23.41	13.1	186	13.5	192
11.0	11.288	286.72	9	0.144	3.66	18.23	27.13	19.47	28.98	13.9	198	14.3	203
12.0	12.288	312.12	9	0.144	3.66	19.86	29.56	21.22	31.58	12.8	182	13.1	186
14.0	14.320	363.73	8	0.160	4.06	25.74	38.30	27.49	40.91	12.5	178	12.8	182
16.0	16.320	414.53	8	0.160	4.06	29.37	43.71	31.38	46.69	10.9	155	11.3	161
18.0	18.320	465.33	8	0.160	4.06	33.00	49.12	35.26	52.47	9.7	138	10.0	142
20.0	20.352	516.94	7	0.176	4.47	40.34	60.02	43.09	64.12	9.9	141	10.1	144
22.0	22.352	567.74	7	0.176	4.47	44.33	65.97	–	–	9.0	128	9.2	131
24.0	24.384	619.35	6	0.192	4.88	52.76	78.52	–	–	9.1	129	9.4	134

NOTE. Tubes for pipelines are usually stress relieved suitable for cold bending or other fabrication processes and unless otherwise specified, are supplied in either the TA, ½H, or O condition appropriate to material and size at the manufacturer's discretion.

*Thicker wall tube/pipe available upon request.

Imperial Aluminium Brass Heating Coils

Nominal Bore		Outside Diameter			*Wall Thickness		Weights		Working Pressure @ 150°C Al/Brass CNI 90/10			
ins.	mm.	ins.	mm.	S.W.G.	ins.	mm.	lb./ft	kg./metre	kg/cm²	psi	kg/cm²	psi
1/2	12.70	0.596	15.14	18	0.048	1.22	0.30	0.44	39.4	560	40.1	570
3/4	19.05	0.846	21.49	16	0.064	1.63	0.57	0.85	52.0	739	52.8	751
1	25.40	1.112	28.25	16	0.064	1.63	0.76	1.13	39.6	563	40.2	572
1	25.40	1.112	28.25	14	0.080	2.03	0.94	1.40	57.5	818	58.4	830
11/4	31.75	1.362	34.60	14	0.080	2.03	1.17	1.73	47.0	668	47.7	678
11/2	38.10	1.612	40.95	14	0.080	2.03	1.39	2.07	39.7	565	40.3	573
2	50.80	2.128	54.05	14	0.080	2.03	1.86	2.77	30.1	428	30.5	434

Conversion Tables

Inches and sixteenths to millimetres

Inch = 25.4mm

Inch	0	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	Inch
0		1.58	3.17	4.76	6.35	7.93	9.52	11.11	12.70	14.28	15.87	17.46	19.05	20.63	22.22	23.81	0
1	25.400	26.98	28.57	30.16	31.74	33.33	34.92	36.51	38.09	39.68	41.27	42.86	44.44	46.03	47.62	49.21	1
2	50.799	52.38	53.97	55.56	57.14	58.73	60.32	61.91	63.49	65.08	66.67	68.26	69.84	71.43	73.02	74.61	2
3	76.199	77.78	79.37	80.96	82.54	84.13	85.72	87.31	88.89	90.48	92.07	93.66	95.24	96.83	98.42	100.01	3
4	101.60	103.19	104.77	106.36	107.54	109.54	111.12	112.71	114.30	115.89	117.47	119.06	120.65	122.24	123.82	125.41	4
5	127.00	128.59	130.17	131.76	133.35	134.94	136.52	138.11	139.70	141.28	142.87	144.46	146.05	147.63	149.22	150.81	5
6	152.40	153.98	155.57	157.16	158.75	160.33	161.92	163.51	165.10	166.68	168.27	169.86	171.45	173.03	174.62	176.21	6
7	177.80	179.38	180.97	182.56	184.15	185.73	187.32	188.91	190.50	192.08	193.67	195.26	196.85	198.43	200.02	201.61	7
8	203.20	204.78	206.37	207.96	209.55	211.13	212.72	214.31	215.90	217.48	219.07	220.66	222.25	223.83	225.42	227.01	8
9	228.60	230.18	231.77	233.36	234.95	236.53	238.12	239.71	241.30	242.88	244.47	246.06	247.65	249.23	250.82	252.41	9
10	254.00	255.58	257.17	258.76	260.35	261.93	263.52	265.11	266.70	268.28	269.87	271.46	273.05	274.63	276.22	277.81	10
11	279.39	280.98	282.57	284.16	285.74	287.33	288.92	290.51	292.09	293.68	295.27	296.86	298.44	300.03	301.62	303.21	11
12	304.79	306.38	307.97	309.57	311.14	312.73	314.32	315.91	317.49	319.08	320.67	322.26	323.84	325.43	327.02	328.61	12
13	330.19	331.78	333.37	334.96	336.54	338.13	339.72	341.31	342.89	344.48	346.07	347.66	349.24	350.83	352.42	354.01	13
14	355.59	357.18	358.77	360.36	361.94	363.53	365.12	366.71	368.29	369.88	371.47	373.06	374.64	376.23	377.82	379.41	14
15	380.99	382.58	384.17	385.76	387.34	388.93	390.52	392.11	393.69	395.28	396.87	398.46	400.04	401.63	403.22	404.81	15
16	406.39	407.98	409.57	411.16	412.74	414.33	415.92	417.50	419.09	420.68	422.27	423.85	425.44	427.03	428.62	430.20	16
17	431.79	433.38	434.97	436.55	438.14	439.73	441.32	442.90	444.49	446.08	447.67	449.25	450.84	452.43	454.02	455.60	17
18	457.19	458.78	460.37	461.95	463.54	465.13	466.72	468.30	469.89	471.48	473.07	474.65	476.24	477.83	479.42	481.00	18

Feet and inches to metres

10′ 6″ = 3200 mm

Feet / Ins.	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0.0	0.305	0.610	0.914	1.219	1.524	1.829	2.133	2.438	2.743	3.048	3.352	3.657
1	0.0254	0.330	0.635	0.940	1.244	1.549	1.854	2.158	2.463	2.768	3.073	3.378	3.682
2	0.0508	0.356	0.660	0.965	1.269	1.575	1.880	2.184	2.489	2.794	3.099	3.403	3.708
3	0.0762	0.381	0.686	0.991	1.295	1.600	1.905	2.209	2.514	2.819	3.124	3.429	3.733
4	0.1016	0.406	0.711	1.016	1.320	1.626	1.931	2.235	2.540	2.844	3.150	3.454	3.759
5	0.1270	0.432	0.737	1.041	1.346	1.651	1.956	2.260	2.565	2.870	3.175	3.479	3.784
6	0.1524	0.457	0.762	1.066	1.371	1.676	1.981	2.286	2.590	2.895	3.200	3.505	3.810
7	0.1778	0.483	0.787	1.092	1.397	1.702	2.007	2.311	2.616	2.921	3.226	3.530	3.835
8	0.2032	0.508	0.813	1.117	1.422	1.727	2.032	2.336	2.641	2.946	3.251	3.555	3.860
9	0.2286	0.533	0.838	1.142	1.448	1.753	2.057	2.362	2.667	2.972	3.276	3.581	3.886
10	0.2540	0.559	0.864	1.168	1.473	1.778	2.083	2.387	2.692	2.997	3.302	3.606	3.911
11	0.2794	0.584	0.889	1.193	1.498	1.803	2.108	2.412	2.717	3.022	3.327	3.632	3.936

Pressure conversion: lbf/in^2 to Kg/cm^2 and bars

lb/in^2	kg/cm^2	Bar
1	0.07031	0.06895
14.22	1	0.9807
14.5	1.0197	1

lbf/in^2		0	10	20	30	40	50	60	70	80	90
0	Kg/cm^2		0.703	1.400	2.109	2.812	3.515	4.219	4.922	5.625	6.328
	Bars		0.689	1.379	2.069	2.758	3.448	4.137	4.827	5.516	6.206
100	Kg/cm^2	7.031	7.734	8.437	9.140	9.843	10.546	11.249	11.952	12.656	13.359
	Bars	6.895	7.585	8.274	8.964	9.653	10.343	11.032	11.722	12.411	13.101
200	Kg/cm^2	14.06	14.77	15.47	16.17	16.87	17.58	18.28	18.98	19.69	20.39
	Bars	13.79	14.48	15.17	15.86	16.55	17.24	17.93	18.62	19.31	20.00
300	Kg/cm^2	21.09	21.80	22.50	23.20	23.91	24.61	25.31	26.01	26.72	27.42
	Bars	20.69	21.37	22.06	22.75	23.44	24.13	24.82	25.51	26.20	26.89
400	Kg/cm^2	28.12	28.83	29.53	30.23	30.94	31.64	32.34	33.05	33.75	34.45
	Bars	27.58	28.27	28.96	29.65	30.34	31.03	31.72	32.41	33.10	33.79
500	Kg/cm^2	35.15	35.86	36.56	37.26	37.97	38.67	39.37	40.08	40.78	41.48
	Bars	34.48	35.16	35.85	36.54	37.23	37.92	38.61	39.30	39.99	40.68
600	Kg/cm^2	42.19	42.89	43.59	44.29	45.00	45.70	46.40	47.11	47.81	48.51
	Bars	41.37	42.05	42.75	43.44	44.13	44.82	45.51	46.20	46.89	47.58
700	Kg/cm^2	49.22	49.92	50.62	51.33	52.03	52.73	53.44	54.14	54.84	55.54
	Bars	48.27	48.95	49.64	50.33	51.02	51.71	52.40	53.09	53.78	54.47
800	Kg/cm^2	56.25	56.95	57.65	58.36	59.06	59.76	60.47	61.17	61.87	62.58
	Bars	55.16	55.85	56.54	57.23	57.92	58.61	59.30	59.99	60.68	61.37
900	Kg/cm^2	63.28	63.98	64.68	65.39	66.09	66.79	67.50	68.20	68.90	69.61
	Bars	62.06	62.74	63.43	64.12	64.81	65.50	66.19	66.88	67.57	68.26
1000	Kg/cm^2	70.31	—	—	—	—	—	—	—	—	—
	Bars	68.95	—	—	—	—	—	—	—	—	—

Temperature Conversion

Cent.	Fahren.	Cent.	Fahren	Fahren.	Cent.	Fahren.	Cent.
100	212	37	98.6	212	100	101	38.3
95	203	36	96.8	200	93.3	100	37.8
90	194	35	95	190	87.8	99	37.2
85	185	34	93.2	180	82.2	98	36.7
80	176	33	91.4	170	76.7	97	36.1
75	167	32	89.6	160	71.1	96	35.6
70	158	31	87.8	150	65.6	95	35
65	149	30	86	140	60	90	32.2
60	140	25	77	130	54.4	80	26.7
55	131	20	68	120	48.9	70	21.1
50	122	15	59	110	43.3	60	15.6
45	113	10	50	105	40.6	50	10
40	104	5	41	104	40	40	4.4
39	102.2	0	32	103	39.4	32	0
38	100.4			102	38.9		

Centigrade to Fahrenheit: $C = \frac{5}{9}(F—32)$

Divide by 5, multiply by 9 and add 32.

Example: 260Cent. ÷ 5 = 52. 52 × 9 = 468 + 32 = 500Fahr.

Ans. 260Cent. = 500Fahr.

To convert Fahrenheit into Centigrade: $F = 32 + \frac{9}{5}C$

Subtract 32 from Fahreneheit and divide remainder by 9 and multiply by 5.

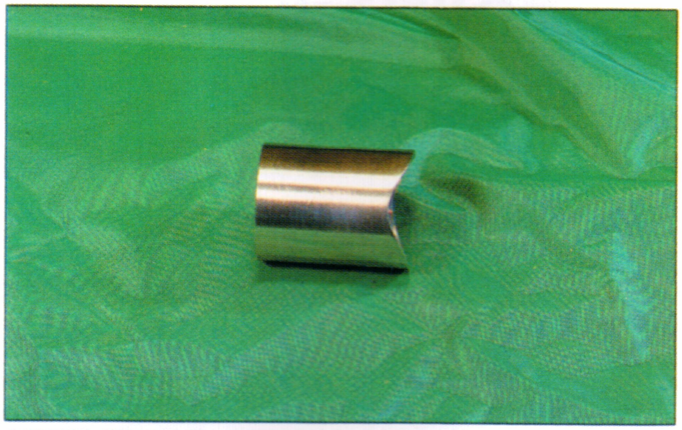
Example: 212 Fahr.

$\frac{32}{180}$ 180 ÷ 9 = 20. 20 × 5 = 100.

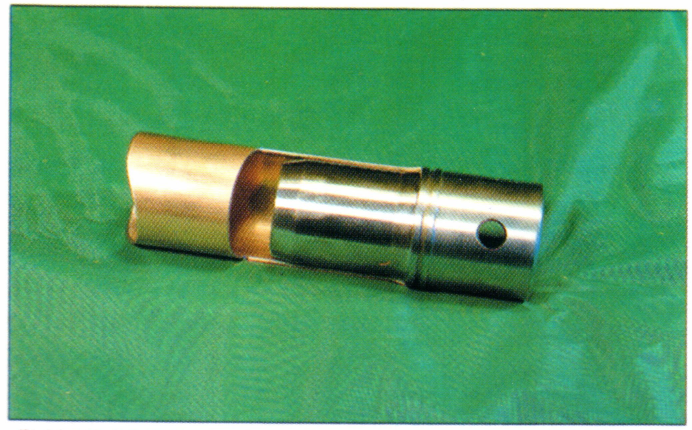
Ans. 212Fahr. = 100Cent.

MAR No. 11 T.U. (TANKER UNION) FITTING

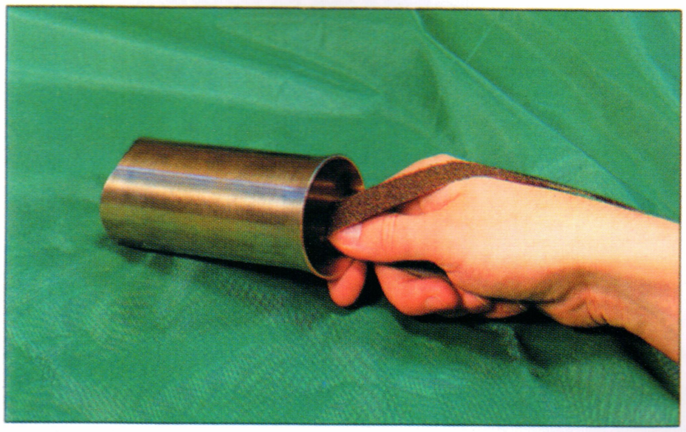
Follow the installation photographs below for the use of the MAR No. 11 T.U. fitting.
Note: the tube thickness is most important when ordering the fittings so the olive can be manufactured to the correct tolerance. Ring our sales department if you require further details.



CUTTING OF PIPE (Square End)

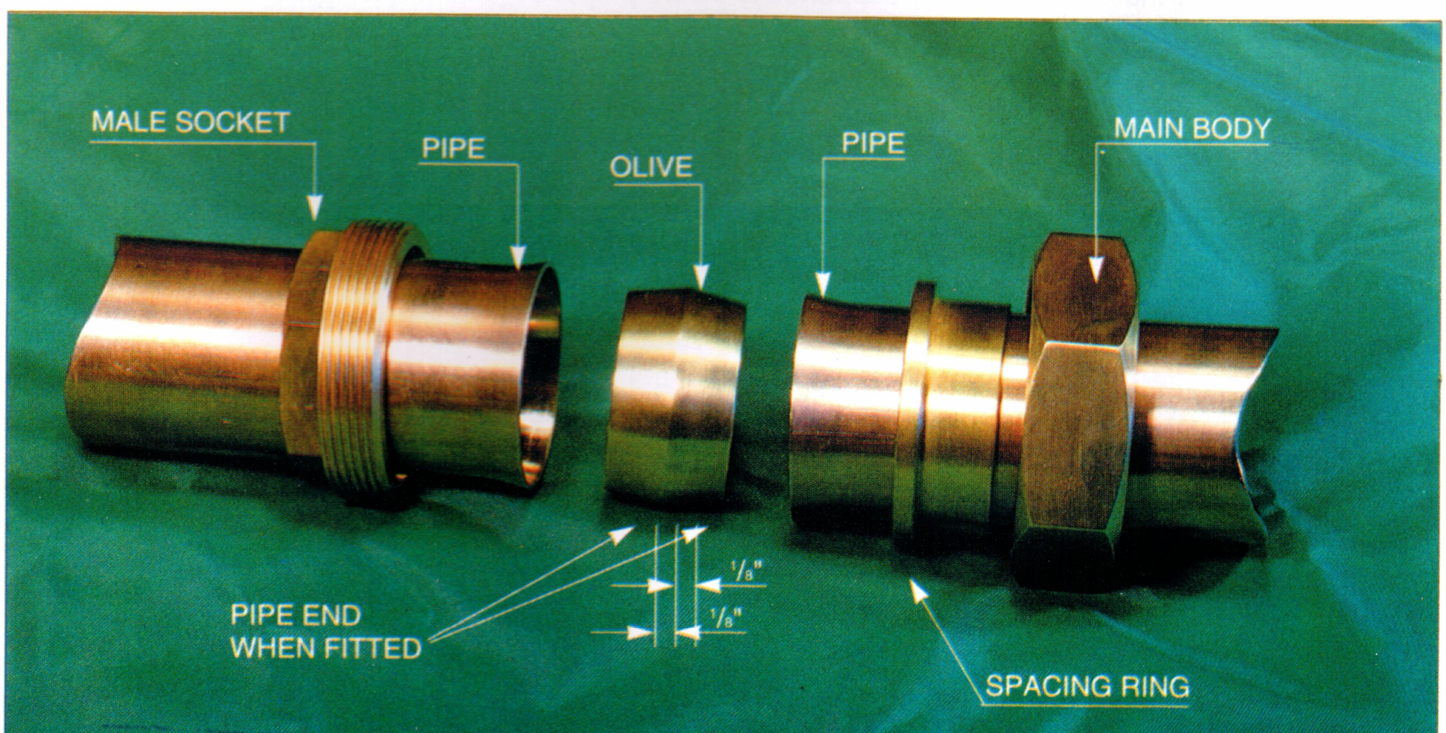


FLARING OF END (Non Spark Flaring Tool)



REMOVAL OF BURR (Emery Cloth)

PREPARING OF SURFACE (Jointing Compound)



ASSEMBLY OF COUPLING

marcon engineering

INSTRUCTIONS FOR MAKING JOINTS

MARINE RANGE
SILVER SOLDER BRAZING PIPE FITTINGS

HOW TO SIL-BRAZE FITTINGS TO ALUMINIUM BRASS AND COPPER NICKEL IRON PIPEWORK

PREPARATION
Pipe should be cut square to insure an all around contact with the bottom of the socket of the fitting. Any burrs or upset on the end of the pipe should be removed by reaming or filing.

CLEANING
Surfaces to be joined must be free of all grease, oil, oxides and dirt of any kind. In a preinserted ring fitting it may be necessary to remove the insert in order to clean the ring groove. Oil and grease can be removed with a solvent such as acetone or alcohol.
Dirt and oxides can be removed with an abrasive cloth.

FLUXING
The brazing flux should be of a paste like consistency and applied evenly to the cleaned surfaces of the pipe and fitting. If necessary water may be added to the flux to obtain the desired consistency.

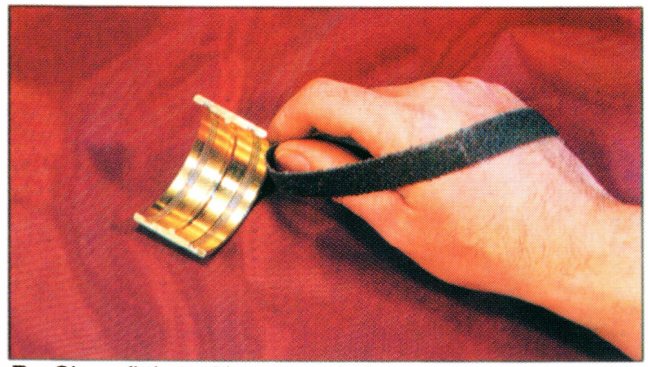
ASSEMBLE & SUPPORT
Insert the pipe the full depth of the cup of the fitting and rotate approximately a ½ turn in order to insure that the flux is evenly distributed in the joint area. The depth of insertion can be checked by inscribing a line at a predetermined distance from the end of the pipe.
The piping assembly must be adequately supported to insure proper alignment and minimise stress on the joint area during the brazing cycle.

BRAZING
Oxyacetylene equipment is recommended for the fabrication of MARCON fittings.
The reducing flame should be used to preheat the pipe around its entire circumference. Heating of the pipe should continue until the flux is clear and transparent.
The flame should then be applied to the circumference of the fitting until the flux on the face of the fitting is transparent.
This is an indication that the assembly is at approximately 600°C.
If it is of the preinserted ring type a segment of the band of the fitting should have additional heat applied to it with a wiping motion from the base of the cup to the pipe. This will produce a capillary action that will force the alloy from the groove and distribute it throughout the joint area.
Once the alloy starts to flow heat should be applied to another segment of the fitting and the brazing procedure repeated until the joint is completed.
It is desirable to have a fillet around the circumference of the joint when it is complete. If this was not obtained with the alloy in the insert then supplemental alloy should be used.
(CAUTION:) Do not overheat the fitting as this will cause it to expand and the capillary action will be lost.

FLUX REMOVAL & VISUAL INSPECTION
All flux must be removed from the completed joint for a visual inspection and pressure testing. This is best accomplished by quenching the assembly with water after it has air cooled to approximately 95°C.

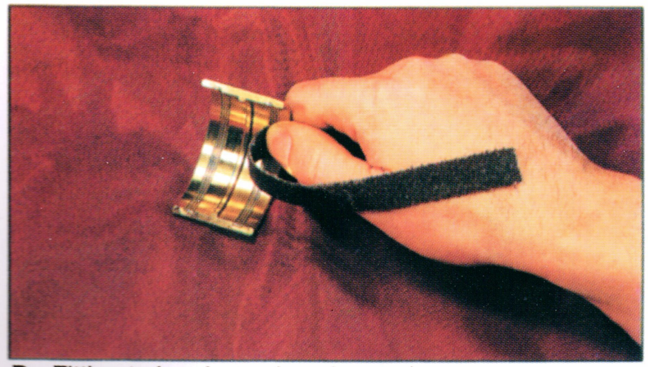
INSTRUCTIONS FOR MAKING SILVER SOLDER SLEEVE JOINTS

A - Remove burr inside and outside



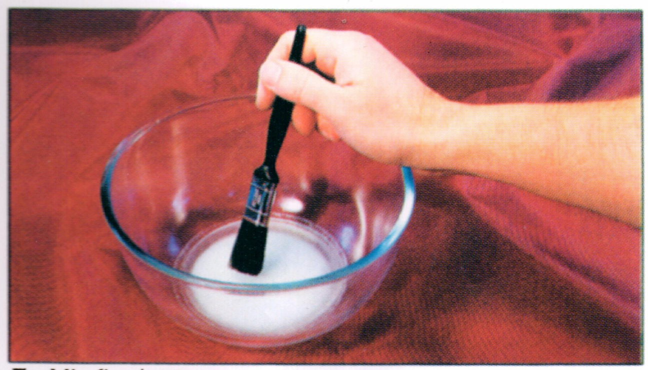
B - Clean fitting with emery cloth

C - Clean outside of tube with emery cloth

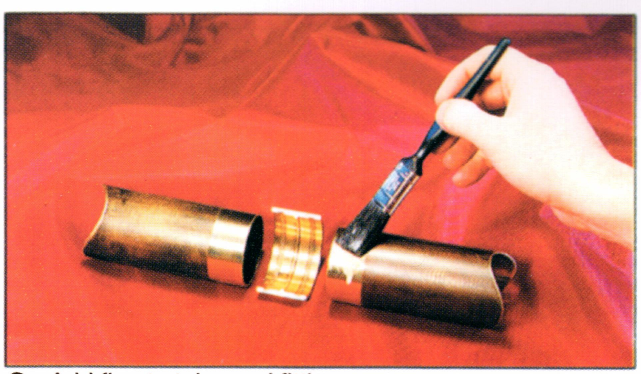


D - Fitting to be cleaned as denoted

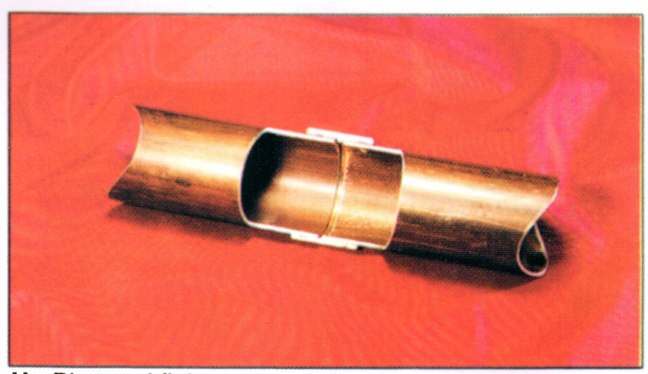
E - Add water to powder flux



F - Mix flux/water to creamy paste



G - Add flux to tube and fitting



H - Pipe and fitting correctly lined up