



# RIGID TUBE, FITTINGS, TUBE BENDING

USA: (704) 793 4319 UK: 01753 545554 WEB: www.bmrs.net

## Rigid Tube, Fittings and Tube Bending

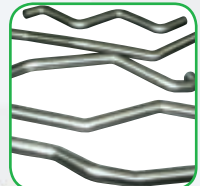
BMRS has many years experience in working in partnership with race teams and engine builders to providing the right solution for their specific requirements.

To complement our flexible hose ranges, a comprehensive range of rigid tube, tube bending and tube fittings are available.

Tube bending is offered in sizes from 1/8" to 2" in stainless steel and aluminium. Other materials including titanium are also available.

Using a combination of compound tube bends and flexible hose, we can offer the ultimate package in terms of form and function.

If you don't see a fitting that will solve your problem, let us custom design a fitting that will suit your application. The options are endless.





## Precision CNC Tube Measuring and Bending



At Brown & Miller Racing Solutions we are at the forefront of technology in lightweight racing hose and fittings and are committed to servicing professional race teams and engine builders world wide. Now we have installed the very latest in CNC tube bending and measuring equipment to further compliment our lightweight ProGold hose and fitting range. This includes:

### CNC Bending Equipment

- State of the art bending equipment
- Size range of 1/8" to 2"
- No quantity requirements
- Minimum turn around time
- Materials - Aluminium, Steel, Stainless Steel, Titanium ,etc.
- High degree of accuracy and repeatability.



### Measuring Equipment

- State of the art multi-axis tube measuring equipment
- Manufacture from drawings
- Reverse engineering from existing tube and mock-up parts
- Capable of precision QC for exact fit requirements.

With these services we are able to help you increase precision and productivity wherever you are using tube bends. From fluid system tubing to chassis tubing - we can meet your needs. A wide range of weld on attachments is also available enabling us to provide you with the finest product.



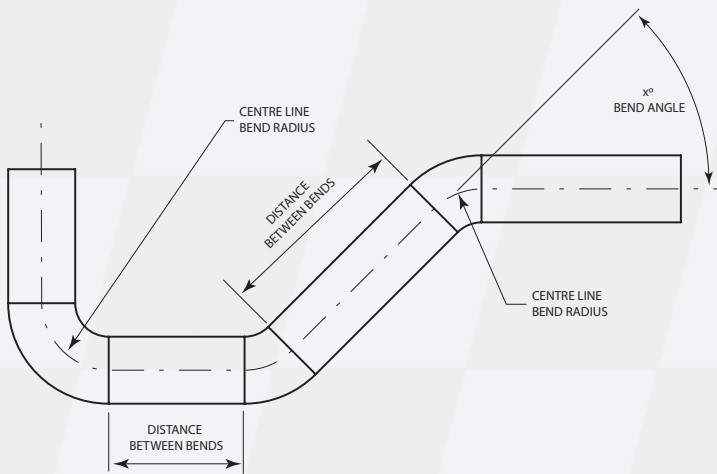


## Tube Bending Guidelines

The following information catalogues the current bend tools that are available. This list is constantly being added to, check with us if your specific requirement does not appear to be listed.

The "Clamp length" is the minimum distance between bends that can be achieved (See illustration below). This figure, plus a small clearance allowance of 1/8", should be taken into account when designing complex compound tube bends. In any specific compound tube bend design only one Centre Line Bend Radius should be selected.

Bend Angle is defined as the actual angle the tube is bent through.



We are able to interpolate all common CAD and 3D model data directly into our bending equipment.

We can also work with X,Y,Z co-ordinates, mock up parts or existing patterns.

### Round Tube

Tube O/D ins	Centre line bend radius	Tube wall thickness ins	Clamp length ins
3/16	1/4" 1/2"	0.020, 0.028, 0.035, 0.049	1/2
1/4	1/2"	0.028	3/4
5/6	13mm	0.035	1/2
3/8	1"	0.035	1
1/2	1"	0.035, 0.049	1
5/8	1"	0.049, 0.065	1
3/4	3/4" 1 1/8" 3"	0.035, 0.049, 0.065	1 1/4, 3
7/8	1 1/4" 3"	0.049, 0.065	1 1/4, 3
1	1" 1 1/2" 4"	0.035, 0.049 0.065, 0.083 0.095	1 1/2, 2, 3
1 1/8	2" 3 1/2"	0.049, 0.065 0.083, 0.095	2 1/2, 3
1 1/4	1 1/4" 2" 3 1/2" 4"	0.035, 0.049 0.065, 0.083 0.095	2 1/2, 3
1 3/8	4"	0.065, 0.083 0.095	3, 4
1 1/2	3" 4"	0.049, 0.065 0.058	3, 4
1 3/4	2" 4"	0.049, 0.065 0.083, 0.095	2 1/2, 4
2	3"	0.049, 0.065	3, 4

### Square & Rectangular Tube

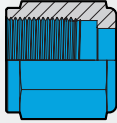
Tube O/D ins	Centre line bend radius ins	Tube wall thickness ins	Clamp length ins
3/4 x 2	3 5/8	0.095	2
5/8 x 5/8	4	0.049, 0.065	2
3/4 x 3/4	4	0.049, 0.065	2
1 x 1	4	0.065, 0.083	2





## Rigid Tube End Fittings

### Coupling Nut



Part no. Aluminium	Part no. Stainless steel	Tube size
AN818-3D	AN818-3J	-03
AN818-4D	AN818-4J	-04
AN818-6D	AN818-6J	-06
AN818-8D	AN818-8J	-08
AN818-10D	AN818-10J	-10
AN818-12D	AN818-12J	-12
AN818-16D	AN818-16J	-16

### Sleeve

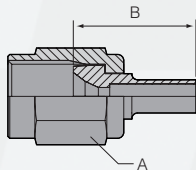


Part no. Aluminium	Part no. Stainless steel	Tube size
AN819-3D	AN819-3J	-03
AN819-4D	AN819-4J	-04
AN819-6D	AN819-6J	-06
AN819-8D	AN819-8J	-08
AN819-10D	AN819-10J	-10
AN819-12D	AN819-12J	-12
AN819-16D	AN819-16J	-16



## Rigid Tube End Fittings - Brazed

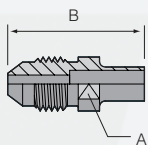
### Tube Fitting JIC (AN) Female - Brazed



Fitting part number		Tube size	Thread size	A		B	
Stainless steel	Aluminium			ins	mm	ins	mm
TF-02-F7-BZ		1/8 -02	5/16 x 24	0.375	9.52	0.58	14.75
TF-02-03-F7-BZ		1/8 -02	3/8 x 24	0.437	11.1	0.64	16.25
TF-03-F7-BZ		3/16 -03	3/8 x 24	0.437	11.1	0.64	16.25

Material Stainless Steel 17-4 ph

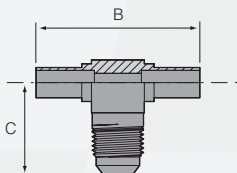
### Tube Fitting JIC (AN) Male - Brazed



Fitting part number		Tube size	Thread size	A		B	
Stainless steel	Aluminium			ins	mm	ins	mm
TF-02-J7-BZ		1/8 -02	5/16 x 24	0.250	6.35	0.92	23.3
TF-03-J7-BZ		3/16 -03	3/8 x 24	0.312	7.92	0.95	24.13

Material Stainless Steel 17-4 ph

### Tube Fitting JIC (AN) Tee - Brazed



Fitting part number		Tube size	Thread size	A		B	
Stainless steel	Aluminium			ins	mm	ins	mm
TF-0012-03-7		3/16 -03	3/8 x 24	1.39	35.3	0.83	21.25

Material Stainless Steel 316

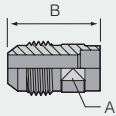


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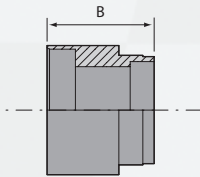
## Rigid Tube End Fittings - Welded

### Tube Fitting JIC (AN) Male (Socket Weld)



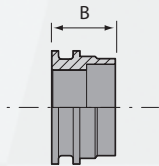
Fitting part number		Tube size	Thread size	A		B	
Stainless	Aluminium			ins	mm	ins	mm
steel							
TF-06-J7	-	3/8 -06	9/16 x 18	0.500	12.70	0.96	24.50
TF-08-J7	-	1/2 -08	3/4 x 16	0.687	17.40	1.13	28.70
TF-10-J7	-	5/8 -10	7/8 x 14	0.750	19.05	1.23	31.25
TF-12-J7	-	3/4 -12	1 1/16 x 12	0.937	23.80	1.33	33.95
TF-16-J7	-	1 -16	1 5/16 x 12	1.250	31.80	1.46	37.15
TF-20-J7	-	1 1/4 -20	1 5/8 x 12	1.500	38.10	1.50	38.30
-	TF-24-JJ	1 1/2 -24	1 7/8 x 12	1.750	44.40	1.96	50.00

### Tube Fitting Clam Shell Female (Socket Weld)



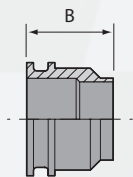
Fitting part number		Tube size	Clamp size	B	
Stainless	Aluminium			ins	mm
steel					
TF-16-WF-7	-	1 -16	1.11	28.35	
TF-20-WF-7	-	1 1/4 -20	1.16	29.50	
-	TF-28-WF-J	1 3/4 -28	1.29	32.85	

### Tube Fitting Clam Shell Male (Socket Weld)



Fitting part number		Tube size	Clamp size	B	
Stainless	Aluminium			ins	mm
steel					
TF-08-WM-7	TF-08-WM-J	1/2 -08	0.48	12.3	
TF-10-WM-7	TF-10-WM-J	5/8 -10	0.48	12.3	
TF-12-WM-7	TF-12-WM-J	3/4 -12	0.56	14.1	
TF-12-16-WM-7	-	3/4 -16	0.77	19.5	
TF-14-16-WM-7	-	7/8 -16	0.77	19.5	
TF-16-12-WM-7	-	1 -12	1.31	33.4	
TF-16-WM-7	TF-16-WM-J	1 -16	0.88	22.5	
TF-16-20-WM-7	-	1 -20	0.88	22.5	
TF-20-WM-7	TF-20-WM-J	1 1/4 -20	0.67	17.0	
-	TF-24-WM-J	1 1/2 -24	0.88	22.5	
-	TF-28-WM-J	1 3/4 -28	0.88	22.5	

### Tube Fitting Clam Shell Male (Butt Weld)

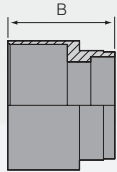


Fitting part number		Tube size	Clamp size	B	
Stainless	Aluminium			ins	mm
steel					
-	WTF-08-WM-J	1/2 -08	0.75	19.05	
-	WTF-10-WM-J	5/8 -10	0.74	18.80	
-	WTF-12-WM-J	3/4 -12	0.78	19.80	
-	WTF-16-WM-J	1 -16	0.83	21.25	
-	WTF-20-WM-J	1 1/4 -20	0.83	21.25	
-	WTF-24-WM-J	1 1/2 -24	0.83	21.25	
-	WTF-28-WM-J	1 3/4 -28	0.83	21.25	
-	WTF-32-WM-J	2 -32	0.85	21.70	
-	WTF-40-WM-J	2 1/2 -40	0.85	21.70	
-	WTF-48-WM-J	3 -48	0.85	21.70	



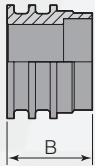
## Rigid Tube End Fittings - Welded

### Tube Fitting Clam Shell Deep Female – Double 'O' Ring (Socket Weld)



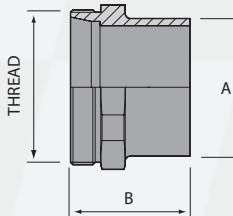
Fitting part number		Tube size	Clamp size	B	
Stainless steel	Aluminium			ins	mm
TF-08-WFFD-7	TF-08-WFFD-J	1/2	-08	0.84	21.4
TF-10-WFFD-7	TF-10-WFFD-J	5/8	-10	0.84	21.4
TF-12-WFFD-7	TF-12-WFFD-J	3/4	-12	1.04	26.4
TF-16-12-WFFD-7	-	1	-12	1.31	33.4
TF-16-WFFD-7	TF-16-WFFD-J	1	-16	1.11	28.35
TF-20-WFFD-7	TF-20-WFFD-J	1 1/4	-20	1.16	29.50
-	TF-24-WFFD-J	1 1/2	-24	1.29	32.85
-	TF-28-WFFD-J	1 3/4	-28	1.29	32.85

### Tube Fitting Clam Shell Male – Double 'O' Ring (Socket Weld)



Fitting part number		Tube size	Clamp size	B	
Stainless steel	Aluminium			ins	mm
TF-08-WM-DO-7	TF-08-WM-DO-J	1/2	-08	0.7	18.00
TF-10-WM-DO-7	TF-10-WM-DO-J	5/8	-10	0.71	18.00
TF-12-WM-DO-7	TF-12-WM-DO-J	3/4	-12	0.79	20.00
TF-16-WM-DO-7	TF-16-WM-DO-J	1	-16	0.84	21.45
TF-20-WM-DO-7	TF-20-WM-DO-J	1 1/4	-20	0.84	21.45
-	TF-24-WM-DO-J	1 1/2	-24	1.11	28.20
-	TF-28-WM-DO-J	1 3/4	-28	1.11	28.20

### Weld on Flareless Male

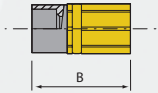


Fitting part number		Hose size	Thread size	A		B	
stainless Steel	Aluminium			ins	mm	ins	mm
-	TF-0021-24-J	-24	1 13/16 x 12	1.58	40.13	1.85	47.00
-	TF-0021-28-J	-28	2 1/8 x 12	1.83	46.50	1.85	47.00
-	TF-0021-32-J	-32	2 3/8 x 12	2.12	53.78	1.85	47.00



## Rigid Tube End Fittings - Welded

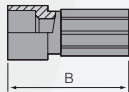
### Tube Fitting to AC Tail (Socket Weld)



Fitting part no.	Fitting part no.	Hose size	Tube size	B	
Stainless steel insert	Aluminium insert			ins	mm
TF-06-05-AC-7	-	-06	5/16	1.00	25.4
TF-06-AC-7	-	-06	5/16	1.00	25.4
TF-08-AC-7	TF-08-AC-J	-08	1/2	1.09	27.8
TF-10-AC-7	TF-10-AC-J	-10	5/8	1.22	31.1
TF-12-AC-7	TF-12-AC-J	-12	3/4	1.23	31.2
TF-12-14-AC-7	-	-12	7/8	1.34	34.2
TF-16-14-AC-7	-	-16	7/8	1.23	31.2
TF-16-AC-7	TF-16-AC-J	-16	1	1.23	31.2
TF-20-AC-7	TF-20-AC-J	-20	1 1/4	1.66	42.1

**Note: These fittings MUST be welded to the tube BEFORE assembling to the hose.**

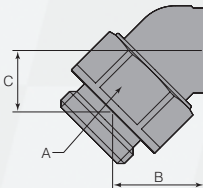
### Tube Fitting to SB Tail (Socket Weld)



Fitting part no.	Fitting part no.	Hose size	Tube size	B	
Stainless steel	Aluminium insert			ins	mm
TF-03-SB-7	-	-03	3/16	0.81	20.5
TF-04-SB-7	-	-04	1/4	0.84	21.5

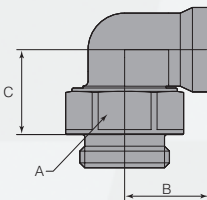
**Note: These fittings MUST be welded to the tube BEFORE assembling to the hose.**

### Tube Fitting to Male Swivel Port Fitting - 45° Elbow (Butt Weld)



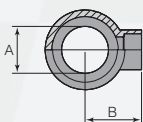
Fitting part no.	Tube size	Port size	Fitting thread size	A		B		C	
Stainless steel				ins	mm	ins	mm	ins	mm
TF-16-12-M7-45	1	-12	1 1/16 x 12	1 1/4	31.7	1.12	28.45	0.75	18.9

### Tube Fitting to Male Swivel Port Fitting - 90° Elbow (Butt Weld)



Fitting part no.	Tube size	Port size	Fitting thread size	A		B		C	
Stainless steel				ins	mm	ins	mm	ins	mm
TF-16-12-M7-90	1	-12	1 1/16 x 12	1 1/4	31.7	1.01	25.6	1.00	25.4

### Tube Fitting to Banjo (Socket Weld)



Fitting part no.	Bolt size	Tube size	B	
Stainless steel	A		ins	mm
TF-0031-04-7	12mm	1/4	0.59	15.0
TF-0031-05-7	12mm	5/16	0.59	15.0
TF-0032-06-7	14mm	3/8	0.67	17.0





## Wiggins Clamps



The W900 series of Adel Wiggins Flexible Tube Connector are qualified to the Military and Aerospace requirements of Mil-C-22263, plus over 20 years of proven reliability within the motorsports industry.

Removed and installed with only one hand quickly and easily, whether they are used with tubing or hose fittings.

Integral electrical bonding feature eliminates external clamps, fasteners and jumper wire.

Operating Pressure 125 p.s.i.  
Proof Pressure 250 p.s.i.  
Burst Pressure 375 p.s.i.

Flexibility +/- 4° total angular tube flexure  
(max. angular misalignment) (+ 2° per tube centerline)

Temperature range Dependent on 'O' Ring material.  
See page 13.8

Hose size	Tube size	Part number		
		Clamp only Aluminium	Clamp plus sleeve Aluminium	Sleeve only Aluminium
-08	1/2	W994-08D	W991-08DE	W908B-08D
-10	5/8	W994-10D	W991-10DE	W908B-10D
-12	3/4	W994-12D	W991-12DE	W908B-12D
-16	1	W994-16D	W991-16DE	W908B-16D
-20	1 1/4	W994-20D	W991-20DE	W908B-20D
-24	1 1/2	W994-24D	W991-24DE	W908B-24D
-28	1 3/4	W994-28D	W991-28DE	W908B-28D
-32	2	W994-32D	W991-32DE	W908B-32D
-40	2 1/2	W994-40D	W991-40DE	W908B-40D
-64	3	W994-64D	W991-64DE	W908B-64D

See page 11.1 for 'O' Ring part numbers.







## Wiggins Caps and Plugs

### Wiggins Caps



Fitting part number	Size ins
W-CAP-08	1/2
W-CAP-10	5/8
W-CAP-12	3/4
W-CAP-16	1
W-CAP-20	1 1/4
W-CAP-24	1 1/2
W-CAP-28	1 3/4
W-CAP-32	2
W-CAP-40	2 1/2

### Wiggins Plugs



Fitting part number	Size ins
W-PLUG-08	1/2
W-PLUG-10	5/8
W-PLUG-12	3/4
W-PLUG-16	1
W-PLUG-20	1 1/4
W-PLUG-24	1 1/2
W-PLUG-28	1 3/4
W-PLUG-32	2
W-PLUG-40	2 1/2

### Wiggins Caps - Plastic



Fitting part number	Size ins
VC-725-16	-08 1/2
VC-875-16	-10 5/8
VC-1062-16	-12 3/4
VC-1312-16	-16 1
VC-1593-16	-20 1 1/4
VC-1875-16	-24 1 1/2
VC-2125-16	-28 1 3/4



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