



AEROSPACE ENGINEERING BULLETIN

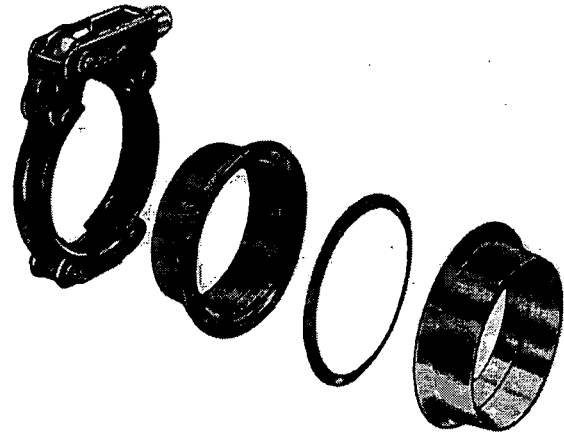
AEB

197A

CONOSEAL
JOINTS

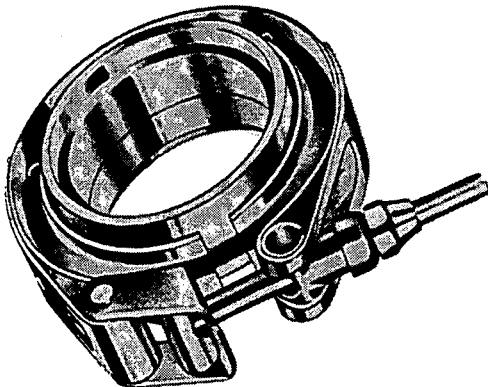
CONOSEAL[®] joints, fittings and Conomate[™] couplings

The Aeroquip Conoseal principle provides a circumferential metal-to-metal seal with essentially "zero leakage." Designs shown in this bulletin include the Conomate coupling, light weight and medium weight tube joints, and tube fittings.



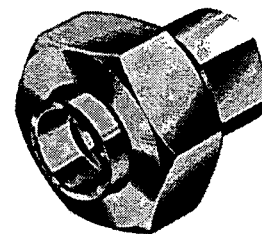
Light Weight Conomate Joints

Light weight Conomate joints offer great strength, high reliability and optimum loading characteristics. No-weld construction provides high joint integrity by eliminating the possibility of undiscovered weld stress.



Standard Light Weight and Medium Weight Joints

Standard tube joints, using either a T-bolt, quick coupler latch or a Conomate coupling permit quick, easy assembly and rapid disassembly.



Union Fittings for Small Diameters

These light weight fittings, available in sizes 1" and under, are highly reliable and require no periodic retorquing. They can be supplied with either socket or butt weld flanges.

CONOSEAL joints and union fittings

The Conoseal joint consists of a male and female flange and frusto-conical shaped gasket (or gaskets) which are contained either by bolts, V-Band couplings or a threaded union. These joints employ a sealing principle which was developed to provide industry with an all-metal joint capable of withstanding high pressures and extreme temperatures without leakage.

Conoseal joints can be supplied to withstand temperatures ranging from -450°F. to $+2000^{\circ}\text{F.}$, and pressures up to 20,000 psi. These joints are suitable for critical sealing applications requiring leakage rates within the capability range of a helium mass spectrometer leak detector. They are adaptable for joining systems such as cryogenic lines, lines for high temperature and high pressure gases and fluids, liquid metal systems, ultra high vacuum lines, etc.

Conoseal joints can be used on systems involving dissimilar metals. The joints are reusable by simply replacing the gasket. Components or complete joints can be furnished in a wide range of materials and configurations as outlined on the following pages.

Special configurations can be designed to suit the application and large diameters can also be supplied. Contact Aeroquip or your nearest sales engineer for designs and sizes not shown in this catalog.

FEATURES

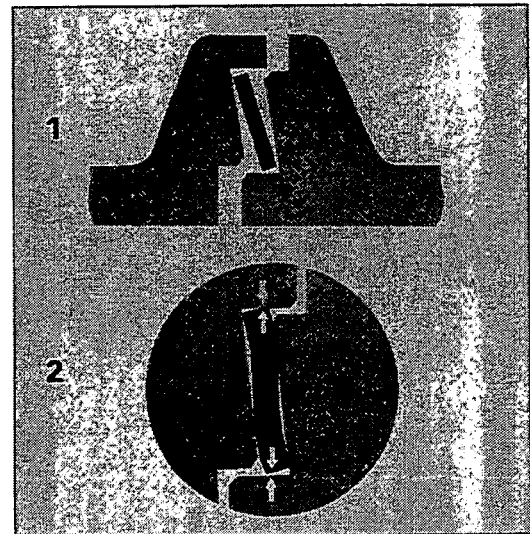
- Handles extreme temperatures (-450°F. to $+2000^{\circ}\text{F.}$)
- Accommodates extremely high pressures
- Withstands severe vibration
- Quick assembly and disassembly
- No periodic retorquing required
- Virtually leakproof (leakage rate is less than 1×10^7 standard cc/second of helium)
- Many sizes and configurations
- Wide range of materials
- Improved elliptical gasket available that retains itself in the flange cavity for ease of installation.

Sealing Principle

Illustration 1: The gasket is shown inserted between the mating flanges prior to assembly of the coupling or bolts. As the flanges are moved axially together, the gasket is loaded radially against the mating flange lips. The inclined flange surfaces are brought to bear against the gasket sides to control buckling.

Illustration 2: The gasket is shown completely enclosed. The mechanical advantage of the Conoseal joint design induces a plastic flow condition on the sealing edges of the gasket. This insures 100% metal-to-metal contact.

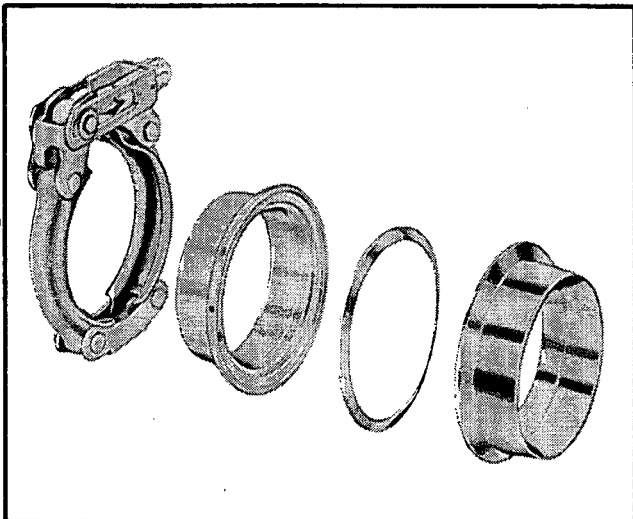
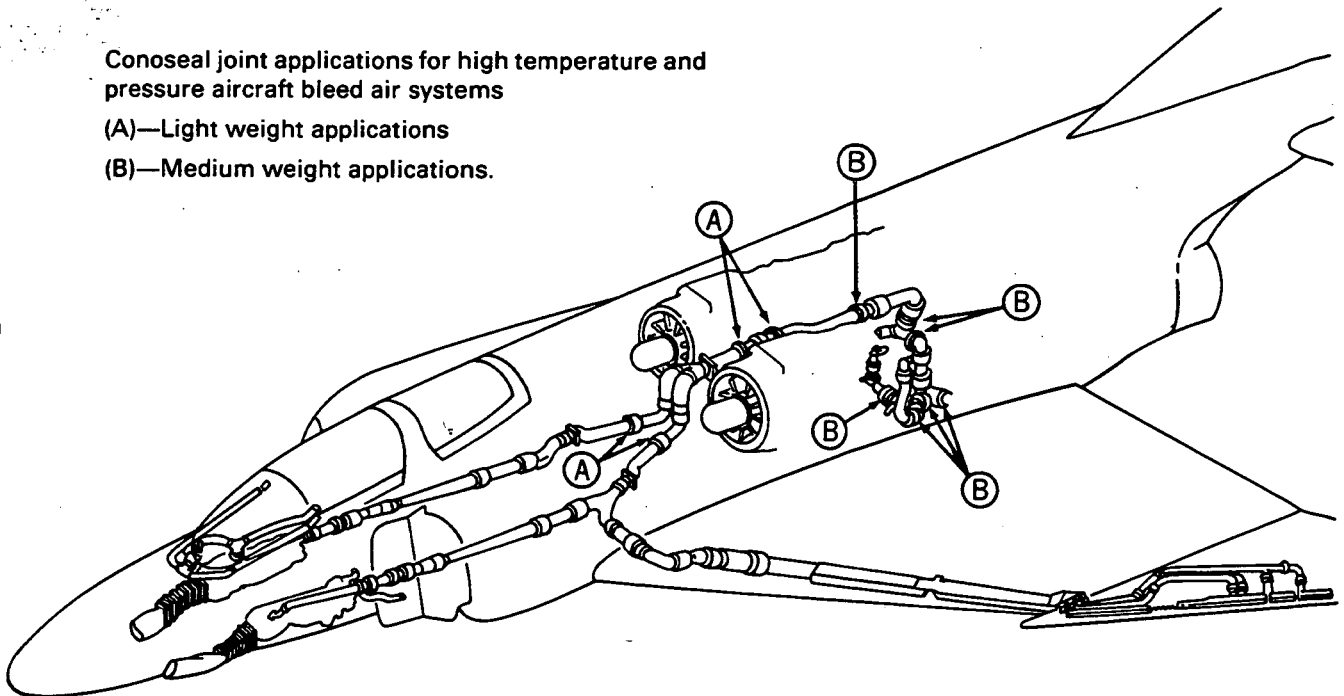
In effect, the Conoseal joint design embodies the recovery characteristics of an elastomeric joint. Since the gasket cross sectional height is greater than the vertical distance between flange lips, its sealing is not limited to the fully compressed position. Proof testing has indicated flange axial separation capabilities up to .06 inches without leakage.



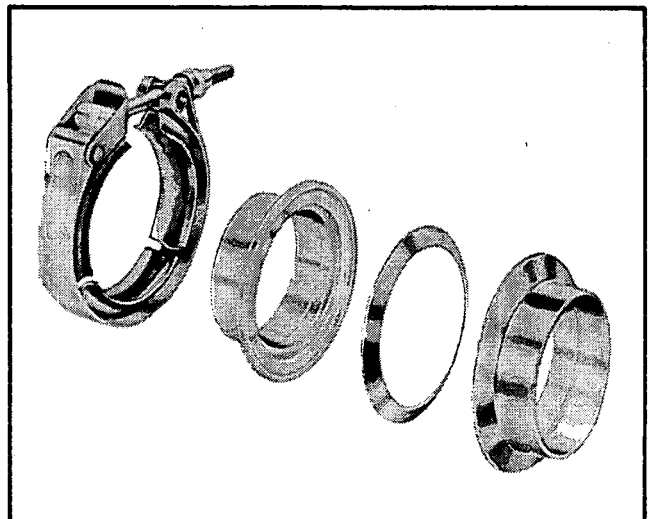
Conoseal joint applications for high temperature and pressure aircraft bleed air systems

(A)—Light weight applications

(B)—Medium weight applications.



Light weight Conoseal joint with Conomate coupling (conventional V-Band coupling also available).



Medium weight Conoseal joint with T-Bolt quick coupler.

CONOSEAL standard light weight and medium weight joints



HOW TO ORDER

Component Parts: Use component part numbers as tabulated and add flange and gasket material codes to complete the part numbers. One coupling, a male and female flange and a gasket are required to make a complete joint. T-bolts and nuts are supplied when coupling is ordered. Replacement T-bolts can be ordered for quick coupler latches only.

Coupling Part Number Example :

MVC69370AP 200

Basic Part No. _____
 Tube Size _____

Light weight coupling with quick coupler latch, 2-inch tube O.D.

NM100836-0200

Basic Part No. _____
 Tube Size _____

Medium weight coupling with quick coupler latch, 2-inch tube O.D.

Flange Part Number Example :

51132-100 A (male flange)

51133-100 A (female flange)

Basic Part No. _____
 Tube Size _____
 Material Code _____

Male/female flanges for light weight joint in aluminum material, 1-inch size.

50889-200 S (male flange)

50888-200 S (female flange)

Basic Part No. _____
 Tube Size _____
 Material Code _____

Male/female flanges for medium weight joint in stainless steel material, 2-inch size.

To order medium weight flanges in "S"—stainless steel material in tube O. D. sizes 4½ inches through 8 inches, use the following basic flange part numbers: 55225 for male flange and 55224 for female flange. Add the tube O. D. size and "S" material code to the basic part number.

Gasket Part Number Example :

51134-200 A

Basic Part No. _____
 Tube Size _____
 Material Code _____

Gasket for light weight joint in aluminum material, 2-inch size.

50887-200 A

Basic Part No. _____
 Tube Size _____
 Material Code _____

Gasket for medium weight joint in aluminum material, 2-inch size.

Self-Retained Gasket Part Number Example :

NK100004-0100 AF

Basic Part No. _____
 Tube Size _____
 Material Code _____

Self-retained gasket for light weight joint in aluminum material, 1-inch size.

NK100589-0200 SE

Basic Part No. _____
 Tube Size _____
 Material Code _____

Self-retained gasket for medium weight joint in stainless steel material, 2-inch size.

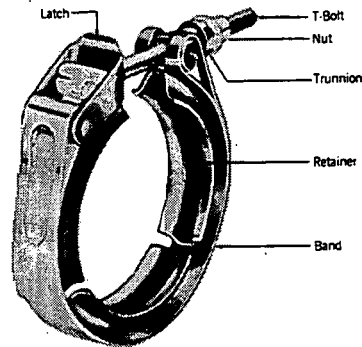
High Vacuum Gaskets: For high vacuum applications (1×10^{-8} through 1×10^{-9} torrs) it is recommended that gasket part number 55666 be used with the medium weight joint. (1 torr = 1mm Hg.) Size and material callouts of these gaskets are the same as the standard gaskets.

Gaskets are not reusable. It is recommended that spare gaskets be purchased for each joint and/or flanges where disassembly will be required.

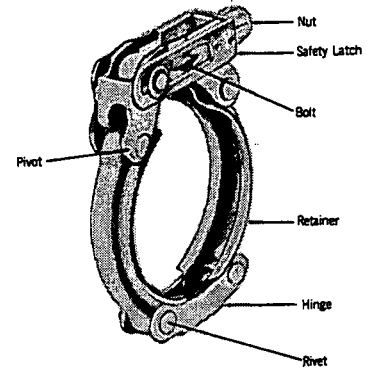


MATERIAL SPECIFICATIONS

COUPLINGS



QUICK COUPLER LATCH



CONOMATE

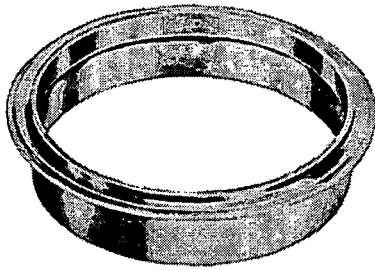
	Part Numbers: Light Weight: MVC69370AP Medium Weight: NM100836, NM100837, NM100838	Part Number: NH100480
Item	Material Specification	Material Specification
Spotweld	Mil-W-6858	NA
Band	AMS 5525 A-286 Stainless Steel	NA
Nut	AMS 5642 347FM Stainless Steel Silver Plated	AMS 5732/5737 A-286 Stainless Steel Silver Plated
Trunnion	AMS 5525 A-286 Stainless Steel	NA
Retainer	AMS 5525 A-286 Stainless Steel	AMS 5662 Inconel 718 Stainless Steel
Bolt	AMS 5732/5737 A-286 Stainless Steel	AMS 5732/5737 A-286 Stainless Steel
Latch	AMS 5525 A-286 Stainless Steel	AMS 5662 Inconel 718 Stainless Steel

*Part numbers for 19-9DL and Inconel 718 couplings not listed. Consult factory.

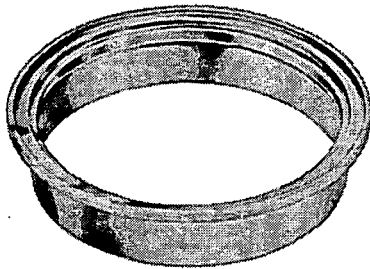
CONOSEAL standard light weight and medium weight joints

(MATERIAL SPECIFICATIONS, continued)

FLANGES



MALE FLANGE



FEMALE FLANGE

Material	Temperature Range	Material Ordering Code
6061-T6 Aluminum Alloy	-450°F. to +400°F.	A
19-9DL Stainless Steel	-300°F. to +1000°F.	D
347 Stainless Steel	-450°F. to +1250°F.	S
Inconel 625 Stainless Steel	-450°F. to +1500°F.	GC

Aluminum gaskets must be used when either male or female flange is aluminum. For tube joints having a material transition from stainless steel to aluminum it is recommended that flanges be ordered as follows:

Temperature	Male Flange	Female Flange	Gasket
+70°F. to +400°F.	A	D, S, or GC	A
-450°F. to +70°F.	D, S, or GC	A	A

This flange material combination will further compress the gasket as the joint reaches its service temperature. This compression is due to the difference in thermal expansion of stainless steel and aluminum.

GASKETS—SELF-RETAINED AND STANDARD



SELF-RETAINED



STANDARD

Material	Temperature Range	Material Ordering Code
6061-0 Aluminum Alloy per QQ-A-327	-450°F. to +400°F.	A or AF
321 Stainless Steel Per MIL-S-6721	-450°F. to +1500°F.	S or SE

*Single letter code for conventional gasket. Double letter code for self-retained gasket.

Gaskets are not reusable. Tolerances are proprietary information. They are 100% inspected by Aeroquip. The performance of the joint will be seriously impaired and possible damage to the flanges may be incurred, unless Aeroquip Conoseal gaskets are used. Self-retaining gaskets are captured in flange cavity for ease of assembly.

Approximate weights of gaskets in stainless steel materials are as follows:

Basic Part No.	Tube O.D. Size	Weight in lbs.
51134-Size ***NK100004-Size	1.00 to 3.00	.007
	3.50 to 4.50	.012
50887-Size ***NK100589-Size	1.00 to 3.00	.019
	3.50 to 6.50	.045
	7.00 to 12.00	.080

**Weights of aluminum gaskets are 30% of those shown.

***Double letter prefix on part number indicates self-retained gasket.

O.D. Dimensions in inches

PERFORMANCE RATINGS AND BENDING MOMENTS

The graph indicates the bending moment and hydrostatic PROOF PRESSURE load capabilities of the lightweight and medium weight Conoseal tube joints.

Operating pressure can be obtained by dividing the desired safety factor into the proof pressure rating. Burst pressure is 1½ times the proof pressure rating.

Proof pressure and maximum bending moment are based on the allowable stress value of 19-9DL flanges using an A286 coupling at room temperature. If the joint is to be used at elevated temperatures, or if aluminum or stainless steel flanges are required, multiply the graph ratings by the values listed in the following table:

TEMPERATURE CORRECTION FACTOR

Material	TEMPERATURE						
	Room Temp.	+400° F.	+500° F.	+750° F.	+1000° F.	+1250° F.	+1500° F.
19-9DL Stainless Steel	1.00	.80	.77	.68	.60	—	—
347 Stainless Steel	.60	.55	.54	.45	.39	.35	.20
Aluminum	.45	.22	—	—	—	—	—
Inconel 625	1.00	.80	.75	.70	.70	.65	.40

If the joint will be subjected to combined loading (pressure and bending), divide the corrected load rating into the actual load conditions for each type of loading and express the answer as a percent. Divide this total percentage into 100% to determine the safety factor.

EXAMPLE:

A Conoseal joint is required for the following conditions:

Tubing: 3.00 diameter, stainless steel

Proof Pressure: 600 psi

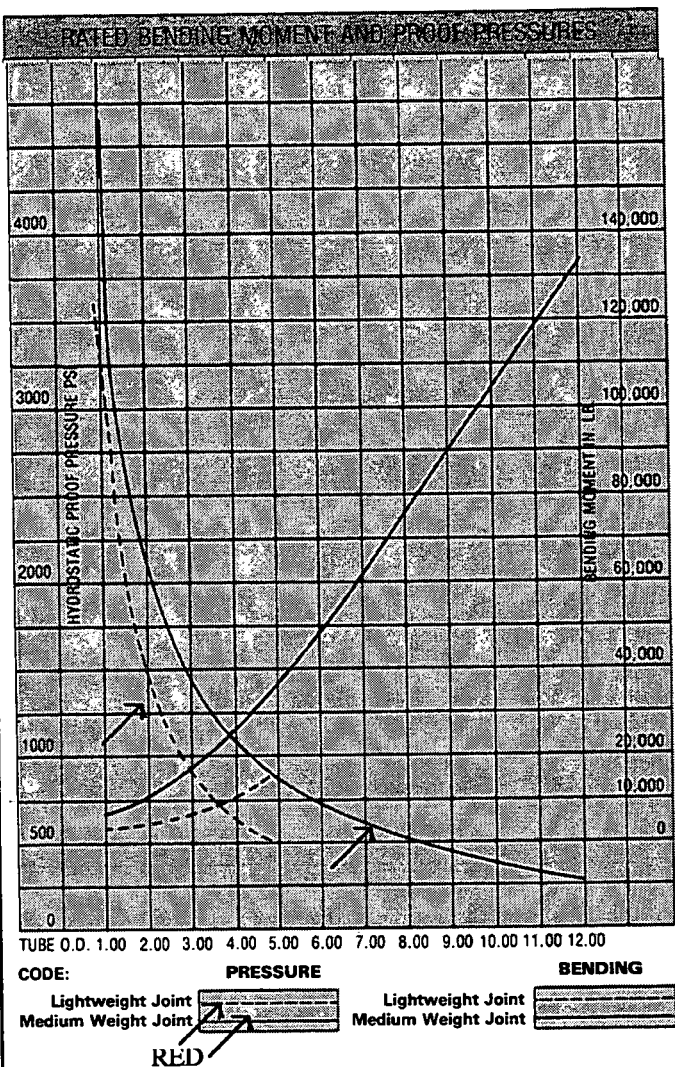
Bending Moment: 3000 in. lb.

Temperature: +500°F.

$$\frac{\text{Proof pressure (applied)}}{\text{Proof pressure (rated) x temperature factor}} = \frac{600}{1400 \times .77} = 56\%$$

$$\frac{\text{Bending moment (applied)}}{\text{Bending moment (rated) x temperature factor}} = \frac{3000}{16,000 \times .77} = 24\%$$

$$\frac{\text{Allowable \%}}{\text{Applied \%}} = \frac{100}{80} = 1.25 \text{ safety factor}$$

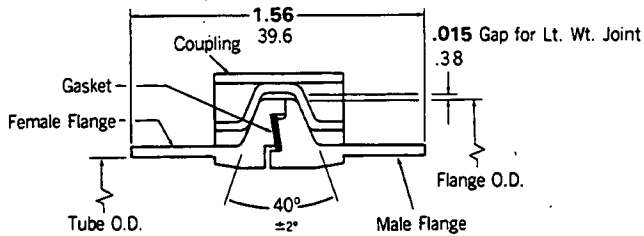


For applications requiring zero leakage (1×10^{-6} Std. cc/sec Helium) when tested by a mass spectrometer leak detector, operating pressures should be no greater than 50% of proof pressures shown in graph above.

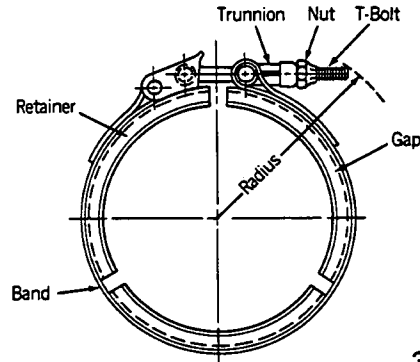
CONOSEAL standard light weight joints

LIGHTWEIGHT JOINT/QUICK COUPLER LATCH COUPLING

JOINT



QUICK COUPLER LATCH COUPLING

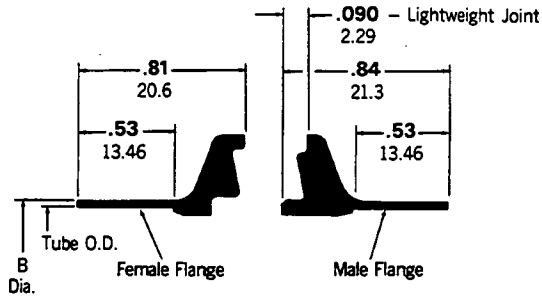


1 Latch
3 Segments
T-Bolts curved
for small diameters.

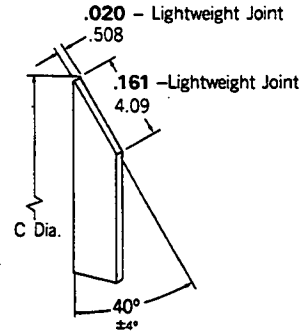
Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

Tube Size O.D.	Flange O.D.	COUPLINGS					FLANGES						
		Coupling Part Number	Wt.	Rad. Max.	Band Width	T-BOLT ONLY			MALE FLANGES				
						Part Number	Thread	Recommended Torque	Standard Part Number	Material Code Specify One Only	Inconel 625 Part Number		
1.00 25.4	1.510 38.4	MVC69370AP100	.22 0.10	2.40 61.0	.750 19.1	MMMD2949-75-275	1/4-28 UNJF-3A	35-50 3.9-5.6	51132-100	A	D	S	55833-100GC
1.25 31.8	1.760 44.7	MVC69370AP125	.23 0.10	2.43 61.7	.750 19.1	MMMD2949-75-275		35-50 3.9-5.6	51132-125	A	D	S	55833-125GC
1.50 38.1	2.010 51.1	MVC69370AP150	.25 0.11	2.65 67.3	.750 19.1	300782-75-275		40-45 4.5-5.1	51132-150	A	D	S	55833-150GC
1.75 44.5	2.260 57.4	MVC69370AP175	.27 0.12	2.72 69.1	.750 19.1	300782-75-275		50-65 5.6-7.3	51132-175	A	D	S	55833-175GC
2.00 50.8	2.510 63.8	MVC69370AP200	.28 0.13	2.80 71.1	.750 19.1	19884-75-275		50-65 5.6-7.3	51132-200	A	D	S	55833-200GC
2.25 57.2	2.760 70.1	MVC69370AP225	.29 0.13	2.88 73.2	.750 19.1	19884-75-275		60-75 6.8-8.4	51132-225	A	D	—	55833-225GC
2.50 63.5	3.010 76.5	MVC69370AP250	.31 0.14	2.96 75.2	.750 19.1	19884-75-275		60-75 6.8-8.4	51132-250	A	D	—	55833-250GC
2.75 69.9	3.260 82.8	MVC69370AP275	.32 0.15	3.04 77.2	.750 19.1	19884-75-275		70-90 7.9-10.2	51132-275	A	D	—	55833-275GC
3.00 76.2	3.510 89.2	MVC69370AP300	.33 0.15	3.13 79.5	.750 19.1	19884-75-275		70-90 7.9-10.2	51132-300	A	D	—	55833-300GC
3.50 88.9	4.010 101.9	MVC69370AP350	.36 0.16	3.31 84.1	.750 19.1	19884-75-275		80-100 9.0-11.3	51132-350	A	D	—	55833-350GC
4.00 101.6	4.510 114.6	MVC69370AP400	.39 0.18	3.50 88.9	.750 19.1	19884-75-325		80-100 9.0-11.3	51132-400	A	D	—	55833-400GC
4.50 114.3	5.010 127.3	MVC69370AP450	.42 0.19	3.70 94.0	.750 19.1	19884-75-325		90-110 10.2-12.4	51132-450	A	D	—	55833-450GC

FLANGES



GASKET

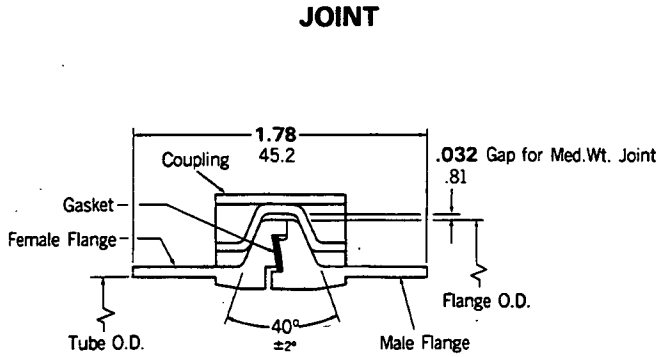


Inches and pounds in bold face type, millimeters and Kg in light face type.

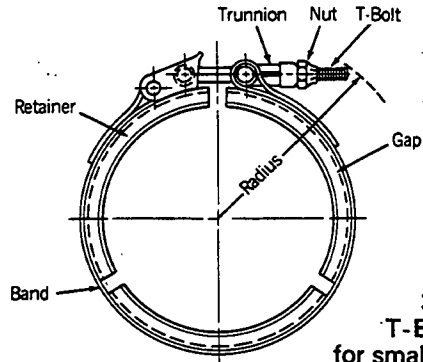
FLANGES							GASKETS							
FEMALE FLANGES				B	Weight One Flange		Standard Part Number	Material Code Specify One Only		C	Self-Retained Part Number	Material Code Specify One Only		
Standard Part Number	Material Code Specify One Only				A Code	D, Sor GC Code		A	S			AF	SE	
51133-100	A	D	S	55834-100GC	1.074 27.3	.02 .01	.06 .03	51134-100	A	S	1.36 34.5	NK100004-0100	AF	SE
51133-125	A	D	S	55834-125GC	1.324 33.6	.02 .01	.07 .03	51134-125	A	S	1.61 40.9	NK100004-0125	AF	SE
51133-150	A	D	S	55834-150GC	1.574 40.0	.03 .01	.09 .04	51134-150	A	S	1.86 47.2	NK100004-0150	AF	SE
51133-175	A	D	S	55834-175GC	1.824 46.3	.03 .01	.10 .05	51134-175	A	S	2.11 53.6	NK100004-0175	AF	SE
51133-200	A	D	S	55834-200GC	2.074 52.7	.04 .02	.11 .05	51134-200	A	S	2.36 60.0	NK100004-0200	AF	SE
51133-225	A	D	—	55834-225GC	2.324 59.0	.04 .02	.13 .06	51134-225	A	S	2.61 66.3	NK100004-0225	AF	SE
51133-250	A	D	—	55834-250GC	2.574 65.4	.05 .02	.14 .06	51134-250	A	S	2.86 72.6	NK100004-0250	AF	SE
51133-275	A	D	—	55834-275GC	2.824 71.7	.05 .02	.15 .07	51134-275	A	S	3.11 79.0	NK100004-0275	AF	SE
51133-300	A	D	—	55834-300GC	3.074 78.1	.06 .03	.17 .08	51134-300	A	S	3.36 85.3	NK100004-0300	AF	SE
51133-350	A	D	—	55834-350GC	3.574 90.8	.06 .03	.19 .09	51134-350	A	S	3.86 98.0	NK100004-0350	AF	SE
51133-400	A	D	—	55834-400GC	4.074 103.5	.07 .03	.22 .10	51134-400	A	S	4.36 110.7	NK100004-0400	AF	SE
51133-450	A	D	—	55834-450GC	4.574 116.2	.08 .04	.25 .11	51134-450	A	S	4.86 123.4	NK100004-0450	AF	SE

CONOSEAL standard medium weight joints

MEDIUM WEIGHT JOINT/QUICK COUPLER LATCH COUPLING



QUICK COUPLER LATCH



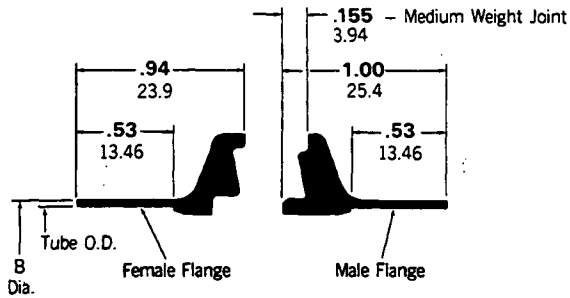
1 Latch
3 Segments
T-Bolts curved
for small diameters.

Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

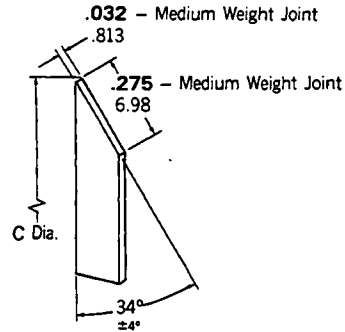
Tube Size O.D.	Flange O.D.	COUPLINGS						FLANGES					
		Coupling Part Number	Wt.	Rad. Max.	Band Width	Part Number	T-BOLT ONLY			MALE FLANGES			
							Thread	Recommended Torque	Standard Part Number	Material Code Specify One Only		Inconel 625 Part Number	
1.00 25.4	1.782 45.3	NM100836-0100	.31 0.14	2.36 60.0	.750 19.1	MMMD2949-75-300	1/4-28 UNJF-3A	70-90 7.9-10.1	50889-100	A	D	S	55836-100GC
1.25 31.8	1.782 51.6	NM100836-0125	.33 0.15	2.42 61.5	.750 19.1	300782-75-300		70-90 7.9-10.1	50889-125	A	D	S	55836-125GC
1.50 38.1	2.282 58.0	NM100836-0150	.35 0.16	3.00 76.2	.750 19.1	300782-75-300		70-90 7.9-10.1	50889-150	A	D	S	55836-150GC
1.75 44.5	2.532 64.3	NM100836-0175	.37 0.17	3.08 78.2	.750 19.1	300782-75-325		70-90 7.9-10.1	50889-175	A	D	S	55836-175GC
2.00 50.8	2.782 70.7	NM100836-0200	.40 0.18	3.36 85.3	.750 19.1	19884-75-325		70-90 7.9-10.1	50889-200	A	D	S	55836-200GC
2.25 57.2	3.032 77.0	NM100836-0225	.42 0.19	3.38 85.9	.750 19.1	19884-75-325		70-90 7.9-10.1	50889-225	A	D	S	55836-225GC
2.50 63.5	3.282 83.4	NM100836-0250	.43 0.20	3.47 88.1	.750 19.1	19884-75-325		70-90 7.9-10.1	50889-250	A	D	S	55836-250GC
2.75 69.9	3.532 89.7	NM100837-0275	.70 0.32	3.92 99.6	.875 22.2	19886-88-400	5/16-24 UNJF-3A	120-140 13.5-15.8	50889-275	A	D	S	55836-275GC
3.00 76.2	3.782 96.1	NM100837-0300	.82 0.37	4.15 105.4	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-300	A	D	S	55836-300GC
3.50 88.9	4.282 108.8	NM100837-0350	.90 0.41	4.38 111.3	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-350	A	D	*	55836-350GC
4.50 101.6	4.782 121.5	NM100837-0400	.97 0.44	4.52 114.8	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-400	A	D	*	55836-400GC
4.50 114.3	5.282 134.2	NM100837-0450	1.03 0.47	4.68 118.9	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-450	A	D	*	55836-450GC
5.00 127.0	5.782 146.9	NM100837-0500	1.10 0.50	4.86 123.4	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-500	A	D	*	55836-500GC
5.50 139.7	6.282 159.6	NM100837-0550	1.16 0.53	5.05 128.3	.875 22.2	19886-88-400		120-140 13.5-15.8	50889-550	A	D	*	55836-550GC

*Use Part Number 55225-000S

FLANGES



GASKETS



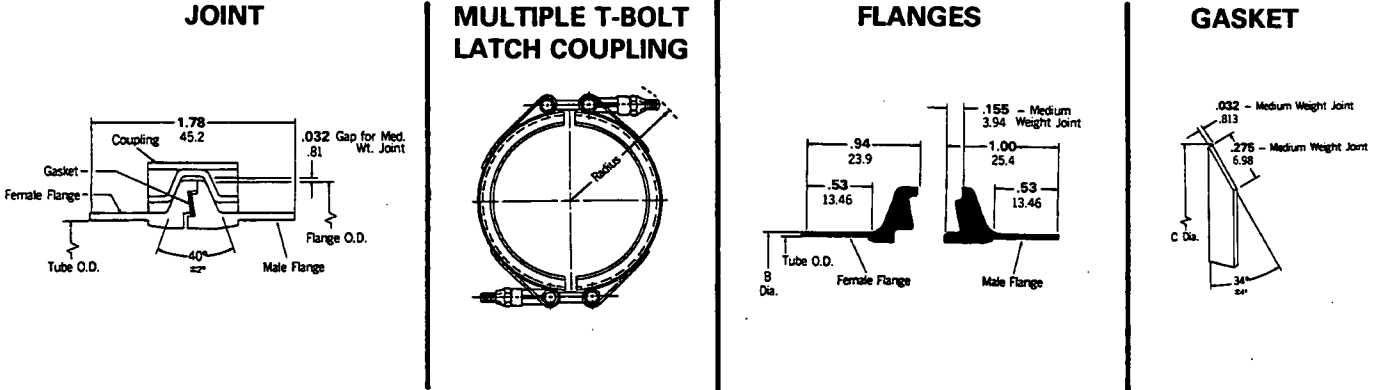
Inches and pounds in bold face type, millimeters and Kg in light face type.

FLANGES							GASKETS							
FEMALE FLANGES				B	Weight One Flange		Standard Part Number	Material Code Specify One Only		C	Self-Retained Part Number	Material Code Specify One Only		
Standard Part Number	Material Code Specify One Only				Inconel 625 Part Number	A Code		D, Sor GC Code	A			S	AF	SE
50888-100	A	D	S	55835-100GC	1.100 27.9	.04 .02	.13 .06	50887-100	A	S	1.60 40.6	NK100589-0100	AF	SE
50888-125	A	D	S	55835-125GC	1.350 34.3	.05 .02	.16 .07	50887-125	A	S	1.85 47.0	NK100589-0125	AF	SE
50888-150	A	D	S	55835-150GC	1.600 40.6	.06 .03	.19 .09	50887-150	A	S	2.10 53.3	NK100589-0150	AF	SE
50888-175	A	D	S	55835-175GC	1.850 47.0	.07 .03	.22 .10	50887-175	A	S	2.35 59.7	NK100589-0175	AF	SE
50888-200	A	D	S	55835-200GC	2.100 53.3	.08 .04	.24 .11	50887-200	A	S	2.60 66.0	NK100589-0200	AF	SE
50888-225	A	D	S	55835-225GC	2.350 59.7	.09 .04	.27 .12	50887-225	A	S	2.82 71.6	NK100589-0225	AF	SE
50888-250	A	D	S	55835-250GC	2.600 66.0	.10 .05	.30 .14	50887-250	A	S	3.07 78.0	NK100589-0250	AF	SE
50888-275	A	D	S	55835-275GC	2.850 72.4	.12 .05	.35 .16	50887-275	A	S	3.32 84.3	NK100589-0275	AF	SE
50888-300	A	D	*	55835-300GC	3.130 79.5	.13 .06	.39 .18	50887-300	A	S	3.57 90.7	NK100589-0300	AF	SE
50888-350	A	D	*	55835-350GC	3.630 92.2	.15 .07	.45 .20	50887-350	A	S	4.07 103.4	NK100589-0350	AF	SE
50888-400	A	D	*	55835-400GC	4.130 104.9	.17 .08	.52 .24	50887-400	A	S	4.57 116.0	NK100589-0400	AF	SE
50888-450	A	D	*	55835-450GC	4.630 117.6	.19 .09	.58 .26	50887-450	A	S	5.07 128.8	NK100589-0450	AF	SE
50888-500	A	D	*	55835-500GC	5.130 130.3	.21 .10	.64 .29	50887-500	A	S	5.57 141.5	NK100589-0500	AF	SE
50888-550	A	D	*	55835-550GC	5.630 143.0	.24 .11	.71 .32	50887-550	A	S	6.07 154.2	NK100589-0550	AF	SE

*Use Part Number 55224-000S.

CONOSEAL standard medium weight joints

MEDIUM WEIGHT JOINT/MULTIPLE T-BOLT LATCH COUPLING



Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

Tube Size O.D.	Flange O.D.	COUPLINGS					FLANGES						
		Part Number	Wt.	Rad. Max.	Band Width	T-BOLT ONLY			MALE FLANGES				
						Part Number	Thread	Recommended Torque	Standard Part Number	Material Code Specify One Only	Inconel 625 Part Number		
6.00 152.4	6.782 172.3	NM100838-0600	1.54 0.7	5.25 133.4	.875 22.2	T-Bolts Are Not Replaceable	5/16-24 UNJF-3A	160-180 18.0-20.3	50889-600	A	D	*	55836-600GC
6.50 165.1	7.282 185.0	NM100838-0650	1.61 0.7	5.44 138.2	.875 22.2			160-180 18.0-20.3	50889-650	A	D	*	55836-650GC
7.00 177.8	7.782 197.7	NM100838-0700	1.68 0.8	5.62 142.8	.875 22.2			160-180 18.0-20.3	50889-700	A	D	*	55836-700GC
7.50 190.5	8.282 210.4	NM100838-0750	1.76 0.8	5.82 147.8	.875 22.2			160-180 18.0-20.3	50889-750	A	D	*	55836-750GC
8.00 203.2	8.782 223.1	NM100838-0800	1.83 0.8	6.02 152.9	.875 22.2			160-180 18.0-20.3	50889-800	A	D	*	55836-800GC

Tube Size O.D.	FLANGES					GASKETS									
	FEMALE FLANGES			B	Weight One Flange		Standard Part Number	Material Code Specify One Only	C	Self-Retained Part Number	Material Code Specify One Only				
	Standard Part Number	Material Code Specify One Only	Inconel 625 Part Number		A Code	D, S or GC Code					AF	SE			
6.00 152.4	50888-600	A	D	**	55835-600GC	6.160 156.5	.26 .12	.78 .35	50887-600	A	S	6.57 166.9	NK100589-0600	AF	SE
6.50 165.1	50888-650	A	D	**	55835-650GC	6.660 169.2	.29 .13	.86 .39	50887-650	A	S	7.07 179.6	NK100589-0650	AF	SE
7.00 177.8	50888-700	A	D	**	55835-700GC	7.160 181.9	.31 .14	.94 .43	50887-700	A	S	7.57 192.3	NK100589-0700	AF	SE
7.50 190.5	50888-750	A	D	**	55835-750GC	7.660 194.6	.34 .15	1.02 .46	50887-750	A	S	8.07 205.0	NK100589-0750	AF	SE
8.00 203.2	50888-800	A	D	**	55835-800GC	8.160 207.3	.37 .17	1.10 .50	50887-800	A	S	8.57 217.7	NK100589-0800	AF	SE

*For "S" material, use part number 55225-000S.

**For "S" material, use part number 55224-000S.

Light weight CONOMATE coupling/flanges/gaskets

The Aeroquip light weight Conomate coupling offers substantial strength advantages over conventional sheet metal V-Band couplings. The no-weld construction of this coupling provides high reliability and precludes the possibility of undiscovered weld stresses. The unique design of the latch pivot provides optimum loading characteristics as the coupling is torqued. The coupling is therefore highly resistant to damage resulting from overtorquing. Failure mode is through the bolt with a safety catch to maintain joint integrity. The hinged design facilitates installation by permitting the clamp to be fully opened and avoids the danger of inadvertently stressing the clamp.

HOW TO ORDER

Conomate Coupling: Add tube size O.D. to basic part number.

Flanges: Add material code to base part number.

Gasket: Add material code to base part number.

One coupling, a male and female flange, and a gasket are required to make a complete joint.



COUPLING



FLANGE



GASKET



FLANGE

FLANGES

MATERIAL SPECIFICATIONS

Material	Temperature Range	Material Ordering Code
6061-T6 Aluminum Alloy	-450°F. to +400°F.	A
19-9DL Stainless Steel	-300°F. to +1000°F.	D
Inconel 625 Stainless Steel	-450°F. to +1500°F.	GC

Aluminum gaskets must be used when either male or female flange is aluminum.

For Joints having material transition from stainless steel to aluminum, it is recommended that flanges be ordered as follows:	Temperature	Male Flange	Female Flange	Gasket
	+70°F. to +400°F.	A	D or GC	A
	-450°F. to +70°F.	D or GC	A	A

This flange material combination will further compress the gasket as the joint reaches its service temperature. This compression is due to the difference in thermal expansion of stainless steel and aluminum.

GASKETS

Material	Temperature Range	Material Ordering Code
6061-0 Aluminum Alloy	-450°F. to +400°F.	A
321 Stainless Steel	-450°F. to +1500°F.	S

Gaskets are not reusable. Tolerances are proprietary information. They are 100% inspected by Aeroquip. The performance of the joint will be seriously impaired and possible damage to the flanges may be incurred, unless Aeroquip Conseal gaskets are used.

Approximate weights of gaskets in stainless steel materials are as follows:

Tube O. D. Size	Weight in lbs.
1.00 to 3.00	.007
3.50 to 4.50	.012

Weights of aluminum gaskets are 30% of those shown.

Pressure Capabilities (PSIA) at +1180°F.

	1-3"	3½-4"	4½"
Operating Pressure	255	170	100
Proof Pressure	510	340	200
Burst Pressure	1020	680	400

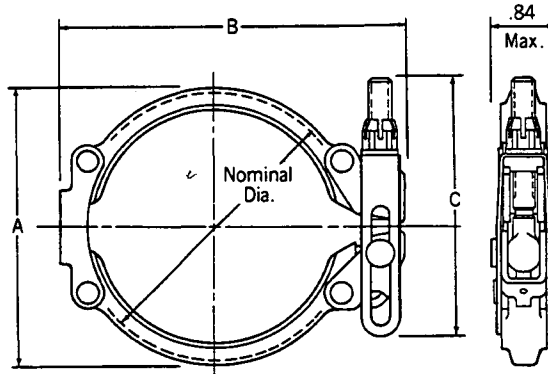
Installation Torque: 125-130 in. lb.

Material—Inconel 718 except bolt and nut which are A286.

Light weight CONOMATE coupling/flanges/gaskets

LIGHTWEIGHT CONOMATE COUPLING

Component part numbers and specifications



Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

Tube Size O.D.	COUPLINGS								FLANGES			
	Basic Part Number	Nom. Dia.	A Max.	B Ref.	C Max.	Calc. Wt.	Allowable Bending Load	MALE FLANGES			Inconel 625 Part Number	
								Standard Part Number	Material Code Specify One Only			
1.00 25.4	NH100480	1.55 39.4	1.75 44.4	2.63 66.8	3.06 77.7	.31 .14	250 28	51132-100	A	D	S	55833-100GC
1.25 31.8	NH100480	1.80 45.7	2.00 50.8	2.93 74.4	3.06 77.7	.32 .15	350 40	51132-125	A	D	S	55833-125GC
1.50 38.1	NH100480	2.05 52.1	2.25 57.2	3.22 81.8	3.06 77.7	.32 .15	500 56	51132-150	A	D	S	55833-150GC
1.75 44.5	NH100480	2.30 58.4	2.50 63.5	3.41 86.6	3.06 77.7	.33 .15	640 72	51132-175	A	D	S	55833-175GC
2.00 50.8	NH100480	2.55 64.8	2.75 69.8	3.56 90.4	3.06 77.7	.33 .15	800 90	51132-200	A	D	S	55833-200GC
2.50 63.5	NH100480	3.05 77.5	3.25 82.6	4.14 105.2	3.06 77.7	.36 .16	1100 124	51132-250	A	D	—	55833-250GC
2.75 69.9	NH100480	3.30 83.8	3.50 88.9	4.42 112.3	3.06 77.7	.38 .17	1200 136	51132-275	A	D	—	55833-275GC
3.00 76.2	NH100480	3.55 90.2	3.75 95.2	4.56 115.8	3.57 90.7	.40 .18	1500 169	51132-300	A	D	—	55833-300GC
3.50 88.9	NH100480	4.05 102.9	4.25 108.0	5.12 130.0	3.57 90.7	.41 .19	2400 271	51132-350	A	D	—	55833-350GC
4.00 101.6	NH100480	4.55 115.6	4.75 120.6	5.65 143.5	3.57 90.7	.43 .20	3600 407	51132-400	A	D	—	55833-400GC
4.50 114.3	NH100480	5.05 128.3	5.25 133.4	6.20 157.5	3.57 90.7	.46 .21	4600 520	51132-450	A	D	—	55833-450GC

NOTE: 5-inch and 6-inch couplings also available. Contact Aeroquip.

PERFORMANCE RATINGS AND BENDING MOMENTS

The graph indicates the bending moment and hydrostatic PROOF PRESSURE load capabilities of the lightweight and medium weight Conoseal tube joints.

Operating pressure can be obtained by dividing the desired safety factor into the proof pressure rating. Burst pressure is 1 1/2 times the proof pressure rating.

Proof pressure and maximum bending moment are based on the allowable stress value of 19-9DL flanges using an A286 coupling at room temperature. If the joint is to be used at elevated temperatures, or if aluminum or stainless steel flanges are required, multiply the graph ratings by the values listed in the following table:

TEMPERATURE CORRECTION FACTOR

Material	TEMPERATURE						
	Room Temp.	+400° F.	+500° F.	+750° F.	+1000° F.	+1250° F.	+1500° F.
19-9DL Stainless Steel	1.00	.80	.77	.68	.60	—	—
347 Stainless Steel	.60	.55	.54	.45	.39	.35	.20
Aluminum	.45	.22	—	—	—	—	—
Inconel 625	1.00	.80	.75	.70	.70	.65	.40

If the joint will be subjected to combined loading (pressure and bending), divide the corrected load rating into the actual load conditions for each type of loading and express the answer as a percent. Divide this total percentage into 100% to determine the safety factor.

EXAMPLE:

A Conoseal joint is required for the following conditions:

Tubing: 3.00 diameter, stainless steel

Proof Pressure: 600 psi

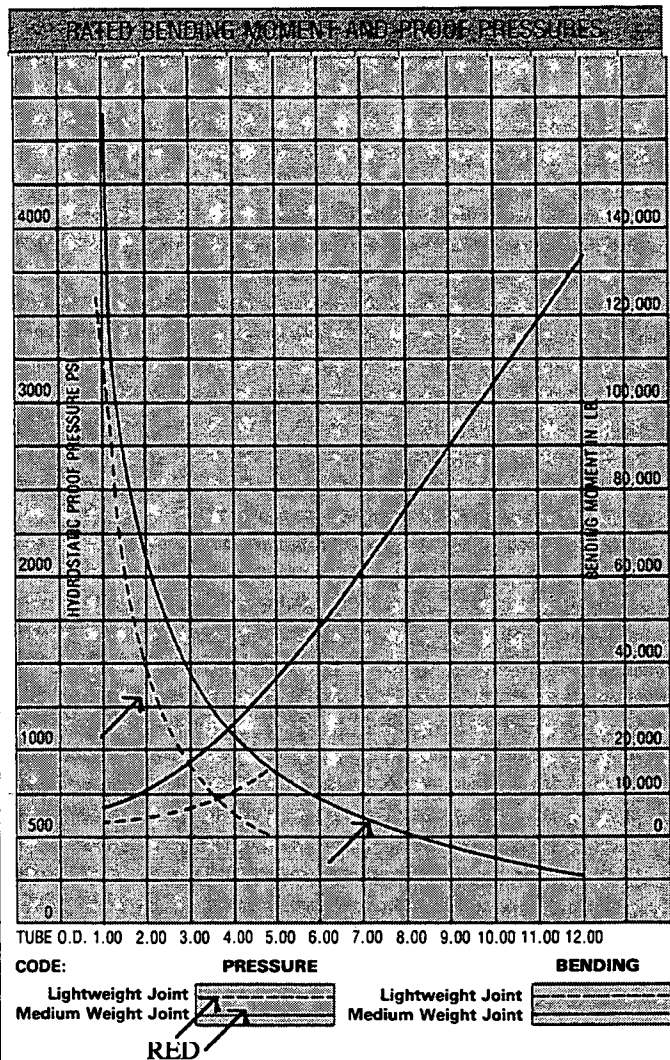
Bending Moment: 3000 in. lb.

Temperature: +500°F.

$$\frac{\text{Proof pressure (applied)}}{\text{Proof pressure (rated) x temperature factor}} = \frac{600}{1400 \times .77} = 56\%$$

$$\frac{\text{Bending moment (applied)}}{\text{Bending moment (rated) x temperature factor}} = \frac{3000}{16,000 \times .77} = 24\%$$

$$\frac{\text{Allowable \%}}{\text{Applied \%}} = \frac{100}{80} = 1.25 \text{ safety factor}$$

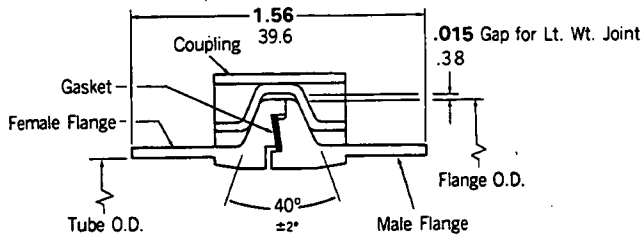


For applications requiring zero leakage (1 x 10⁻⁶ Std. cc/sec Helium) when tested by a mass spectrometer leak detector, operating pressures should be no greater than 50% of proof pressures shown in graph above.

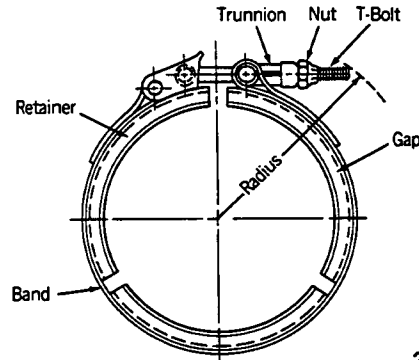
CONOSEAL standard light weight joints

LIGHTWEIGHT JOINT/QUICK COUPLER LATCH COUPLING

JOINT



QUICK COUPLER LATCH COUPLING



1 Latch
3 Segments
T-Bolts curved
for small diameters.

Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

Tube Size O.D.	Flange O.D.	COUPLINGS						FLANGES					
		Coupling Part Number	Wt.	Rad. Max.	Band Width	Part Number	Thread	Recommended Torque	MALE FLANGES				
									Standard Part Number	Material Code Specify One Only		Inconel 625 Part Number	
1.00 25.4	1.510 38.4	MVC69370AP100	.22 0.10	2.40 61.0	.750 19.1	MMMD2949-75-275	1/4-28 UNJF-3A	35-50 3.9-5.6	51132-100	A	D	S	55833-100GC
1.25 31.8	1.760 44.7	MVC69370AP125	.23 0.10	2.43 61.7	.750 19.1	MMMD2949-75-275		35-50 3.9-5.6	51132-125	A	D	S	55833-125GC
1.50 38.1	2.010 51.1	MVC69370AP150	.25 0.11	2.65 67.3	.750 19.1	300782-75-275		40-45 4.5-5.1	51132-150	A	D	S	55833-150GC
1.75 44.5	2.260 57.4	MVC69370AP175	.27 0.12	2.72 69.1	.750 19.1	300782-75-275		50-65 5.6-7.3	51132-175	A	D	S	55833-175GC
2.00 50.8	2.510 63.8	MVC69370AP200	.28 0.13	2.80 71.1	.750 19.1	19884-75-275		50-65 5.6-7.3	51132-200	A	D	S	55833-200GC
2.25 57.2	2.760 70.1	MVC69370AP225	.29 0.13	2.88 73.2	.750 19.1	19884-75-275		60-75 6.8-8.4	51132-225	A	D	—	55833-225GC
2.50 63.5	3.010 76.5	MVC69370AP250	.31 0.14	2.96 75.2	.750 19.1	19884-75-275		60-75 6.8-8.4	51132-250	A	D	—	55833-250GC
2.75 69.9	3.260 82.8	MVC69370AP275	.32 0.15	3.04 77.2	.750 19.1	19884-75-275		70-90 7.9-10.2	51132-275	A	D	—	55833-275GC
3.00 76.2	3.510 89.2	MVC69370AP300	.33 0.15	3.13 79.5	.750 19.1	19884-75-275		70-90 7.9-10.2	51132-300	A	D	—	55833-300GC
3.50 88.9	4.010 101.9	MVC69370AP350	.36 0.16	3.31 84.1	.750 19.1	19884-75-275		80-100 9.0-11.3	51132-350	A	D	—	55833-350GC
4.00 101.6	4.510 114.6	MVC69370AP400	.39 0.18	3.50 88.9	.750 19.1	19884-75-325		80-100 9.0-11.3	51132-400	A	D	—	55833-400GC
4.50 114.3	5.010 127.3	MVC69370AP450	.42 0.19	3.70 94.0	.750 19.1	19884-75-325		90-110 10.2-12.4	51132-450	A	D	—	55833-450GC

Union fittings/.125 inch through 1.00 inch tube diameters

Conoseal union fittings can be supplied with flanges designed for socket welding or butt welding. The butt weld flange design is recommended for high vacuum applications. Special designs can be furnished for brazing to tube. Different part numbers are tabulated for joints and components with socket weld or butt weld flanges.

The part numbers shown for the joint and components with socket weld flanges are in stainless steel material. Contact Aeroquip for further information on aluminum joints with socket weld flanges (basic part number 55800).

The butt weld joint and components are shown tabulated for both aluminum and stainless steel material.

Although not tabulated in this catalog, these tube fittings can also be supplied in pipe sizes.

HOW TO ORDER

Complete Joint—Socket Weld Flanges: Part numbers for socket weld flanges are in stainless steel material. Contact Aeroquip for aluminum joints with socket weld flanges. To order joint, specify part number 54857 and correct dash size (dash number indicates tube O.D. in 16th inches, i.e., 16 = 1.00 in.). Standard gasket (part number 54973) will automatically be supplied. To obtain joint with special gasket (part number MGC 60637) order by component part numbers.

Part numbers for components of a joint for socket welding with stainless steel flanges, nut and special gasket, part number MGC 60637, for .375 in. (9.53 mm) tube O.D. are shown below:

Component Parts: Add dash number to base part numbers (dash number indicates tube O.D. in 16th inches, i.e., 16 = 1.00 in.).

Female flange socket welding (.375 in. (9.53 mm) Tube O. D.) → **54971-6,**
 Male flange socket welding (.375 in. (9.53 mm) Tube O. D.) → **54972-6,**
 Nut—stainless steel (.375 in. (9.53 mm) Tube O. D.) → **54974-6,**
 Gasket—Special—stainless steel (.375 in. (9.53 mm) Tube O. D.) → **MGC 60637-6S**

Complete Joint—Butt Weld Flanges: Order by base part number 59190, add correct dash size (dash number indicates tube O.D. in 16th inches, i.e., 16 = 1.00 in.) and material code. Standard gasket (part number 54973) will automatically be supplied. To order joint with special gasket (part number MGC 60637) order by component part numbers.

Sample Part Number: 59190-6AA joint for butt welding with aluminum flanges, nut and 54973 gasket for .375 in. (9.53 mm) tube O.D.

Part numbers for components of a joint for butt welding with aluminum flanges, nut and special gasket (part number MGC 60637) for .375 in. (9.53 mm) tube O.D. are shown below:

Component Parts: Add dash number to base part number (dash number indicates tube O.D. in 16th inches, i.e., 16 = 1.00 in.) and material code.

Female flange butt welding Aluminum (.375 in. (9.53 mm) Tube O. D.) → **56340-6A,**
 Male flange butt welding Aluminum (.375 in. (9.53 mm) Tube O. D.) → **56341-6A,**
 Nut—Aluminum (.375 in. (9.53 mm) Tube O. D.) → **55803-6,**
 Gasket—Special—Aluminum (.375 in. (9.53 mm) Tube O. D.) → **MGC 60637-6A.**

MATERIAL SPECIFICATIONS

Flanges: 347 stainless steel or 6061-T6 aluminum alloy.

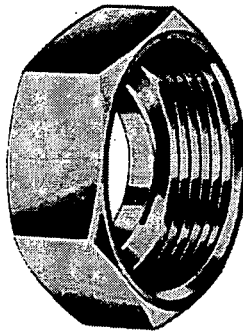
Gaskets: 321 stainless steel or 6061-O aluminum alloy. Aluminum gaskets must be used when either male or female flange is aluminum. Gaskets are not reusable. It is recommended that spare gaskets be purchased for each joint and/or flanges where disassembly will be required. Gasket tolerances are proprietary information. They are 100% inspected by Aeroquip. The performance of the joint will be seriously impaired, and possible damage to the fittings may be incurred, unless Aeroquip Conoseal gaskets are used.

Nut: 347 stainless steel or 6061-T6 aluminum alloy. Nut material must be of same material as the female flange.

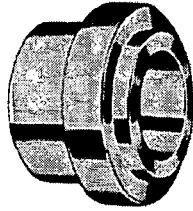
JOINT PRESSURE RATINGS

Material	Operating Pressure Psig	Burst Pressure Psig	Temperature Ranges
Stainless Steel	4000	16000	-450°F. to +1500°F. (-268°C. to +816°C.)
Aluminum	1000	4000	-450°F. to +400°F. (-268°C. to +204°C.)

*Pressure ratings are at +70°F. (+21.1°C.)



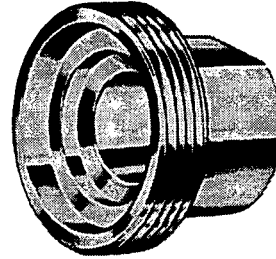
NUT



FLANGE

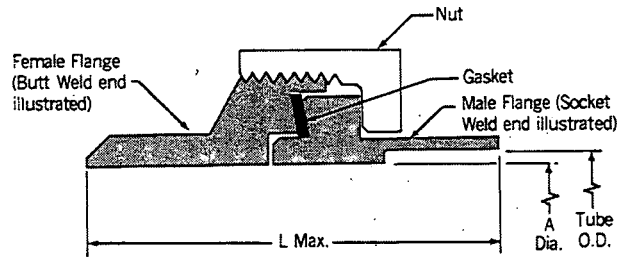


GASKET



FLANGE

COMPLETE JOINTS



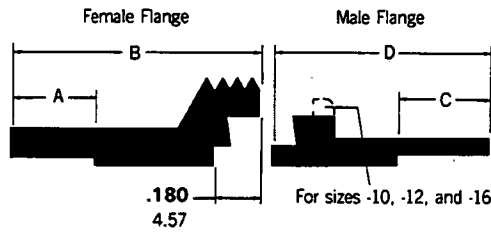
Inches, pounds and inch/pounds in bold face type, millimeters, Kg and N-M in light face type.

Tube Size O.D.	JOINT PART NUMBER				A Dia.	L Max.	CALCULATED WEIGHT		RECOMMENDED TORQUE	
	Socket Welding	Butt* Welding	Material* Code Specify One Only				Stainless Steel	Aluminum	Stainless Steel Nut	Aluminum Nut
.125 3.2	54857-2	59190-2	AA	SS	.080 2.0	1.08 27.4	.04 .02	.02 .01	95-105 11-12	50-70 6-8
.250 6.4	54857-4	59190-4	AA	SS	.190 4.8	1.15 29.2	.07 .03	.03 .01	200-240 23-27	140-170 15-19
.375 9.5	54857-6	59190-6	AA	SS	.300 7.6	1.28 32.5	.11 .05	.04 .02	365-405 42-46	240-280 27-32
.500 12.7	54857-8	59190-8	AA	SS	.420 10.7	1.29 32.8	.15 .07	.05 .02	550-600 62-68	380-420 43-47
.625 15.9	54857-10	59190-10	AA	SS	.535 13.6	1.41 35.8	.21 .10	.07 .03	775-825 87-93	530-570 60-64
.750 19.0	54857-12	59190-12	AA	SS	.630 16.0	1.48 37.6	.28 .13	.09 .04	1000-1050 113-119	690-730 77-82
1.000 25.4	54857-16	59190-16	AA	SS	.850 21.6	1.58 40.1	.46 .21	.15 .07	1600-1650 180-186	1100-1150 124-130

*For butt weld joint only.

Union fitting components

FLANGES



Inches in bold face type, millimeters in light face type.

Tube Size O.D.	FEMALE FLANGE					MALE FLANGE				
	Socket Welding Part Number	A	Butt Welding* Part Number	B	Material Code* Specify One Only	Socket Welding Part Number	C	Butt Welding* Part Number	D	Material Code* Specify One Only
.125 3.2	54971-2	.13 3.3	56340-2	.60 15.2	A S	54972-2	.25 6.4	56341-2	.59 15.0	A S
.250 6.4	54971-4	.16 4.1	56340-4	.64 16.3	A S	54972-4	.28 7.1	56341-4	.62 15.7	A S
.375 9.5	54971-6	.19 4.8	56340-6	.72 18.3	A S	54972-6	.32 8.1	56341-6	.64 16.3	A S
.500 12.7	54971-8	.25 6.4	56340-8	.72 18.3	A S	54972-8	.38 9.7	56341-8	.68 17.3	A S
.625 15.9	54971-10	.28 7.1	56340-10	.81 20.6	A S	54972-10	.41 10.4	56341-10	.71 18.0	A S
.750 19.0	54971-12	.31 7.9	56340-12	.84 21.3	A S	54972-12	.44 11.2	56341-12	.75 19.0	A S
1.000 25.4	54971-16	.38 9.7	56340-16	.88 22.4	A S	54972-16	.50 12.7	56341-16	.81 20.6	A S

*For butt weld flange only.

Installation of Flanges to Tube

1. Cut the tubing off at a 90° angle with its axis and remove all burrs and sharp corners from the tubing.
2. Keep flange sealing edges and surfaces protected at all times. Do not remove protective covers until necessary.
3. Always size the tubing to fit the flange prior to assembly. This operation is of utmost importance in controlling flatness and squareness of the flange face. The tubing to flange diametral clearance should not exceed .005 inch.
4. The assembled joint should not be used as a weld fixture or chill block. Use weld fixtures to dissipate heat, reduce warpage, and correctly position the flanges on the tubing. Do not overtorque couplings or bolts used with weld fixtures.
5. Acceptable methods of joining are: silver brazing, seam-welding, and gas or arc welding. Furnace brazing is not recommended as it will anneal the sealing surfaces of the flanges.
6. Prior to welding, the flanges should be spotwelded or tack-welded to the tubing eight to ten places alternately around the tube (second weld 180° from first weld, fourth weld 180° from third weld, etc.). Fusion tack welds must be on end of flange.
7. After welding, the tolerances on the flange position and alignment for the various joints are as follows:

CONOSEAL Joint	Flange Sealing Edge		Average Sealing Diameter Tolerance
	Out of Flat	Out of Round	
Lightweight Joint	.010 in. total	.008	±.003
Medium Weight Joint or Bolted Tube Joints			
1.00 dia. thru 5.00	.015 in. total	.013	±.003
5.50 dia. thru 8.00	.018 in. total	.020	

8. A 1/16" gap should be left between end of tubing and socket on machined flanges to allow for thermal expansion and contraction as shown in Fig. 1.

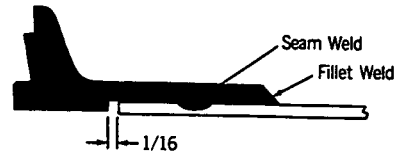


Fig. 1

9. When fillet welding is used, the class of filler metal should be compatible with the base metals to maintain the mechanical properties and corrosion resistance of the base metals.

Applicable welding specifications

MIL-W-8611	Fusion welding
MIL-W-6858	Resistance welding
MIL-W-6860	Resistance welding

When welding aluminum flanges it is necessary to prevent the temperature of the flange (excluding weld area) from exceeding +275°F. For best results it is recommended that the flange be cooled by LN₂ as shown in Fig. 2.

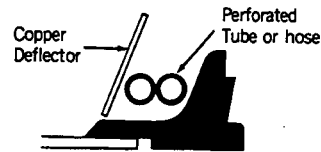


Fig. 2

Perforations in hose to face inward toward flange. Hose to contain LN₂. One end hooks to LN₂ supply, open on other end to atmosphere.



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