ENGINEERING DATA & SPECIFICATIONS

V-BAND CLAMP/COUPLING LOAD FORMULAS

V-Band Couplings must be designed to provide an axial preload that exceeds the total in-service loads. These loads include: internal pressure; bending moments; and axial tension. For economy, the V-Band Coupling should be designed based on the minimum strength required for the application loading. See the formulas below to determine your application loads or contact a Clampco sales engineer for assistance.

SYMBOLS

L_p = Load Intensity due to Pressure, lbs./in. of circumference

L_b = Load Intensity due to Bending Moment, lbs./in. of circumference

L_a = Load Intensity due to Axial Tension, lbs./in. of circumference

L = Total Load Intensity, lbs. / in. of circumference

D = Flange O.D., in.

P = Internal Pressure, psi

M = Bending Moment, in.-lbs.

A = Axial Tension, lbs.

Step 1
Determine the Load Intensity due to Internal Pressure, L_p.

$$L_p = \frac{P \times D}{4}$$

Step 2
Determine the Load Intensity due to Bending Moment, L_b.

$$L_b = \frac{4 \times M}{\pi \times D^2}$$

Step 3
Determine the Load Intensity due to Axial Tension, L_a.

$$L_a = \frac{A}{\pi \times D}$$

Step 4
Determine the Total Load Intensity by adding the results of Steps 1, 2, and 3.

$$L = L_p + L_b + L_a$$

Example
A V-Band Coupling meeting the following:
Flange O.D., D = 5.00 in.
Internal Pressure, P = 200 psi
Bending Moment, M = 1000 in.-lbs.
Axial Tension Load, A = 1200 lbs.

$$L_p = \frac{200\ (5.00)}{4} = 250 \text{ lbs. / in.}$$

$$L_b = \frac{4\ (1000)}{3.14\ (5.00)^2} = 51 \text{ lbs. / in.}$$

$$L_a = \frac{1200}{3.14\ (5.00)} = 76 \text{ lbs. / in.}$$

$$L = 250 + 51 + 76 = 377 \text{ lbs. / in.}$$

Step 5
Use the formula below to convert the total load intensity to an equivalent operating pressure:

$$P = \frac{4 \times L}{D} = \frac{4\ (377)}{5.00} = 302 \text{ psi}^*$$

*Please note:
Equivalent operating pressure does not include a Factor of Safety.

MATERIALS AND TEMPERATURES

For different materials and temperatures, the pressure chart data must be corrected using the following table:

FAHRENHEIT						CELSIUS				
RETAINER MATERIAL	70°F	200°F	400°F	600°F	800°F	21°C	93°C	204°C	315°C	427°C
301 Annealed	1.00	.88	.75	.68	.60	1.00	.88	.75	.68	.60
316	.50	.47	.44	.42	.39	.50	.47	.44	.42	.39
Carbon Steel	.50	.46	.43	.37	—	.50	.46	.43	.37	—

BAND STRENGTH

Minimum Yield Strength for 300 Series Stainless Steel ½ Hard Temper in lbs. [kilograms]

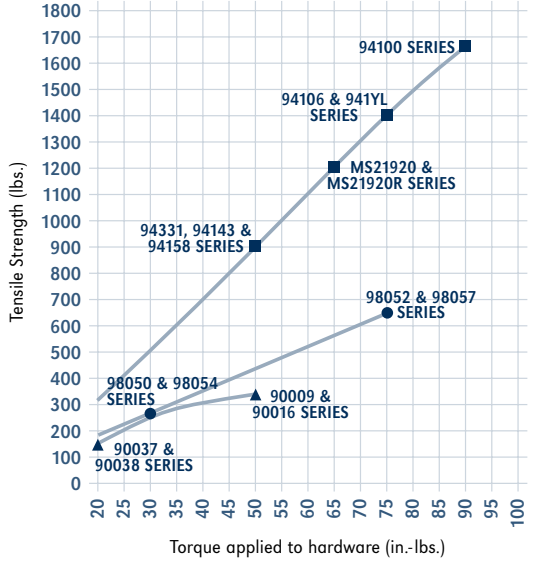
MATERIAL THICKNESS IN INCHES [MILLIMETERS]	BAND WIDTH IN INCHES [MILLIMETERS]						
	.500 [12.70]	.625 [15.88]	.750 [19.05]	.875 [22.22]	1.000 [25.40]	1.125 [28.57]	1.250 [31.75]
.020 [.51]	1100 [499]	1375 [624]	1650 [748]	1925 [873]	2200 [998]	2475 [1123]	2750 [1247]
.025 [.64]	1375 [624]	1719 [780]	2063 [936]	2406 [1091]	2750 [1247]	3094 [1403]	3438 [1559]
.031 [.79]	1705 [773]	2131 [967]	2558 [1160]	2984 [1353]	3410 [1547]	3836 [1740]	4263 [1934]
.040 [1.02]	2200 [998]	2750 [1247]	3300 [1497]	3850 [1746]	4400 [1996]	4950 [2245]	5500 [2495]
.050 [1.27]	2750 [1247]	3438 [1559]	4125 [1871]	4813 [2183]	5500 [2495]	6188 [2807]	6875 [3118]
.062 [1.57]	3410 [1546]	4263 [1934]	5115 [2320]	5968 [2707]	6820 [3094]	7673 [3480]	8525 [3867]

MATERIAL SPECIFICATIONS

Common materials used to manufacture Clampco clamps.

CORROSION RESISTANT MATERIAL	COMMERCIAL DESIGNATION	PROCUREMENT SPECIFICATION
STEEL SHEET & STRIP	TYPE 301 ANNEALED TYPE 301 1/4 HARD TYPE 301 1/2 HARD	AMS 5901 AMS 5517 AMS 5518
STEEL SHEET & STRIP	TYPE 302 ANNEALED TYPE 302 1/4 HARD TYPE 302 1/2 HARD	AMS 5516 AMS 5903 AMS 5904
STEEL SHEET & STRIP	TYPE 304L ANNEALED TYPE 304 ANNEALED TYPE 304 1/4 HARD TYPE 304 1/2 HARD	AMS 5511 AMS 5513 AMS 5910 AMS 5911
STEEL SHEET & STRIP	TYPE 316 ANNEALED TYPE 316 1/4 HARD TYPE 316L ANNEALED TYPE 316 1/2 HARD	AMS 5524 AMS 5907 AMS 5507 ASTM-A-666
STEEL SHEET & STRIP	TYPE 321 ANNEALED	AMS 5510
STEEL BARS & FORGINGS	TYPE 410	AMS 5504
STEEL BARS & FORGINGS	TYPE 431	AMS 5628
STEEL BARS & FORGINGS	TYPE A286	AMS 5732 AMS 5735 AMS 5737
STEEL SHEET & STRIP	TYPE A286 ANNEALED	ASM 5525
STEEL SHEET & STRIP	C276 HASTELLOY	ASTM-B-575
STEEL SHEET & STRIP	6061-T6 ALUMINUM	AMS 4027
STEEL SHEET & STRIP	INCONEL 718	AMS 5596

PERFORMANCE COMPARISON
BAND TENSION VS. APPLIED TORQUE



T-BOLT BAND CLAMPS
- High performance
- Safe and effective
- Good for light, medium, and heavy-duty applications

BARREL HARDWARE CLAMPS
- Low profile design
- Good for light and medium-duty applications

WORM DRIVE CLAMPS
- Economical
- Easy-to-use
- Good for light-duty applications