

# V-BAND CLAMPS/COUPLINGS

*Made-to-Order*

Clampco V-Band Couplings, also known as V-Band Clamps or V-Clamps, join flanges with V-shaped profiles. A V-Band Coupling operates by exerting a wedging load, which squeezes the flanges together. The V-Band Couplings can be designed to work with or without gaskets and O-rings. The material gauge, latch style, and number of retainer segments all vary depending on the requirements for each application.



V-Band Couplings eliminate the need for cumbersome bolted flange designs and costly welded flange designs. Because V-Band Couplings can be easily assembled and disassembled, they are often used on equipment that requires frequent service or maintenance. Typical V-Band applications include pumps, engines, exhaust systems, filters, and food and chemical processing equipment.

## How to Determine Your V-Band Clamp/Coupling Description Code

Clampco's description code contains 7 segments, each representing a different part of the clamp/coupling.

Below is a sample description code:

**V01-3-52-00-N-0588-S2**

It's easy to create your made-to-order V-Band Clamp/Coupling description code, just follow these 7 easy steps:

### 1. Determine Latch & Band or Strap Style Code

**V01**-3-52-00-N-0588-S2

### 2. Determine Number of Retainer Segments

V01-**3**-52-00-N-0588-S2

### 3. Determine Retainer Series Code

V01-3-**52**-00-N-0588-S2

### 4. Determine Product Design Code

V01-3-52-**00**-N-0588-S2

### 5. Determine Bolt Code

V01-3-52-00-**N**-0588-S2

### 6. Determine Retainer Inside Diameter Code

V01-3-52-00-N-**0588**-S2

### 7. Determine Nut, Knob, or T-Handle Code

V01-3-52-00-N-0588-**S2**

## CLAMPKO LATCH STYLES



### T-BOLT LATCH

The Clampco T-bolt latch is used for permanent or semi-permanent applications and/or safety on pressurized systems. The T-bolt latch is our most economical latch.



### QUICK RELEASE LATCH

The Clampco quick release latch is used for ease of disassembly and is required where the ability to replace bolts is desired.



### SADDLE QUICK RELEASE LATCH

The saddle quick release latch is also used for ease of disassembly and where the ability to replace bolts is desired. It is not recommended for diameters larger than 10 in. [254 mm] due to trunnion/band interference.



### LIGHT-DUTY OVER CENTER LATCH

The light-duty over center latch is used on applications that require frequent assembly or disassembly. No tools are required for opening and closing the clamp after initial installation. This latch style is ideal for light-duty applications on small diameters and requires a 3/16 in. diameter T-bolt.

(Note: Not recommended for pressurized applications)



### MEDIUM-DUTY OVER CENTER LATCH

The medium-duty over center latch is well suited for heavier applications and on larger diameters. No tools are required for opening and closing the clamp after initial installation. It is available with either a 1/4 in. or 5/16 in. diameter T-bolt.

(Note: Not recommended for pressurized applications)



### HEAVY-DUTY OVER CENTER LATCH

The heavy-duty over center latch is well suited for heavy-duty applications and large diameters. It is available with 3/8 in. diameter T-bolt.

(Note: Not recommended for pressurized applications)

# SPECIFICATIONS



## 1. DETERMINE LATCH & BAND OR STRAP STYLE CODE

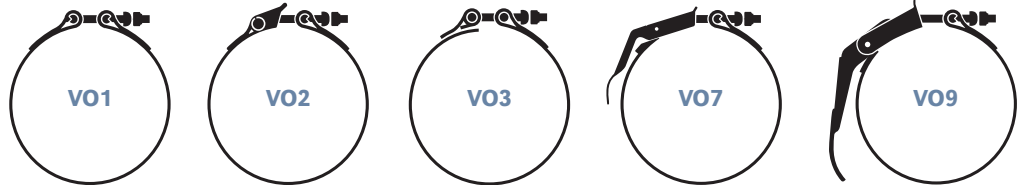
**V01-3-52-00-N-0588-S2** (Sample Description Code)

Clampco offers several latch styles and latch combinations for your convenience. Choose the code that corresponds with the best design for your application.

### FULL BANDS: SINGLE LATCH

Full Band Styles are recommended where greater strength is required.

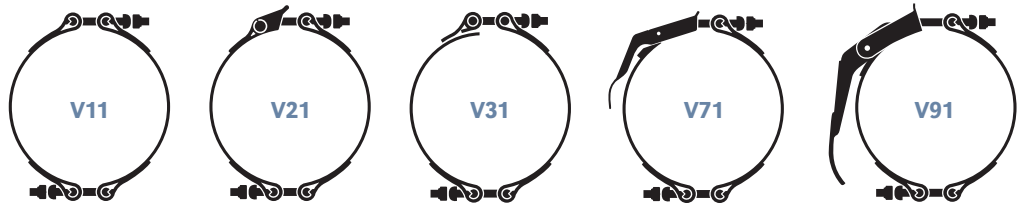
CODE	LATCH STYLE
V01	T-Bolt
V02	Quick Release
V03	Saddle Quick Release
V07	Light-Duty Over Center
V09	Medium-Duty Over Center



### FULL BANDS: MULTIPLE LATCHES

Full Band Styles are recommended where greater strength is required.

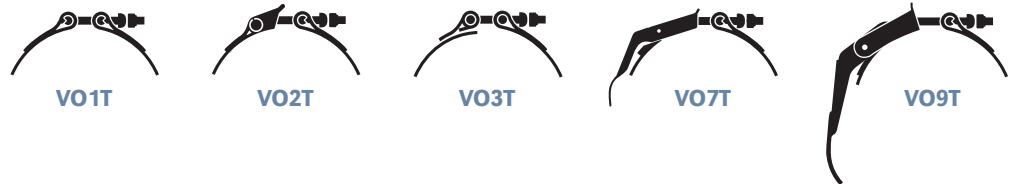
CODE	LATCH STYLE
V11	Two T-Bolts
V21	Quick Release and T-Bolt
V31	Saddle Quick Release and T-Bolt
V71	Light-Duty Over Center and T-Bolt
V91	Medium-Duty Over Center and T-Bolt



### STRAP BANDS: SINGLE LATCH

Strap Band Styles are more economical for diameters 8-10 in. [203-254 mm] and larger.

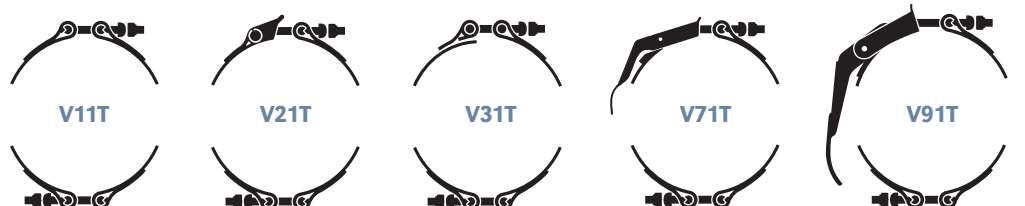
CODE	LATCH STYLE
V01T	T-Bolt
V02T	Quick Release
V03T	Saddle Quick Release
V07T	Light-Duty Over Center
V09T	Medium-Duty Over Center



### STRAP BANDS: MULTIPLE LATCHES

Strap Band Styles are more economical for diameters 8-10 in. [203-254 mm] and larger.



CODE	LATCH STYLE
V11T	Two T-Bolts
V21T	Quick Release and T-Bolt
V31T	Saddle Quick Release and T-Bolt
V71T	Light-Duty Over Center and T-Bolt
V91T	Medium-Duty Over Center and T-Bolt





## 2. DETERMINE NUMBER OF RETAINER SEGMENTS

**V01-3-52-00-N-0588-S2** (Sample Description Code)

Clampco offers one, two, three, and four-segment V-Band Couplings.

NUMBER OF SEGMENTS	LATCH DESCRIPTION
1	 <p>One-segment retainers are available for large couplings (approximately 12 in. [304.8 mm] and larger). One-segment retainers are difficult to install due to their inherent stiffness. Therefore, they should be used on permanent applications. One-segment retainers can only be used with latch &amp; band styles V01, V02, V03, V07, V09, V01T, V02T, V03T, V07T, and V09T.</p>
2	 <p>Two-segment retainers are also generally used for V-Band Couplings 8-10 in. [203-254 mm] and larger. However, they provide increased installation and removal flexibility. Two-segment retainers are primarily recommended for double latch clamps but can be used with single latch clamps. Please note: Two-segment retainers CANNOT be used with latch &amp; band styles V01T, V02T, V03T, V07T and V09T</p>

NUMBER OF SEGMENTS	LATCH DESCRIPTION
3	 <p>Three-segment retainers are used for all coupling diameters, especially those 8-10 in. [203-254 mm] and smaller. Three-segment retainers provide even greater ease of assembly and disassembly and offer the best balance between functionality and economy. Three-segment retainers can only be used with latch &amp; band styles V01, V02, V03, V07 and V09.</p>
4	 <p>Four-segment retainers are only recommended for exceptionally large couplings where two or three segments are not adequate. Four-segment retainers can only be used with latch &amp; band styles V01, V02, V03, V07, V09, V11, V21, V31, V71 and V91.</p>

# V-BAND CLAMPS/COUPLINGS

Made-to-Order



## 3. DETERMINE RETAINER SERIES CODE

V01-3-**52**-00-N-0588-S2 (Sample Description Code)

Clampco is currently tooled for over 20 standard retainer shapes. These retainer shapes mate with the most common industrial flange profiles. To arrive at the proper retainer series for your application, please consider the following factors: the design and dimensions of the mating flanges; operating pressure and temperature; whether or not gaskets or O-rings will be used; and what the system will carry (fluid, dry bulk solids, air, etc.).

### RETAINER THICKNESS OF .031 in. [.787 mm]

ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	500	380	51	3.45	2.62
4	250	180	102	1.72	1.24
6	140	95	152	.96	.65
8	80	65	203	.55	.45
10	60	50	254	.41	.34
12	45	38	305	.31	.26
14	38	32	355	.26	.22
16	32	28	406	.22	.19
18	28	25	457	.19	.17
20	25	23	508	.17	.16

**WARNING:** The pressure ratings shown are the maximum pressures that will not cause yielding of any component. The ratings are for V-Band Clamps/Couplings with the following: 301 annealed retainers with 40 degree included angles; 301/302/304 1/4 hard or 1/2 hard bands; and operating at ambient temperatures of 70 degrees F. See the Materials and Temperatures Chart on page 36 to calculate pressure ratings for different materials and temperatures. Do not use pressure ratings for over center latch styles or for any other latch styles that are tightened by hand. Vessel pressure must be released before coupling is opened.

### RETAINER THICKNESS OF .040 in. [1.02 mm]

ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	1500	620	51	10.34	4.27
4	450	300	102	3.10	2.07
6	240	180	152	1.65	1.24
8	150	120	203	1.03	.83
10	110	80	254	.76	.55
12	80	60	305	.55	.41
14	65	50	355	.45	.34
16	55	40	406	.38	.28
18	50	35	457	.34	.24
20	45	30	508	.31	.21

### RETAINER THICKNESS OF .070 in. [1.78 mm]

ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	3150	1250	51	21.72	8.62
4	1100	650	102	7.58	4.48
6	600	400	152	4.14	2.76
8	350	280	203	2.41	1.93
10	250	210	254	1.72	1.45
12	200	160	305	1.38	1.10
14	170	120	355	1.17	.83
16	150	100	406	1.03	.69
18	120	90	457	.83	.62
20	100	70	508	.69	.48

### RETAINER THICKNESS OF .050 in. [1.27 mm]

ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	2000	700	51	13.79	4.83
4	650	320	102	4.48	2.21
6	350	200	152	2.41	1.38
8	210	140	203	1.45	.96
10	150	100	254	1.03	.69
12	120	80	305	.83	.55
14	90	65	355	.62	.45
16	80	60	406	.55	.41
18	70	52	457	.48	.36
20	65	46	508	.45	.32

### RETAINER THICKNESS OF .080 in. [2.03 mm]

ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	4000	1600	51	27.58	11.03
4	1500	780	102	10.34	5.38
6	750	500	152	5.17	3.45
8	500	340	203	3.45	2.34
10	360	260	254	2.48	1.79
12	280	200	305	1.93	1.38
14	210	160	355	1.45	1.10
16	180	140	406	1.24	.96
18	150	120	457	1.03	.83
20	130	100	508	.90	.69

### RETAINER THICKNESS OF .062 in. [1.57 mm]

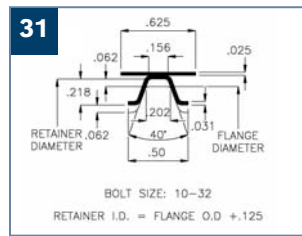
ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	2500	1000	51	17.24	6.89
4	800	550	102	5.52	3.79
6	480	350	152	3.31	2.41
8	300	250	203	2.07	1.72
10	240	180	254	1.65	1.24
12	180	150	305	1.24	1.03
14	160	120	355	1.10	.83
16	130	90	406	.90	.62
18	110	78	457	.76	.54
20	100	68	508	.69	.47

### RETAINER THICKNESS OF .090 in. [2.29 mm]

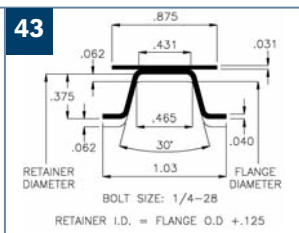
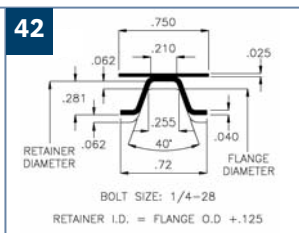
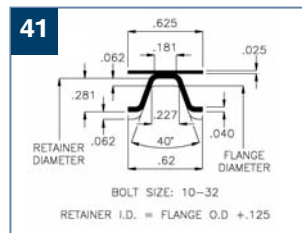
ENGLISH (inches)			METRIC (millimeters)		
COUPLING DIAMETER	PRESSURE IN PSI		COUPLING DIAMETER	PRESSURE IN MPa	
	FULL BAND	STRAP BAND		FULL BAND	STRAP BAND
2	5500	3800	51	37.92	26.20
4	2000	1500	102	13.79	10.34
6	1200	800	152	8.27	5.52
8	780	550	203	5.38	3.79
10	580	400	254	3.99	2.76
12	440	310	305	3.03	2.14
14	350	260	355	2.41	1.79
16	290	210	406	1.99	1.45
18	250	180	457	1.72	1.24
20	200	150	508	1.38	1.03



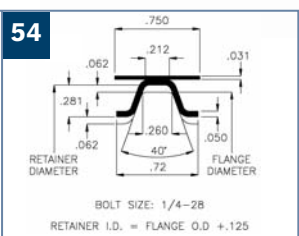
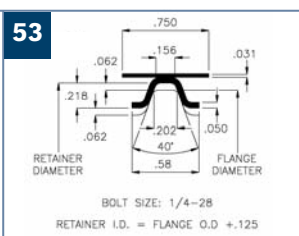
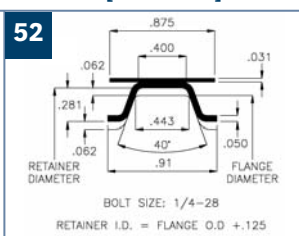
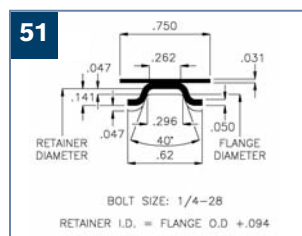
### RETAINER THICKNESS OF .031 in. [.787 mm]



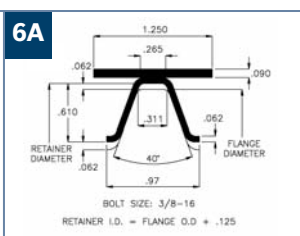
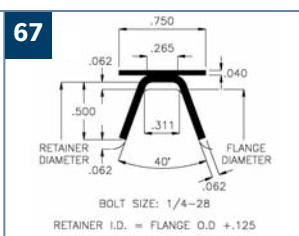
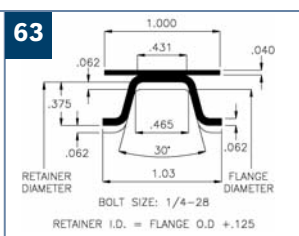
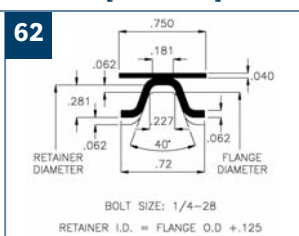
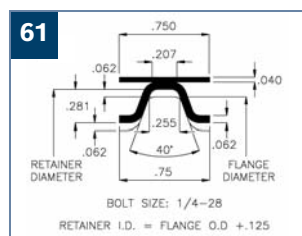
### RETAINER THICKNESS OF .040 in. [1.02 mm]



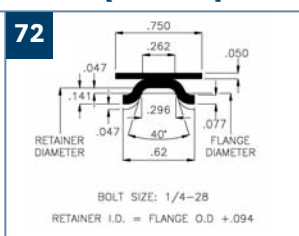
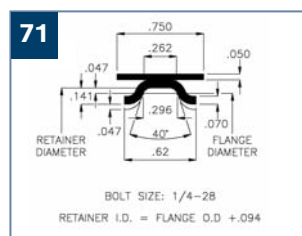
### RETAINER THICKNESS OF .050 in. [1.27 mm]



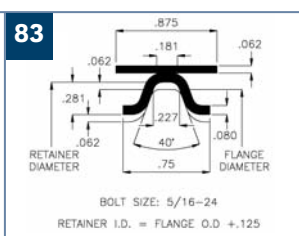
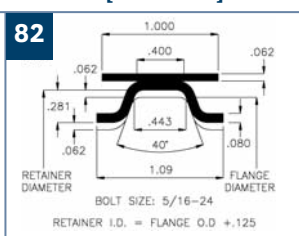
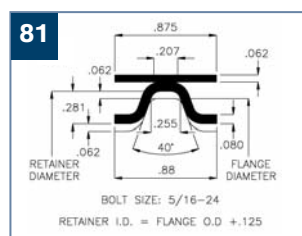
### RETAINER THICKNESS OF .062 in. [1.57 mm]



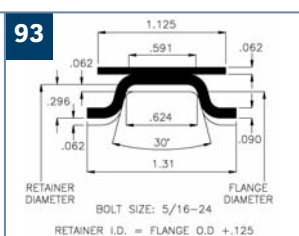
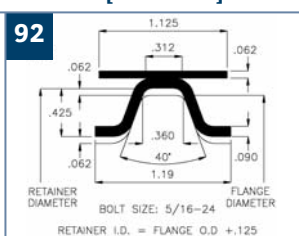
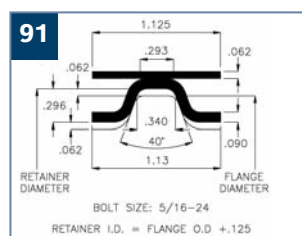
### RETAINER THICKNESS OF .070 in. [1.78 mm]



### RETAINER THICKNESS OF .080 in. [2.03 mm]



### RETAINER THICKNESS OF .090 in. [2.29 mm]



### DESIGN CONSIDERATIONS

#### Application Loads

See the V-Band Clamp/Coupling load formulas on page 36 for applications involving bending moments and/or axial loads in addition to pressure loads.

#### Safety Factor

Choose the thinnest material for the application that still meets the performance requirements, including **your appropriate safety factor** and material and temperature corrections.

#### Retainer Series

Retainer series are available in 301/302/304 annealed stainless steel. Other materials are available upon request.

To use a standard retainer series the flange apex width (including compressed flat gasket or o-ring) must be as shown. Other flange apex widths require special retainer series not shown.

Select a retainer series with enough opening (at the bottom of the retainer) so that the retainers can grab (or catch) the free state flanges sufficiently to prepare the joint for tightening.

Retainer series profile dimensions are in inches; 1 in. = 25.4 mm

# V-BAND CLAMPS/COUPLINGS

*Made-to-Order*



## 4. DETERMINE PRODUCT DESIGN CODE

**V01-3-52-00-N-0588-S2** (Sample Description Code)

The standard design code is "00" for all V-Band Couplings. A unique design code is assigned to custom parts. Custom parts include variations such as different band and retainer materials, non-standard hardware, special retainer profiles, custom markings, and more. Parts with different over center latch designs, along with their corresponding safety features, are also custom items and will receive a special design code. (See pages 30–34 for more information regarding custom options.)

Clampco will assign the design code that represents your custom part upon receipt of an order.



## 5. DETERMINE BOLT CODE

**V01-3-52-00-N-0588-S2** (Sample Description Code)

Clampco offers the following bolts as standard options. Other bolt materials and thread sizes are available upon request. Some bolts may be bent for small diameter applications.

CODE	BOLT DESCRIPTION	THREAD SIZE
C		10-32
		1/4-28
		M6 X 1
		5/16-24
N	18-8 Stainless Steel (302 or 305)	10-32
		1/4-20
		1/4-28
		5/16-18
M	431, 420 or 410 Stainless Steel Heat Treated to 140,000 to 160,000 psi	10-32
		1/4-28
		5/16-24
		3/8-16
A	A286 Stainless Steel, 130,000 psi minimum	10-32
		1/4-28
W	316 Stainless Steel	1/4-28
		M6 X 1
		M8 X 1.25

## Bolt Performance and Torque Chart

THREAD SIZE	BOLT MATERIAL	MAXIMUM RECOMMENDED TORQUE IN.-LBS. [NEWTON-METERS]	ULTIMATE TENSILE STRENGTH LBS. [KILOGRAMS]
10-32	300 Series Stainless Steel	50 [5.7]	1815 [823]
10-32	Type 420 or 431 Stainless Steel	65 [7.3]	2390 [1084]
10-32	Type A286 Stainless Steel	65 [7.3]	2390 [1084]
10-32	Plated Alloy Steel	65 [7.3]	2390 [1084]
1/4-20	300 Series Stainless Steel	75 [8.5]	3322 [1508]
1/4-28	300 Series Stainless Steel	75 [8.5]	3322 [1508]
M6 X 1	300 Series Stainless Steel	75 [8.5]	3322 [1508]
1/4-28	Type 420 or 431 Stainless Steel	90 [10.2]	4370 [1983]
1/4-28	Type A286 Stainless Steel	90 [10.2]	4370 [1983]
1/4-28	Plated Alloy Steel	90 [10.2]	4370 [1983]
M6 X 1	Plated Alloy Steel	90 [10.2]	4370 [1983]
5/16-18	300 Series Stainless Steel	180 [20.3]	5320 [2414]
5/16-24	300 Series Stainless Steel	180 [20.3]	5320 [2414]
M8 X 1.25	300 Series Stainless Steel	180 [20.3]	5320 [2414]
5/16-24	Type 420 or 431 Stainless Steel	240 [27.1]	7000 [3177]
5/16-24	Type A286 Stainless Steel	240 [27.1]	7000 [3177]
5/16-24	Plated Alloy Steel	240 [27.1]	7000 [3177]
3/8-16	300 Series Stainless Steel	390 [44.1]	7100 [3221]
3/8-16	Plated Alloy Steel	480 [54.2]	9350 [4241]
1/2-13	Plated Alloy Steel	550 [62.1]	17200 [7802]

300 series stainless steel bolt strength based on 95,000 psi minimum tensile strength. Type 420–431 stainless steel bolt strength based on 125,000 psi minimum tensile strength. Type A286 stainless steel bolt strength based on 125,000 psi minimum tensile strength. Plated alloy steel bolt strength based on 125,000 psi minimum tensile strength. Torque coupling or band to a level where joints are properly closed. Maximum torque levels are not required for proper joint function.



## 6. DETERMINE RETAINER INSIDE DIAMETER CODE

V01-3-52-00-N-**0588**-S2 (Sample Description Code)

The retainer inside diameter (I.D.) must be specified in .01 in. increments. It is determined by adding the flange outside diameter (O.D.) plus the recommended air gap for the retainer series. The last 2 digits of the code are represented as a two place decimal number without the decimal point.

### For Example:

You have a flange with an O.D. of 5.750 in. designed for use with a 52 series retainer. See 52 series chart to determine what should be added to flange O.D. to get retainer I.D.

### 1. ADD FLANGE O.D. AND RECOMMENDED AIR GAP FROM CHART TO GET RETAINER SERIES I.D.

$$5.750 \text{ in.} + .125 \text{ in.} = 5.875 \text{ in.}$$

### 2. ROUND TO NEAREST TWO PLACE DECIMAL: 5.88

### 3. DROP THE DECIMAL POINT TO ARRIVE AT YOUR CODE: 588

When starting with a metric unit, convert millimeters to inches rounded to two decimal places, and then drop the decimal point.

### For Example:

$$60 \text{ mm} = (60 \text{ mm}/25.4) = 2.36 \text{ in.} = 236$$

Remember...The V-Band I.D. is always larger than the flange O.D.




## 7. DETERMINE NUT, KNOB, OR T-HANDLE CODE

V01-3-52-00-N-0588-**S2** (Sample Description Code)

Clampco provides the following nuts, knobs, and T-handles as standard options. Choose the nut, knob, or T-handle that is best suited to your application, or contact our sales department with your special request.

CODE	NUT DESCRIPTION	TEMP RATING	SELF-LOCKING
S	Steel, self-locking, nylon insert, Cadmium or Zinc Plated	250° F [120° C]	Yes
S1	All metal, Steel, self-locking, collar or short beam design, Cadmium or Zinc Plated	550° F [290° C]	Yes
S2	All metal, 18-8 Stainless Steel*, self-locking, collar or short beam design, Silver Plated	800° F [425° C]	Yes
S3	All metal, 347 Stainless Steel*, self-locking, collar or short beam design, Silver Plated	1200° F [650° C]	Yes
S4	18-8 Stainless Steel, self-locking, nylon insert, Silver Plated	250° F [120° C]	Yes
S6	All metal, 347 Stainless Steel, self-locking, long beam design, Silver Plated	1200° F [650° C]	Yes
S14	316 Stainless Steel, self-locking, nylon insert, Silver Plated	250° F [120° C]	Yes
H	Stainless Steel Hex Nut, Silver Plated	800° F [425° C]	No
H6	Steel Hex Nut, Zinc Plated	--	No
H8	Brass Hex Nut	--	No

CODE	KNOB AND T-HANDLE DESCRIPTION
K	 Knob for hand tightening, plastic with Brass insert, 1 in. long [25.4 mm]
K1	 Knob for hand tightening, plastic with Brass insert, 1.75 in. long [44.5 mm]
T	 T-Handle for hand tightening, Steel, Cadmium or Zinc Plated, 3 in. long [76.2 mm]



See pages 32 and 33 for additional knob and T-handle information.

\* We reserve the right to substitute with A286 stainless steel and/or other equivalent locknuts unless otherwise specified.