

# PROCO™

# RC

## SERIES

### concentric reducer expansion joints



The PROCO Series RC-221 Rubber Concentric Reducer Expansion Joint, often called a "Taper", serves as a reducing element to transition from one pipe size to another. Concentric in design, each flange-end shares the same common center-line. The PROCO Rubber Reducer is engineered to replace metallic or rubber-lined reducers used to provide unequal diameter connections of: piping and/or operating equipment applications such as: Pumps, Chillers, Cooling Towers, Compressors, Blowers, Fans, Absorption Machines, etc. Installed next to mechanical equipment or between the anchor points of a piping system, specify the PROCO Series RC-221 to: (1) Absorb Pipe Movement/Stress, (2) Reduce System Noise, (3) Isolate Mechanical Vibration, (4) Compensate Alignment/Offset, (5) Eliminate Electrolysis, (6) Protect Against Start-up/Surge Forces. The PROCO Series RC-221 is engineered for tough, demanding, industrial and commercial applications, as found in: Air Conditioning-Heating and Ventilating Systems, Chemical-Petrochemical and Industrial Process Piping Systems, Power Generating Plants, Steel Mills, Marine Services, Pulp/Paper Systems, Water-Wastewater-Sewage and Pollution Control Systems, where metallic reducers used in conjunction with metal hose or expansion joints may have been previously used or specified. Our history in manufacture of expansion joint products dates back to 1930. PROCO Products is a member of the Rubber Expansion Joint Division, Fluid Sealing Association. When a rubber expansion joint is needed to solve a piping system problem, call PROCO.

Traditional design when using a metallic reducer incorporates the use of a flexible element such as an expansion joint or metal hose to absorb the vibrations and movements of the system. The PROCO Series RC-221 Reducer combines the basic shape and dimensions of the metal reducer and the movement-sound reduction-vibration-absorbing features of a flexible element into one unit. Here are some of the many advantages:

- **Less System Installation Space:**  
The PROCO RC-221 replaces a metal reducer and a flexible element. Thus less space is required and valves of other equipment can be more conveniently located.
- **Less Installation Cost:**  
The PROCO RC-221 costs less than the metal reducer and flexible element that are replaced. Additionally, standard joints (as listed in Table 1 and the "stock" section in Table 2) can be shipped same day as order placement.

**Engineered For Your Application:** The PROCO Rubber Reducer materials consist of rubber and fabric which are formed and cured in a heated compression mold using an exclusive high-pressure press. The thick outer-cover and interior-tube are of an elastomer especially compounded to satisfy the Chemical-Temperature requirement of your application. Available styles include:

- **Style RC-221:**  
Features one Open Arch for maximum movement, and good noise-vibration control. Our most popular style. (See Figure 1)
- **Style-RCFA-221:**  
Features one Filled Arch, is generally specified for slurry or abrasive services. Provides noise and vibration control but less movement than Style RC-221. (See Figure 2)

**Absorbs Pipe-Wall And Fluid-Borne Noise.** The PROCO quiet-operating Series RC-221 is

a replacement for "sound transmitting" metallic reducers. Pipe-Wall sound loses energy and is absorbed as the noise carried by the piping enters and exits the rubber section. Fluid-borne noise is absorbed by the volumetric expansion (breathing) of the connector. This action cushions water hammer, and smooths out pumping impulses.

**Isolates Vibrations And Motion.** Vibration originating from mechanical equipment is absorbed by the PROCO Series RC-221. Rubber connectors should be installed right after and ahead of the equipment generating the vibration, thus isolating the equipment. Most machinery vibrates in a radial direction from the main shaft. For optimum performance the PROCO connector should be installed horizontally and parallel to this shaft. Vertical and perpendicular installations are also acceptable as the PROCO Reducer will accept both axial and lateral movements and vibration. Installations of the Series RC-221 in a system enables isolated equipment to move freely on its vibration mountings. **Note: For maximum vibration transmission reduction, the piping section beyond the rubber connector must be anchored or sufficiently rigid.**

**Chemical Or Abrasive Service Capability At Minimal Cost.** Expensive, exotic metal or rubber lined reducers for chemical service can be replaced with the PROCO Rubber Reducer. Fabricated with low-cost chemical resistant elastomers such as: Chlorobutyl, EPDM, Hypalon, Neoprene and Nitrile; insures a rubber connector compatible with the fluid being pumped or piped. (See Table 1) Our Neoprene, Natural/Gum and filled arch products should be specified when handling abrasive slurries. Use the PROCO "Chemical to Elastomer Guide" to specify an elastomer for your requirement.

**Reduces System Stress And Strain/Compensate For Misalignment.** Rigid attachment of piping to critical or mechanical equipment can produce excessive loading. Thermal or mechanically created strain-stress-shock are cushioned and absorbed with the installation of a flexible low "force-to-deflect" PROCO Rubber Reducer. The PROCO Style RC-221 adds a flexible component that is automatically self-correcting for misalignment created by structural movements caused by settling, expansion or ground shifts.

**Flange And Retaining Ring Drilling.** All PROCO rings are coated to prevent corrosion and dimensionally drilled to ANSI 125/150# standards. In accordance with ANSI, all bolt hole pairs "straddle" the center line. Hole drilling on center line, other drilling standards or materials such as: 304 or 316 Stainless and Bronze are available on special order.

**Less Turbulence Or Material Entrapment.** The molded integral flange of the PROCO Rubber Reducer joins the body at a true 90 degree angle. Our product will install snug against the mating pipe flange without voids. Because this flange-body angle is difficult to form, many competitors severely radius this edge angle. The resulting void can create flow turbulence, allow for material entrapment and/or bacteria growth. Avoid these problems by specifying PROCO.

**Exclusive Sealing Bead Means A Quick Seal.** We have built an "O-Ring" on each flange-face of the Series RC-221. Available only from PROCO, our product seals faster with less torque at installation and less long-term maintenance. For exclusive design features, specify PROCO.

**High Pressure With Full Safety Factors.** We have assigned conservative pressure ratings to the Series RC-221. However, the ratings meet or exceed the requirements of the Rubber Expansion Joint Division, Fluid Sealing Association, for Series A, B, and C. More importantly, our conservative ratings are fully tested and based on a minimum four-to-one safety factor. With competitive products the safety factor is often calculated or unknown. For pressure protection, specify PROCO.

Table 1: Available Styles • Materials • Temperatures • Stock							
Style Numbers		Type of Elastomer		Maximum Operating Temp. °F	PROCO™ Branding Label Color	F.S.A. Material Class	
RC-221	RCFA-221	PROCO™ Material Code	Cover/Outside				Tube/Inside
S	S	/BB	Butyl	Butyl	250°	Black	Special II
X	X	/EE	EPDM	EPDM	250°	Red	Special II
X	X	/NH	Neoprene	Hypalon <sup>1</sup>	230°	Green	Standard II
X <sup>7</sup>	X <sup>7</sup>	/NN <sup>3</sup>	Neoprene	Neoprene	230°	Blue	Standard II
X	X	/NP	Neoprene	Nitrile	230°	Yellow	Standard II
X	X	/NR	Neoprene	Natural <sup>2</sup>	180°	White	Standard I

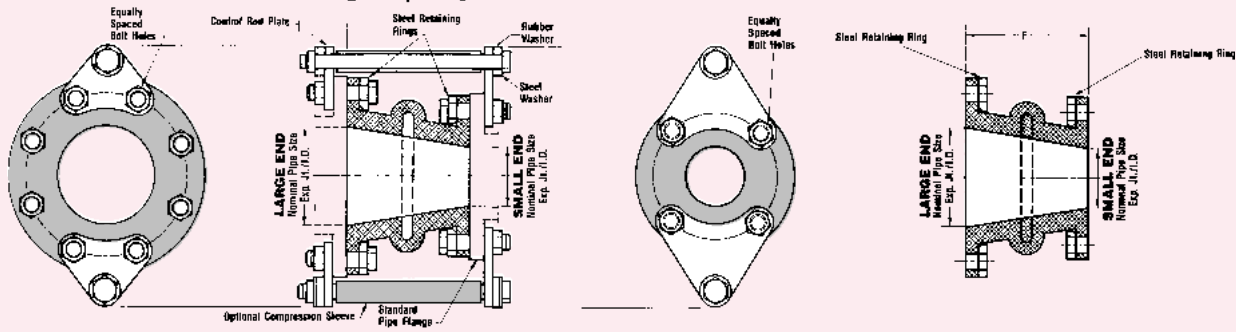
NOTES: 1. Hypalon is a trademark of E.I. duPont Nemours & Co.  
2. Filled Arch is Tan-Gum, Open Arch is Black-Natural.  
3. Material NN meets all requirements of U.S.C.G.  
4. In applications where pressure is less than 15 PSIG, temperature may be increased.  
5. All products are reinforced with synthetic fabric plies.  
6. Material Availability: X=Special Order, S=Standard Stock.  
7. Certain sizes in stock, call for availability.  
8. To Order, provide: 1. Size (I.D. x Length), 2. Style Number, 3. Material Code.

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email: [sales@procoproducts.com](mailto:sales@procoproducts.com)

Protecting Piping And  
Equipment Systems  
From Stress/Motion



# concentric reducer expansion joints



**Figure 1: Style RC-221  
Single Open Arch**

**Figure 2: Style RCFA-221  
Single Filled Arch**

Concentric Joint Size I.D. x I.D. x Length	Stock		RC-221 Open Arch Capacity: From Neutral Position							Weight/Pounds			Stock		RCFA-221 Filled Arch Capacity: From Neutral Position							Weight/Pounds			Pressure	
	/BB Butyl	/NN Neoprene	Axial Compression	Axial Extension	±Lateral Deflection	±Angular Deflection <sup>1</sup>	Torsional Movement <sup>2</sup>	Thrust Factor <sup>3</sup>	Expansion Joint Open Arch	Retaining Ring Set	Control Rod Set	/BB Butyl	/NN Neoprene	Axial Compression	Axial Extension	±Lateral Deflection	±Angular Deflection <sup>1</sup>	Torsional Movement <sup>2</sup>	Thrust Factor <sup>3</sup>	Expansion Joint Filled Arch	Retaining Ring Set	Control Rod Set	Positive Pressure PSIG	Vacuum In. Hg		
																									Inches	Inches
2 x 1 x 6"	S	X	.25	.25	.5	18.4°	3"	12.69	3	3	6	X	X	.25	.125	.3	9.5°	1.8"	3.14	3	3	6	200	26		
2 x 1.5 x 6"	S	X	.25	.25	.5	15.9°	3"	14.32	3	3	6	X	S	.25	.125	.3	8.1°	1.8"	3.14	3	3	6	200	26		
2.5 x 1.5 x 6"	S	X	.25	.25	.5	14.1°	3"	16.04	4	3	7	X	X	.25	.125	.3	7.2°	1.8"	4.97	4	3	7	200	26		
2.5 x 2 x 6"	S	X	.25	.25	.5	12.5°	3"	17.87	3	4	7	S	X	.25	.125	.3	6.4°	1.8"	4.97	3	4	7	200	26		
3 x 1 x 6"	X	X	.25	.25	.5	14.0°	3"	16.04	4	4	7	X	X	.25	.125	.3	6.4°	1.8"	7.06	4	4	7	200	26		
3 x 1.5 x 6"	S	X	.25	.25	.5	12.5°	3"	17.87	4	4	7	S	X	.25	.125	.3	6.4°	1.8"	7.06	4	4	7	200	26		
3 x 2 x 6"	S	X	.25	.25	.5	11.3°	3"	19.79	4	4	7	S	S	.25	.125	.3	5.7°	1.8"	7.06	4	4	7	200	26		
3 x 2.5 x 6"	S	X	.25	.25	.5	10.3°	3"	21.81	5	5	7	X	X	.25	.125	.3	5.2°	1.8"	7.06	5	5	7	200	26		
4 x 2 x 6"	S	S	.25	.25	.5	9.5°	3"	23.93	5	5	7	S	S	.25	.125	.3	4.8°	1.8"	12.57	5	5	7	200	26		
4 x 2 x 7"	S	S	.25	.25	.5	9.5°	3"	23.93	5	5	7	X	S	.25	.125	.3	4.8°	1.8"	12.57	5	5	7	200	26		
4 x 2.5 x 6"	S	S	.25	.25	.5	8.7°	3"	26.14	5	6	8	X	S	.25	.125	.3	4.4°	1.8"	12.57	5	6	8	200	26		
4 x 2.5 x 7"	S	X	.25	.25	.5	8.7°	3"	26.14	6	6	8	X	X	.25	.125	.3	4.4°	1.8"	12.57	6	6	8	200	26		
4 x 3 x 6"	S	X	.25	.25	.5	8.1°	3"	28.46	6	6	8	X	S	.25	.125	.3	4.1°	1.8"	12.57	6	6	8	200	26		
4 x 3 x 7"	S	X	.25	.25	.5	8.1°	3"	28.46	6	6	8	X	X	.25	.125	.3	4.1°	1.8"	12.57	6	6	8	200	26		
5 x 3 x 6"	S	X	.25	.25	.5	7.1°	3"	33.38	6	6	10	X	X	.25	.125	.3	3.6°	1.8"	19.63	6	6	10	190	26		
5 x 4 x 6"	S	X	.25	.25	.5	6.3°	3"	38.70	8	7	10	X	S	.25	.125	.3	3.2°	1.8"	19.63	8	7	10	190	26		
5 x 4 x 8"	S	X	.25	.25	.5	6.3°	3"	38.70	8	7	10	X	X	.25	.125	.3	3.2°	1.8"	19.63	8	7	10	190	26		
6 x 2 x 8"	S	X	.25	.25	.5	7.1°	3"	33.38	8	6	12	X	S	.25	.125	.3	3.6°	1.8"	28.27	9	6	12	190	26		
6 x 2.5 x 6"	S	X	.25	.25	.5	6.7°	3"	35.99	6	7	12	X	X	.25	.125	.3	3.4°	1.8"	28.27	6	7	12	190	26		
6 x 3 x 6"	S	X	.25	.25	.5	6.3°	3"	38.70	7	7	12	X	X	.25	.125	.3	3.2°	1.8"	28.27	7	7	12	190	26		
6 x 3 x 9"	S	X	.25	.25	.5	6.3°	3"	38.70	9	7	13	X	X	.25	.125	.3	3.2°	1.8"	28.27	10	7	13	190	26		
6 x 4 x 6"	S	S	.25	.25	.5	5.7°	3"	44.41	8	7	11	X	S	.25	.125	.3	2.9°	1.8"	28.27	8	7	11	190	26		
6 x 4 x 8"	S	X	.25	.25	.5	5.7°	3"	44.41	9	7	11	X	S	.25	.125	.3	2.9°	1.8"	28.27	9	7	11	190	26		
6 x 4 x 9"	S	S	.25	.25	.5	5.7°	3"	44.41	11	7	11	X	X	.25	.125	.3	2.9°	1.8"	28.27	12	7	11	190	26		
6 x 5 x 6"	S	S	.25	.25	.5	5.2°	3"	50.51	9	8	11	S	S	.25	.125	.3	2.6°	1.8"	28.27	9	8	11	190	26		
6 x 5 x 9"	S	S	.25	.25	.5	5.2°	3"	50.51	12	8	12	X	X	.25	.125	.3	2.6°	1.8"	28.27	13	8	12	190	26		
8 x 3 x 6"	S	X	.75	.375	.5	7.8°	3"	56.64	9	9	19	X	S	.375	.188	.3	3.9°	1.8"	50.27	10	9	19	190	26		
8 x 4 x 6"	S	S	.75	.375	.5	7.1°	3"	63.51	10	9	19	S	S	.375	.188	.3	3.6°	1.8"	50.27	10	9	19	190	26		
8 x 4 x 8"	S	X	.75	.375	.5	7.1°	3"	63.51	11	9	20	X	X	.375	.188	.3	3.6°	1.8"	50.27	12	9	20	190	26		
8 x 4 x 10"	X	X	.75	.375	.5	7.1°	3"	63.51	15	9	21	X	X	.375	.188	.3	3.6°	1.8"	50.27	17	9	21	190	26		
8 x 4 x 11"	S	X	.75	.375	.5	7.1°	3"	63.51	15	9	21	X	X	.375	.188	.3	3.6°	1.8"	50.27	17	9	21	190	26		
8 x 5 x 6"	S	S	.75	.375	.5	6.6°	3"	70.77	10	10	18	X	X	.375	.188	.3	3.3°	1.8"	50.27	11	10	18	190	26		
8 x 5 x 11"	S	S	.75	.375	.5	6.6°	3"	70.77	15	10	21	X	X	.375	.188	.3	3.3°	1.8"	50.27	16	10	21	190	26		
8 x 6 x 6"	S	S	.75	.375	.5	6.1°	3"	78.42	12	10	18	S	S	.375	.188	.3	3.1°	1.8"	50.27	12	10	18	190	26		
8 x 6 x 8"	S	S	.75	.375	.5	6.1°	3"	78.42	14	10	18	S	S	.375	.188	.3	3.1°	1.8"	50.27	14	10	18	190	26		
8 x 6 x 11"	S	S	.75	.375	.5	6.1°	3"	78.42	18	10	20	X	S	.375	.188	.3	3.1°	1.8"	50.27	18	10	20	190	26		
10 x 5 x 8"	S	X	.75	.375	.5	5.7°	3"	86.46	19	11	27	X	X	.375	.188	.3	2.9°	1.8"	78.54	21	11	27	190	26		
10 x 6 x 8"	S	X	.75	.375	.5	5.4°	3"	94.90	15	11	26	S	S	.375	.188	.3	2.8°	1.8"	78.54	15	11	26	190	26		
10 x 6 x 12"	S	X	.75	.375	.5	5.4°	3"	94.90	21	11	28	X	S	.375	.188	.3	2.8°	1.8"	78.54	22	11	28	190	26		
10 x 8 x 6"	S	X	.75	.375	.5	4.8°	3"	112.95	14	13	25	X	X	.375	.188	.3	2.4°	1.8"	78.54	14	13	25	190	26		
10 x 8 x 8"	S	X	.75	.375	.5	4.8°	3"	112.95	18	13	25	X	X	.375	.188	.3	2.4°	1.8"	78.54	20	13	25	190	26		
10 x 8 x 12"	S	X	.75	.375	.5	4.8°	3"	112.95	20	13	28	X	X	.375	.188	.3	2.4°	1.8"	78.54	23	13	28	190	26		
12 x 6 x 8"	S	S	.75	.375	.5	4.8°	3"	112.95	19	15	29	S	S	.375	.188	.3	2.4°	1.8"	113.10	22	15	29	190	26		
12 x 6 x 14"	S	X	.75	.375	.5	4.8°	3"	112.95	30	15	31	X	X	.375	.188	.3	2.4°	1.8"	113.10	35	15	31	190	26		
12 x 8 x 6"	S	S	.75	.375	.5	4.3°	3"	132.57	19	17	28	S	S	.375	.188	.3	2.2°	1.8"	113.10	19	17	28	190	26		
12 x 8 x 8"	S	S	.75	.375	.5	4.3°	3"	132.57	24	17	29	S	S	.375	.188	.3	2.2°	1.8"	113.10	24	17	29	190	26		
12 x 8 x 14"	S	X	.75	.375	.5	4.3°	3"	132.57	30	17	30	X	X	.375	.188	.3	2.2°	1.8"	113.10	35	17	30	190	26		
12 x 10 x 8"	S	S	.75	.375	.5	3.9°	3"	153.77	23	18	24	S	S	.375	.188	.3	1.9°	1.8"	113.10	24	18	24	190	26		
12 x 10 x 14"	S	X	.75	.375	.5	3.9°	3"	153.77	35	18	26	X	X	.375	.188	.3	1.9°	1.8"	113.10	38	18	26	190	26		
14 x 8 x 8"	S	X	.75	.375	.5	3.9°	2"	177.09	22	18	29	X	X	.375	.188	.3	1.9°	1.2"	153.94	22	18	29	130	26		
14 x 10 x 8"	S	X	.75	.375	.5	3.6°	2"	201.46	30	19	29	S	S	.375	.188	.3	1.8°	1.2"	153.94	32	19	29	130	26		
14 x 10 x 10"	X	X	.75	.375	.5	3.6°	2"	201.46	31	19	30	X	X	.375	.188	.3	1.8°	1.2"	153.94	25	19	30	130	26		
14 x 12 x 8"	S	S	.75	.375	.5	3.3°	2"	227.40	32	23	27	S	X	.375	.188	.3	1.7°	1.2"	153.94	33	23	27	130	26		
16 x 10 x 8"	S	X	.75	.375	.5	3.3°	2"	227.40	31	21	36	S	X	.375	.188	.3	1.7°	1.2"	201.06	31	21	36	110	26		
16 x 10 x 10"	X	S	.75	.375	.5	3.3°	2"	227.40	34	21	39	X	X	.375	.188	.3	1.7°	1.2"	201.06	35	21	39	110	26		
16 x 12 x 8"	S	X	.75	.375	.5	3.1°	2"	254.92	36	25	36	S	S	.375	.188	.3	1.5°	1.2"	201.06	39	25	36	110	26		
16 x 14 x 8"	S	X	.75	.375	.5	2.9°	2"	284.00	38	26	37	S	S	.375	.188	.3	1.4°	1.2"	201.06	42	26	37	110	26		
18 x 12 x 8"	S	X	.75	.375	.5	2.9°	1"	284.00	37	26	37	S	X	.375	.188	.3	1.4°	0.6°	254.47	37	26	37	110	26		
18 x 12 x 12"	X	X	.75	.375	.5	2.9°	1"	284.00	41	27	42	X	X	.375	.188	.3	1.4°	0.6°	254.47	41	27	42	110	26		
18 x 14 x 8"	S	X	.75	.375	.5	2.7°	1"	314.65	41	27	37	X	S	.375	.188	.3	1.3°	0.6°	254.47	41	27	37	110	26		
18 x 16 x 8"	S	X	.75																							