

Ralphs-Pugh Bearings and Bearing Units

Ralphs-Pugh offers a broad range of bearings and bearing inserts to meet the most demanding operating environments. We control our bearing manufacturing process from design through tooling, material selection, injection molding, and assembly. We've set our standards high to ensure that our products meet or exceed our customers' expectations. Ralphs-Pugh plastic housed bearings are available with labyrinth seals for applications requiring the ultimate protection against dirt, dust, and other contaminants that adversely affect bearing performance and useful life. If you do not see a particular bearing style you require, please contact our customer service department for assistance. ***Ralphs-Pugh also offers private label programs.***

Products include:

Commercial Grade

Most suitable for light to moderate loads and speeds, commercial grade bearings have hardened steel balls and raceways, and are lubricated with light oil. Grease packed units may be ordered for driven applications. Commercial bearings do not have ball retainers, and consequently the balls will contact each other during operation and are a source of conveyor noise. Commercial grade bearing styles include:

- **Plated Steel Bearings / Metal Stamped and Plastic Housings**
- **Stainless Steel Bearings / Plastic Housings**

ABEC-1 Precision

ABEC-1 precision bearings are most suitable for moderate to heavy loads and higher speeds. These bearings have hardened and ground balls and raceways with a ball retainer, and are grease packed at the factory. Several seal or shield options including Contact Rubber Seals (2RS) and Non-Contact Rubber Seals (LLB), or Non-Contact Metal Shields (ZZ) are available to help retain the grease and isolate the bearings from contaminants. ABEC-1 bearings are quiet and typically have a significantly longer life than commercial bearings. Ralphs-Pugh ABEC-1 bearing inserts are available in the following configurations:

- **Plastic Housing with Labyrinth Seal**
Provides the highest level of protection from exposure to contaminants.
- **Plastic Housing without Labyrinth Seal**
- **Stamped Plated Steel Housing (Metal Tubes Only)**
*When plastic housings should not be used due to higher loads.
Should be swaged into the tube for optimum performance.*
- **Machined Steel Housing (Metal Tubes Only)**
*Designed for heavier loads. Ideal for SNUBBER and BELT WRAP Roller Applications.
Welded Into the Tube.*

Bushings:

Non-ball bearing bushing units are designed for light to medium loads conveyed at low speeds. Typically bushings are used in push and gravity conveyors. They are ideal for sanitary, rust and corrosion resistant, low maintenance wet or dry applications. Bushing inserts are available in Ultra (Acetal plastic with internal Teflon lubricants), CS2 Acetal, UHMW, and ABS plastic. Bushing adapters are available in nylon, stainless steel, carbon steel, and Ultra. Bushings are identified with a 5 Prefix in the part number. Example - 5B5

Definition of terms and dimensions used in bearing descriptions in this section:

A Dim: Outside diameter of the flange

B Dim: Outside diameter of the body

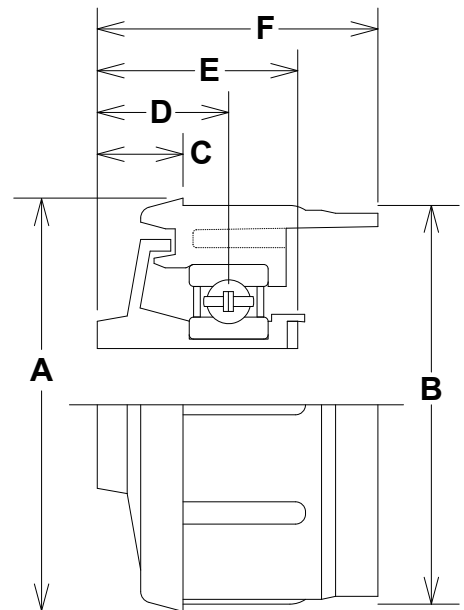
C Dim: Distance from the hub to the backside of the flange (bearing offset)

D Dim: Distance from the hub to the centerline of the ball complement

E Dim: Distance from the front to the back of the hub

F Dim: Total length

Bore: Size and configuration (hexagonal or round) of the bore



Bearing: ABEC-1 precision or commercial non-precision bearing used in a bearing insert. Load rating for bearing is not roller load rating. Please refer to specific roller pages for roller load capacity.

Bearing BDLR: Basic Dynamic Load Rating of the ABEC-1 precision bearing: Load at which 90% of a group of bearings will still be successfully spinning at 600 RPM after 1,000,000 revolutions.

Bearing Load Rating: Load rating for commercial bearings at 600 rpm. Determined utilizing the number of balls in the bearing and their size. This load rating is not the roller load rating. Please refer to a specific roller page for the roller load capacity.

Races: These refer to the inner and outer surfaces the balls ride on. Precision ball bearing races utilize bearing quality steel. This material is then heat-treated to uniform hardness and ground to a micro-finish. Non-precision ball bearing races are made with hardened steel that provide an economical and smooth finish.

Balls: Balls in non-precision bearings are manufactured from hardened steel. These balls are then loaded into the raceway utilizing a full compliment of “loose” balls. Precision balls are made of hardened chrome alloy steel and separated in the raceway with a ball retainer or cage. This “cage” separates the balls, which greatly minimizes the noise and contact friction between adjacent balls. This also permits higher operating speeds.

Bearing Seals and Shields: Precision bearings are produced with seals or shields.

Seals: Seals are normally made of rubber and can be a “Contact Seal (2RS)” or “Non-Contact Seal (LLB)”. Both types of seals are generally in contact with the outer raceway, however, the **Contact Seal (2RS)** will also come into contact with the inner race of the bearing. Therefore, while offering a higher degree of contamination resistance versus a shielded bearing, this seal will also cause increased frictional torque.

The **Non-Contact Seal (LLB)** consists of a synthetic rubber bonded onto a steel backing ring, which is fastened to the outer race for positive sealing. Both sides of the seal edge are provided with corrugations to create an alternating series of wide and narrow gaps along the inner ring V-groove seal surface. This causes a complete labyrinth effect. The frictional torque on this bearing is low, it can be safely used in dusty environments, and is excellent for powered applications.

Non-Contact Shields (ZZ) are metallic shields press fit into the outer ring to keep foreign objects from getting into the bearing. This is a general purpose, prelubricated bearing with low frictional torque, and is widely used in both gravity and powered applications.

Labyrinth Seal: A series of intricate passageways manufactured into the plastic bearing housing designed to prevent foreign materials and contaminants from getting into the balls and raceways.

Service Life: The life of a bearing is dependent on numerous factors; load, speed, temperature, humidity, airborne contaminants, bearing materials, and lubricants. Load duration and shock loading also affect service life. Precision bearings are affected differently than commercial bearings and each factor should be considered when selecting a bearing or bearing unit. In applications where chemicals are a factor, the proper selection of engineered plastics and bearing material is critical.



Static Electricity

Static electricity is the release of stored electricity created by the sliding, rubbing, turning or separating of material that generates electrostatic voltages. Plastics, fiberglass, rubber, textiles, etc. are prime generators of static electricity, and under certain conditions can build up to 30,000-40,000 volts.

When an electrostatic charge occurs in an insulating material, the built-up charge tends to remain in the local area of contact. It will discharge in the form of an arc or spark when the material comes in contact with a body at a sufficiently different potential, such as a person or microcircuit. If electrostatic discharge (ESD) occurs to a person, the result can range from a mild to very painful shock. In extreme cases, ESD can cause loss of life. ESD can also trigger explosions or fire in any environment containing flammable liquids, solids, or gasses. Since conveyor rollers are often used in these environments it is critical that they provide a means to safely dissipate the electrical charge.

Plastic parts and components are classified as insulating materials having typical surface resistivity of $10^{16} - 10^{17}$ ohms/sq. Most electrically conductive plastics today contain insulating base resins and conductive fillers or reinforcing agents to provide for static electricity dissipation. Electrically conductive plastics are defined as:

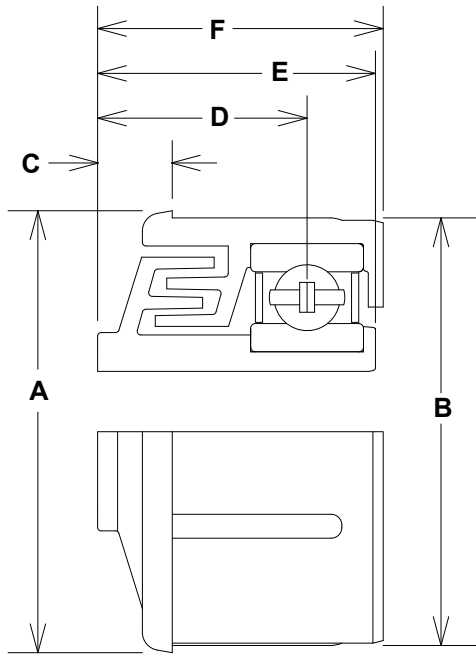
- Dissipative Composites - $10^5 - 10^{11}$ ohms/sq resistivity
- Conductive Composites - $10^2 - 10^4$ ohms/sq resistivity
- ESD Shielding Composites - $10^{-4} - 10^1$ ohms/sq resistivity

Engineered Plastics Data:

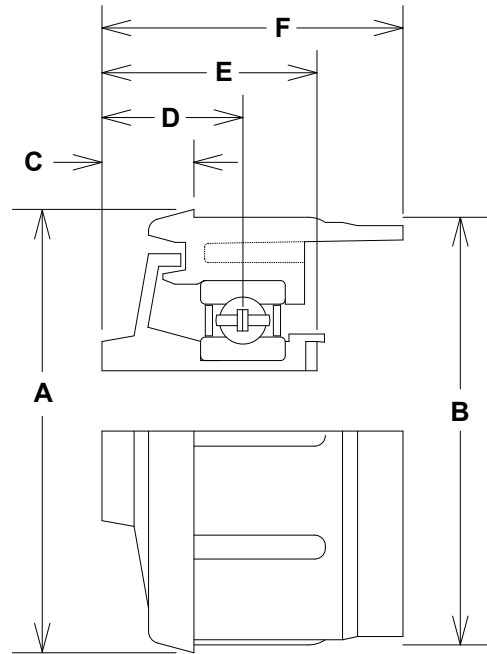
	Non-Conductive Polypropylene	Conductive Polypropylene	Non-Conductive Acetal	Conductive Acetal
Bearing Parts	Housings (On Request)	Housings (STANDARD)	Housings (On Request)	Housings (On Request)
	Internal Parts (On Request)	Internal Parts (On Request)	Internal Parts (On Request)	Internal Parts (STANDARD)
Chemical Resistance	Excellent	Excellent	Inquire	Inquire
FDA Approved	Yes	No	Yes	No
Normal Operating Temperatures *	$10 - 150\text{ }^{\circ}\text{F} *$	$10 - 150\text{ }^{\circ}\text{F} *$	$10 - 200\text{ }^{\circ}\text{F} *$	$10 - 200\text{ }^{\circ}\text{F} *$
Surface Resistivity (Ohms)	$10^{13} - 10^{16}$	$10^3 - 10^6$	$10^{13} - 10^{16}$	$10^3 - 10^6$

* Assumes no shock loading.

ABEC-1 Precision / Plastic Housing with Labyrinth Seals



2 LABYRINTH SEALS



1 LABYRINTH SEAL

• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

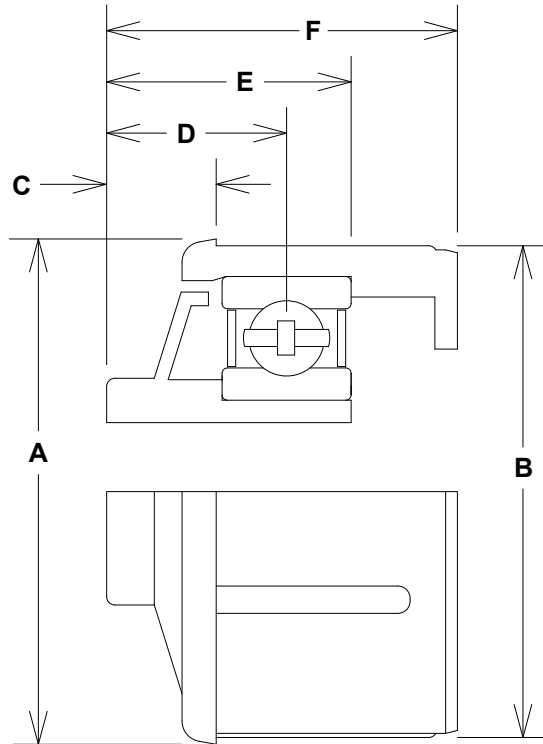
Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	F Dim	Bore*	Standard Bearing **	# of lab seals	Bearing BDLR
3M8	1.36	1.28	0.22	0.54	0.80	0.81	7/16 HEX	6902	1	906
3M3	1.36	1.28	0.22	0.56	0.80	0.97	5/16 HEX	R8	2	1010
3A8	1.49	1.38	0.25	0.59	0.90	0.98	7/16 HEX	6002	2	1260
3H0	1.61	1.50	0.25	0.59	0.90	1.08	7/16 HEX	6002	2	1260
3A9	1.64	1.53	0.25	0.59	0.90	1.13	7/16 HEX	6002	2	1260
3D6	1.73	1.62	0.25	0.59	0.90	1.13	7/16 HEX	6002	2	1260
3W8	1.86	1.75	0.39	0.59	0.90	1.26	7/16 HEX	6002	1	1260
3A1	1.87	1.68	0.25	0.59	0.90	1.13	7/16 HEX	6002	2	1260
3RP	1.87	1.77	0.38	0.59	0.88	0.95	7/16 HEX	6002	1	1260
3H5	1.87	1.77	0.25	0.59	0.90	1.13	7/16 HEX	6002	2	1260
3A6	1.87	1.77	0.31	0.86	1.16	1.19	7/16 HEX	6203	2	2150
3A0	1.87	1.77	0.31	0.86	1.22	1.23	5/16 HEX	6203	2	2150
3W6	1.98	1.87	0.39	0.59	0.90	1.26	7/16 HEX	6002	1	1260
3E0	1.97	1.87	0.31	0.86	1.16	1.19	7/16 HEX	6203	2	2150
3W10	2.07	1.87	0.39	0.59	0.90	1.26	7/16 HEX	6002	1	1260
3K3	2.48	2.33	0.25	0.59	0.90	1.13	7/16 HEX	6002	2	1260
3B8	2.45	2.33	0.31	0.86	1.16	1.20	7/16 HEX	6203	2	2150
3J7	2.45	2.26	0.31	0.93	1.38	1.38	5/8 HEX	6205	2	3150
3B9	2.45	2.26	0.31	0.93	1.38	1.38	11/16 HEX	6205	2	3150
3K4	2.98	2.76	0.31	0.93	1.38	1.38	11/16 HEX	6205	2	3150
3E6	3.45	3.33	0.31	0.93	1.38	1.38	11/16 HEX	6205	2	3150
3D4	3.45	3.26	0.31	0.93	1.38	1.38	11/16 HEX	6205	2	3150

* Other bore configurations available upon request - inquire with customer service

** Other bearing seal/shield configurations available upon request - inquire with customer service

*** Bearing dimensions and configurations subject to change without notification

ABEC-1 Precision / Plastic Housings without Labyrinth Seals



NO LABYRINTH SEAL

• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

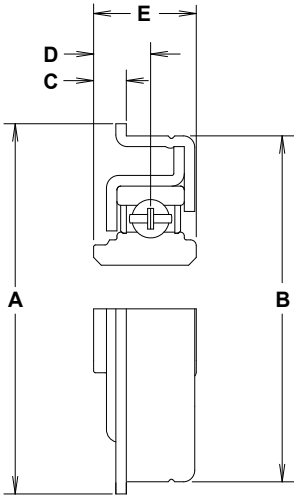
Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	F Dim	Bore*	Bearing**	Bearing BDLR
3W7	1.66	1.53	0.23	0.35	0.69	0.69	7/16 HEX	6002	1260
3W1	1.87	1.77	0.39	0.65	0.89	1.30	7/16 HEX	6203	2150
3W2	1.87	1.77	0.39	0.65	0.89	1.30	5/16 HEX	6203	2150
3W3	2.45	2.33	0.39	0.65	0.89	1.30	7/16 HEX	6203	2150

* Other bore configurations available upon request - inquire with customer service

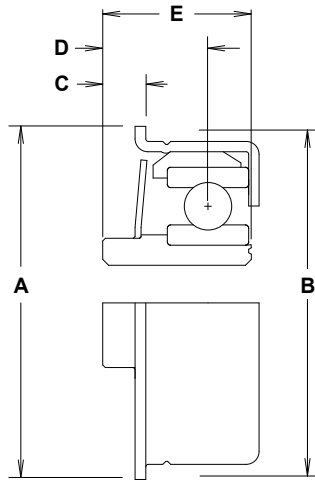
** Other bearing seal/shield configurations available upon request - inquire with customer service

*** Bearing dimensions and configurations subject to change without notification

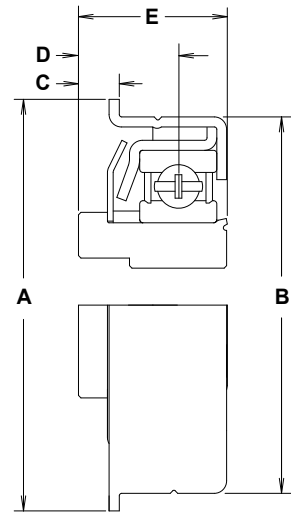
ABEC-1 Precision / Plated Steel / Stamped Metal Housings



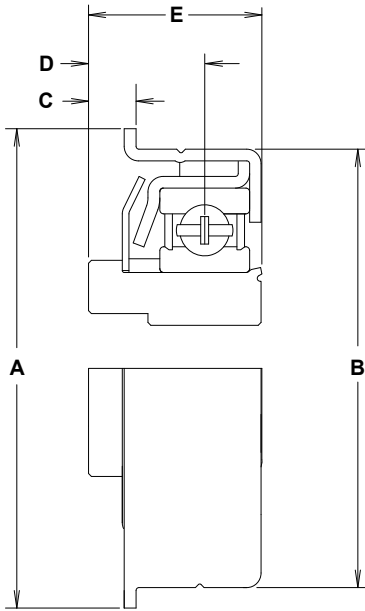
33RP



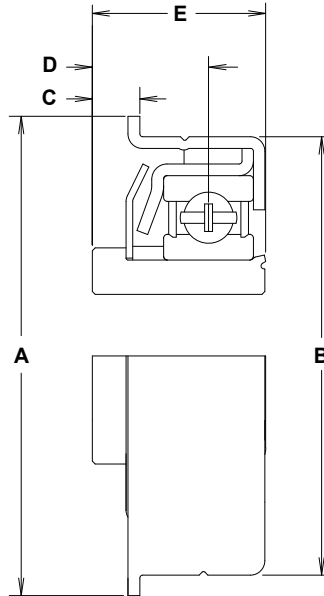
33W10



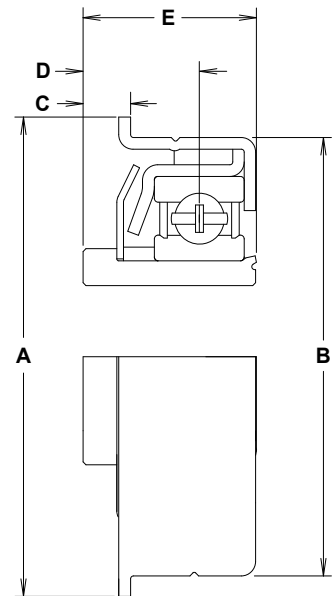
33B8



33C8



33J7



33W9

• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

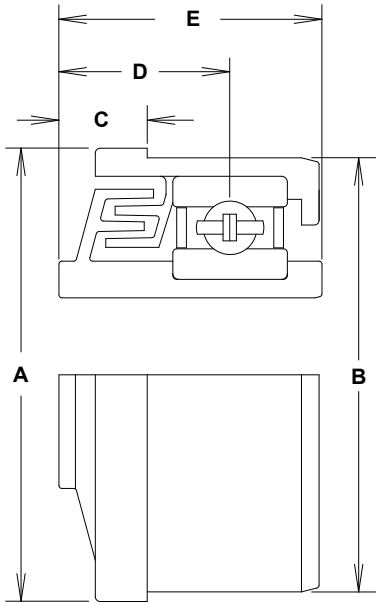
Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	Bore	Bearing	Bearing BDLR
33RP	1.90	1.78	0.17	0.30	0.54	7/16 HEX	6002 LLB	960
33W10	2.05	1.88	0.25	0.30	0.91	7/16 HEX	6203 LLB	1650
33B8	2.45	2.34	0.25	0.61	0.91	7/16 HEX	6005 LLB	1740
33C8	2.45	2.27	0.25	0.61	0.91	7/16 HEX	6005 LLB	1740
33J7	2.45	2.27	0.25	0.61	0.91	5/8 HEX	6005 LLB	1740
33W9	2.45	2.27	0.25	0.61	0.91	11/16 HEX	6005 LLB	1740

LLB = Non-contact rubber seals

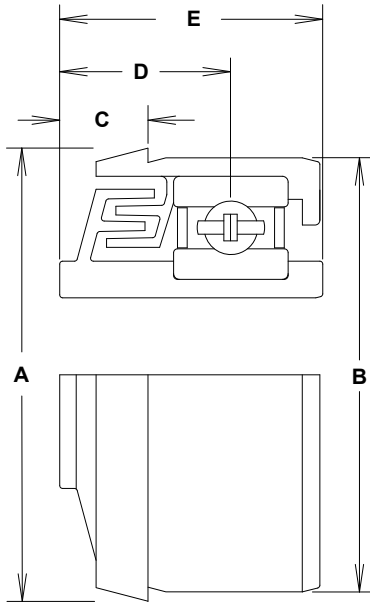
Swaging of tube ends is recommended for bearing retention

Drawings not to scale

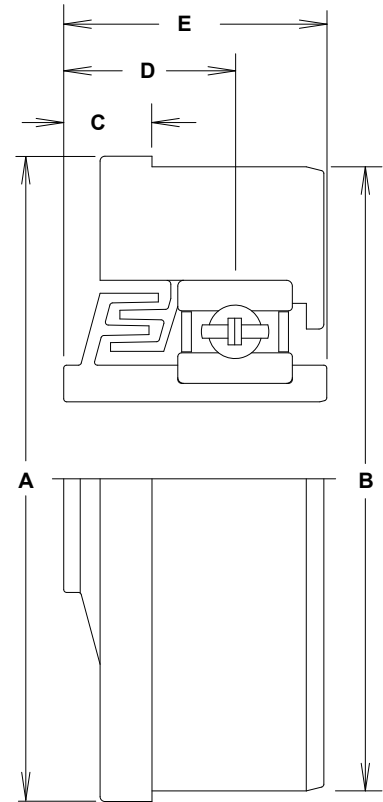
ABEC-1 Precision / Machined Metal Housings



34B9



35B9



34D4

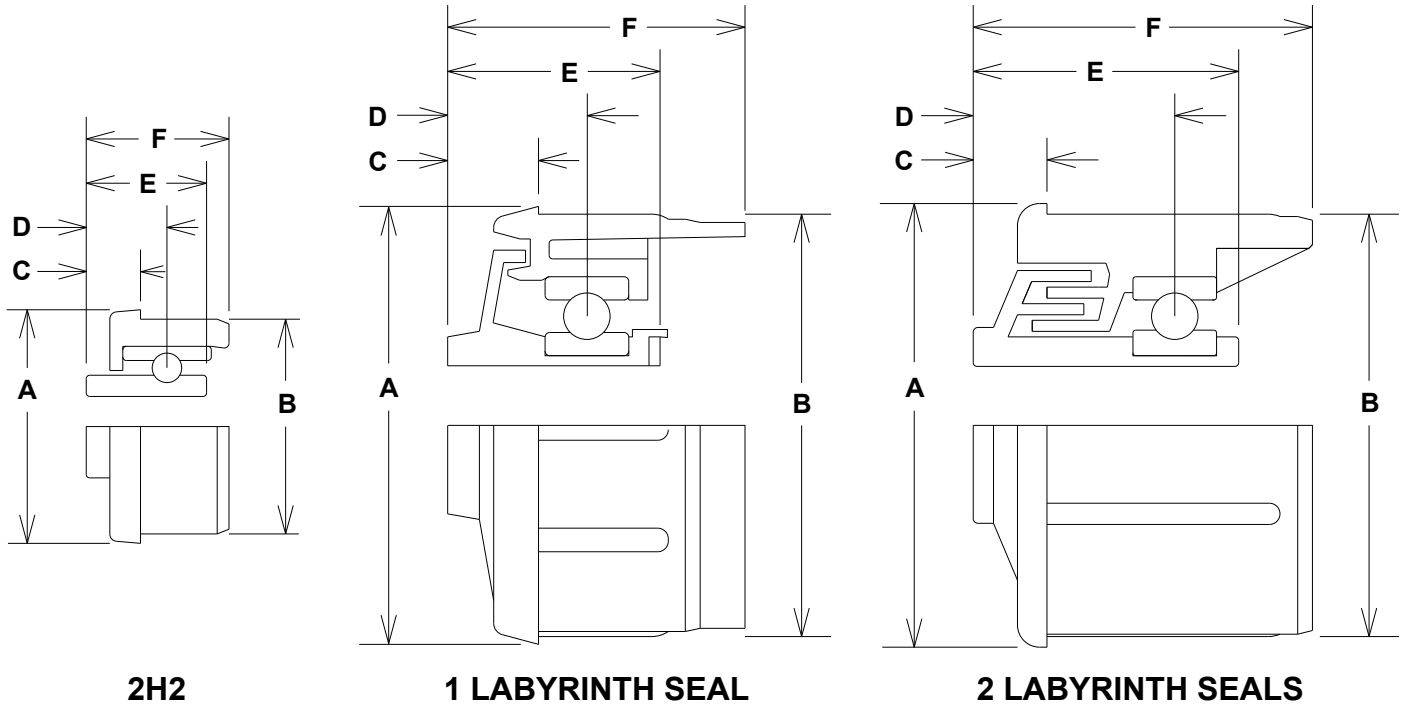
• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	Bore *	Bearing	Bearing BDLR
34B9	2.36	2.26	0.46	0.89	1.37	11/16 hex	6205 LLB	3150
35B9	2.36	2.26	0.46	0.89	1.37	11/16 hex	6205 LLB	3150
34D4	3.36	3.25	0.46	0.89	1.37	11/16 hex	6205 LLB	3150

* Bearing dimensions and configurations subject to change without notification LLB = Non-contact rubber seals

- Also available in 20MM round, 3/4" round and 5/8" hex bores. Inquire with customer service.
- Machined metal housings are typically welded into metal tubes.
- The ABEC-1 bearings are covered with a conductive plastic double labyrinth seal system.
- Ideal for heavy duty snubber and belt wrap areas in conveyor systems.

Commercial Grade / Plated Steel / Plastic Housing



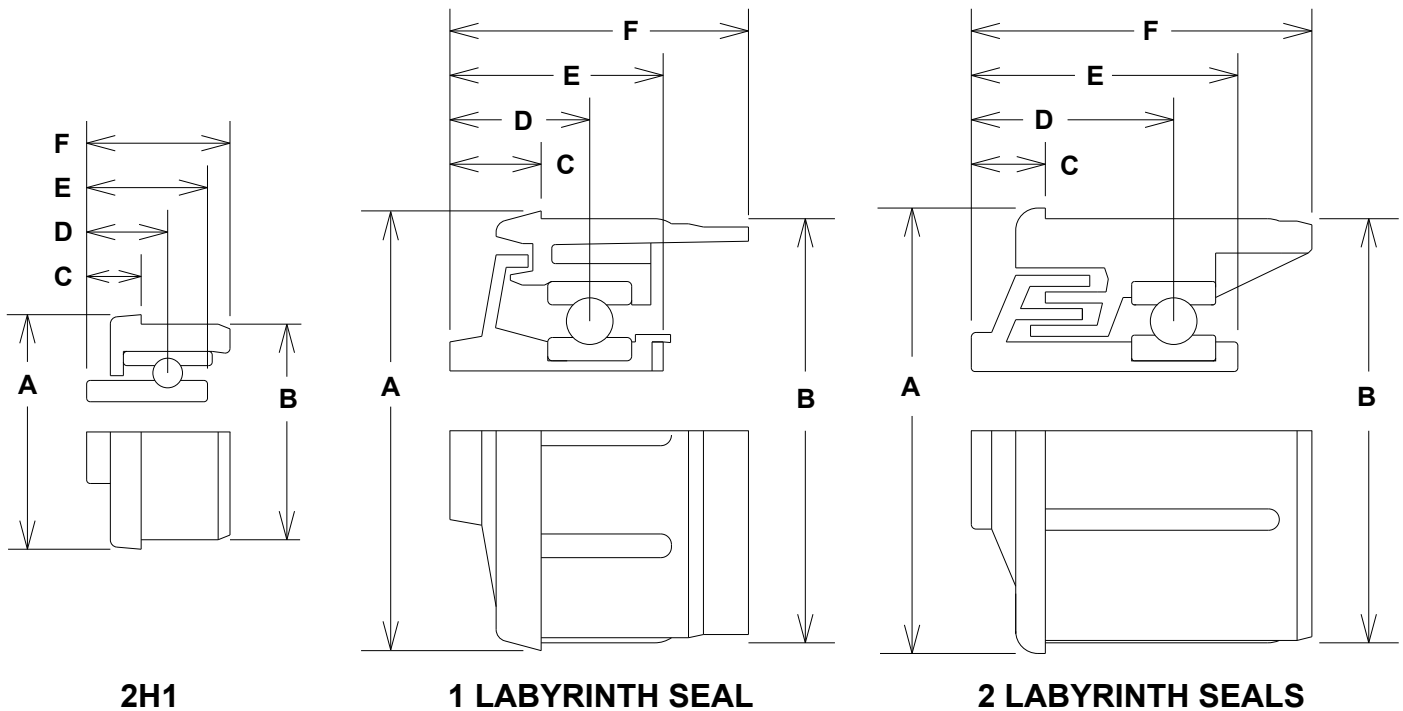
• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	F Dim	# of Lab Seals	Bore*	Bearing Load Rating
2H2	0.98	0.93	0.19	0.35	0.50	0.68	0	1/4 round	31
2P7	1.49	1.38	0.25	0.59	0.90	0.98	2	7/16 hex	120
2N7	1.61	1.50	0.25	0.59	0.90	1.08	2	7/16 hex	120
2O3	1.64	1.53	0.25	0.59	0.90	1.13	2	7/16 hex	120
2O1	1.73	1.62	0.25	0.59	0.90	1.13	2	7/16 hex	120
2U3	1.86	1.75	0.39	0.59	0.90	1.26	1	7/16 hex	120
2A8	1.87	1.68	0.25	0.59	0.90	1.13	2	7/16 hex	120
2U8	1.87	1.77	0.39	0.59	0.90	1.26	1	7/16 hex	120
2A6	1.87	1.77	0.25	0.59	0.90	1.13	2	7/16 hex	120
2U1	1.98	1.87	0.39	0.59	0.90	1.26	1	7/16 hex	120
2U5	2.07	1.87	0.39	0.59	0.90	1.26	1	7/16 hex	120
2C8	2.23	2.12	0.25	0.59	0.90	1.13	2	7/16 hex	120
2D5	2.48	2.33	0.25	0.59	0.90	1.13	2	7/16 hex	120

* Other bore configurations available upon request - Inquire with customer service

** Bearing dimensions and configurations subject to change without notification

Commercial Grade / Stainless Steel / Plastic Housing



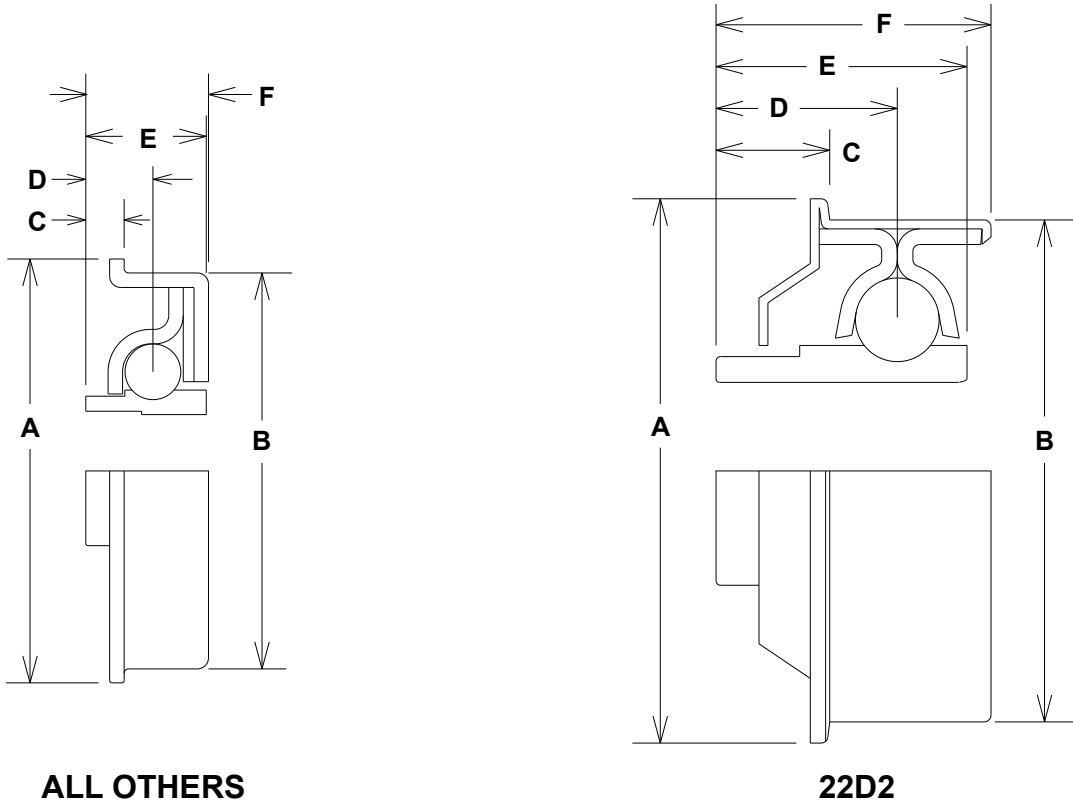
• SEE PAGE 14 FOR RECOMMENDED INSTALLATION & TUBE PREPARATION INFORMATION •

Bearing #	A dim	B Dim	C Dim	D Dim	E Dim	F Dim	# of Lab Seals	Bore*	Bearing Load Rating
2H1	0.98	0.93	0.19	0.35	0.50	0.68	0	1/4 ROUND	31
2O5	1.49	1.38	0.25	0.59	0.90	0.98	2	7/16 HEX	87
2N8	1.61	1.50	0.25	0.59	0.90	1.08	2	7/16 HEX	87
2O4	1.64	1.53	0.25	0.59	0.90	1.13	2	7/16 HEX	87
2O8	1.73	1.62	0.25	0.59	0.90	1.13	2	7/16 HEX	87
2U4	1.86	1.75	0.39	0.59	0.90	1.26	1	7/16 HEX	87
2R3	1.87	1.68	0.25	0.59	0.90	1.13	2	7/16 HEX	87
2U9	1.87	1.77	0.39	0.59	0.90	1.26	1	7/16 HEX	87
2A7	1.87	1.77	0.25	0.59	0.90	1.13	2	7/16 HEX	87
2U2	1.98	1.87	0.39	0.59	0.90	1.26	1	7/16 HEX	87
2U6	2.07	1.87	0.39	0.59	0.90	1.26	1	7/16 HEX	87
2C0	2.23	2.12	0.25	0.59	0.90	1.13	2	7/16 HEX	87
2E3	2.48	2.33	0.25	0.59	0.90	1.13	2	7/16 HEX	87

* Other bore configurations available upon request - Inquire with customer service

** Bearing dimensions and configurations subject to change without notification

Commercial Grade / Plated Steel / Metal Housing



ALL OTHERS

22D2

Bearing #	A Dim	B Dim	C Dim	D Dim	E Dim	F Dim	Bore	Bearing Load Rating
22G4	1.00	0.91	0.13	0.25	0.38	0.38	5/16 Hex	25
22L4	1.25	1.13	0.22	0.41	0.57	0.56	5/16 Hex	45
22L2	1.25	1.13	0.12	0.27	0.43	0.43	1/4 Round	45
22M2	1.38	1.28	0.22	0.16	0.56	0.56	1/4 Round	47
22M4	1.38	1.28	0.22	0.38	0.56	0.56	5/16 Hex	47
22S4	1.38	1.26	0.25	0.49	0.70	0.71	7/16 Hex	198
22R1	1.75	1.63	0.15	0.31	0.53	0.55	7/16 Hex	135
22A8	1.80	1.71	0.22	0.45	0.72	0.72	7/16 Hex	428
22A6	1.90	1.78	0.17	0.33	0.53	0.55	7/16 Hex	135
22J5	1.90	1.67	0.17	0.31	0.53	0.53	7/16 Hex	135
22D2	2.44	2.27	0.47	0.81	1.15	1.22	11/16 Hex	290

* Other bore configurations available upon request - Inquire with customer service

** Bearing dimensions and configurations subject to change without notification

Installation Recommendations for Bearing Units with Plastic Housings

Preparation

The inside of all tubes must be deburred.

Installation

- Scuffing must be avoided – Scuffing is indicated by a build up of “shredded” or “rolled up “ plastic between the flange of the bearing and the end of the tube.
- Bearing unit should be pressed into the tube with a device that conforms to the face of the unit to exert even pressure.
- Avoid excessive and non-uniform pressure on any one component.
- Bearing units should not have any preload from spring and crimp positioning.
- Shaft should have 1/16” to 1/8” free play before contacting bearing.
- Swaging the tube ends approximately 0.020” overall should be sufficient for retaining the bearing housing.
- Tube diameter decreases in excess of 0.030” are not recommended.
- Each completed roller should be test spun to assure smooth operation.

Any deviation from the recommended practices and procedures should be carefully evaluated.