CANADIAN BABBITT BEARINGS LTD.

Engineered Bearing Solutions

Zincaloy™ ZA12 Series
Standard Sleeve Bearings

ZA12 Sleeve Bearings

ZA12 bearings are the cost effective alternative to traditional SAE-660 bronze sleeve bearings

- **RESILIENCE** - Protects bearing housings from deformation due to pounding.
- **BETTER DRY RUNNING PROPERTIES** - Resists damage to shaft if lubrication fails.
- **LOW COEFFICIENT OF FRICTION**
- **BETTER MECHANICAL PROPERTIES** - Especially strength, toughness and hardness.
- **BETTER DAMPENING PROPERTIES** - Absorbs impact energy well to reduce vibration.
- **HIGHER TOLERANCE OF FOREIGN SUBSTANCES** - Ability to absorb foreign particles to avoid shaft damage.
- **LIGHTER WEIGHT** - 32% Lighter.
- **FREE MACHINING** - Excellent surface finish.
- **LONGER BEARING LIFE**
- **LEAD FREE**

The Cost Effective Alternative to Bronze

ZA12 Sleeve Bearings

ZA-12 Bearings are stocked in semi-finished state for fast delivery to specific sizes

Stock sizes range from 0.625” O.D. through to 9” O.D. in 0.125” increments for small diameters to 0.25” increments for larger sizes

As cast hollow stock sizes include a 1/8 inch machining allowance on the I.D. and O.D. i.e. a 5 x 6 inch hollow is actually 4-7/8 inches x 6-1/8 inches, which is designed to finish to 5 x 6 inches. The ZA-12 hollow stock sizes are listed in finished sizes.

ZA-12 Bearing Stock is manufactured at our Zincaloy™ continuous casting facility in Mississauga Ontario.

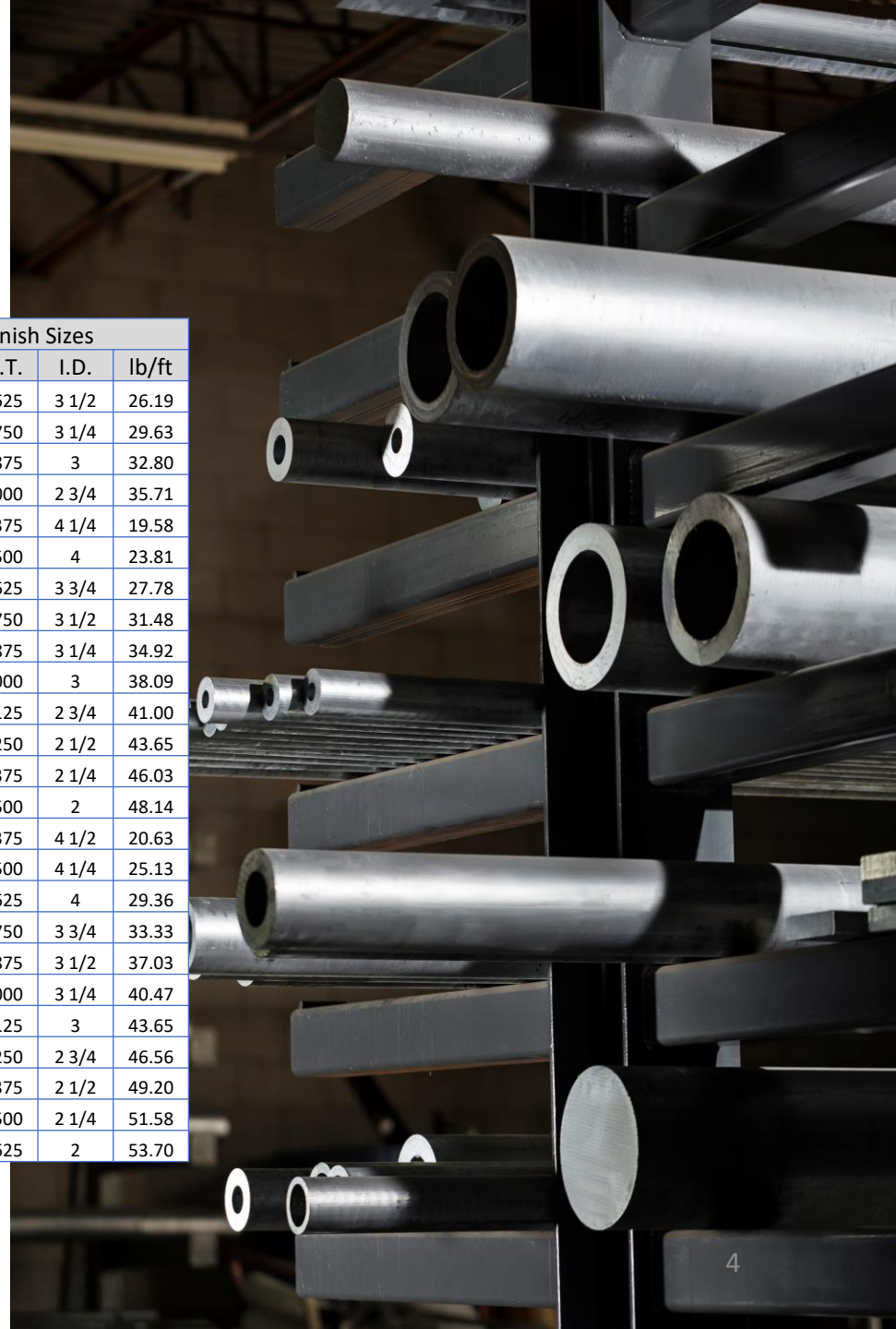
ZA12 Hollow Stock Sizes

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
1 1/2	0.250	1	3.97
1 3/4	0.375	1	5.82
	0.500	3/4	6.61
2	0.250	1 1/2	5.56
	0.375	1 1/4	6.88
	0.500	1	7.94
2 1/4	0.250	1 3/4	6.35
	0.375	1 1/2	7.94
	0.500	1 1/4	9.26
	0.563	1 1/8	9.82
	0.625	1	10.32
2 1/2	0.250	2	7.14
	0.375	1 3/4	8.99
	0.500	1 1/2	10.58
	0.625	1 1/4	11.90
	0.688	1 1/8	12.47
	0.750	1	12.96
2 3/4	0.250	2 1/4	7.94
	0.375	2	10.05
	0.500	1 3/4	11.90
	0.625	1 1/2	13.49
	0.750	1 1/4	14.81
	0.875	1	15.87

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
3	0.250	2 1/2	8.73
	0.375	2 1/4	11.11
	0.500	2	13.23
	0.625	1 3/4	15.08
	0.750	1 1/2	16.67
	0.875	1 1/4	17.99
	1.000	1	19.05
3 1/4	0.250	2 3/4	9.52
	0.375	2 1/2	12.17
	0.500	2 1/4	14.55
	0.625	2	16.67
	0.750	1 3/4	18.52
	0.875	1 1/2	20.10
	1.000	1 1/4	21.43
3 1/2	0.375	2 3/4	13.23
	0.500	2 1/2	15.87
	0.625	2 1/4	18.25
	0.750	2	20.37
	0.875	1 3/4	22.22
	1.000	1 1/2	23.81
	1.125	1 1/4	25.13
	1.250	1	26.19
3 3/4	0.375	3	14.28
	0.500	2 3/4	17.19
	0.625	2 1/2	19.84

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
3 3/4	0.725	2 1/4	22.22
	0.875	2	24.34
	1.000	1 3/4	26.19
4	0.375	3 1/4	15.34
	0.500	3	18.52
	0.625	2 3/4	21.43
	0.750	2 1/2	24.07
	0.875	2 1/4	26.45
	1.000	2	28.57
4 1/4	0.375	3 1/2	16.40
	0.500	3 1/4	19.84
	0.625	3	23.01
	0.750	2 3/4	25.92
	0.875	2 1/2	28.57
	1.000	2 1/4	30.95
4 1/2	0.375	3 3/4	17.46
	0.500	3 1/2	21.16
	0.625	3 1/4	24.60
	0.750	3	27.78
	0.875	2 3/4	30.69
	1.000	2 1/2	33.33
	1.125	2 1/4	35.71
	1.250	2	37.83
4 3/4	0.375	4	18.52
	0.500	3 3/4	22.49

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
4 3/4	0.625	3 1/2	26.19
	0.750	3 1/4	29.63
	0.875	3	32.80
	1.000	2 3/4	35.71
5	0.375	4 1/4	19.58
	0.500	4	23.81
	0.625	3 3/4	27.78
	0.750	3 1/2	31.48
	0.875	3 1/4	34.92
	1.000	3	38.09
	1.125	2 3/4	41.00
	1.250	2 1/2	43.65
	1.375	2 1/4	46.03
	1.500	2	48.14
5 1/4	0.375	4 1/2	20.63
	0.500	4 1/4	25.13
	0.625	4	29.36
	0.750	3 3/4	33.33
	0.875	3 1/2	37.03
	1.000	3 1/4	40.47
	1.125	3	43.65
	1.250	2 3/4	46.56
	1.375	2 1/2	49.20
	1.500	2 1/4	51.58
	1.625	2	53.70



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ZA12 Hollow Stock Sizes

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
5 1/2	0.375	4 3/4	21.69
	0.500	4 1/2	26.45
	0.625	4 1/4	30.95
	0.750	4	35.18
	0.875	3 3/4	39.15
	1.000	3 1/2	42.85
	1.125	3 1/4	46.29
	1.250	3	49.47
	1.375	2 3/4	52.38
	1.500	2 1/2	55.02
5 3/4	0.500	4 3/4	27.78
	0.625	4 1/2	32.54
	0.750	4 1/4	37.03
	0.875	4	41.27
	1.000	3 3/4	45.23
	1.125	3 1/2	48.94
	1.250	3 1/4	52.38
	1.375	3	55.55
	1.500	2 3/4	58.46
6	0.500	5	29.10
	0.625	4 3/4	34.12
	0.750	4 1/2	38.89
	0.875	4 1/4	43.38
	1.000	4	47.62
	1.125	3 3/4	51.58

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
6	1.250	3 1/2	55.29
	1.375	3 1/4	58.73
	1.500	3	61.90
	1.725	2 1/2	67.46
6 1/4	0.500	5 1/4	30.42
	0.625	5	35.71
	0.750	4 3/4	40.74
	0.875	4 1/2	45.50
	1.000	4 1/4	50.00
	1.125	4	54.23
	1.250	3 3/4	58.20
	1.375	3 1/2	61.90
	1.500	3 1/4	65.34
6 1/2	0.500	5 1/2	31.74
	0.750	5	42.59
	0.875	4 3/4	47.62
	1.000	4 1/2	52.38
	1.125	4 1/4	56.87
	1.250	4	61.11
	1.375	3 3/4	65.07
	1.500	3 1/2	68.78
6 3/4	0.500	5 3/4	33.07
	0.625	5 1/2	38.89
	0.750	5 1/4	44.44
	0.875	5	49.73

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
6 3/4	1.000	4 3/4	54.76
	1.125	4 1/2	59.52
	1.250	4 1/4	64.02
	1.375	4	68.25
	1.500	3 3/4	72.22
7	0.500	6	34.39
	0.750	5 1/2	46.29
	1.000	5	57.14
	1.250	4 1/2	66.93
	1.500	4	75.66
7 1/4	0.500	6 1/4	35.71
	0.750	5 3/4	48.14
	1.000	5 1/4	59.52
	1.250	4 3/4	69.84
	1.500	4 1/4	79.09
7 1/2	0.500	6 1/2	37.03
	0.750	6	50.00
	1.000	5 1/2	61.90
	1.250	5	72.75
	1.500	4 1/2	82.53
7 3/4	0.500	6 3/4	38.36
	0.750	6 1/4	51.85
	1.000	5 3/4	64.28
	1.250	5 1/4	75.66
	1.500	4 3/4	85.97

Finish Sizes			
O.D.	W.T.	I.D.	lb/ft
8 1/4	0.500	7 1/4	41.00
	0.750	6 3/4	55.55
	1.250	5 3/4	81.48
	1.500	5 1/4	92.85
	1.750	4 3/4	103.17
	2.625	3	130.94
8 1/2	0.500	7 1/2	42.32
	0.750	7	57.40
	1.000	6 1/2	71.42
	1.250	6	84.39
	1.500	5 1/2	96.29
	1.750	5	107.13
8 3/4	0.500	7 3/4	43.65
	0.875	7	66.66
	1.500	5 3/4	99.73
	1.875	5	116.39
9	0.500	8	44.97
	0.625	7 3/4	53.17
	0.750	7 1/2	61.11
	1.000	7	76.18
	1.250	6 1/2	90.20
	1.500	6	103.17
	1.625	5 3/4	109.25
	1.750	5 1/2	115.07
	2.000	5	125.92

For diameters in excess of 9 in. and technical support please contact CBB

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ZA12 Properties

CHEMICAL COMPOSITION wt. % ASTM B86 ZA12			
Al	Cu	Mn	Zn
10.5 - 11.5	0.5 - 1.2	0.015 - 0.030	Balance

ZA12 As Cast Properties		
PROPERTY	English	Metric
Tensile Strength (ksi) (Mpa)	61-69	420.6-475.7
Yield Strength - 0.2% offset (ksi) (Mpa)	45-58	310.3-400.0
Elongation (%)	1-4	1-4
Hardness (BHN @ 250 kg load - 5mm ball)	130-150	130-150
Density (lb/in.3) (g/cm.3)	0.218	6.034

CBB CANADIAN BABBITT BEARINGS LTD.

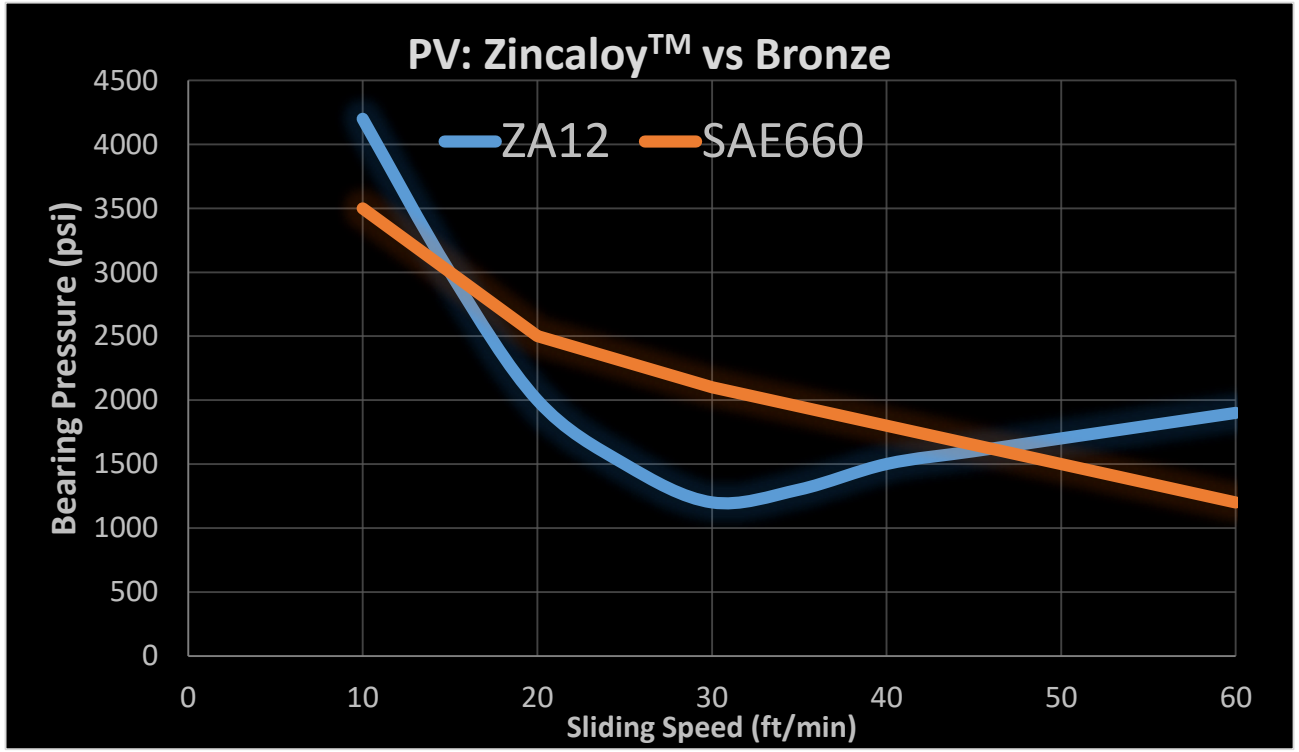
ZA12 Comparison

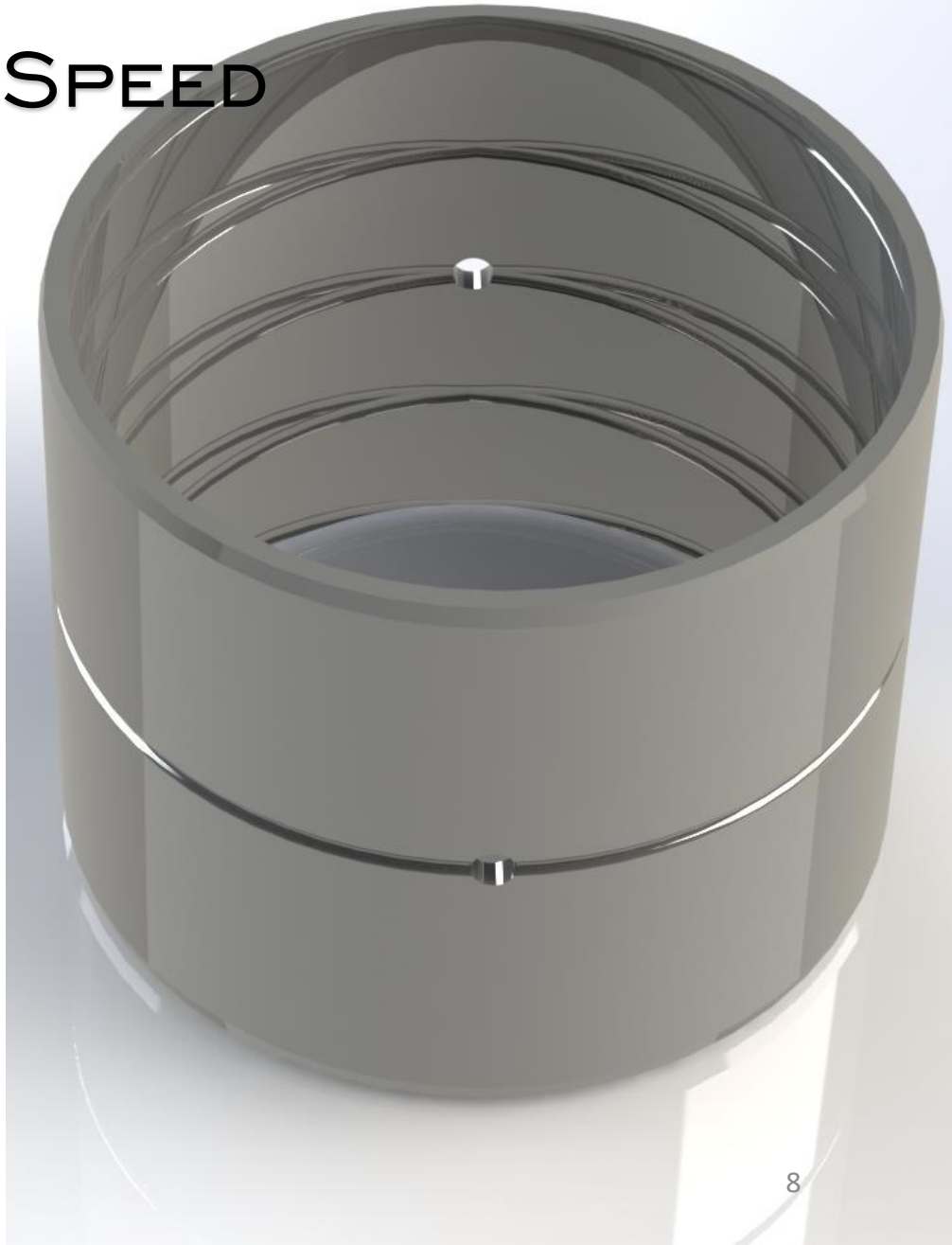
ZA12 Bearings are reliable alternatives to Bronze and Aluminum Bronzes with very low sensitivity to pounding, lack of lubrication and contamination

ZA12 vs Bronze vs Aluminum Bronze	ZA12		Bronze SAE 660		Aluminum Bronze 954	
PROPERTY	English	Metric	English	Metric	English	Metric
Ultimate Tensile Strength (psi) (Mpa)	65,000	448	35,000	241	85,000	586
Yield Strength (psi) (Mpa)	50,000	345	20,000	138	32,000	221
Elongation (%)	2	2	10	10	12	12
Hardness (BHN)	130	130	60	60	170	170
Density (lb/in.3) (g/cm.3)	0.218	6.034	0.322	8.913	0.269	7.446
Melting Range (ºF) (ºC)	710-810	377-432	1570-1790	854-977	1880-1990	1027-1088
Electrical Conductivity (%IACS) (MSm^{-1})	28	0.00048	12	0.00021	13	0.00022
Thermal Conductivity (BTU/ft-hr-ºF) [W/(m*K)]	67	115.88	34	58.80	35	60.54
Coef. of Thermal Expansion (µin/in/ºF) (µm/m/ºC)	13	23.4	10	18	9	16.2

Bearing Pressure vs Sliding Speed

ZA12 bearings can be substituted for SAE-660 bronze bearings in most cases without any design changes. Guidelines only differ in relation to press fits and clearances at elevated temperatures





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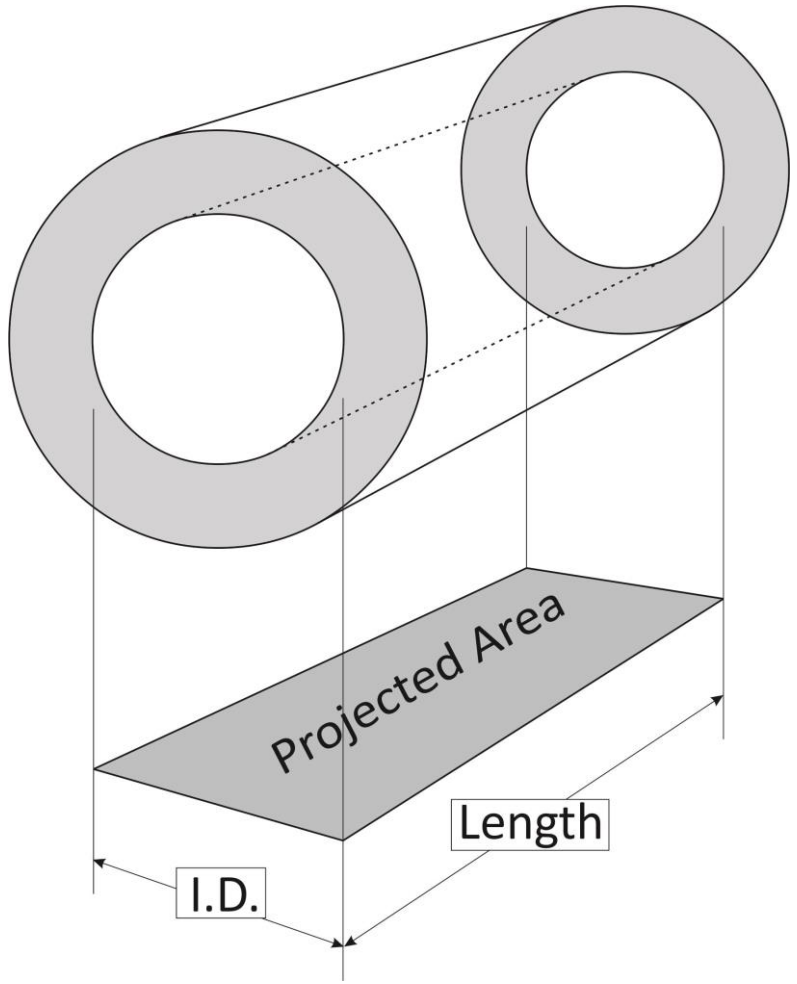
Bearing Pressure Calculation

ZA12 stock is suitable for bearing use under the following operating conditions: Maximum pressure on the bearing at a low shaft rotation speed (less than 10 ft/min surface speed) should be kept between 4500 and 6000 psi. As shaft speed increases to 60 ft/min and beyond, the recommended operating pressure decreases to about a 1000 psi. ZA12 bearings can operate well at very high speeds under low loads as long as the heat generated does not exceed 100ºC (212ºF) and the bearings are well lubricated.

$$\text{Bearing Pressure, (psi)} = \frac{\text{Total Load (lb) on Bearing}}{\text{Projected Bearing Area (in}^2\text{)}}$$

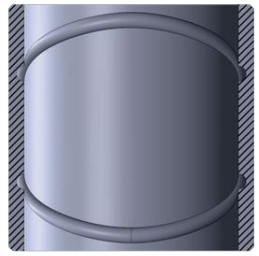
$$\text{Shaft Speed, (ft./min)} = \frac{\text{3.14 x Shaft Dia.(in.) x RPM}}{12}$$

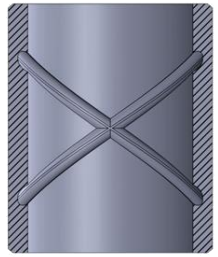


ZA-12 Bearing Design Notes

Corrosion

Zincaloy™ bearings offer good resistance to atmospheric corrosion as well as a variety of plant environments. However, direct exposure to corrosive liquids and gases should be avoided. Contact liquids should have a pH of 6-11.5 to avoid corrosion problems. Zincaloy™ may experience bimetallic galvanic corrosion if in contact with other metals, however, under atmospheric conditions this is generally small and of no concern. It can be of concern in a constantly wet environment or in sea water. Under these circumstances the material should be tested to determine its suitability

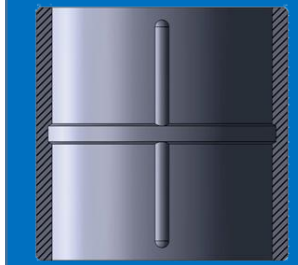


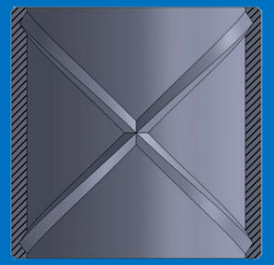


Dry Running

Most bearings perform best if lubricated, including Zincaloy™ bearings. However, under extreme conditions of dry running, Zincaloy™ is superior to bronze under such conditions because a thin film of Zincaloy™ is smeared over the shaft which protect it from wear and damage

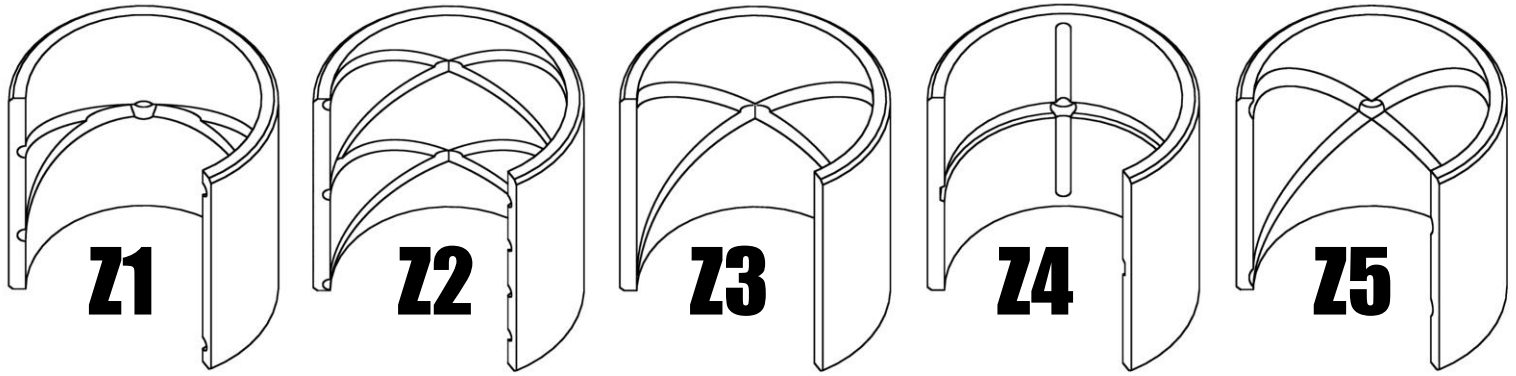
Zinc alloy metals generally do not spark when struck by rusted ferrous materials





Sleeve Bearing Lubrication

Standard grease groove designs for bronze bearings are suitable for Zincaloy™. Small diameter bearings under 3 inches (75mm) usually require no grooving. Groove edges should be rounded to prevent lubrication from being scraped from the shaft. Standard greases normally used for bronze bearings are compatible with Zincaloy™. Acidic, alkaline or sulphur containing lubricants should be avoided to prevent corrosion.



The maximum recommended running temperature for Zincaloy™ bearings is 100ºC (212ºF).

Standard grease grooves are available, Z1, through Z5.

Special groove configurations can be supplied based on operational requirements

ZA12 Sleeve Bearings

For fast response and engineering support contact CBB at

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