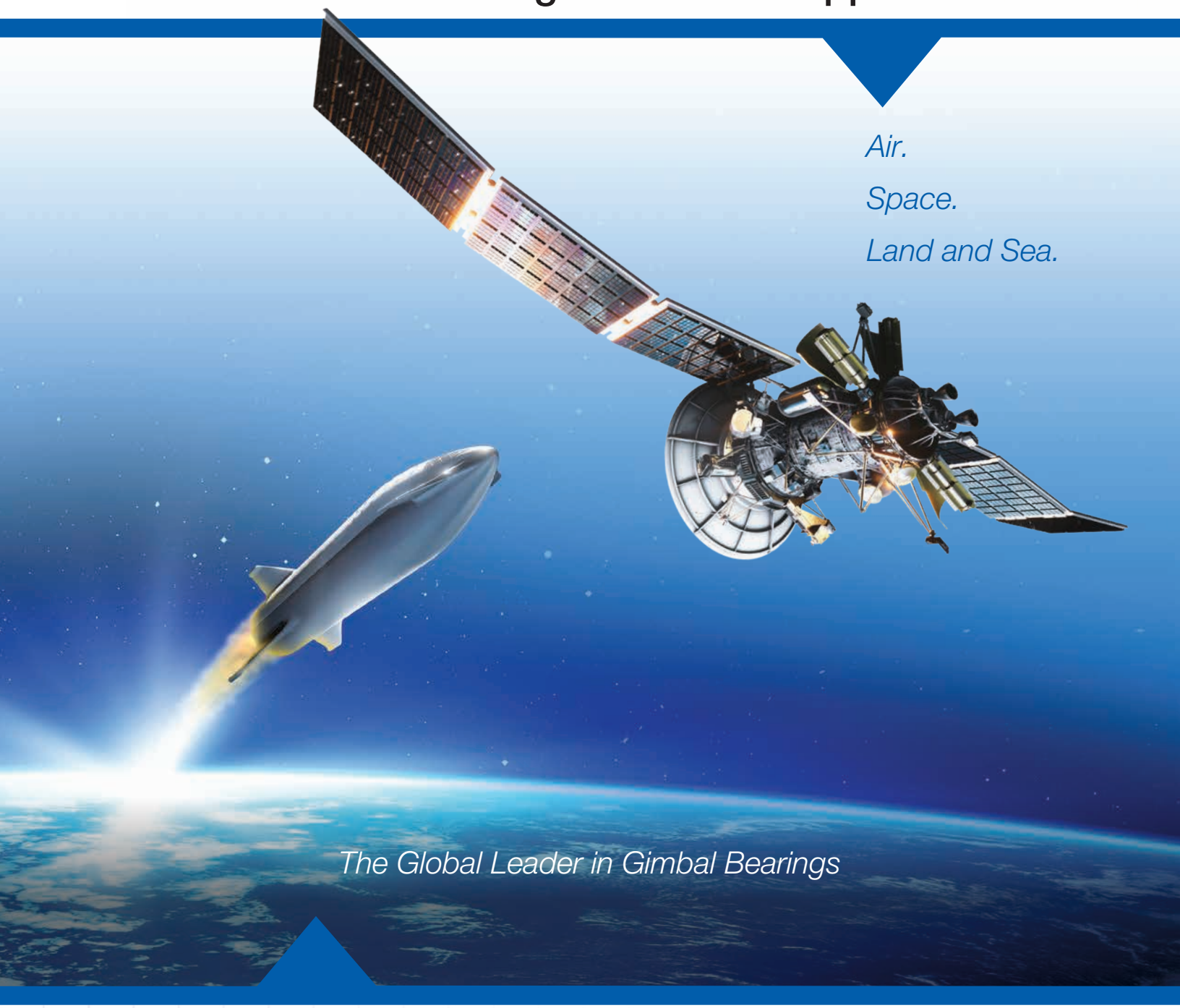
RBC AEROSPACE

# Simplex™ Bearing Series

## Thin Section Ball Bearings for Gimbal Applications



*Air.*

*Space.*

*Land and Sea.*

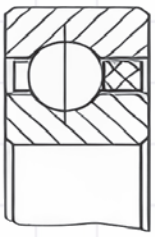
*The Global Leader in Gimbal Bearings*

***Innovation. Commitment. Quality.***

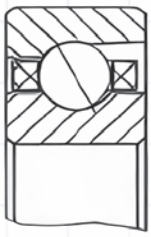
# RBC Thin Section Ball Bearings

## Bearing Type Selection Guide

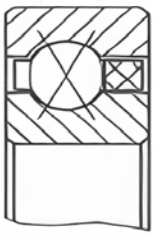
| Position 6: Bearing Type | | | | | | |
|---|---|---|---|---|---|---|
| Bearing Type | Ball Contact | Load Condition | | | | |
| | | Radial | Axial | Moment | Reversing Axial | Combined: Radial, Axial, & Moment |
| C | **Radial** | Good | Fair | Poor | Fair | Poor |
| A | **Angular** | Good | Very Good | Do Not Use | Do Not Use | Do Not Use |
| X | **4-Point** | Fair | Good | Good | Good | Fair |
| B | **Double Angular** | Very Good | Very Good | Very Good | Very Good | Good |
| F | **Double Angular** | Very Good | Very Good | Very Good | Very Good | Good |
| T | **Double Angular** | Excellent | Excellent | Do Not Use | Do Not Use | Do Not Use |
| M | Double Angular | Excellent | Excellent | Excellent | Excellent | Excellent |
| W | Double Angular | Excellent | Excellent | Excellent | Excellent | Excellent |



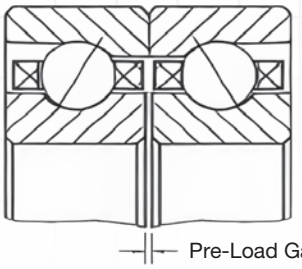
**C-Type**
Radial Contact



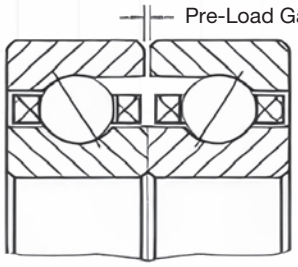
**A-Type**
Angular Contact



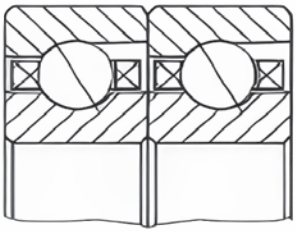
**X-Type**
4-Point Contact



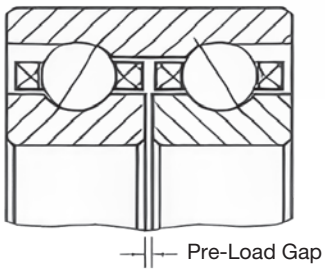

**B-Type**
Duplex Back-to-Back (DB)



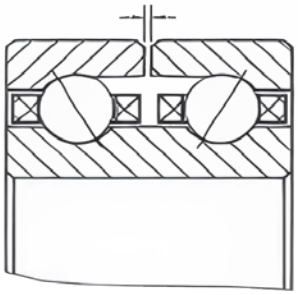

**F-Type**
Duplex Face-to-Face (DF)



**X-Type**
Duplex Tandem (DT)




**M-Type**
SuperDuplex™ Back-to-Back



**V-Type**
SuperDuplex™ Face-to-Face

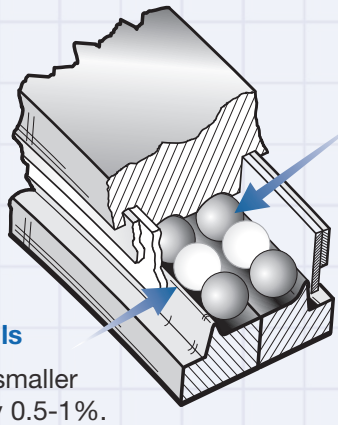
# General Features and Technical Specifications

### Low Torque Seals or Non-contacting Shields

Engineering assistance provided for optimum performance when evaluating application requirements.

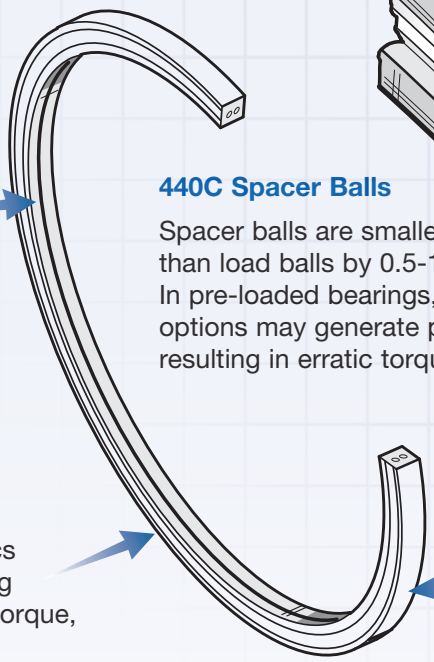
### Silicon Nitride Load Balls ($Si_3N_4$)

$Si_3N_4$ balls promote a much lower coefficient of friction versus steel balls, therefore providing enhanced survivability under marginal lubrication. $Si_3N_4$ balls also have a higher modulus of elasticity - 50% higher than steel balls to provide higher stiffness.



### 440C Ring Material

Eliminates thin dense chrome plating while providing corrosion resistance protection and maintaining the precision, tolerance, and finish.



### 440C Spacer Balls

Spacer balls are smaller than load balls by 0.5-1%. In pre-loaded bearings, other separator options may generate particle shedding resulting in erratic torque fluctuations.

### Low Torque/High Stiffness

Internal design characteristics result in an optimized bearing solution for demanding low torque, high stiffness applications.

### SuperDuplex™ Design

A one-piece ring on a double row set design offers improved ring stiffness and reduced distortion, improved face-to-face runout, and parallelism. As a result, the bearing offers superior accuracy and performance reliability, including improved alignment and ease of next level assemblies.

# Integrated Assemblies

- Bearing fit-ups are factory-optimized and pre-loaded for repeatable stiffness and torque.
- Integrated assemblies are simply bolted in place, eliminating individual bearing fit-up time and assembly errors in the field.
- Most integrated assemblies are integrally shielded to prevent contamination and ensure long bearing life.
- Superior performance compared to conventional approach to bearing assemblies.
- Lower total cost of ownership.

**More than just bearings...**

air. space. land and sea.

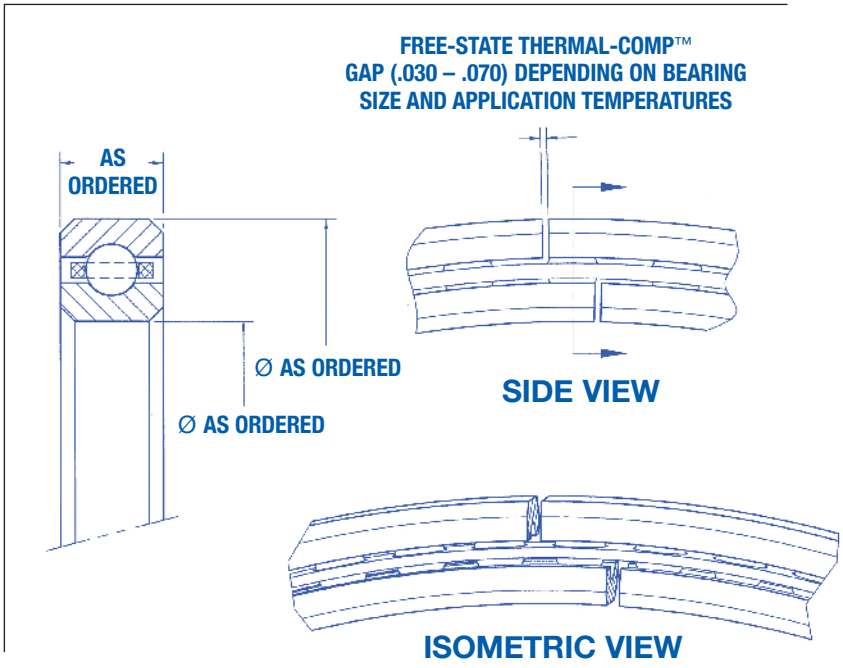
# RBC Aerospace Applications
## THERMAL-COMP™ Bearings

**THERMAL-COMP™ Bearings** are custom designed to compensate for adverse effects of temperature extremes on bearing performance in airborne applications.

**THERMAL-COMP™ Bearings** have a double-split rings design and once properly installed in bearing support structure at ambient temperature, they will maintain steady and predictable stiffness and torque characteristics throughout a temperature range, regardless of differences in coefficient of thermal expansion (CTE) of the bearing and the support structure materials.

In most airborne systems, large azimuth bearings are installed in support structures (shaft and housing), which have to be made from light aluminum alloys in order to control weight. While conventional bearings may be installed and fitted for optimum stiffness and rotational torque at ambient temperature, significant variations in bearing performance will be experienced at extremes of temperature in actual application. Such variations are caused by differences in CTE of bearing materials (hardened steels) and the aluminum alloys used for the support structure. At one temperature extreme, the bearing will be internally over-loaded to a much higher stiffness and rolling friction torque; yet at another extreme, the bearing internal pre-load may be compromised resulting in loss of stiffness or excessive deflection. Such undesirable variations in conventional bearing performance at extremes of temperature will have to be carefully analyzed and consequences mitigated, often necessitating utilization of larger drive motors and/or using more expensive support structure alloys with CTE properties as close to bearing steel as possible. With **THERMAL-COMP™ Bearings** such uncertainties in performance are greatly reduced.

The following is a typical illustration of **THERMAL-COMP™ Bearings** manufactured at RBC-Industrial Tectonics Bearings. Note that the free-state gap in ring split is determined based on bearing size and application temperatures involved. The gap will be closed to near zero when the bearing is operating at the coldest temperature in the application. The gap will be slightly wider when bearing is operating at higher temperatures. However, bearing performance will remain consistent.

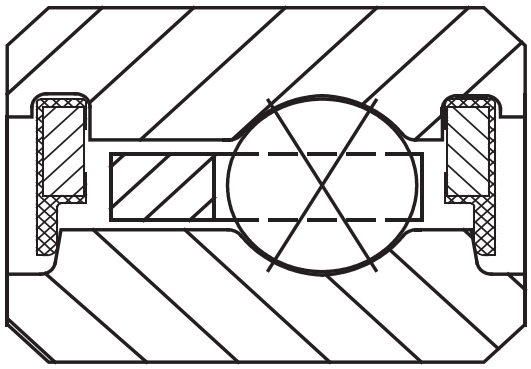


# RBC Thin Section Ball Bearings

## Elastomer Molded Seals vs. PTFE/SS300 Seals

Many molded seals used in bearings are made out of nitrile material (Buna-N rubber per MIL-R-6855). The material has a relatively high coefficient of friction. In order to meet low torque bearing requirements, seal fit-up during installation must be adjusted to minimize contact pressure on the sealing surfaces - reducing torque by reducing sealing effectiveness. The inherent variability in the seal molding process can further aggravate these issues. Over time, torque fluctuations are nearly inevitable, since seals may reset or the amount of lube between the seal and the sealing surface may change.

Based on these performance characteristics, molded seals are often marginal and unreliable solutions for torque sensitive applications.



TYPICAL ELASTOMER MOLDED DESIGN

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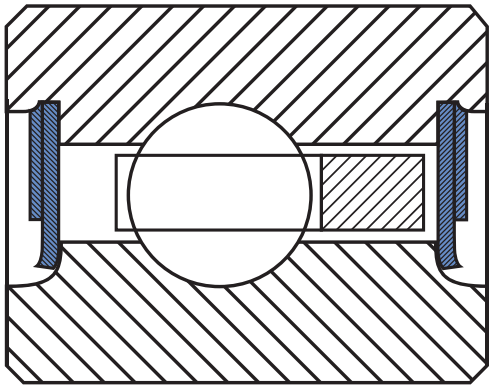

TYPICAL PTFE/300SS DESIGN

RBC's solution is a combination seal-shield design. The seal is made from either pure PTFE Teflon® or glass fiber reinforced PTFE Armalon®. PTFE is chemically inert, has a very low coefficient of friction (inherent lubricity), and provides the widest operating temperature range of any sealing material. The seal is held in place and shielded with a stainless steel (300 series) flat ring. The seal drag torque in this design is minimal, predictable, and consistent over time.

RBC invariably recommends this design for all low torque or torque sensitive applications that require sealing. RBC can readily retrofit problematic molded seal designs with a PTFE/300SS optimized solution.

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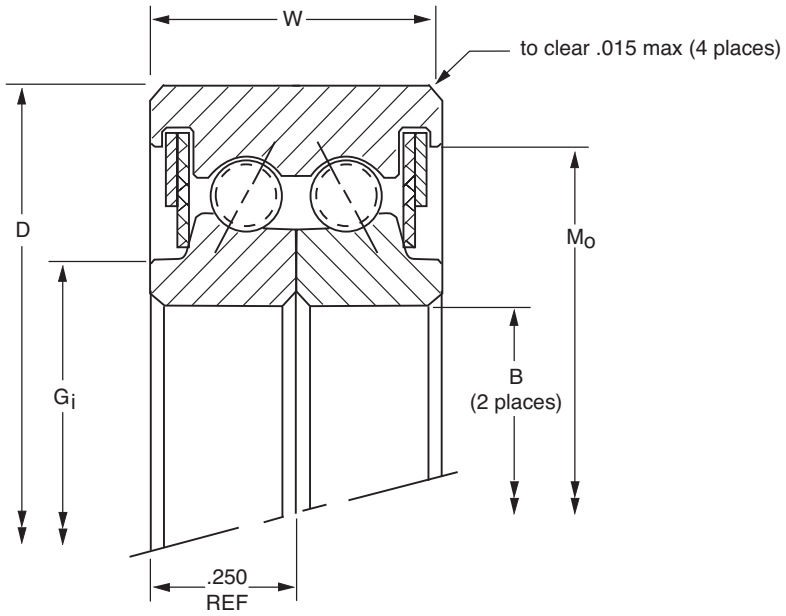
# Simplex™ Bearing Series

## SuperDuplex™ (DB) Sealed Bearings

- SuperDuplex™ back-to-back
- ABEC-3
- High-stiffness
- Low torque
- 440C stainless steel rings
- SigN, ceramic load balls w/440C spacer balls
- Low torque PTFE seals




| PART NUMBER* | NOMINAL DIMENSIONS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B Bore | | D Outside Diameter | | W Width | | G1 Recess Diameter | | Mo Groove Diameter | | Ball Diameter | Ball Quantity |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | in. |
| ZU040MZ3*RBC | 4.000 | 101.600 | 4.750 | 120.650 | 0.500 | 12.700 | 4.155 | 105.54 | 4.550 | 115.57 | 1/8 | 54 |
| ZU042MZ3*RBC | 4.250 | 107.950 | 5.000 | 127.000 | 0.500 | 12.700 | 4.405 | 111.89 | 4.800 | 121.92 | 1/8 | 57 |
| ZU045MZ3*RBC | 4.500 | 114.300 | 5.250 | 133.350 | 0.500 | 12.700 | 4.655 | 118.24 | 5.050 | 128.27 | 1/8 | 60 |
| ZU047MZ3*RBC | 4.750 | 120.650 | 5.500 | 139.700 | 0.500 | 12.700 | 4.905 | 124.59 | 5.300 | 134.62 | 1/8 | 63 |
| ZU050MZ3*RBC | 5.000 | 127.000 | 5.750 | 146.050 | 0.500 | 12.700 | 5.155 | 130.94 | 5.550 | 140.97 | 1/8 | 66 |
| ZU055MZ3*RBC | 5.500 | 139.700 | 6.250 | 158.750 | 0.500 | 12.700 | 5.655 | 143.64 | 6.050 | 153.67 | 1/8 | 72 |
| ZU060MZ3*RBC | 6.000 | 152.400 | 6.750 | 171.450 | 0.500 | 12.700 | 6.155 | 156.34 | 6.550 | 166.37 | 1/8 | 79 |
| ZU065MZ3*RBC | 6.500 | 165.100 | 7.250 | 184.150 | 0.500 | 12.700 | 6.655 | 169.04 | 7.050 | 179.07 | 1/8 | 85 |
| ZU070MZ3*RBC | 7.000 | 177.800 | 7.750 | 196.850 | 0.500 | 12.700 | 7.155 | 181.74 | 7.550 | 191.77 | 1/8 | 91 |
| ZU075MZ3*RBC | 7.500 | 190.500 | 8.250 | 209.550 | 0.500 | 12.700 | 7.655 | 194.44 | 8.050 | 204.47 | 1/8 | 97 |
| ZU080MZ3*RBC | 8.000 | 203.200 | 8.750 | 222.250 | 0.500 | 12.700 | 8.155 | 207.14 | 8.550 | 217.17 | 1/8 | 104 |
| ZU090MZ3*RBC | 9.000 | 228.600 | 9.750 | 247.650 | 0.500 | 12.700 | 9.155 | 232.54 | 9.550 | 242.57 | 1/8 | 116 |
| ZU100MZ3*RBC | 10.000 | 254.000 | 10.750 | 273.050 | 0.500 | 12.700 | 10.155 | 257.94 | 10.550 | 267.97 | 1/8 | 129 |
| ZU110MZ3*RBC | 11.000 | 279.400 | 11.750 | 298.450 | 0.500 | 12.700 | 11.155 | 283.34 | 11.550 | 293.37 | 1/8 | 141 |
| ZU120MZ3*RBC | 12.000 | 304.800 | 12.750 | 323.850 | 0.500 | 12.700 | 12.155 | 308.74 | 12.550 | 318.77 | 1/8 | 154 |

*The alphanumeric identification system is used under license. ZU Series are also available in low-torque design using PTFE seals.

# Simplex™ Bearing Series
## SuperDuplex™ (DB) Sealed Bearings

| LOAD RATINGS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approx. Weight | | Radial | | | | Thrust | | | | Moment | | | | PART NUMBER* |
| | | Static | | Dynamic | | Static | | Dynamic | | Static | | Dynamic | | |
| lbs. | kg. | lbf | N | lbf | N | lbf | N | lbf | N | lbf-in | Nm | lbf-in | Nm | |
| 0.55 | 0.249 | (2x) 905 | (2x) 4,030 | (2x) 640 | (2x) 2,850 | 2,710 | 12,050 | 1,850 | 8,230 | 4,130 | 470 | 1,555 | 180 | ZU040MZ3*RBC |
| 0.58 | 0.263 | (2x) 950 | (2x) 4,230 | (2x) 655 | (2x) 2,910 | 2,850 | 12,680 | 1,900 | 8,450 | 4,540 | 510 | 1,670 | 190 | ZU042MZ3*RBC |
| 0.61 | 0.277 | (2x) 995 | (2x) 4,430 | (2x) 660 | (2x) 2,940 | 2,990 | 13,300 | 1,915 | 8,520 | 5,070 | 570 | 1,840 | 210 | ZU045MZ3*RBC |
| 0.65 | 0.295 | (2x) 1,050 | (2x) 4,670 | (2x) 675 | (2x) 3,000 | 3,140 | 13,970 | 1,955 | 8,700 | 5,575 | 630 | 1,990 | 220 | ZU047MZ3*RBC |
| 0.68 | 0.308 | (2x) 1,090 | (2x) 4,850 | (2x) 685 | (2x) 3,050 | 3,285 | 14,610 | 1,995 | 8,870 | 6,105 | 690 | 2,130 | 240 | ZU050MZ3*RBC |
| 0.74 | 0.336 | (2x) 1,190 | (2x) 5,290 | (2x) 700 | (2x) 3,110 | 3,580 | 15,920 | 2,035 | 9,050 | 7,235 | 820 | 2,450 | 280 | ZU055MZ3*RBC |
| 0.81 | 0.367 | (2x) 1,305 | (2x) 5,800 | (2x) 730 | (2x) 3,250 | 3,925 | 17,460 | 2,125 | 9,450 | 8,575 | 970 | 2,835 | 320 | ZU060MZ3*RBC |
| 0.87 | 0.395 | (2x) 1,400 | (2x) 6,230 | (2x) 755 | (2x) 3,360 | 4,210 | 18,730 | 2,185 | 9,720 | 9,910 | 1,120 | 3,200 | 360 | ZU065MZ3*RBC |
| 0.93 | 0.422 | (2X) 1,500 | (2x) 6,670 | (2x) 760 | (2x) 3,380 | 4,495 | 19,990 | 2,200 | 9,790 | 11,340 | 1,280 | 3,565 | 400 | ZU070MZ3*RBC |
| 0.99 | 0.449 | (2x) 1,600 | (2x) 7,120 | (2x) 775 | (2x) 3,450 | 4,780 | 21,260 | 2,250 | 10,010 | 12,870 | 1,450 | 3,950 | 450 | ZU075MZ3*RBC |
| 1.06 | 0.481 | (2x) 1,710 | (2x) 7,610 | (2x) 815 | (2x) 3,630 | 5,130 | 22,820 | 2,350 | 10,450 | 14,630 | 1,650 | 4,405 | 500 | ZU080MZ3*RBC |
| 1.18 | 0.535 | (2x) 1,905 | (2x) 8,470 | (2x) 840 | (2x) 3,740 | 5,705 | 25,380 | 2,420 | 10,760 | 18,180 | 2,050 | 5,275 | 600 | ZU090MZ3*RBC |
| 1.31 | 0.594 | (2x) 2,110 | (2x) 9,390 | (2x) 875 | (2x) 3,890 | 6,330 | 28,160 | 2,550 | 11,340 | 22,290 | 2,520 | 6,250 | 710 | ZU100MZ3*RBC |
| 1.43 | 0.649 | (2x) 2,300 | (2x) 10,230 | (2x) 905 | (2x) 4,030 | 6,915 | 30,760 | 2,625 | 11,680 | 26,620 | 3,010 | 7,235 | 820 | ZU110MZ3*RBC |
| 1.56 | 0.708 | (2x) 2,515 | (2x) 11,190 | (2x) 935 | (2x) 4,160 | 7,545 | 33,560 | 2,720 | 12,100 | 31,560 | 3,570 | 8,330 | 940 | ZU120MZ3*RBC |

†Radial load rating is two times the value per row ideally if both rows share load equally.
Refer to the Engineering section for load and speed limitations.

# Operating Conditions

## Lubrication

Lubricants serve a number of very important purposes in ball bearings, including:

- protecting bearing surfaces from corrosion
- reducing rolling and sliding friction
- preventing metal-to-metal contact between balls and raceway
- providing a barrier against external contaminants (grease)
- removing heat (oil)

Lack of lubrication or inadequate lubrication is the most common cause of bearing failure.

Standard RBC Thin Section Ball Bearings are lubricated with either oil or grease. The unsealed bearings, the K series, are thoroughly coated in MIL-PRF-3150 or MIL-PRF-6085 oil and drained of excess. Sealed bearings are lubricated with MIL-PRF-23827 grease. The external surfaces of sealed bearings are lightly coated with the same grease for corrosion resistance. Additional lubricants are also available. Your RBC Sales Engineer can help select the appropriate lubricant.

## Temperature

Standard RBC Thin Section Ball Bearings can operate at temperatures from -65°F to 250°F. Temperatures up to 350°F can be reached if the bearings are temperature stabilized. By the use of special materials RBC can provide bearings for operation to 900°F. Contact your RBC Sales Engineer for recommendations on bearings operating above 250°F.

## Limiting Speed

The limiting speed of a bearing is dependent upon a number of different factors including bearing size, bearing type, ball separator design, lubrication and loading. The limiting speeds for the bearings shown in this catalog are determined using the following:

N = with N = Speed (RPM)
E = (Bearing Pitch Diameter)
k = constant, see table below

| Bearing Type | Load Condition | k Value | |
|---|---|---|---|
| | | Grease | Oil |
| C or A | Radial or Thrust | 16 | 20 |
| X | Thrust | 10 | 12 |
| X | Radial, Combined Radial and Thrust, or Moment | 3 | 4 |

The k values shown give the maximum speeds at which a typical thin section ball bearing can operate. It is recommended that operating speeds of large diameter bearings in a given series be reduced up to 40% of the calculated rating to avoid high bearing temperatures.

Speed ratings can also be impacted by load conditions, lubrication, alignment and ambient temperature. All of these factors must be considered when designing thin section ball bearings into your application.

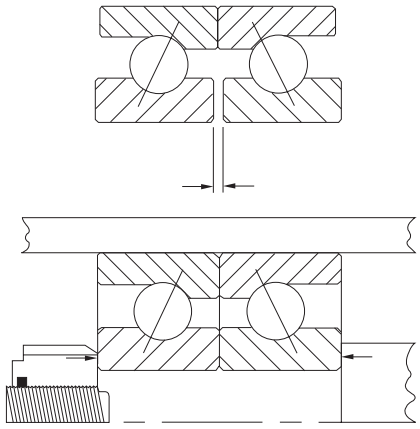
## DUPLEX PAIRS AND AXIAL PRELOADING

### Duplex Pairs

Duplex bearings are a pair of angular contact RBC Thin Section Ball Bearings specially ground for use as a matched set. A duplexed pair can be used to provide accurate shaft location, to increase capacity or to increase stiffness of the bearing assembly. A duplex pair of RBC Thin Section Ball Bearings is ground so that when mounted using recommended fits, there will be no internal clearance in the bearings. There are three basic mounting methods to accommodate different loading requirements:

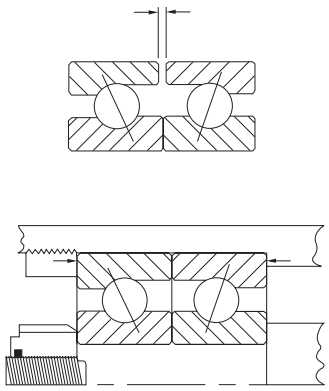
- Back-to-Back (DB), B-Type
- Face-to-Face (DF), F-Type
- Tandem (DT), T-Type

**Back-to-Back, DB**
**B-Type**



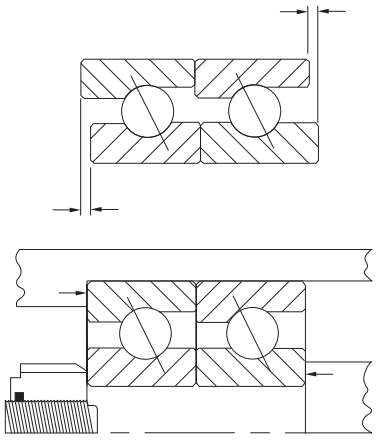
- Heavy radial loads
- Combined thrust & radial loads
- Reversing thrust load
- Excellent rigidity
- Moment loads

**Face-to-Face, DF**
**F-Type**



- Heavy radial loads
- Combined thrust & radial loads
- Reversing thrust load
- Moment loads

**Tandem, DT**
**T-Type**

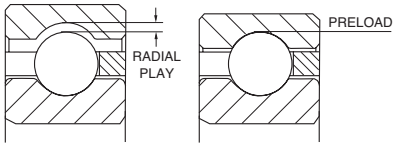


- High one-direction thrust loads
- Minimum axial shaft deflection
- Heavy radial loads

## Axial Preloading

Standard duplex bearings are ground so that there will be a light axial preload induced on the bearing at nominal conditions. In some applications increased bearing stiffness may be required. In these cases the duplex grinding can be done such that a heavier axial load is induced in the mounted bearing. This load can be increased or decreased to meet the requirements of a particular application. Consult your RBC Sales Engineer for special requirements.

## Radial Play




Radial play (diametral clearance) is the distance the inner ring can be moved radially from one extreme position to the other. Standard RBC Thin Section Ball Bearings are manufactured with enough radial play that some clearance remains after the bearing is properly installed.

When there is negative radial play (diametral preload) there is interference rather than clearance between the balls and the races. As the interference increases, the friction, stiffness and torque also increase. RBC Thin Section Ball Bearings can be manufactured with customer specified diametral preload or clearance.

## Radial and Axial Runout

Radial runout of RBC Thin Section Ball Bearings is a measurement of the thickness variation of the bearing rings. The outer ring is measured from the ball path to the outer diameter of the ring, the inner ring is measured from the ball path to the bore. Radial runout is defined as the wall thickness variation of the rotating ring.

Axial runout is measured from the ball path to the face of the bearing rings. The variation in thickness measured is the axial runout.

## TOLERANCES

### Precision Grades

RBC Thin Section Ball Bearings are available in four precision grades. RBC Precision classes 0, 3, 4 and 6 correspond to ABMA ABEC grades 1F, 3F, 5F and 7F respectively. The tolerances for the bearing bores, outer diameters, radial runouts, axial runouts and radial plays are shown in the Tolerance Tables (pages 106-111).

### Shaft and Housing Fits

Proper shaft and housing fits are critical to the successful operation of a thin section ball bearing. The internal clearance of the bearing will be reduced proportionally by an interference fit. In addition, the roundness of the shaft and housing will directly affect the roundness of the inner and outer ring raceways. For most applications the inner ring is rotating and the load is stationary with respect to the outer ring. In this circumstance a light press fit onto the shaft is recommended. The recommended shaft and housing fits are shown in the Tolerance Tables (pages 106-111).

# Thin Section Bearing Availability Chart

| Cross Section | Race Type | BORE SIZE IN INCHES | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.00 | 1.50 | 1.75 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.50 | 6.00 | 6.50 | 7.00 | 7.50 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 30.00 |
| **KAA** 3/16" | A | ▲ | ▲ | ▲ | | | | | | | | | | | | | | | | | | | | | | | | |
| | C | ▲ | ▲ | ▲ | | | | | | | | | | | | | | | | | | | | | | | | |
| | X | ▲ | ▲ | ▲ | | | | | | | | | | | | | | | | | | | | | | | | |
| **JA**** 1/4" | A | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | C | | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | | | ✔ | ✔ | ✔ | | | | | | | | | | | | | |
| | X | | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | | | | ✔ | ✔ | | | | | | | | | | | | | |
| **KA** 1/4" | A | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ✔ | ✔ | ▲ | ✔ | ✔ | ✔ | | ▲ | ✔ | ✔ | ✔ | | ✔ | | | | |
| | C | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | ▲ | ▲ | ▲ | ▲ | | ▲ | | | | |
| | X | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | | ✔ | ✔ | ✔ | ▲ | | ▲ | | | | |
| **JB**** 5/16" | A | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | C | | | | | | ✔ | ✔ | | | | | | ✔ | | | | | | | | | | | | | | |
| | X | | | | | | | ✔ | | | | | | | | | | | | | | | | | | | | |
| **KB** 5/16" | A | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ✔ | | ✔ | ✔ | | ✔ | | | | ✔ | | | | | | | | |
| | C | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ✔ | | ▲ | ✔ | | ✔ | | | | ✔ | | | | | | | | |
| | X | | | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | ▲ | ▲ | | ▲ | | | | ▲ | | | | | | | | |
| **KC** 3/8" | A | | | | | | | | ▲ | | ▲ | | ▲ | ✔ | ▲ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | | | | | |
| | C | | | | | | | | ▲ | | ▲ | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ✔ | ▲ | ✔ | ✔ | | | | | |
| | X | | | | | | | | ▲ | | ▲ | | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | ▲ | ▲ | ▲ | ▲ | ▲ | | | | | |
| **JU**** 1/2" | A | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | C | | | | | | | | ▲ | | ▲ | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ✔ | | | | | |
| | X | | | | | | | | ▲ | | ▲ | | ▲ | ▲ | ▲ | ▲ | ✔ | ▲ | ▲ | ✔ | ▲ | ▲ | ▲ | | | | | |
| **KD** 1/2" | A | | | | | | | | ▲ | ✔ | ✔ | | ▲ | ▲ | ▲ | ▲ | ▲ | | ▲ | ▲ | ✔ | ▲ | ✔ | ✔ | | ✔ | | |
| | C | | | | | | | | ▲ | ▲ | ✔ | | ▲ | ▲ | ▲ | ▲ | ▲ | | ▲ | ▲ | ▲ | ✔ | ▲ | ▲ | | ✔ | | |
| | X | | | | | | | | ▲ | ✔ | ▲ | | ▲ | ▲ | ▲ | ▲ | ✔ | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | ▲ | | |
| **KF** 3/4" | A | | | | | | | | ✔ | | ✔ | ▲ | ✔ | ▲ | ✔ | ▲ | ✔ | ✔ | ✔ | ▲ | ✔ | ✔ | ✔ | ✔ | | | | |
| | C | | | | | | | | ▲ | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | | |
| | X | | | | | | | | ▲ | | ✔ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | | |
| **KG** 1" | A | | | | | | | | | | | | ✔ | | ✔ | ✔ | ✔ | ▲ | ▲ | ▲ | ✔ | ✔ | ▲ | ▲ | ✔ | ▲ | | |
| | C | | | | | | | | | | | | ▲ | | ✔ | ▲ | ✔ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | |
| | X | | | | | | | | | | | | ▲ | | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | ▲ |
| Cross Section | Race Type | 1.00 | 1.50 | 1.75 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.50 | 6.00 | 6.50 | 7.00 | 7.50 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 30.00 |

** Sealed bearings

▲ Bearings in stock ✔ Bearings with limited availability

# Engineering Application Data Form

For assistance in selecting the correct bearings for your design, complete this form and send to:

**Industrial Tectonics Bearings Division**
**18301 S. Santa Fe Avenue, Rancho Dominguez, CA 90221-9998**
**Email: ITBsales@rbcbearings.com**

Company Name: _____ Date: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Name: _____ Title: _____

Phone: _____ Fax: _____ e-mail: _____

Description of application: _____

_____

**Speed:**

Rotational _____ rpm ☐ Inner Ring Rotating

Oscillatory _____ cpm ☐ Outer Ring Rotating

**Temperature:**

Average running _____ min _____ max _____

**Loading:**

☐ Shock ☐ Vibration ☐ Safety factor (Please specify) _____

Dynamic radial _____ Lbs./N ☐ Stationary Load ☐ Rotating Load

Dynamic thrust _____ Lbs./N

Dynamic moment _____ Ft. Lbs./N.m ☐ Stationary Load ☐ Rotating Load
(show application of load on sketch)

Static radial _____ Lbs./N

Static thrust _____ Lbs./N

Static moment _____ Ft. Lbs./N.m (show application of load on sketch)

**Life:** _____

**Lubricant:**

☐ Grease ☐ Oil ☐ Special (Please specify) _____

**Size limitations:**

Max. OD _____ inches/mm Min. bore _____ inches/mm Max. Width _____ inches/mm

**Other data:**

☐ Seals ☐ Shields ☐ Special (Please specify) _____

Housing material: _____ Shaft material: _____

**Further description of application and/or special requirements**: ☐ Sketch included

_____

_____

_____

(continue on second sheet if necessary)

# RBC BEARINGS — Innovation. Commitment. Quality.

RBC Bearings® has been producing bearings in the USA since 1919. In addition to unique custom bearings, RBC Bearings® offers a full line of standard industrial and aerospace bearings, including:

## Spherical Bearings

- MS approved to AS81820 (formerly MIL-B-81820)
- Self-lubricating • Metal-to-Metal
- Loader slots • High temperature
- Low coefficient of friction
- Special configurations and materials

## Thin Section Ball Bearings

- Standard cross sections to one inch
- Stainless steel and other materials are available
- Sizes to 40"
- Seals available on all sizes and standard cross sections
- Super duplex configurations

## Journal Bearings

- MS approved to AS81934 (formerly MIL-B-81934)
- Plain and flanged • Self-lubricating
- High temperature • High loads
- Available in inch and metric sizes

## Airframe Control Ball Bearings

- MS approved to AS7949 (formerly MIL-B-7949)
- Single and double row
- Radial, self-aligning, and pulley series
- 52100 Cad plated and 440C stainless
- Zinc Nickel plated

## Ball Bearing Rod Ends

- MS approved to AS6039 (formerly MIL-B-6039)
- Various shank configurations
- Low coefficient of friction
- Advanced AeroCres® materials available

## Rings and Seals

- Solutions for any pneumatic and hydraulic applications
- Seals from .5" to 55" diameter
- Cast Iron to Rene 41
- Precision machined & wire rings to tight tolerances

## Specialty Fasteners

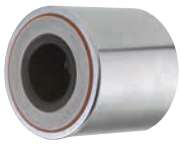
- Hollow Bolts, Fuse Pins, Solid Bolts (Standards), Custom Machined Parts & Nuts
- Hot Headed, Thread Rolled, HVOF Coated
- Large Diameter over 3/4"

## Hydraulic Actuators

- 2-Position Fluid Hydraulic
- Auto or Manual Mechanical Locking
- Lock Sensing/Position Sensing
- Flow/Directional Control Valves; Solenoid/Manual

## Rod End Bearings

- MS approved to AS81935 (formerly MIL-B-81935)
- Self-lubricating • Metal-to-Metal
- Loader slots • High temperature
- Low coefficient of friction
- Special configurations and materials



## Track Rollers

- MS approved to AS39901 (formerly MIL-B-3990)
- ATF single row and ATL double row
- Sealed with lube holes and grooves
- Heavy duty cross sections
- Advanced AeroCres® materials available

## Cam Followers

- MS approved to AS39901 (formerly MIL-B-3990)
- Advanced AeroCres® materials available
- Maximum corrosion resistance
- Superior lubricants & seals to reduce maintenance

## Load Slot Bearings

- Spherical and rod end designs
- Superior ball-to-race conformity
- Reduced maintenance cost
- Variety of race materials available

## Specials

- Many specialty bearings, custom-designed and configured for diverse aerospace applications
- Capability for advanced aerospace specialty corrosion resistant and high temperature materials

## Control Rods

- Swaging up to 14' length and 4" diameter
- Nadcap and customer special process approvals including NDT
- Surface treatments, CNC Machining, Flash Welding, Aluminum Heat Treat
- Design and build to print

## Ducting Solutions

- Solutions for pneumatic ducting
- Patented couplings
- Temperatures 450° to 1,500°F
- Engines, Aircraft, APUs

## Machined Components

- Exotic materials • 3, 3.5, 4 and 5 Axis
- Horizontal and Vertical Milling
- Lathes, Hot Head, Gearing, Heat Treat, Special Processes

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