

# RULAND

Carefully Made Shaft Collars and Couplings



**BELLOWS COUPLINGS**

# Introduction

Ruland Manufacturing Co., Inc. has been supplying carefully made products since 1937. We have manufactured everything from bicycle pumps to high pressure valves, including the valve that pressurized the spacesuit of the first American to walk in space. In recent years, all of our expertise has been devoted to making the best shaft collars and couplings available. Bellows couplings are just one design in the full line of motion control couplings manufactured by Ruland (see back cover).



Bellows couplings are an assembly of two aluminum hubs and a uniform, thin walled stainless steel bellows. The use of aluminum hubs with a bellows results in a coupling with very low inertia, a feature that is very important in today's highly responsive systems. The characteristics of bellows make them an ideal method for transmitting torque in motion control applications. The bellows allow the coupling to bend easily under loads caused by the three basic types of misalignment between shafts (angular, parallel, axial motion). Because they have uniform, thin walls, the bellows provide low bearing loads that remain constant at all points of rotation, without the damaging cyclical high and low loading points found in some other types of couplings. All of this is accomplished while remaining rigid under torsional loads. Torsional rigidity is a key factor in determining the accuracy of the coupling. The stiffer the coupling, the more accurately motion is translated from the motor to the driven component. Among servo couplings, bellows type couplings are one of the stiffest available, making them ideal in high performance applications that require a high degree of accuracy and repeatability.

## WARRANTY / DISCLAIMER OF UNSTATED WARRANTIES / LIMITATION OF LIABILITY

**Warranty.** Ruland warrants that the products sold hereunder meet Ruland's size and materials specifications as set forth in this catalog. Products not meeting Ruland's size and material specifications will, at Ruland's option, be replaced or the purchase price refunded.

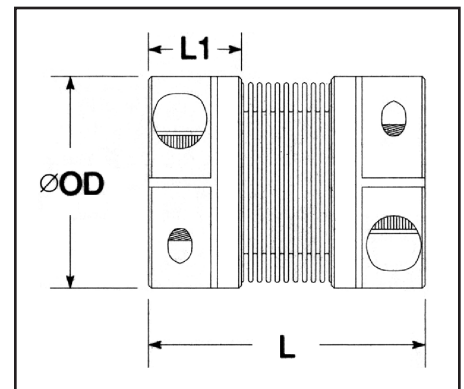
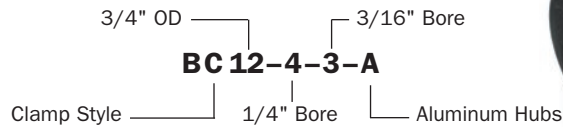
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**Limitation of Liability.** IT IS UNDERSTOOD AND AGREED THAT SELLER'S LIABILITY SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE. SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCT IS A CONSIDERATION IN LIMITING RULAND'S LIABILITY.

PART NUMBER		SPECIFICATIONS											
CLAMP STYLE	SET SCREW STYLE	BORE 1 (in)	BORE 2 (in)	OUTER DIAM. OD (in)	LENGTH L (in)	CLAMP SCREW	SET SCREW	HUB WIDTH L1 (in)	STATIC TORQUE (lb-in)	TORSIONAL STIFFNESS (lb-in/Deg)	ANGULAR MISALIGNMENT (Deg)	PARALLEL MISALIGNMENT (in)	AXIAL MOTION (in)
BC10	BS10	2 (.125)	2 (.125)	.590	1.0720	M2	M3	.340	22	72	1.50	.004	.008
		3 (.188)	3 (.188)										
		4 (.250)	4 (.250)										
BC12	BS12	3 (.188)	3 (.188)	.750	1.1875	M2.5	M3	.410	40	120	1.50	.004	.010
		4 (.250)	4 (.250)										
		5 (.313)	5 (.313)										
BC16	BS16	4 (.250)	4 (.250)	1.000	1.3125	M3	M4	.467	60	244	1.50	.004	.012
		5 (.313)	5 (.313)										
		6 (.375)	6 (.375)										
BC21	BS21	5 (.313)	5 (.313)	1.313	1.5625	M3	M4	.590	120	400	1.50	.006	.016
		6 (.375)	6 (.375)										
		8 (.500)	8 (.500)										
BC26	BS26	6 (.375)	6 (.375)	1.625	2.0000	M4	M5	.710	250	550	2.00	.010	.020
		8 (.500)	8 (.500)										
		10 (.625)	10 (.625)										
BC32	BS32	10 (.625)	10 (.625)	2.000	2.3125	M5	M6	.810	400	950	2.00	.010	.020
		12 (.750)	12 (.750)										
		14 (.875)	14 (.875)										
		16 (1.000)	16 (1.000)										

**ORDERING INFORMATION**

Choose any bore **b1** and any bore **b2** available in a body size. Part numbers are in the following format with numbers representing inches:



- Note 1** Static torque ratings are at maximum misalignment. To obtain dynamic rating, static ratings should be divided by 2 for non-reversing applications and by 4 for reversing applications.
- Note 2** Hardware is alloy steel with black oxide finish. Parts BS10, BS12, MBS15 and MBS19 have one set screw on each end. BS16, BS21, BS26, BS32, MBS25, MBS33, MBS41 and MBS51 have two set screws 90° apart.
- Note 3** Performance ratings are for guidance only. The user must determine suitability for a particular application.
- Note 4** Couplings supplied with black anodized aluminum hubs. Stainless steel hubs available upon request.
- Note 5** Maximum speed 10,000 RPM.

**FOR ENGINEERING INFORMATION, SEE PAGE 5. FOR WARRANTY INFORMATION, SEE PAGE 2.**

# STAINLESS STEEL BELLOWS COUPLING

## METRIC DIMENSION SERIES

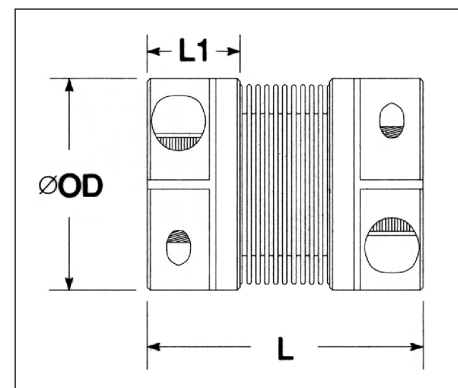
**MBC**  
**MBS**

PART NUMBER		SPECIFICATIONS											
CLAMP STYLE	SET SCREW STYLE	BORE 1 (mm)	BORE 2 (mm)	OUTER DIAM. OD (mm)	LENGTH L (mm)	CLAMP SCREW	SET SCREW	HUB WIDTH L1 (mm)	STATIC TORQUE (Nm)	TORSIONAL STIFFNESS (Nm/Deg)	ANGULAR MISALIGNMENT (Deg)	PARALLEL MISALIGNMENT (mm)	AXIAL MOTION (mm)
MBC15	MBS15	3	3	15	27.2	M2	M3	8.65	2.5	8	1.50	0.10	0.20
		4	4										
		5	5										
		6	6										
MBC19	MBS19	4	4	19	30.2	M2.5	M3	10.40	4.5	14	1.50	0.10	0.25
		5	5										
		6	6										
		8	8										
MBC25	MBS25	6	6	25	33.3	M3	M4	11.85	6.8	27	1.50	0.10	0.30
		8	8										
		10	10										
		12	12										
MBC33	MBS33	8	8	33	39.7	M3	M4	15.00	13.6	45	1.50	0.15	0.40
		10	10										
		12	12										
		14	14										
		15	15										
		16	16										
MBC41	MBS41	10	10	41	50.8	M4	M5	18.05	28.0	63	2.00	0.25	0.50
		12	12										
		14	14										
		15	15										
MBC51	MBS51	16	16	51	58.7	M5	M6	20.55	45.2	108	2.00	0.25	0.50
		20	20										
		20	20										
		25	25										
		25	25										

### ORDERING INFORMATION

Choose any bore **b1** and any bore **b2** available in a body size. Part numbers are in the following format with numbers representing metrics:

19mm OD ———— 5mm Bore  
**MBC 19-6-5-A**  
 Clamp Style ———— 6mm Bore ———— Aluminum Hubs



- Note 1** Static torque ratings are at maximum misalignment. To obtain dynamic rating, static ratings should be divided by 2 for non-reversing applications and by 4 for reversing applications.
- Note 2** Hardware is alloy steel with black oxide finish. Parts BS10, BS12, MBS15 and MBS19 have one set screw on each end. BS16, BS21, BS26, BS32, MBS25, MBS33, MBS41 and MBS51 have two set screws 90° apart.
- Note 3** Performance ratings are for guidance only. The user must determine suitability for a particular application.
- Note 4** Couplings supplied with black anodized aluminum hubs. Stainless steel hubs available upon request.
- Note 5** Maximum speed 10,000 RPM.

**FOR ENGINEERING INFORMATION, SEE PAGE 5. FOR WARRANTY INFORMATION, SEE PAGE 2.**

# Technical Information

## Materials

Bellows: AISI 321 Stainless Steel  
 Hubs: 2024 T351 or 7075 T651 Extruded and Drawn Aluminum Bar

## Surface Finish

Hubs: Sulfuric Anodized MIL-A-8625 Type II, class 2

## Hardware

Socket Head Cap Screws: Alloy steel, heat treated. Meet or exceed ASA specification B18.3. Metric hardware meets or exceeds ASA specifications B18.3.1M and ASTM A574M property class 12.9

Forged Socket Set Screws: Alloy steel, heat treated, cup point. Meet or exceed ASA specification B18.3

## Temperature Range

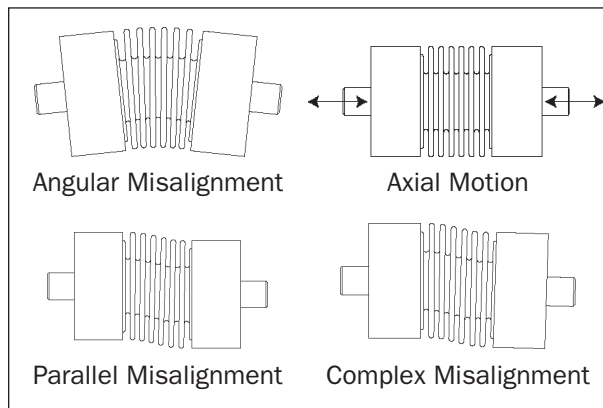
-40° F to 200° F

## Bore Tolerance

+0.002"/-0.000"  
 +.050 mm/-0.000 mm

## Maximum Speed

10,000 rpm



## Hardware Torque Charts

### TORQUE RATINGS—CLAMP SCREW

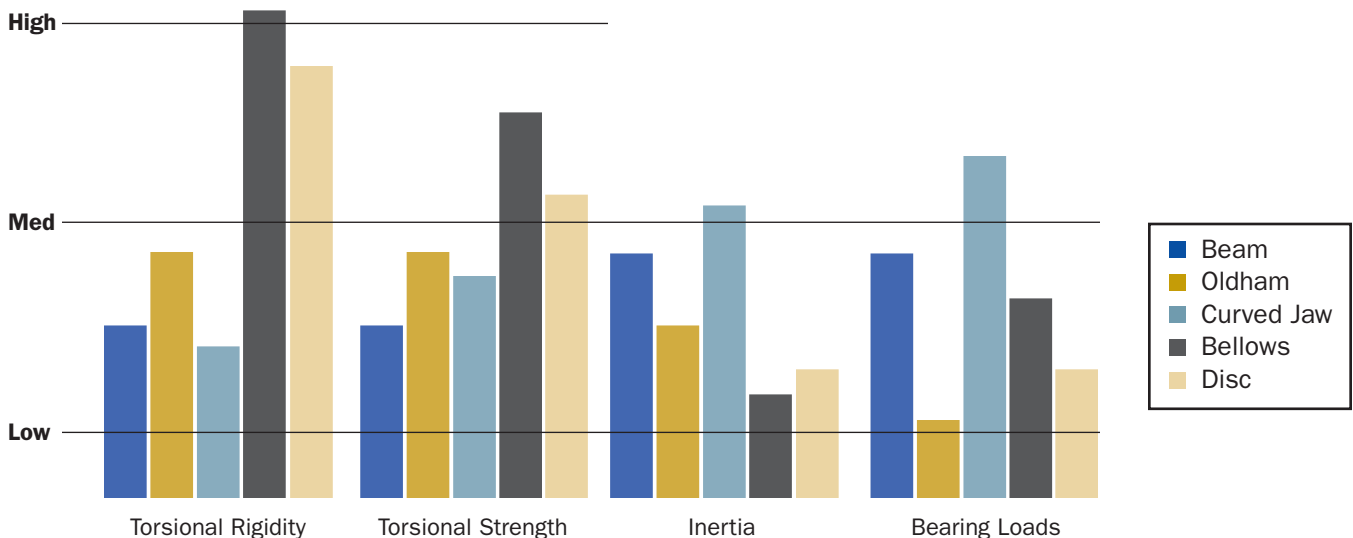
METRIC Clamp Screw	Seating Torque (Nm)	
	ALLOY	STAINLESS STEEL
M2	0.60	0.36
M2.5	1.21	0.73
M3	2.10	1.10
M4	4.60	2.50
M5	9.50	5.40
M6	16.00	9.60

### TORQUE RATINGS—SET SCREW

METRIC Set Screw	Seating Torque (Nm)	
	ALLOY	STAINLESS STEEL
M2.5	0.57	0.44
M3	0.92	0.73
M4	2.20	1.76
M5	4.00	3.20
M6	7.20	5.76

## Installation Instructions

1. Assure that the misalignment between shafts is within the coupling's ratings.
2. Align both hubs of the coupling on the shafts that are to be joined.
3. Fully tighten the screw(s) on one hub to their recommended seating torque (see charts above).
4. Before tightening the screw(s) on the second hub, rotate the coupling by hand to allow it to reach its free length.
5. Tighten the hub on the second shaft such that the misalignment angle remains centered along the length of the coupling and the coupling remains axially relaxed.





We are committed to have the largest variety of sizes and styles in the industry. In addition to the items listed below, we can manufacture an extensive variety of special designs. Please contact us with your custom needs.

## OLDHAM COUPLING

Clamp and  
set screw  
styles.



## BELLOWS COUPLING

Clamp and  
set screw  
styles.



## BEAM COUPLING

Clamp and  
set screw  
styles.



## JAW COUPLING

Clamp and  
set screw  
styles.



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One-piece  
integral  
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One- and  
two-piece  
styles.



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set screw  
styles.



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two-piece  
styles.

