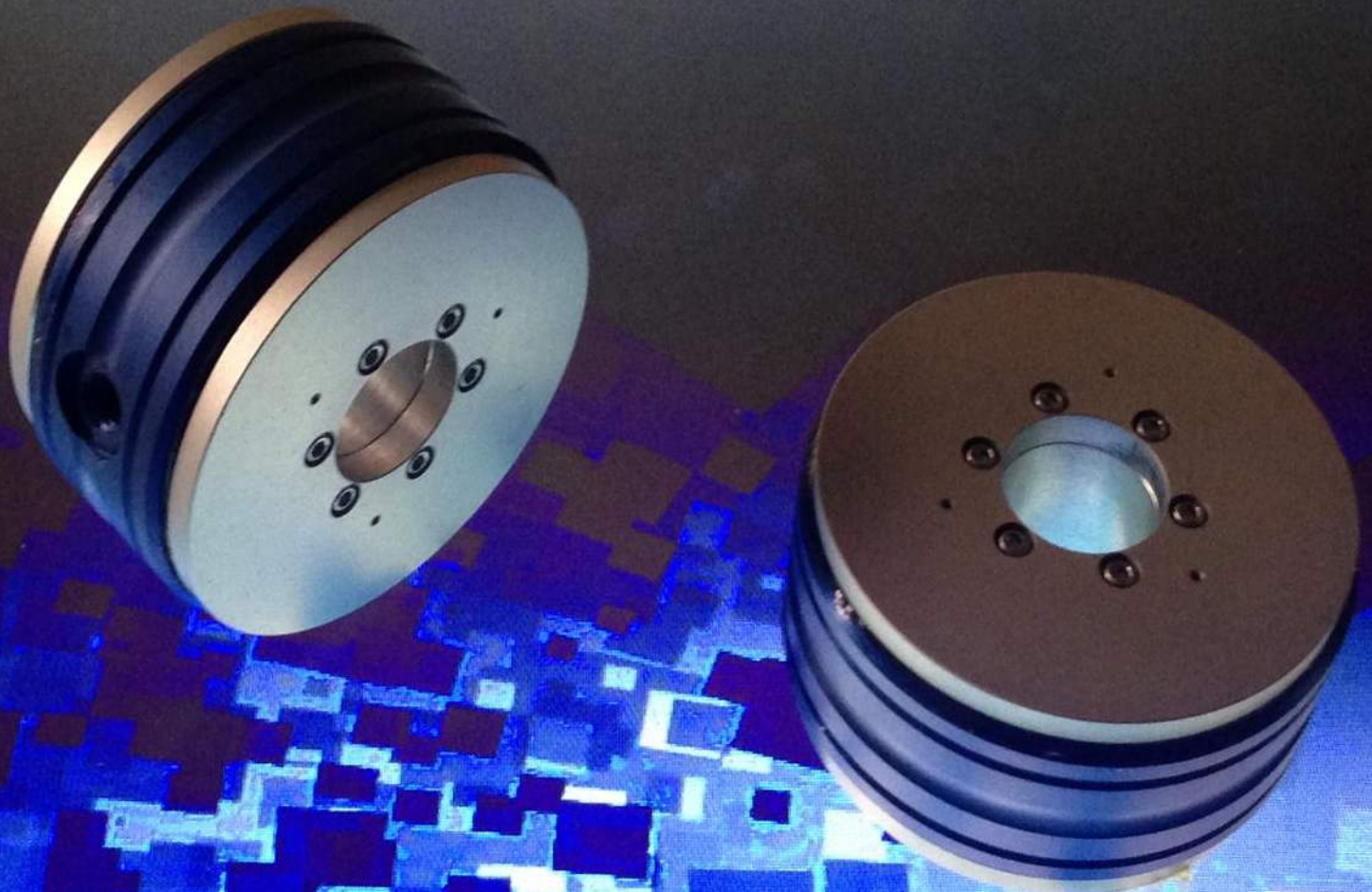




Product Book

&
Design Guide



Go to: www.oavco.com Your first step for frictionless motion.



OUR PRODUCTS BLEND OUTSTANDING DESIGN WITH SUPERIOR QUALITY AND WORKMANSHIP

OAV® AIR BEARING SPECIFICATION GUIDE

INTRODUCTION

OAV Air Bearings is the leading manufacturer of the recently advanced air bearing technology. We are committed to providing our customers with the most precise bearing system available spread over many existing and emerging markets around the world. Advanced technologies have led to major breakthroughs and have given way to new markets.

THE BEST JUST GOT BETTER

Drive your overall equipment efficiencies higher with OAV frictionless air bearings.

- * Higher Capacity
- * Higher Accuracy
- * No Friction
- * No downtime
- * Indefinite operating life
- * Higher Speed
- * Higher Damping
- * Ultra-smooth and quiet motion

Air bearings offer inherent advantages over traditional bearings as well as create opportunity for a much broader range of applications. But OAV Air bearings offer more: integrated Air bearings, Aerospace materials and standardization of product and proven performance in the most demanding applications.

We are focused on understanding our customer engineering problems and strive to find solutions that are tailored to each individual application in finding ultimate success.

GENERAL GUIDELINES

The data presented here provides guidelines and reference for the identification of bearings and components. The information referenced is deemed reliable but not guaranteed. Oav Air bearings reserves the right to make changes to, and amendments of, any information displayed without notice.

HOW TO USE THIS CATALOG

First, identify the correct part number in the Catalog. If you are unable to identify the correct bearing, then utilize the Air Bearing Design Guide. Bearings in this catalog are arranged by standard bearing type, with a size and/or type listing. Each bearing listed includes the appropriate dimensions. If the specific bearing type is not known, contact your Oav Air bearing representative to request engineering support.

A FULL LINE OF AIR BEARINGS

Bearings

Air Bushings
Flat Round Air Bearings
OAV® Roller Air Bearing
Thrust Air Bearing and Bushings
Flat Rectangular
Vacuum Preloaded Air Bearing

Assemblies

Air Bearing Guide
Linear Motion Guide

Mounting Components

Balls
Clamp On Shaft Precision Face Collars
Housing Mounting Blocks
Shaft End Support
O-Rings
Shafts
Mounting Screws
Tubings and Fittings
Air Filters and Regulators

Main Features of Product

Zero Friction-indefinite operating life
Air is clean, contaminant free, clean environments
Zero friction -No heat generation at high speeds
High accuracy components,
High accuracy motion
High speed
Higher Damping
Position accuracy better than 0.1 micron
Ultra-precise linear and rotary motion
Manufactured from Aircraft Quality Material

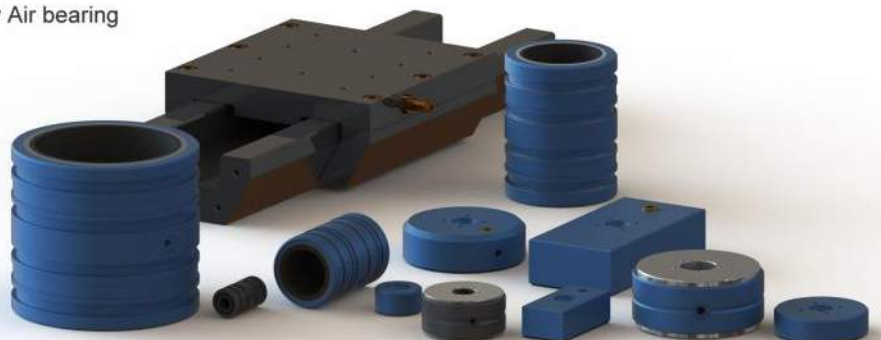
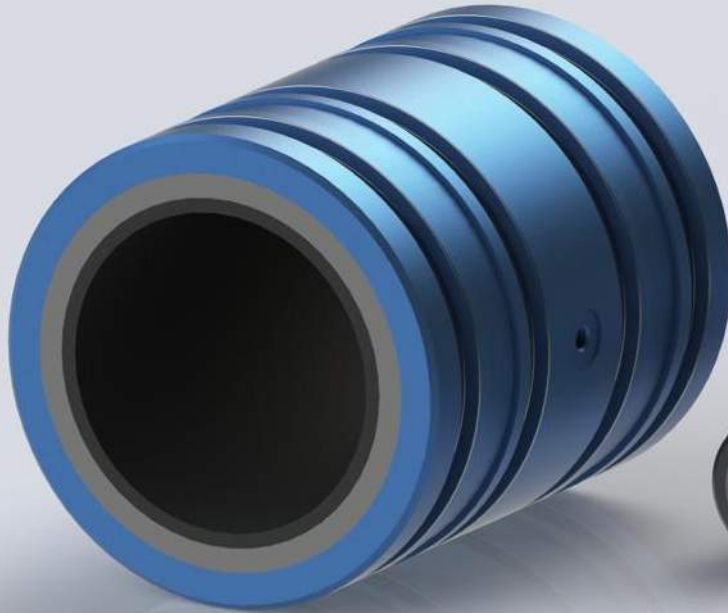


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OAV® Air Bushings



Through its range of Bushings, OAV Air Bearing proudly unveils all the craftsmanship that is to be found in its Manufacturer in Princeton, New Jersey.

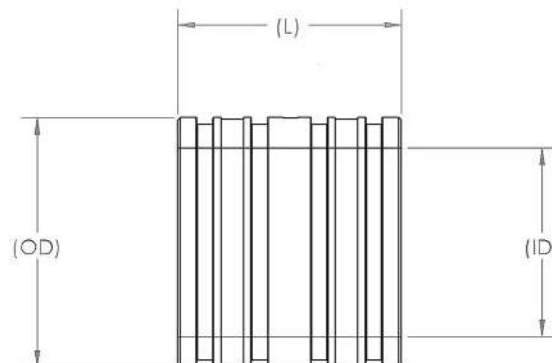
OAV Air Bearings also demonstrate true excellence in design. The bushings have a strong technical aspect but remain nonetheless full of character. Building on the success of the Standard Product Line already launched in 2011, OAV Air Bearings introduces here some new fresh designs to satisfy its most demanding applications in the upper segment of its price range.

English Size

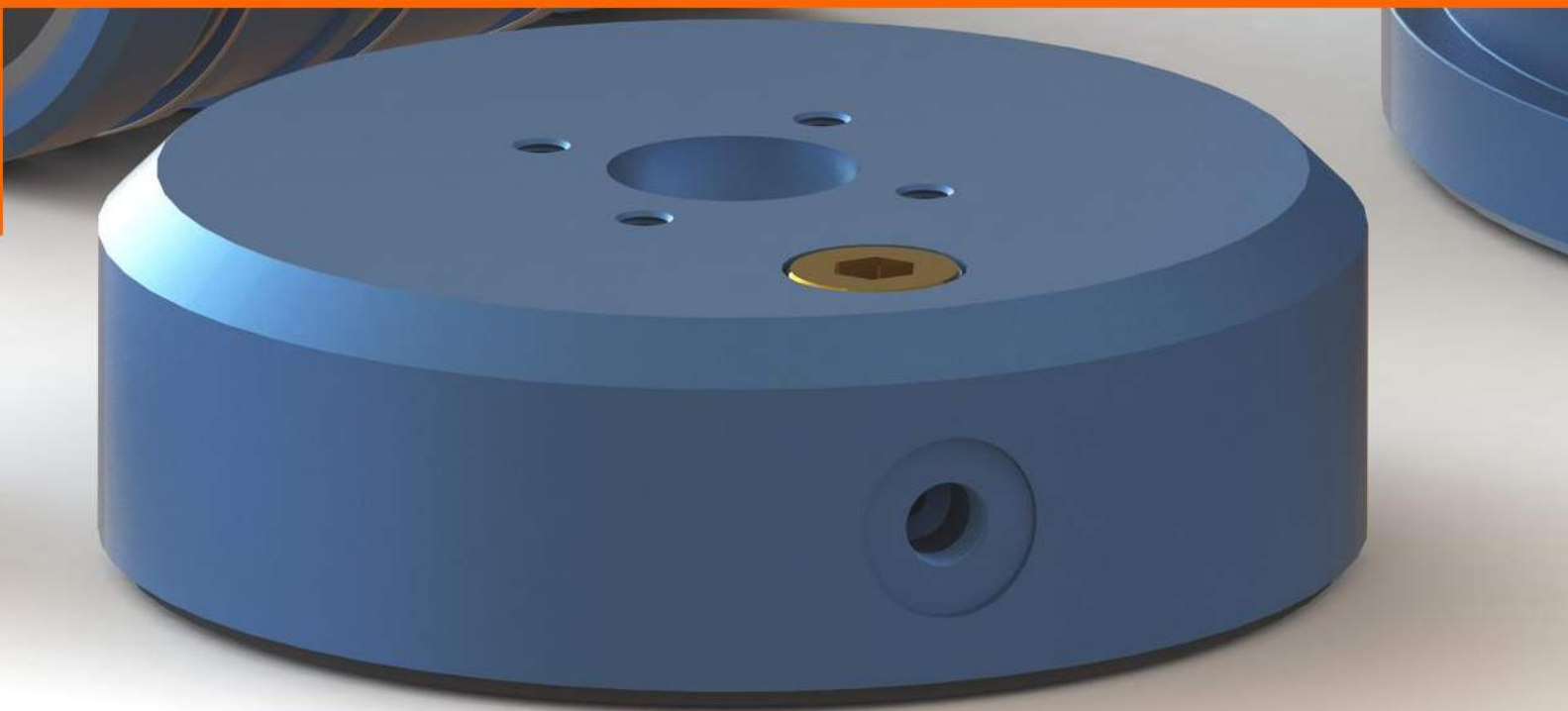
Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Pitch Moment Max	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Recommended Shaft (OD)
0.250	OAV0250IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	2.94 lbs	0.125 lbs-in (0.013 N-m)	0.01 lbs/μ in (2 N/μ m)	3 SCFH	0.634	0.2507	1.250	9.8 grams	0.2500 in - .0007in
0.375	OAV0375IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	4.44 lbs	2.75 lbs-in (0.29 N-m)	0.04 lbs/μ in (7 N/μ m)	4.5 SCFH	0.634	0.3757	1.250	8.8 grams	0.3750 in - .0007in
0.500	OAV0500IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	9.5 lbs	7.5 lbs-in (0.8 N-m)	0.06 lbs/μ in (11 N/μ m)	5.98 SCFH	0.932	0.5007	2.000	33.9 grams	0.5000 in - .0007in
0.750	OAV0750IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	34.4 lbs	10 lbs-in (1.1 N-m)	0.13 lbs/μ in (23 N/μ m)	8.98 SCFH	1.25	0.7507	2.000	51.6 grams	0.7500 in - .0007in
1.000	OAV1000IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	51.6 lbs	17 lbs-in (1.9 N-m)	0.19 lbs/μ in (34 N/μ m)	11.97 SCFH	1.532	1.0007	2.250	79.5 grams	1.0000 in - .0007in
1.500	OAV1500IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	126.2 lbs	28 lbs-in (3.1 N-m)	0.41 lbs/μ in (72 N/μ m)	17.96 SCFH	2.346	1.5007	3.000	266.0grams	1.5000 in - .0007in
2.000	OAV2000IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	198.0 lbs	46 lbs-in (5.2 N-m)	0.63 lbs/μ in (110 N/μ m)	23.94 SCFH	2.918	2.0007	3.500	446.4grams	2.0000 in - .0007in
3.000	OAV3000IB	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	298.0 lbs	63 lbs-in (7.1 N-m)	0.91 lbs/μ in (159 N/μ m)	35.92 SCFH	3.917	3.0007	3.500	620.2grams	3.0000 in - .0007in

Metric Size

Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Pitch Moment Max	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Recommended Shaft (OD)
6mm	OAV006MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	12.4N	0.013 N-m (.125 lbs-in)	2 N/μ m (0.01 lbs/μ in)	2.84 SCFH	16.1	6.018	31.8	9.9 grams	6.00mm - .02mm
10mm	OAV010MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	20.6N	0.29 N-m (2.75 lbs-in)	7 N/μ m (0.04 lbs/μ in)	4.70 SCFH	16.1	10.018	31.8	8.6 grams	10.00mm - .02mm
13mm	OAV013MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	42.5N	0.80N-m (7.5 lbs-in)	11 N/μ m (0.06 lbs/μ in)	6.12 SCFH	23.7	13.018	50.8	32.5 grams	13.00mm - .02mm
20mm	OAV020MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	160N	1.1 N-m (10 lbs-in)	23 N/μ m (0.13 lbs/μ in)	9.42 SCFH	31.8	20.018	50.8	49.1 grams	20.00mm - .02mm
25mm	OAV025MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	226.3N	1.9 N-m (17 lbs-in)	34 N/μ m (0.19 lbs/μ in)	11.78 SCFH	38.9	25.018	57.2	72 grams	25.00mm - .02mm
40mm	OAV040MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	593.8N	3.1N-m (28 lbs-in)	72 N/μ m (0.41 lbs/μ in)	18.85 SCFH	59.6	40.018	76.2	249.1 grams	40.00mm - .02mm
50mm	OAV050MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	866.3N	5.2N-m (46 lbs-in)	110 N/μ m (0.63 lbs/μ in)	23.57 SCFH	74.1	50.018	88.9	443.0 grams	50.00mm - .02mm
75mm	OAV075MB	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5X 0.8	1300N	7.1N-m (63 lbs-in)	159 N/μ m (0.91 lbs/μ in)	35.42 SCFH	99.5	75.018	88.9	688.1 grams	75.00mm - .02mm



Flat Round Air Bearings

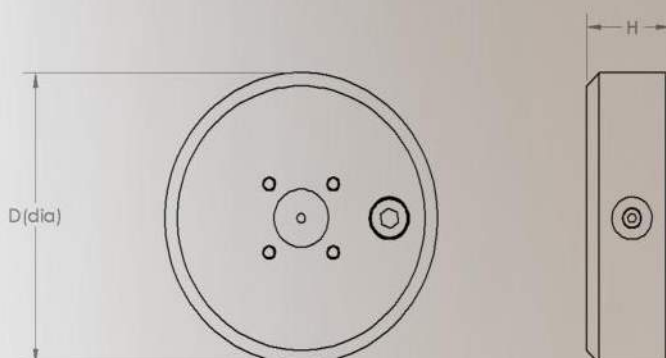


Through its Standard Product Line, OAV Air Bearings demonstrates that high quality precision bearings can be offered at a very competitive yet cost effective price positioning. Our Flat Round air bearings work on any flat, nonporous surfaces. Featuring one of the best precision bearing movements on the market and assembled according to the very high demanding OAV Air Bearings quality standards, the Standard Product Line offers a wonderful blend of reassuring precision along with an infinite lifespan. A very attractive alternative for tasks where high speeds, non-contact, and no-noise are imperative.

Flat Round

Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port *	Max Load	Stiffness	Flow Rate	(Dia)	(H)	Weight	Flatness
25mm dia	OAVR025R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	23 lbs	18 N/ μ m (0.10 lbs/ μ in)	1.3 SCFH	25	13	14 grams	0.0005 mm (0.00002 in)
40mm dia	OAVR040R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	54 lbs	23 N/ μ m (0.13 lbs/ μ in)	2.0 SCFH	40	13	34 grams	0.0005 mm (0.00002 in)
50mm dia	OAVR050R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	84 lbs	37 N/ μ m (0.21 lbs/ μ in)	2.5 SCFH	50	13	61 grams	0.0005 mm (0.00002 in)
65mm dia	OAVR065R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	145 lbs	64 N/ μ m (0.37 lbs/ μ in)	3.2 SCFH	65	20	149 grams	0.0005 mm (0.00002 in)
80mm dia	OAVR080R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	222 lbs	98 N/ μ m (0.56 lbs/ μ in)	4.0 SCFH	80	20	231 grams	0.0005 mm (0.00002 in)
100mm dia	OAVR100R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	354 lbs	156 N/ μ m (0.89 lbs/ μ in)	5.1 SCFH	100	25	436 grams	0.0005 mm (0.00002 in)
125mm dia	OAVR125R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	557 lbs	237 N/ μ m (1.4 lbs/ μ in)	6.4 SCFH	125	35	1028 grams	0.0005 mm (0.00002 in)
150mm dia	OAVR150R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	806 lbs	350 N/ μ m (2.0 lbs/ μ in)	7.7 SCFH	150	50	2085 grams	0.0005 mm (0.00002 in)
200mm dia	OAVR200R	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	1403 lbs	630 N/ μ m (3.6 lbs/ μ in)	10.1 SCFH	200	70	4765 grams	0.0005 mm (0.00002 in)

*Both top and side air ports available for size 65mm dia and larger. Comes with 1 plug.



OAV® Roller Air Bearing



OAV Air Bearing's another unique interpretation of innovation, the "OAV Roller Air Bearing", this time for ultra precision, hard install, fixed location bearing to replace your conventional bearings. This development only confirms the brand's positioning as one of the most innovative and forward thinking Air Bearings manufacturers in the world.

OAV Roller Air Bearing is a Ultra Precision, Hard install, Fix location bearing to replace your conventional bearings. The result is no frictions, no contact surface, requires no maintenance, indefinite operating life, with no heat generated at high speeds.

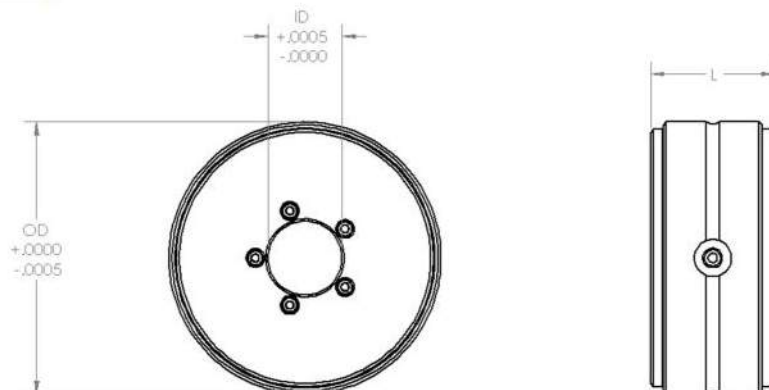
English Size

Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Axial Load	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Max Rotational Speed
0.500	OAVRL0500	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	6.5 lbs	27 lbs	0.06 lbs/μ in (11 N/μ m)	12.2 SCFH	1.75	0.5000	0.865	76 grams	>70,000 RPM
0.750	OAVRL0750	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	22.6 lbs	85 lbs	0.13 lbs/μ in (23 N/μ m)	18.7 SCFH	2.75	0.7500	1.250	302 grams	>60,000 RPM
1.000	OAVRL1000	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	28.6 lbs	155 lbs	0.19 lbs/μ in (34 N/μ m)	23.6 SCFH	3.5	1.0000	1.375	498 grams	>45,000 RPM
1.500	OAVRL1500	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	56.2 lbs	185 lbs	0.41 lbs/μ in (72 N/μ m)	33.83 SCFH	4	1.5000	1.625	585 grams	>40,000 RPM
2.000	OAVRL2000	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	70.1 lbs	175 lbs	0.63 lbs/μ in (110 N/μ m)	39.30 SCFH	4.25	2.0000	1.750	636 grams	>35,000 RPM
3.000	OAVRL3000	7075 Al/blck Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	124.8 lbs	260 lbs	0.91 lbs/μ in (159 N/μ m)	57.90 SCFH	5.5	3.0000	2.000	1102 grams	>33,000 RPM

Metric Size

Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Axial Load	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Max Rotational Speed
13mm	OAVRL13M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	28.8 N	120 N	11 N/μ m (0.06 lbs/μ in)	12.2 SCFH	44.5	13.000	22.0	76 grams	>70,000 RPM
20mm	OAVRL20M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	100.4 N	378 N	23 N/μ m (0.13 lbs/μ in)	18.7 SCFH	70.0	20.000	31.8	302 grams	>60,000 RPM
25mm	OAVRL25M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	127.0 N	689.5 N	34 N/μ m (0.19 lbs/μ in)	23.6 SCFH	90.0	25.000	34.9	498 grams	>45,000 RPM
40mm	OAVRL40M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	250.0 N	822.9 N	72 N/μ m (0.41 lbs/μ in)	33.83 SCFH	100.0	40.000	41.3	585 grams	>40,000 RPM
50mm	OAVRL50M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	311.8 N	778.4 N	110 N/μ m (0.63 lbs/μ in)	39.30 SCFH	110.0	50.000	44.5	636 grams	>35,000 RPM
75mm	OAVRL75M	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	555.1 N	1156.5 N	159 N/μ m (0.91 lbs/μ in)	57.90 SCFH	140.0	75.000	50.8	1102 grams	>33,000 RPM

- TIR ±1 millionths of an inch
- Flatness of Rotation ±6 millionths



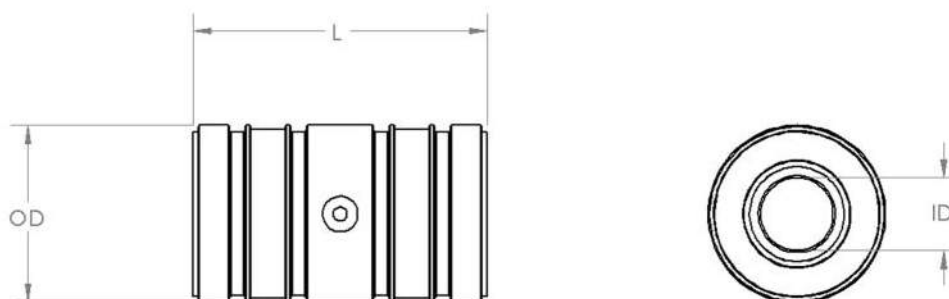
OAV® Thrust Air Bearing and Bushings



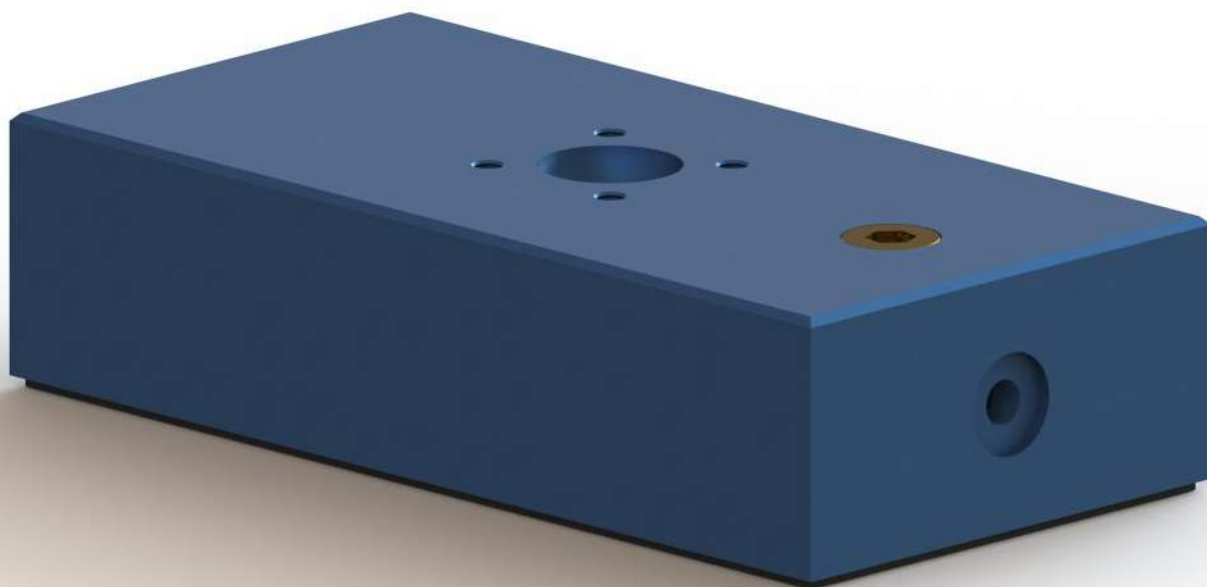
Yet another World Premiere by OAV Air Bearings! The presentation of the Thrust Air Bushing and Bearings has already broken boundaries introducing the first available Air Bearing that fully integrates and works on a 3 way Frictionless surface.

Bushing Size														
Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Thrust Load	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Max Rotational Speed
13mm	OAVTR32i13	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	9.7 lbs	18.3 lbs	11 N/μm (0.06 lbs/μ in)	8.1 SCFH	31.8	13	52.8	84.4 grams	>70,000 RPM
20mm	OAVTR60i20	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	54.9 lbs	84.0 lbs	23 N/μm (0.13 lbs/μ in)	15.6 SCFH	60	20	79.2	465 grams	>60,000 RPM
25mm	OAVTR60i25	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	68.6 lbs	68.1 lbs	34 N/μm (0.19 lbs/μ in)	14.8 SCFH	60	25	79.2	416.9 grams	>45,000 RPM
50mm	OAVTR100i50	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	195.9 lbs	193.8 lbs	110 N/μm (0.63 lbs/μ in)	28.5 SCFH	100	50	91.4	1237.9 grams	>35,000 RPM
75mm	OAVTR150i75	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	293.8 lbs	498.0 lbs	159 N/μm (0.91 lbs/μ in)	42.1 SCFH	150	75	91.4	2899.9 grams	>35,000 RPM

Bearing Size														
Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port	Radial Load	Thrust Load	Radial Stiffness	flow rate	(OD)	(ID)	(L)	Weight	Max Rotational Speed
13mm	OAVTR32i13	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	2.4 lbs	18.3 lbs	11 N/μm (0.06 lbs/μ in)	8.1 SCFH	31.8	13	12.7	12.8 grams	>70,000 RPM
20mm	OAVTR60i20	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	11.7 lbs	84.0 lbs	23 N/μm (0.13 lbs/μ in)	15.6 SCFH	60	20	16.5	95.7 grams	>60,000 RPM
25mm	OAVTR60i25	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	14.7 lbs	68.1 lbs	34 N/μm (0.19 lbs/μ in)	14.8 SCFH	60	25	16.5	86.7 grams	>45,000 RPM
50mm	OAVTR100i50	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	42.9 lbs	193.8 lbs	110 N/μm (0.63 lbs/μ in)	28.5 SCFH	100	50	19.6	266.3 grams	>35,000 RPM
75mm	OAVTR150i75	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	64.4 lbs	498.0 lbs	159 N/μm (0.91 lbs/μ in)	42.1 SCFH	150	75	19.6	476.4 grams	>35,000 RPM



Flat rectangular Air Bearing

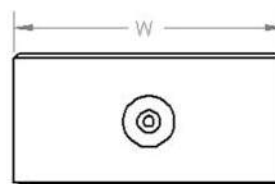
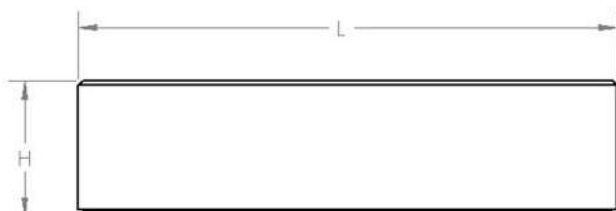


The design of our Porous Carbon material breathes the OAV Air Bearing DNA. Majestically combined with Military Spec materials to provide a precise mind-boggling floating effect around the surfaces. We are proud to have brought Aerospace Technology to the Air Bearing System!

OAV Flat Air Bearings are often used as a standard, off-the-shelf solution for providing axial constraint in rotary motion applications. Our standard product line is available in metric sizing with Custom sizes being made to order.

Flat Rectangular													
Size	Part Number	Housing Material	Input Pressure	Core Materials	Pressure Port *	Max Load	Stiffness	Flow Rate	(L)	(W)	(H)	Weight	Flatness
20x40mm	OAVF20L40	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	37 lbs	14 N/μm (0.08 lbs/μin)	2.0 SCFH	20	40	13	25 grams	0.0005 mm (0.00002 in)
25x50mm	OAVF25L50	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M3 X 0.5	55 lbs	22 N/μm (0.13 lbs/μin)	2.4 SCFH	25	50	17	47 grams	0.0005 mm (0.00002 in)
40x50mm	OAVF40L50	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	87 lbs	35 N/μm (0.20 lbs/μin)	2.9 SCFH	40	50	13	55 grams	0.0005 mm (0.00002 in)
40x80mm	OAVF40L80	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	139 lbs	58 N/μm (0.33 lbs/μin)	3.8 SCFH	40	80	20	143 grams	0.0005 mm (0.00002 in)
50x100mm	OAVF50L100	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	219 lbs	97 N/μm (0.56 lbs/μin)	4.8 SCFH	50	100	25	295 grams	0.0005 mm (0.00002 in)
25x100mm	OAVF25L100	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	116 lbs	46 N/μm (0.26 lbs/μin)	4.0 SCFH	25	100	25	163 grams	0.0005 mm (0.00002 in)
100x200mm	OAVF100L200	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	930 lbs	674 N/μm (3.82 lbs/μin)	9.6 SCFH	100	200	39	3625 grams	0.0005 mm (0.00002 in)
100x1000mm	OAVF100L1000	7075 Al/blue Anodize	60 psi - 100 psi	Carbon/Graphite	M5 X 0.8	4530 lbs	2868 N/μm (16.25 lbs/μin)	96.0 SCFH	100	1000	39	18125 grams	0.0005 mm (0.00002 in)

*Both top and side air ports available for size 40x80mm and larger. Comes with 1 plug.



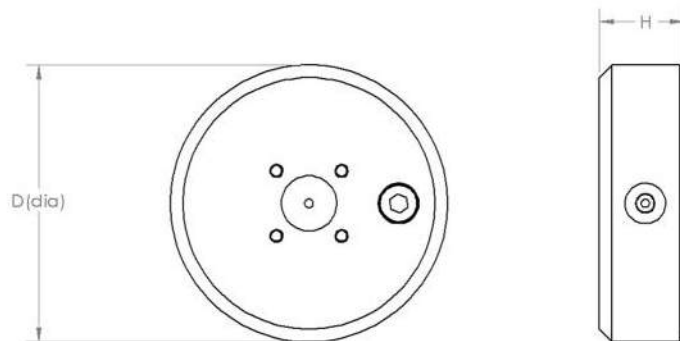
Vacuum Preloaded Air Bearing



For applications where pre-loading is difficult or impossible, OAV Vacuum Pre Loaded Air Bearings add vacuum like effect to the OAV Porous Media Technology. Moreover these bearings hold themselves down while simultaneously lifting themselves from the guide surface for the most precise results available. By adjusting the pressure and vacuum separately, the stiffness and fly height can boost.

Vacuum Preloaded

Size	Part Number	Housing Material	Input Pressure	Vacuum Pressure	Core Materials	Pressure Port	Vacuum Port	Max Load	Stiffness	Flow Rate	(Dia)	(H)	Weight	Flatness
50mm dia	OAVR050RV	7075 Al/blue Anodize	60 psi - 100 psi	15 in Hg	Carbon/Graphite	M5 X 0.8	M5 X 0.8	10.4 lbs	13 N/ μ m (0.08 lbs/ μ in)	2.4 SCFH	50	22	98 grams	0.001 mm (0.00004 in)
80mm dia	OAVR080RV	7075 Al/blue Anodize	60 psi - 100 psi	15 in Hg	Carbon/Graphite	M5 X 0.8	M5 X 0.8	25.3 lbs	30 N/ μ m (0.17 lbs/ μ in)	2.8 SCFH	80	22	253 grams	0.001 mm (0.00004 in)
100mm dia	OAVR100RV	7075 Al/blue Anodize	60 psi - 100 psi	15 in Hg	Carbon/Graphite	M5 X 0.8	M5 X 0.8	38.8 lbs	48 N/ μ m (0.28 lbs/ μ in)	4.9 SCFH	100	22	382 grams	0.001 mm (0.00004 in)



Mounting Components

Balls

This high carbon stainless is one of the hardest stainless steels and meets ASTM A276, ASTM A756 AND AMS 5630 as well as MIL-SPEC MS19063B. Sphericity within .0006mm



DETERMINATION OF BALL RETAINING PLATE PART NUMBERS

MIL-SPEC MS19063B Sphericity .0006mm

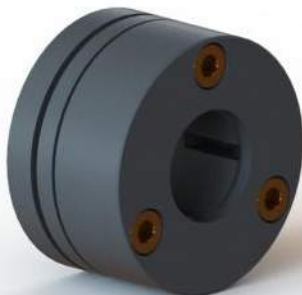
Bearing Part Number	B.C.(DIA)	BALL DIA.	HOLE SIZE	BALL RETAINER
Flat Rectanglar Air Bearings				
OAVF15L30	10.8	6	M1.4X0.3-6H	OAVBR06FL11
OAVF20L40	18	13	M1.6X0.35-6H	OAVBR13FL18
OAVF25L50	18	13	M1.6X0.35-6H	OAVBR13FL18
OAVF40L50	21.6	13	M3X0.5-6H	OAVBR13FL21
OAVF40L80	21.6	13	M3X0.5-6H	OAVBR13FL21
OAVF50L100	21.6	13	M3X0.5-6H	OAVBR13FL21
OAVF100L200	40	25	M3X0.5-6H	OAVBR25FL40
Round Air Bearings				
OAVR025R	N/A	13	N/A	N/A
OAVR040R	21.6	13	M3X0.5-6H	OAVBR13R21
OAVR050R	21.6	13	M3X0.5-6H	OAVBR13R21
OAVR065R	21.6	13	M3X0.5-6H	OAVBR13R21
OAVR080R	32	20	M3X0.5-6H	OAVBR20R32
OAVR100R	32	20	M3X0.5-6H	OAVBR20R32
OAVR125R	32	20	M3X0.5-6H	OAVBR20R32
OAVR150R	40	25	M3X0.5-6H	OAVBR25R40
OAVR200R	40	25	M3X0.5-6H	OAVBR25R40

Clamp On Shaft Precision Face Collars

C13TB1



C13TB2



For the first time, an air bearing is available that fully integrates and works on 3 way Frictionless surface. Face collars are an option for one or each face and prevents the shaft or bushing from moving side to side. Flat Precision Face Collars are used in conjunction with Thrust Air Bushings

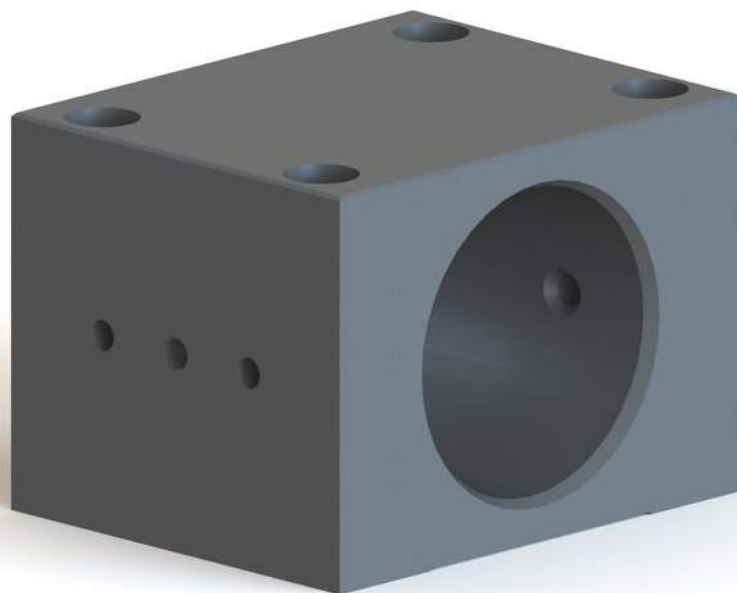
DETERMINATION OF FACE COLLARS PART NUMBERS

Precision Face Collars				
Part Number	Shaft Size	Compatible With		
C13TB1	13mm	OAVTB32i13	OAVTR32i13	
C20TB1	20mm	OAVTB60i20	OAVTR60i20	
C25TB1	25mm	OAVTB60i25	OAVTR60i25	
C50TB1	50mm	OAVTB100i50	OAVTR100i50	
C75TB1	75mm	OAVTB150i75	OAVTR150i75	
High Speed Balanced Precision Face Collars				
Part Number	Shaft Size	Compatible With		
		Thrust Bushings		Thrust Bearings
C13TB2	13mm	OAVTB32i13	OAVTR32i13	
C20TB2	20mm	OAVTB60i20	OAVTR60i20	
C25TB2	25mm	OAVTB60i25	OAVTR60i25	
C50TB2	50mm	OAVTB100i50	OAVTR100i50	
C75TB2	75mm	OAVTB150i75	OAVTR150i75	

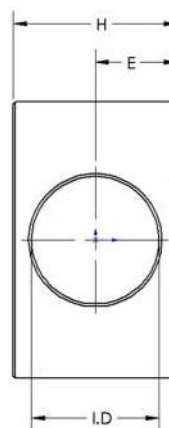
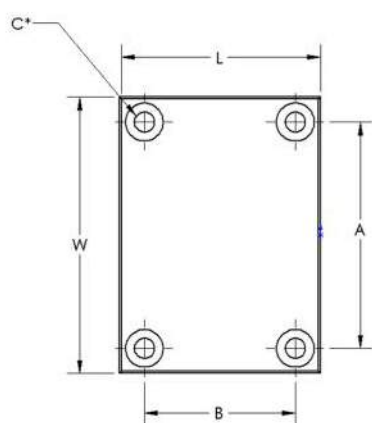
Mounting Components

Housing Mounting Blocks

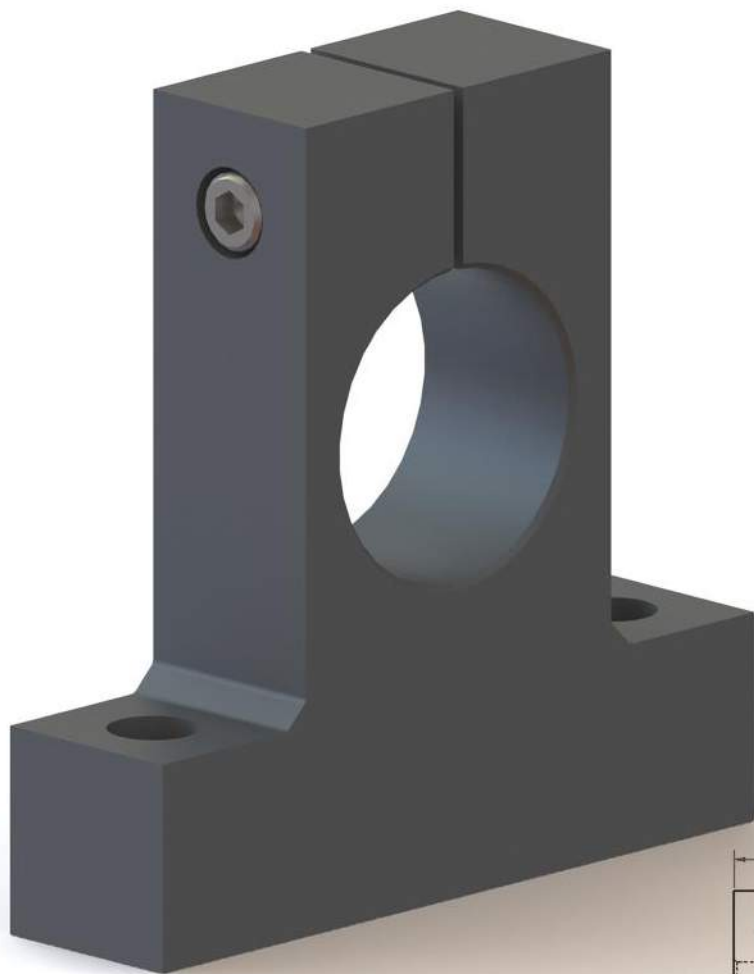
Housing Blocks for english or metric Air bushings manufactured from Aircraft Quality Aluminum and anodized with Mil spec. for design to ultimate Quality. Design allow easy assembling of custom slides using OAV air bushings, which are mounted inside on O-rings to allow self-alignment.



Part Number	ID	E	H	W	L	A	B	C*	Air Port	Compatible With
MBi0250	0.646	0.500	1.000	1.250	1.250	0.875	0.875	C1	M5X0.8	OAV0250IB, OAV006MB
MBi0500	0.947	0.750	1.500	2.000	2.000	1.500	1.500	C2	M5X0.8	OAV0500IB, OAV013MB
MBi0750	1.265	0.813	1.625	2.750	2.000	2.250	1.500	C2	M5X0.8	OAV0750IB, OAV020MB, OAVTB32i13
MBi1000	1.547	1.000	2.000	2.750	2.250	2.250	1.500	C2	M5X0.8	OAV1000IB, OAV025MB
MBi1500	2.361	1.625	3.250	3.750	3.000	3.000	2.000	C3	M5X0.8	OAV1500IB, OAV040MB, OAVTB60i20, OAVTB60i25
MBi2000	2.933	2.000	4.000	4.625	3.500	4.000	3.000	C3	M5X0.8	OAV2000IB, OAV050MB
MBi3000	3.932	2.375	4.750	5.750	3.500	5.000	3.000	C3	M5X0.8	OAV3000IB, OAV075MB, OAVTB100i50
*	C1	4-40 SOCKET HEAD SCREW/M4X0.7 TAPPED FAR SIDE								
	C2	10-32 SOCKET HEAD SCREW/M8x1.25 TAPPED FAR SIDE								
	C3	1/4-20 SOCKET HEAD SCREW / M8x1.25 TAPPED FAR SIDE								

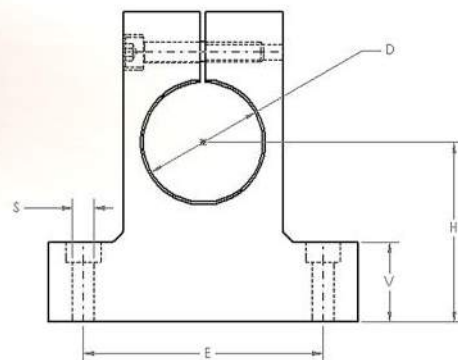
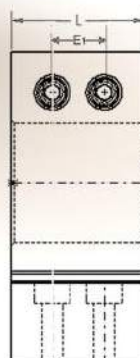


Mounting Components



Shaft End Support

Black Anodized aluminum end support block is lightweight and strong for end mounting to support precision shafting are available for inch and metric sizes.



Shaft End Support

English Sizes								
Part Number	D	H	L	E	E1	V	S*	SHAFT SIZE
SEMI-OAV0250	0.250	1.000	0.500	1.500	N/A	0.500	S1	0.2500
SEMI-OAV0375	0.375	1.125	0.750	2.000	N/A	0.625	S2	0.3750
SEMI-OAV0500	0.500	1.375	0.750	2.000	N/A	0.625	S2	0.5000
SEMI-OAV0750	0.750	1.438	0.750	2.000	N/A	0.750	S2	0.7500
SEMI-OAV1000	1.000	1.625	0.875	2.000	N/A	0.875	S2	1.0000
SEMI-OAV1500	1.500	2.250	1.000	3.000	N/A	1.000	S2	1.5000
SEMI-OAV2000	2.000	2.625	1.875	4.000	1.000	1.125	S2	2.0000
SEMI-OAV3000	3.000	3.000	1.875	5.000	1.000	1.250	S2	3.0000
* S1	#10 SOCKET HEAD SCREW TYP							
S2	1/4 SOCKET HEAD SCREW TYP							
Metric Sizes								
Part Number	D	H	L	E	E1	V	S*	SHAFT SIZE
SEMM-OAV06	6mm	25.4	12.7	38.1	N/A	12.7	S1	6.00mm
SEMM-OAV10	10mm	28.6	19.1	50.8	N/A	15.9	S2	10.00mm
SEMM-OAV13	13mm	34.9	19.1	50.8	N/A	15.9	S2	13.00mm
SEMM-OAV20	20mm	36.5	19.1	50.8	N/A	19.1	S2	20.00mm
SEMM-OAV25	25mm	41.3	22.2	50.8	N/A	22.2	S2	25.00mm
SEMM-OAV40	40mm	57.2	25.4	76.2	N/A	25.4	S2	40.00mm
SEMM-OAV50	50mm	66.7	47.6	101.6	25.4	28.6	S2	50.00mm
SEMM-OAV75	75mm	76.2	47.6	127.0	25.4	31.8	S2	75.00mm
* S1	5mm SOCKET HEAD SCREW TYP							
S2	6mm SOCKET HEAD SCREW TYP							

Mounting Components

O RING

The O-Rings Meet MIL-R-83248C and ASTM D2000/SAE J200. They offer excellent resistance. Temperature range is -15° to +400° F. Hardness is A75. Color is black



DETERMINATION OF O-RINGS COMPATIBLE PART NUMBERS

Compatible With:	
AIR BUSHINGS (METRIC)	O-RINGS
OAV006MB	OAV0250RG
OAV010MB	OAV0375RG
OAV013MB	OAV0500RG
OAV020MB	OAV0750RG
OAV025MB	OAV1000RG
OAV040MB	OAV1500RG
OAV050MB	OAV2000RG
OAV075MB	OAV3000RG
AIR BUSHINGS (ENGLISH)	O-RINGS
OAV0250IB	OAV0250RG
OAV0375IB	OAV0375RG
OAV0500IB	OAV0500RG
OAV0750IB	OAV0750RG
OAV1000IB	OAV1000RG
OAV1500IB	OAV1500RG
OAV2000IB	OAV2000RG
OAV3000IB	OAV3000RG

SHAFT

Manufactured from Aircraft quality Stainless Steel shafts surface finish better than 16 RMS and .0007 tolerance



DETERMINATION OF SHAFT SIZE COMPATIBLE PART NUMBERS

Compatible With:	TOLERANCE	SIZE	SHAFT SIZE PART#
AIR BUSHINGS (METRIC)			
OAV006MB	+0/- .02mm	6MM	OAV06MMSHAFT
OAV010MB	+0/- .02mm	10MM	OAV10MMSHAFT
OAV013MB	+0/- .02mm	13MM	OAV13MMSHAFT
OAV020MB	+0/- .02mm	20MM	OAV20MMSHAFT
OAV025MB	+0/- .02mm	25MM	OAV25MMSHAFT
OAV040MB	+0/- .02mm	40MM	OAV40MMSHAFT
OAV050MB	+0/- .02mm	50MM	OAV50MMSHAFT
OAV075MB	+0/- .02mm	50MM	OAV75MMSHAFT
AIR BUSHINGS (ENGLISH)			
OAV0250IB	+0/-0.0007"	0.250INC	OAV0250SHAFT
OAV0375IB	+0/-0.0007"	0.375INC	OAV0375SHAFT
OAV0500IB	+0/-0.0007"	0.500INC	OAV0500SHAFT
OAV0750IB	+0/-0.0007"	0.750INC	OAV0750SHAFT
OAV1000IB	+0/-0.0007"	1.000INC	OAV1000SHAFT
OAV1500IB	+0/-0.0007"	1.500INC	OAV1500SHAFT
OAV2000IB	+0/-0.0007"	2.000INC	OAV2000SHAFT
OAV3000IB	+0/-0.0007"	3.000INC	OAV3000SHAFT

Mounting Components

Mounting Screws

This high carbon stainless meets aerospace quality. With ball end configuration .0006mm tolerance always parallel and easy to install.



****DETERMINATION OF MOUNTING SCREWS SIZE COMPATIBLE PART NUMBERS*****

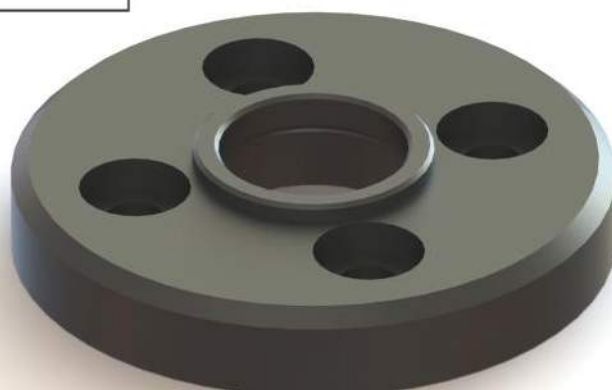
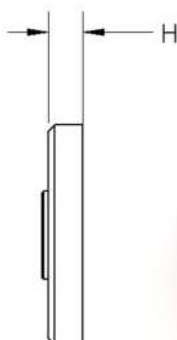
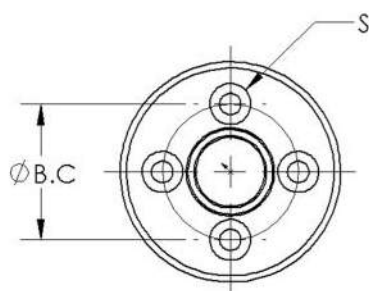
Compatible With:	TOLERANCE	SIZE	PART#
FLAT RECTANGULAR BEARINGS			
OAVF20L40	.0006mm	13MM	OAV13MSCREW
OAVF25L50	.0006mm	13MM	OAV13MSCREW
OAVF40L50	.0006mm	13MM	OAV13MSCREW
OAVF40L80	.0006mm	13MM	OAV13MSCREW
OAVF50L100	.0006mm	13MM	OAV13MSCREW
OAVF100L200	.0006mm	25MM	OAV25MSCREW
FLAT ROUND AIR BEARINGS			
OAVR025R	.0006mm	13MM	OAV13MSCREW
OAVR040R	.0006mm	13MM	OAV13MSCREW
OAVR050R	.0006mm	13MM	OAV13MSCREW
OAVR065R	.0006mm	13MM	OAV13MSCREW
OAVR080R	.0006mm	20MM	OAV20MSCREW
OAVR100R	.0006mm	20MM	OAV20MSCREW
OAVR125R	.0006mm	20MM	OAV20MSCREW
OAVR150R	.0006mm	25MM	OAV25MSCREW
OAVR200R	.0006mm	25MM	OAV25MSCREW
VACUUM PRELOADED AIR BEARINGS			
OAVR050RV	.0006mm	13MM	OAV13MSCREW
OAVR080RV	.0006mm	13MM	OAV13MSCREW
OAVR100RV	.0006mm	25MM	OAV25MSCREW

Retaining Plate

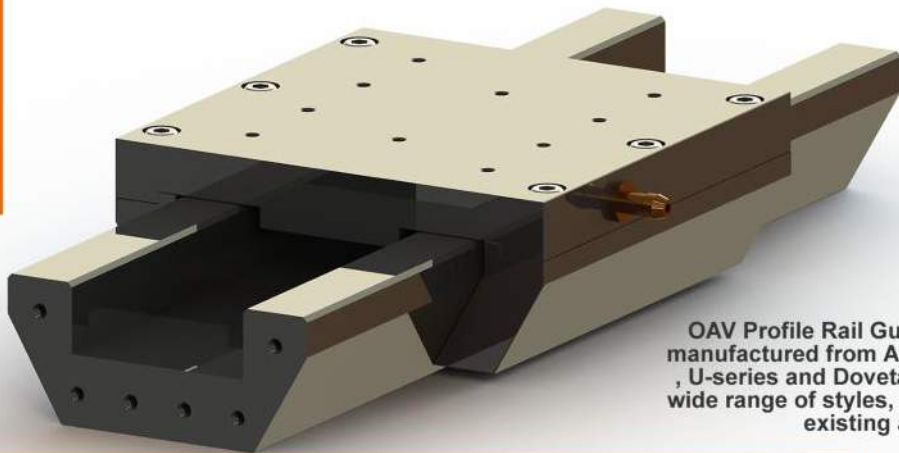
This high Quality Aluminum Anodized meets aerospace quality. 0006mm tolerance always parallel and easy to install.



RETAINER PLATE	B.C.(DIA)	H	S	Compatible With	
				Flat Rectanglar Air Bearings	Round Air bearings
OAVBR13R18	18	0.250	M1.6	OAVF20L40, OAVF25L50	N/A
OAVBR13R21	21.6	0.250	M3	OAVF40L50, OAVF40L80, OAVF50L100	OAVR040R, OAVR050R, OAVR065R
OAVBR20R32	32	0.500	M3	N/A	OAVR080R, OAVR100R, OAVR125R
OAVBR25R40	40	0.625	M3	OAVF100L200	OAVR150R, OAVR200R



Air Bearing Guides



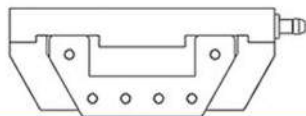
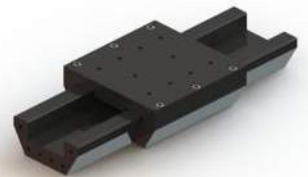
Air Bearing Guides

OAV Profile Rail Guides consists of the next generation Oav Air Bearing® and manufactured from Aircraft Quality lightweight linear guides, Box Series, T-Series, U-series and Dovetail Series. It is a complete offering of Air Bearing slides in a wide range of styles, sizes and unique features produced for easy retrofitting into existing applications or designing into new applications.

Dovetail-series

OAV Profile Dovetail Series Rail Guides consists of the next generation Oav Air Bearing® and manufactured from Aircraft Quality lightweight linear guides

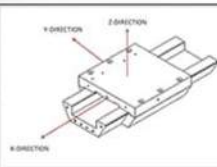
Standard OAV Air bearings guide tolerances
Local straightness .25µm per 25mm travel with a maximum error of 2µm per 1000mm travel..
Flatness .0005mm or .00002inc.



OAV Dovetail-series manufactured from Aircraft Quality lightweight Material, Ultra precise linear straightness and flatness vibration-free, maintenance-free motion. Ready to install, Integrated locking brake function, through pretensioning of the air bearing, for ultimate accuracy positioning.

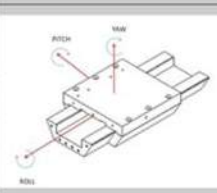
Dovetail Series Linear Guide Systems (Load Capacity (lbs))

	size (mm x mm)	Load Capacity (lbs)		
		60 PSI	80 PSI	100 PSI
Z direction	150x150	180	240	300
	150x300	360	480	600
Y direction	150x150	135	180	225
	150x300	270	360	450



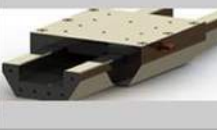
Dovetail Series Linear Guide Systems (Max Moment (in-lbs))

	size (mm x mm)	Max Moment (in-lbs)		
		60 PSI	80 PSI	100 PSI
Pitch	150x150	214	285	356
	150x300	742	990	1237
Roll	150x150	240	320	400
	150x300	742	990	1237
Yaw	150x150	105	140	175
	150x300	371	495	618



Dovetail Series Linear Guide Systems Stiffness (lbs/micro inch)

	size (mm x mm)	Stiffness (lbs/micro inch)		
		60 PSI	80 PSI	100 PSI
Z direction	150x150	0.96	1.28	1.60
	150x300	1.36	1.81	2.26
Y direction	150x150	1.65	2.20	2.75
	150x300	2.33	3.11	3.88

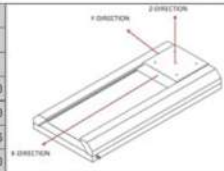


U-Series

OAV Profile Dovetail Series Rail Guides consists of the next generation OAV Air Bearing® and manufactured from Aircraft Quality lightweight linear guides Standard OAV Air bearings guide tolerances
Local straightness .25µm per 25mm travel with a maximum error of 2µm per 1000mm travel..
Flatness .0005mm or .00002inc.

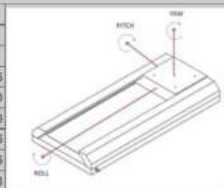
U-Series Series Linear Guide System (Load Capacity (lbs))

	size (mm x mm)	Load Capacity (lbs)		
		60 PSI	80 PSI	100 PSI
Z direction	150x150	450	600	750
	150x300	900	1200	1500
Y direction	150x150	123	164	205
	150x300	246	328	410



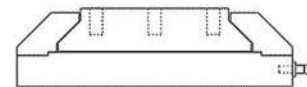
U-Series Series Linear Guide System (Max Moment (in-lbs))

	size (mm x mm)	Max Moment (in-lbs)		
		60 PSI	80 PSI	100 PSI
Pitch	150x150	231	308	385
	150x300	750	1000	1250
Roll	150x150	252	336	420
	150x300	771	1028	1285
Yaw	150x150	105	140	175
	150x300	371	495	618



U-Series Series Linear Guide System Stiffness (lbs/micro inch)

	size (mm x mm)	Stiffness (lbs/micro inch)		
		60 PSI	80 PSI	100 PSI
Z direction	150x150	2.32	3.09	3.86
	150x300	3.28	4.37	5.46
Y direction	150x150	1.61	2.15	2.69
	150x300	2.28	3.04	3.80



U-Series OAV Profile U-series Rail Guides manufactured from Aircraft Quality lightweight Material. Air supply port located in guide for ultimate accuracy positioning.

Air Bearing Guides

OAV Profile vacuum preloaded T-Series Rail Guides consists of the next generation Oav Air Bearing® and manufactured from Aircraft Quality lightweight linear guides

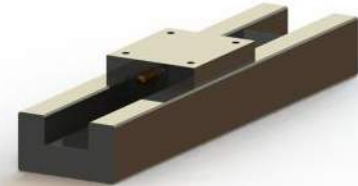
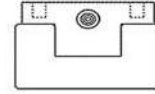
Standard OAV Air bearings guide tolerances
 Local straightness .25µm per 25mm travel with a maximum error of 2µm per 1000mm travel..
 Flatness .0005mm or .00002inc.
 Vacuum Input 15 in Hg

T-Series Series Linear Guide System (Load Capacity (lbs))				
	size (mm x mm)	Load Capacity (lbs)		
		60 PSI	80 PSI	100 PSI
Z direction	75x75	20	27	34
	75x150	41	54	68
Y direction	75x75	40	53	66
	75x150	79	106	132

T-Series Series Linear Guide System (Max Moment (in-lbs))				
	size (mm x mm)	Max Moment (in-lbs)		
		60 PSI	80 PSI	100 PSI
Pitch	75x75	6	8	10
	75x150	14	18	23
Roll	75x75	9	12	15
	75x150	23	31	39
Yaw	75x75	38	51	64
	75x150	116	155	194

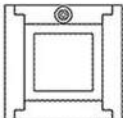
T-Series Series Linear Guide System Stiffness (lbs/micro inch)				
	size (mm x mm)	Stiffness (lbs/micro inch)		
		60 PSI	80 PSI	100 PSI
Z direction	75x75	0.16	0.21	0.26
	75x150	0.35	0.47	0.59
Y direction	75x75	0.10	0.14	0.17
	75x150	0.20	0.27	0.34

T-series Vacuum Preloaded



T-series Vacuum Preloaded OAV Profile T-series Rail Guides manufactured from Aircraft Quality lightweight Material. Oav Vacuum Preloaded Air Bearing combination of air pressure and vacuum, air bearings hold it down while simultaneously lifting from surface for ultimate precision

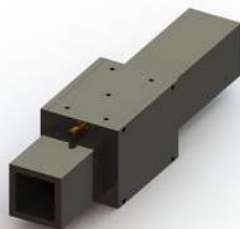
Box-Series



OAV Profile Box-Series Rail Guides consists of the next generation Oav Air Bearing® and manufactured from Aircraft Quality lightweight linear guides

Standard OAV Air bearings guide tolerances
 Local straightness .25µm per 25mm travel with a maximum error of 2µm per 1000mm travel..
 Flatness .0005mm or .00002inc.

Box-series
 OAV Profile Box-series Rail Guides manufactured from Aircraft Quality lightweight Material, Ultra precise linear straightness and flatness vibration-free, maintenance-free motion. Ready to install, Integrated locking brake function, through pretensioning of the air bearing, for ultimate accuracy positioning.

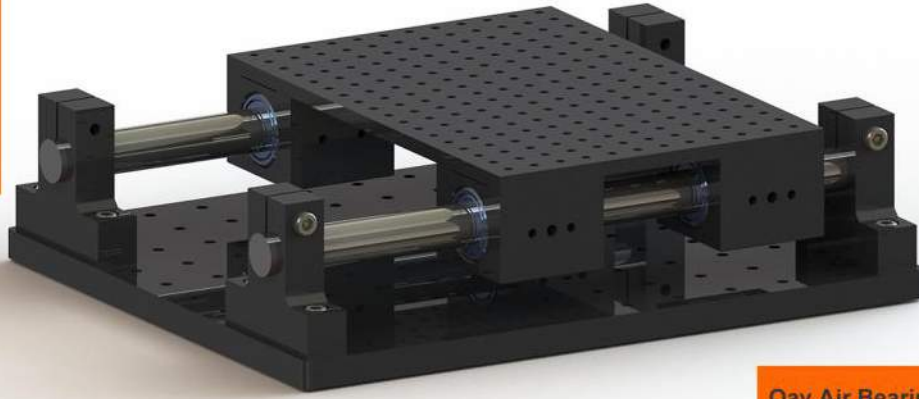


Box-Series Series Linear Guide System (Load Capacity (lbs))					
	bar size (mm x mm)	length (mm)	Load Capacity (lbs)		
			60 PSI	80 PSI	100 PSI
Z direction	40x40	75	78	104	130
	50x50	125	168	224	280
Y direction	40x40	75	78	104	130
	50x50	125	168	224	280

Box-Series Series Linear Guide System (Max Moment (in-lbs))					
	bar size (mm x mm)	length (mm)	Max Moment (in-lbs)		
			60 PSI	80 PSI	100 PSI
Pitch	40x40	75	54	72	90
	50x50	125	120	160	200
Roll	40x40	75	51	68	85
	50x50	125	108	144	180
Yaw	40x40	75	54	72	90
	50x50	125	120	160	200

Box-Series Series Linear Guide System Stiffness (lbs/micro inch)					
	bar size (mm x mm)	length (mm)	Stiffness (lbs/micro inch)		
			60 PSI	80 PSI	100 PSI
Z direction	40x40	75	1.03	1.37	1.71
	50x50	125	1.65	2.20	2.75
Y direction	40x40	75	1.03	1.37	1.71
	50x50	125	1.65	2.20	2.75

Air Bearing Assemblies

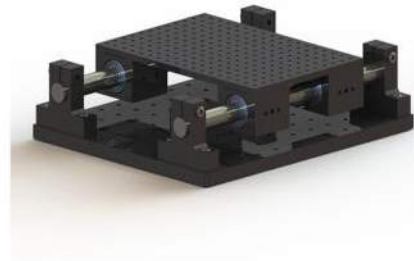


Oav Air Bearing Linear Slides, high precision and accurate air slide assembly. Our Bearings provide you with the confidence of integrated bearing systems motion and dynamic response way better than conventional rolling bearings.

OAV air bearing linear slide assemblies, which combine an accurate guide surface with an air slide ready-fit for installation. This provides the user with the convenience of integrated guide and bearing systems.

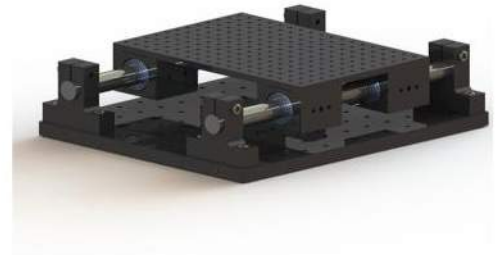
4" TRAVEL .500 LINEAR MOTION GUIDE

4" TRAVEL .500 LINEAR MOTION GUIDE
10"x6" table size Aluminum Housing Blocks, Aluminum breadboard
Frictionless .500 inc Air bushings made from aircraft Quality Aluminum and anodized with Mil spec. for ultimate Quality.



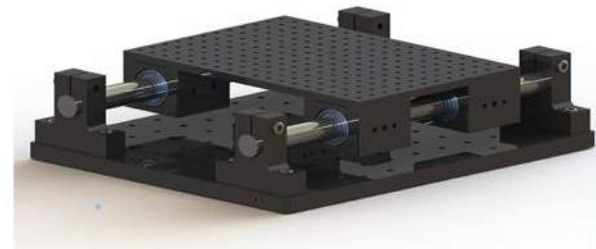
6" TRAVEL .500 LINEAR MOTION GUIDE

6" TRAVEL .500 LINEAR MOTION GUIDE
10"x6" table size Aluminum Housing Blocks, Aluminum breadboard
Frictionless .500 inc Air bushings made from air craft Quality Aluminum and anodized with Mil spec. for ultimate Quality.



12" TRAVEL .750 LINEAR MOTION GUIDE

12" TRAVEL .750 LINEAR MOTION GUIDE
10"x8" table size Aluminum Housing Blocks, Aluminum breadboard
Frictionless .750inc Air bushings made from air craft Quality Aluminum and anodized with Mil spec. for ultimate Quality.



FAQ

1-What is Oav Air Bearing Material And Technology?

OAV Air Bearings brought Aerospace Technologies to air bearing systems. Crafted with Aerospace Quality Aluminum and Titanium that meet Military specs along with a Porous Carbon material, Oav air bearings use exotic Aerospace Material to push the limit of engineering for ultimate accuracy, speed and performance.

2-What maintenance do air bearings need?

OAV Air Bearings Porous Media Air Bearings require no maintenance. If you do need to clean the air bearing surface simply wipe with alcohol and let it dry.

3-can only air be used for air bearings?

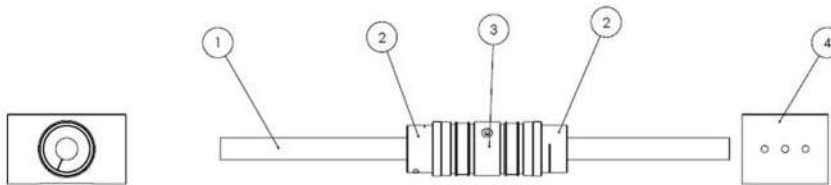
Compressed air is very common in industrial environments, however other gases such as compressed nitrogen can be used if required. Different gases will provide different results. The specifications listed by OAVCO are based on compressed air.

4-What air quality is required for OAV® Air bearings?

Between ISO 8573.1 Quality Classes 3 & 4. Minimum recommendation: dirt particle size at 15 microns, dew point at 37 deg F, oil/vapour content at 5mg per cubic meter Works best: dirt particle size at 5 microns, dew point at -4 deg F, oil/vapour content at 1 mg per cubic meter.

5-How is a thrust bearing guided? How is a thrust bearing held in position?

There are clamps or face collars on each side of the thrust bearing to hold the bearing in one position. Once in position, the bearing stays there and the shaft can rotate freely



BILL OF MATERIALS	
REF	DESCRIPTION
1	SHAFT
2	FACE COLLAR
3	THRUST BUSHING
4	MOUNTING BLOCK

6-How do Air Bearings Work?

Air bearings are designed to lift loads away from the surface and float them on a thin film of air. Air bearings use a thin film of pressurized air to support a load. There is no Solid contact between the two surfaces

7-Can I use an OAV air bushing for Fixed location, rotational motion as well as linear motion?

Yes, OAV Air Bushings and Unique OAV Roller Air Bearings are designed to support rotating shafts with linear motion or fixed location. See <http://oavco.com/rollerairbearing.html>

8-What is the accuracy of these OAV air bushings?

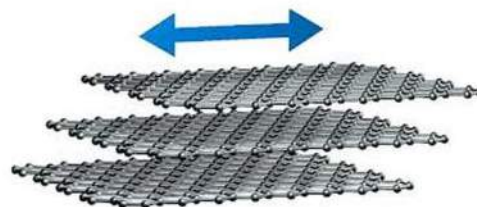
Ultra-precise linear and rotary motion Linear Accuracy: 10 µin/in, 100 µin/36 in Rotary Accuracy: ±1 µin TIR Roll/Pitch/Yaw: 0.25 arcsec/in Linear Repeatability: ±10 µin Rotary Repeatability: 1 µin Positioning Resolution: to ±1 encoder count

9-What is OAV® Roller Air Bearing?

The OAV Roller Air bearing is designed to replace conventional bearings. The roller bearing is hard installed at a fixed location. The result: no friction, no contact, requires no maintenance, indefinite operating life, and no heat generation at high speeds.

10-what happens to Air bearing systems when the air supply suddenly shuts off ?

Oav Air bearings are made from Aircraft Quality Aluminum and Graphite. Graphite is a carbon that forms only two bonds with other carbon atoms. This means it has free electrons and the graphite material exists in layers. This enables one layer to slip over another layer, making graphite an excellent lubricant. If the air supply shuts off, Oav Air bearings act as low friction bushings and it won't damage the platform or the bearing.



11-How does OAV® Air Bearing maintain stability and damping effect?

we design our Air bearings to have a special epoxy to block the pores on the surface where air flow is not desired. Our design forces the flow in the direction of the frictionless surface. This results in higher stiffness, more stability, and better damping properties

12. How accurate are air bearings?

The accuracy of air bearings is almost entirely determined by the accuracy of the guide. To improve the accuracy, the guide will need to have high stiffness, very good flatness and the right surface roughness.

For best results use the following tolerances:

Surface Roughness 16 micro-inch (0.4 micron) RMS or better

Grade A for high precision

Grade AA for ultra precision

OAV manufactures guide surfaces. With state of the art measuring and testing equipment OAV can assure that tolerances are met and that the air bearings get the desired performance on the guide.

13. I have orifice air bearings. How will I benefit by switching to porous media air bearings?

Porous media air bearings distribute the air much more evenly. Because of this, they offer the benefit of more load capacity, higher stiffness, better gap stability, etc. In addition, the porous material (graphite) has a natural lubricity. Therefore, your assembly will still work even if the bearing briefly makes contact with the guide. An orifice air bearing however, will have metal on metal contact which could damage both the bearing and the guide. The porous media air bearings won't get damaged from contact.

14. What is the difference between the Air Bearing Guides and the Flat Air Bearings? And which one do I need

Both are designed for precision linear motion. Flat air bearings are more commonly used and are more cost effective. The Air Bearing Guides such as Dovetail Series are high-end air bearing systems designed to handle more load, higher acceleration, and more moment.

15.Can I download solid files and drawings?

Yes you can click on the product link in www.oavco.com and each size will have a solid file and drawing. For example, go to OAVRL20M then just click "Download PDF" or "Download 3D Solid".

Design Guide

Air bearings are a fascinating phenomenon and tend to draw curiosity about what they can be used for. Due to their many benefits, air bearings are the best option to use for many applications. The number of applications is expected to grow exponentially over the next couple decades as the air bearing technology progresses and the world relies more and more on precision.

The following charts compare different air bearing products with one another.

Product	Linear Motion?	Rotary Motion?	Load Capacity	Maximum Torque	Precision	Cost	Requirements
Air Bushing	Yes	Rarely	Low	Medium	Very Good	Low	
Thrust Air Bushing	Rarely	Yes	Medium	Very high	Excellent	Medium-Low	Face Collars
Roller Air Bearing	No	Yes	Medium	Very high	Excellent	Medium	
Flat Air Bearings	Yes	Rarely	High	High	Excellent	Medium	Mounting Components
Vacuum Preloaded	Yes	No	Low	Low	Best	Medium-High	Mounting Components

Table 1. General Air Bearing Comparison

Initial Design Considerations

Air Bearing Type: The first thing you will need to do is figure out which type of air bearing will work best for the application. Table 1 above, is a good source to start with.

Tolerances: Air bearing products provide and rely on precision. The smoother and more precise the surfaces are, the better the performance. If the guide surface cannot be as smooth as desired, consider using a larger bearing and high input pressure. It is important to design according to the tolerance requirements.

Guide Surfaces: Common guide surfaces include granite, hard-coated aluminum, ceramics, glass, stainless steel, and chromed steel.

Temperature: All standard air bearing products are designed to function at room temperature ($70 \pm 30^\circ\text{F}$). High temperature applications will require a custom air bearing, possibly with exotic materials, and may be a trial and error process.

Environment: It is important to make sure that oils and contaminants will not make contact with the air bearings. Air bearings work best in clean and dry environments.

Specifications and Size: Determine which size based on capabilities of the bearing and allowable size. It is always best to use one size larger than to use an air bearing that barely meets the performance requirements. A larger bearing will require less input pressure, have higher stiffness and better damping properties. The specifications of all standard air bearings can be found on www.oavco.com.

Preloading: Preloading the bearings will lower the air film thickness and increase the stiffness. The result is a better functioning air bearing. Although Air Bushings are automatically preloaded, it is important to incorporate preloading in any design using Flat Air Bearings. More information on preloading can be found in the Flat Air Bearing Design and Installation Guide section below.

Custom Air Bearings: Many applications are very specific or cannot fit a standard air bearing into the assembly. Therefore, OAV provides engineering services and custom air bearings to determine the best solution.

Once an air bearing type is determined, you may use the following information to design around the air bearings

Recommended Air Supply and Filters

All air bearings require an air compressor or air supply. It is recommended to use a filter system to remove oils in order to achieve the best performances out of air bearings.

Between ISO 8573.1 Quality Classes 3 & 4.

Minimum recommendation: dirt particle size at 15 microns, dew point at 37 deg F, oil/vapour content at 5mg per cubic meter
Works best: dirt particle size at 5 microns, dew point at -4 deg F, oil/vapour content at 1 mg per cubic meter.

You should use an oil free type air compressor such as a rotary screw compressor. The air should be passed through in steps:

Step 1: Filter/regulator

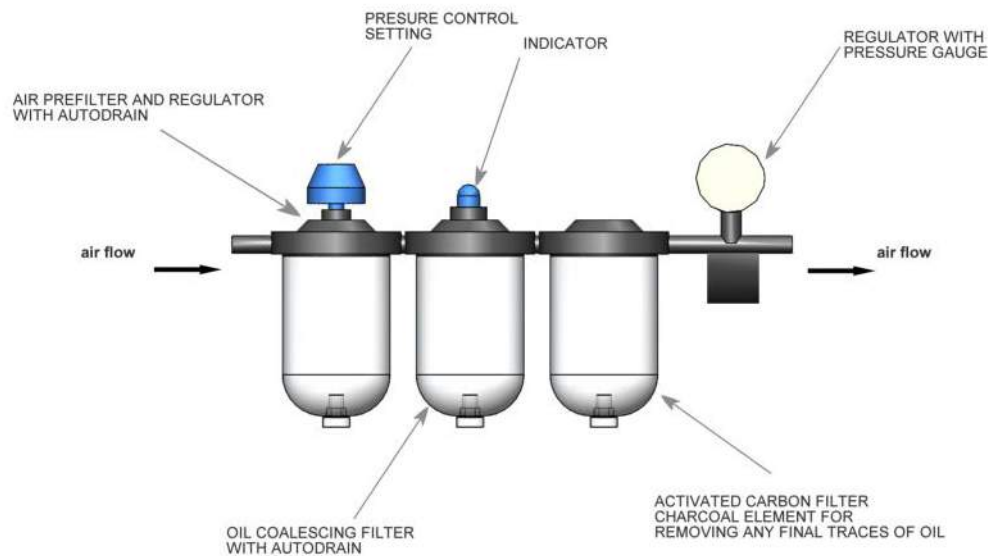
Step 2: Dryer

Step 3: Outlet

a) Oil removal

b) Vapor removal

Step 4: Pressure Sensor (optional)



How to calculate load capacity

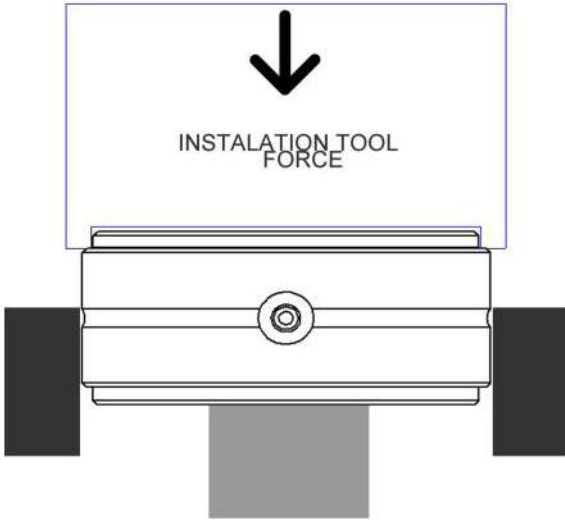
OAV does a great deal of custom work. Load capacity is generally easy to calculate and it is a function of both surface area and input pressure. Any flat bearing can be calculated using:

$$F=E*P*A$$

Where F is the Load Capacity, E is the efficiency, P is the input pressure and A is the surface area of the frictionless surface.

Determining the load capacity can help you find the most cost effective bearing available that will give you the performance you need. It is recommended to calculate using 80 PSI to leave room for spike loads or any other variables in your design.

ROLLER AIR BEARING DESIGN AND INSTALLATION GUIDE



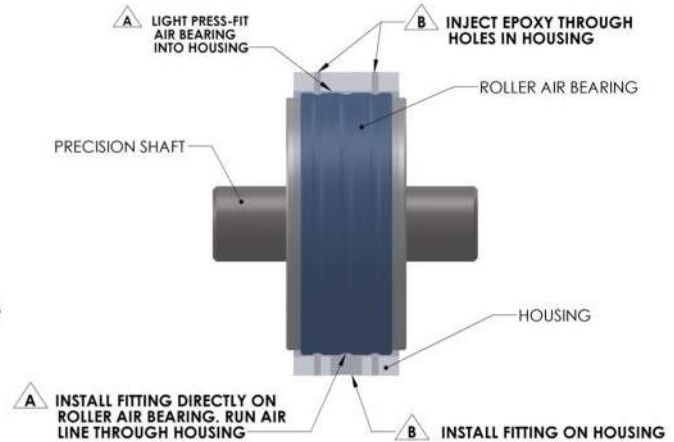
OAV® Roller Air Bearing			Metric Tolerance values in mm	
APPLICATION	DESIRED FIT TYPE	DESIRED FIT	USE SHAFT DIAMETER	USE HOUSING DIAMETER
Preloaded assemblies	Bonding (no adhesive air port)	.010 to .020	d - .015	D + .010
			d - .020	D + .015
Low speed, or spring preload	Loose	.002 to .012	d - .007	D + .002
			d - .012	D + .007
Medium speed	Transition	.005 to .005	d - .000	D - .000
			d - .005	D - .005
High speed	Light press	.000 to .010	d +.005	D - .005
			d - .000	D - .010

1. Interference factor may affect final dimension
2. add relative thermal expansion
3. Tight press not recommended for OAV Roller Air Bearing

OAV Roller Air Bearing Design and installation guide

The basic methods of mounting the linear Roller Air bearing are transition fit external and internal. For external mounting, there are air grooves on the exterior surface of the bearing. These grooves accommodate air flow. If more than one bearing is used, a spacer may be inserted to secure the overall precise fit. Another means of installation is to coat the bearing with an adhesive (carefully covering the bearing OD) and to insert it into the mount or inject epoxy through holes in housing

It is of utmost importance to avoid misalignment of the bearings in the seats and that mounting loads never be applied through the side plate of the bearing. As shown below, the force should be applied to the face of the bearing itself (middle component).

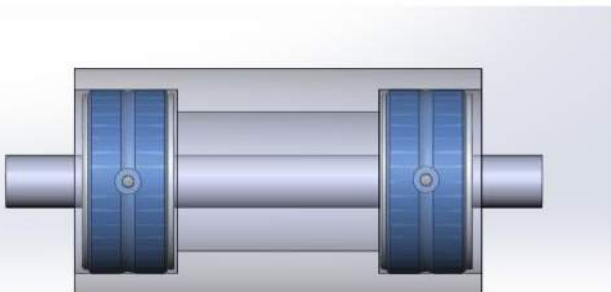
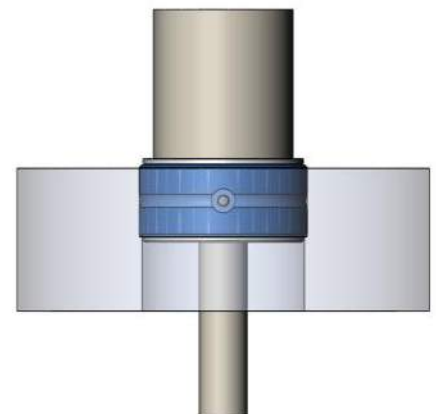


Design With Roller Air Bearings

Typical configurations: The Roller Air Bearings are lightly press-fit into position on the shaft. A housing can be used to hold the roller bearing. If a customer-designed housing is used, contact OAV for the bore size recommendation.

The roller bearing consists of the frictionless bearing and face collars all in one part. Therefore the length of the bearing will be the length of the bearing system. Aside from this, the Roller Air Bearings have the same design guidelines as the Thrust Air Bushings.

Typical Configurations



FLAT AIR BEARING DESIGN AND INSTALLATION GUIDE



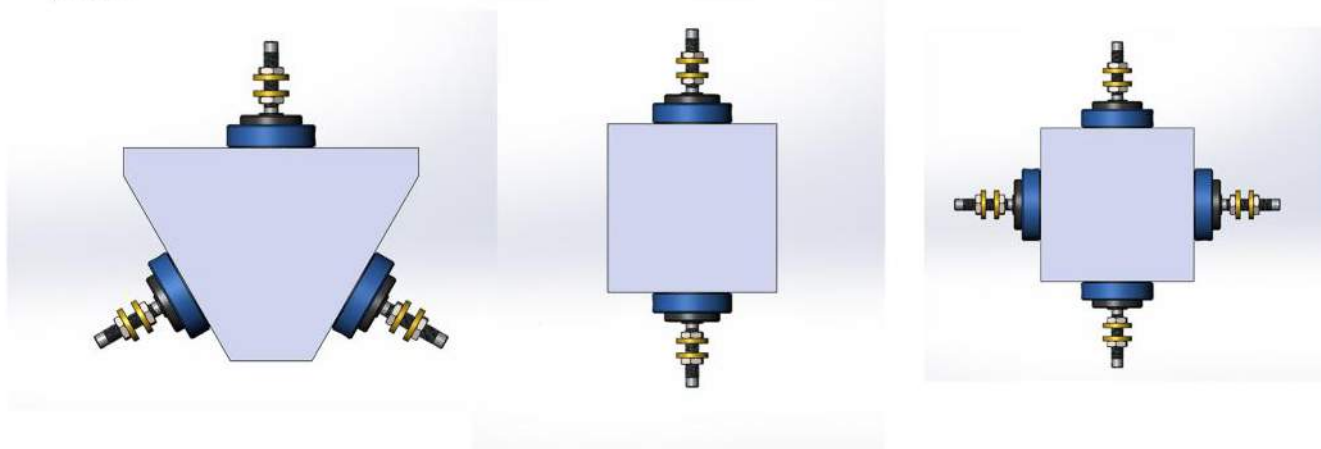
Design With Flat Air Bearings

The flat air bearings are typically configured with a preload as described below. Mounting components are used to position and assemble the bearings.

Typical Configurations

Preload: Flat bearings can be preloaded in 3 different ways.

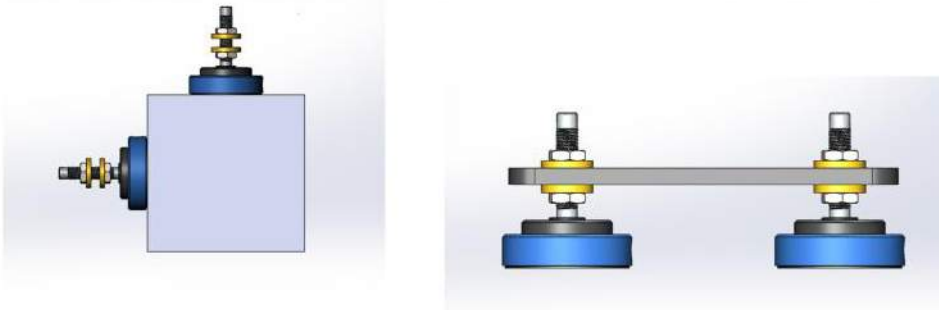
1) Opposite bearing: The most common way is to preload with a bearing on the opposite end. This requires more space and adds more weight but it provides more stiffness and load capacity. To achieve the highest stiffness and balance, it is recommended to make sure the two bearings are opposite of one another and that both surfaces are parallel.



When preloading with other air bearings the preload force needs to be considered to determine the appropriate size bearing. Preloading with other air bearings is typically utilized to provide a load capacity in both directions as well as higher stiffness.

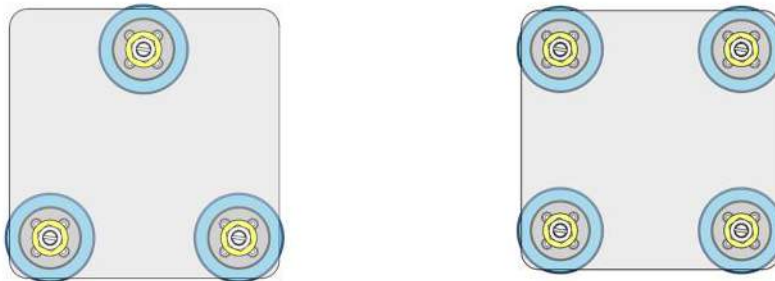
FLAT AIR BEARING DESIGN AND INSTALLATION GUIDE

2) **Weights:** Flat bearings can also be preloaded if there is a constant force pushing down on them. This type of preload is typically used when moving large objects. It is recommended to use a minimum of 3 bearings for this configuration.



3) **Magnets:** Magnets are a good option if low mass is desired. Typically there will be one magnet on the bearing and one along the entire length of the guide.

4) **Vacuum:** Vacuum Preloaded Air bearings use a vacuum to preload. The vacuum gives more control over the air film thickness and in turn maintains optimal stiffness and performance while reducing the overall weight and size of the system.



Other considerations: It is best to keep the resulting force of the load distribution in the center of the bearing. The size of the bearing will be determined based on factors including:

- where is the resulting load located on the bearing?
- what is the surface roughness of the guide?
- what is the maximum load being applied to the bearing?

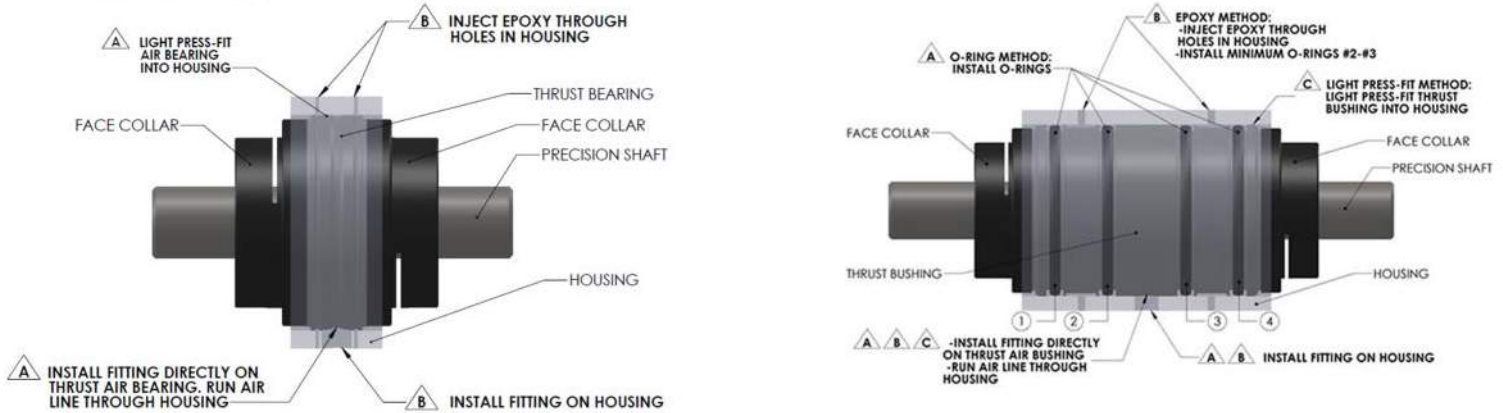
Keep in mind that the load capacities for each bearing are based on the maximum load being applied to the center of the bearing. Smoother surface finish always results in better performance. However, if a smooth surface finish is not possible, you will need a bigger bearing and high input pressure because it will be crucial to maintain a higher fly height and to improve on the damping capabilities.

When supporting a load on a flat surface, it is most reliable to use 3 bearings (rather than 4). Assuming that the location of the load is maintained between the three bearings, this will add the most stability. 3 bearings are especially best when the guide surface is not perfectly flat because the bearings will always maintain their approximate fly height. If 4 bearings are used on an uneven surface, there will always be one or two bearings suspended too high until the weight shifts or the surface changes.

THRUST AIR BEARING DESIGN AND INSTALLATION GUIDE

Design With Thrust Air Bushings

Typical configuration: Thrust air bushings slide over the shaft just like air bushings. The only difference is the thrust air bushings have face collars clamped to the shaft on both sides to keep the thrust air bushing from moving linearly. OAV Mounting blocks can be used to hold the thrust air bushings. If a customer-designed housing is used, make sure to follow the same guideline as shown below for air bushings.



If the shaft is rotated with a drive-belt, it is best to use two thrust bearings per shaft to counteract the torque. The drive belt should always be placed between the thrust air bushings. If this is not possible, then keep the belt as close to the first thrust air bushing as possible. Statics equations can be used to determine the load requirement on each thrust bushing.

The diagrams below show two common examples where F1 is the tension from the drive-belt, F2 & F3 are the forces acting on the bushings and d1 and d2 are the distances from the center of the belt and thrust air bushings:

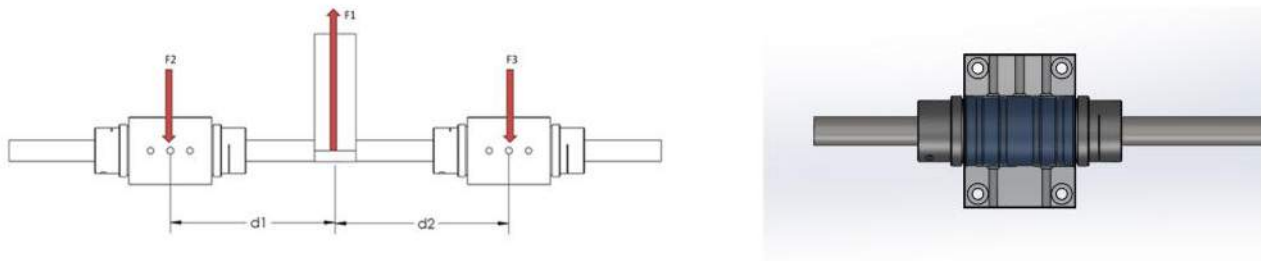


Figure 1. The drive belt in between both thrust air bushings. This is recommended and the tension on the belt will distribute amongst both thrust air bushings as shown in the equations below.

$$F3 = F1 \cdot d1 / (d1 + d2)$$

$$F2 = F1 \cdot d2 / (d1 + d2)$$

Assuming: $d1 = d2$:

$$F2 = F3 = .5 \cdot F1$$

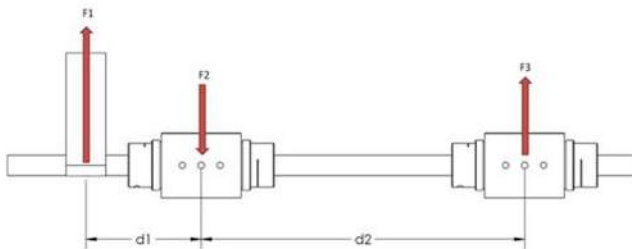


Figure 2. The drive belt outside the two thrust air bushings. This configuration works best with a small distance d1 and long distance d2. The corresponding load equations are below.

$$F2 = F1 \cdot (d1 / d2 + 1)$$

$$F3 = F1 \cdot d1 / d2$$

Consider the gap between the bushing and face collar as negligible. The face collar will be placed up against the frictionless surface of the thrust bushing. Once the air supply is turned on, a small gap will be created. Therefore, the total length of the thrust bushing system can be determined by:
 Length of left face collar + Length of thrust air bushing + length of right face collar

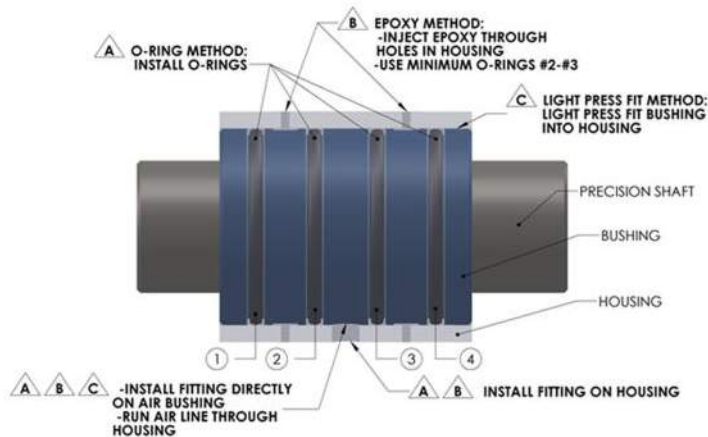
AIR BUSHING DESIGN AND INSTALLATION GUIDE

Design With Air Bushings

Typical Configurations consist of one shaft and one bushing or two parallel shafts with two to four bushings.

Usually the Air Bushings are inserted inside a Mounting block or inside the bore of a customer-designed housing. The customer designed housing must be designed so that the air supply is forced into the air ports of the bushings.

The three methods of installation are epoxy, o-rings or light press fit. OAV Mounting blocks allow for epoxy and o'ring methods of installation. In most cases it is recommended to design using o-rings because o-rings have self-aligning features and can be readjusted.



Designing with epoxy: If epoxy is used, make sure that the epoxy grooves on the bushings can be accessed with a syringe.

Designing with o-rings: If o-rings are used, make sure to use the appropriate bore size and tolerance. OAV can provide this information.

Designing with light press fit : If light press fit method used, make sure use recommended bore size and tolerances. OAV can provide this information

Other considerations: Air bushings rely on straightness of the shaft. Design so that deflection/displacement of the shaft is minimal.

Installing bushings with o-rings:

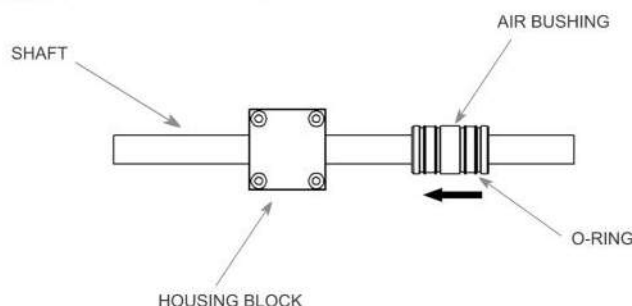
- 1) First do a quick visual inspection to assure there are no sharp edges in the bore of the mounting block. The o-rings provide a very tight fit and if they get damaged, they will not work properly.
- 2) Lubricate the o-rings and surfaces with alcohol.
- 3) Press-fit the bushing inside the mounting block.
- 4) Insert the shaft and apply the air pressure. 30 PSI is enough to test the bushing without any load being applied.
- 5) Use proper alignment. If two shafts are used side-by-side, it is best to use gages to assure that the shafts are at equal distance at both ends. Parallelism is crucial for the performance of the air bushings.

Installing bushings with epoxy:

- 1) Clean the surfaces with alcohol.
- 2) Slide the air bushing into the mounting block and the shaft into the bushing.
- 3) Align the shaft(s) with the best parallelism possible. If two shafts are used side-by-side, it is best to use gages to assure that the shafts are at equal distance at both ends. Parallelism is crucial for the performance of the air bushings.
- 4) Turn the air supply on at 30 PSI and do not apply any load to the bushing.
- 5) Use a syringe to apply the epoxy through the syringe holes on the mounting block until the epoxy fills the epoxy grooves on the bushing. Make sure that the air port on the bushing lines up with the air port on the mounting block.
- 6) Keep the air supply on at 30 PSI until the epoxy cures.

Installing bushings with light Press Fit:

- 1) Clean the surfaces with alcohol.
- 2) light press fit air bushing into the mounting block and the shaft into the bushing.
- 3) Align the shaft(s) with the best parallelism possible. If two shafts are used side-by-side, it is best to use gages to assure that the shafts are at equal distance at both ends. Parallelism is crucial for the performance of the air bushings.
- 4) Make sure that the air port on the bushing lines up with the clearance hole on the mounting block.
- 5) install air fitting directly to O.



Terms Glossary

A:

AIR BEARING:

Unlike contact-roller bearings, an air bearing (or air caster) utilizes a thin film of pressurized air to provide an exceedingly low friction load-bearing interface between surfaces. The two surfaces don't touch. Being non-contact, air bearings avoid the traditional bearing-related problems of friction, wear, particulates, and lubricant handling, and offer distinct advantages in precision positioning, such as lacking backlash and stiction, as well as in high-speed applications.

AXIAL LOAD:

A type of load on a bearing that is parallel to the axis of rotation.

AXIS:

A straight line about which an object rotates; a straight line about which the parts of a bearing are regularly arranged. The center line of a shaft serves as an axis for a bearing; the cup and housing remain stationary while the shaft and cone rotate OR the cone and shaft remain stationary and the cup and housing rotate around it. The relative motion of the cup and cone is accommodated by the rolling motion of the rollers.

B:

BALL:

A spherical rolling element.

BORE SIZE:

The inner diameter of a cone, which accommodates a shaft.

C:

COMBINED LOAD:

Both radial and thrust loads applied to the same bearing at one time.

CORE:

The bearing's inner ring that is fixed to and/or pressed onto a rotating shaft.

CONTAMINATION:

The pollution of a lubricant or particals by an external agent.

D:

DIRECTION OF LOAD

bearings are meant for supporting loads perpendicular to axle ("radial loads"). Whether they can also bear axial loads, and if so, how much, depends on the type of bearing. Thrust bearings are specifically designed for axial loads.

E:

ECCENTRIC:

Circles or diameters not having the same exact centers.

F:

FACE:

The side surface of a bearing.

FIXED BEARING :

Bearing which positions shaft against axial movement in both directions.

FPM:

Feet per minute.

FRICTION:

Resistance to motion due to the contact of surfaces.

H:

HOUSING:

A rigid structure that supports and locates the bearings.

HOUSING FIT

Amount of interference or clearance between bearing outside surface and housing bearing seat.

I:

INSIDE FACE:

The surface of the inner case that faces and is usually in contact with the sealed fluid.

O:

OUTSIDE DIAMETER:

The diameter of the outer circle. It also is known as O.D.

OUTSIDE FACE:

The surface of the thrust bearing perpendicular to the shaft axis that is not in contact with.

P:

PRELOAD:

Thrust load applied to bearings that support a rotating part; eliminates axial endplay or movement.

PITCH MOMENT :

Angular change in the gap when one side of the gap gets large and air flow will lose its pressure following the path of least resistance. But porous bearing contrast still has pressure For this reason porous bearing has higher tilt moment and stiffness.

R:

RADIAL DEVIATION:

The amount of deviation from the true circular form.

RADIAL LOAD:

Force that is applied perpendicular to the axis of a bearing's shaft. Radial loads are also called rotary loads.

RPM:

Revolutions per minute

Terms Glossary

S:

SHAFT FIT:

Amount of interference or clearance between bearing inside diameter and shaft bearing seat outside diameter.

SHAFT TOLERANCE:

This is the allowable variation in the shaft diameter.

SPINDLE:

Axle that supports a free rolling wheel.

STIFFNESS:

rigidity of bearing—the extent to which it resists deformation in response to an applied force. The complementary concept is flexibility or pliability: the more flexible an object is, the less stiff it is.

T:

THERMAL EXPANSION:

Linear or volumetric expansion caused by the increase in temperature.

THRUST:

The continuous pressure of one object against another, parallel to the center of the axis.

THRUST LOAD:

A load applied parallel to the center line of rotation.

TORQUE:

The turning force of a shaft.

W:

WEAR:

Damage resulting from the removal of materials from surfaces in relative motion. Wear is generally described as:

Abrasive: Removal of materials from surfaces in relative motion by a cutting or abrasive action of a hard particle, which is usually a contaminant.

Adhesive: Removal of materials from surfaces in relative motion as a result of surface contact. Galling and scuffing are the extreme cases.

Corrosive: Removal of materials by chemical action.

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