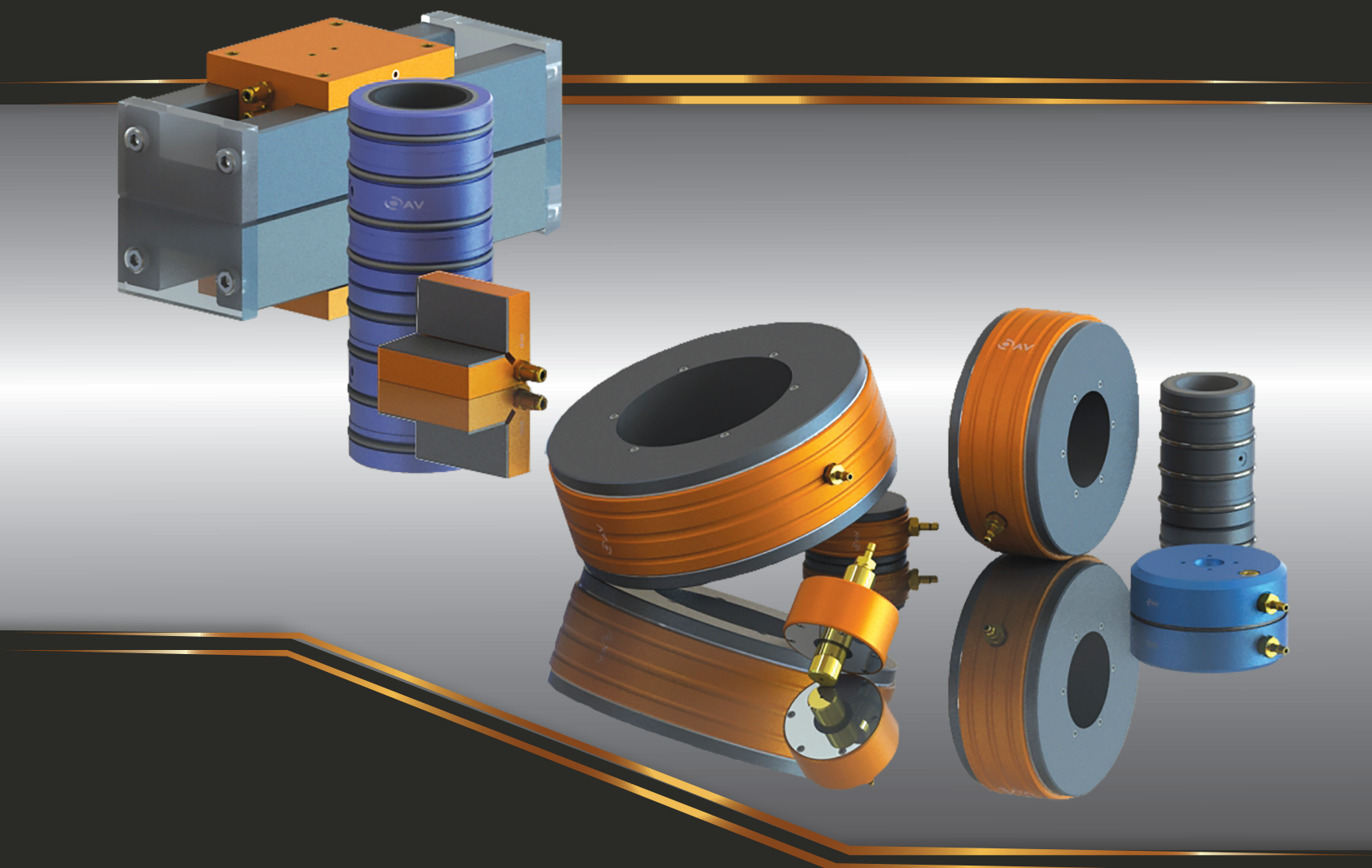
OAV
air bearing

PRODUCT BOOK AND DESIGN GUIDE



Ultra-High Precision Air Bearings, Stages, Components, and Motion Systems

WWW.OAVCO.COM

CERTIFIED ISO 9001:2015 COMPANY

REACH COMPLIANCE

RoHS

MADE IN USA

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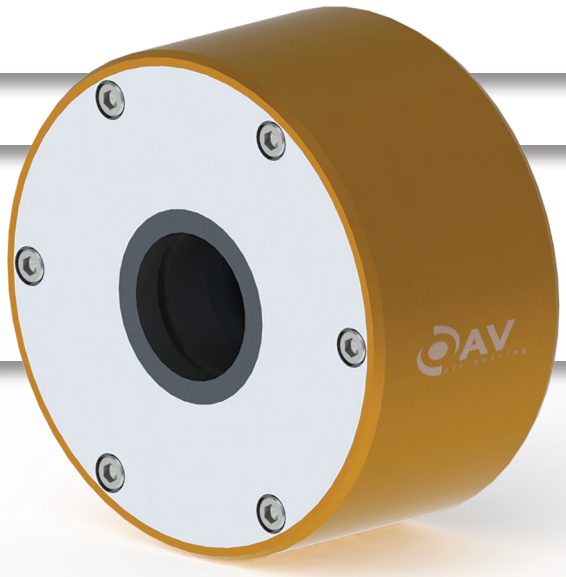


INTRODUCTION

OAV® Air Bearing 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 has 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 Speeds
- Higher Damping
- Ultra-Smooth & Quiet Motion

Air bearings offer inherent advantages over traditional bearings in addition to creating opportunities for a broader range of applications. OAV® offers integrated air bearings, aerospace materials, standardization of products, custom products, and proven performance in the most demanding applications.

We are focused on understanding engineering problems and strive to find solutions that are tailored to each individual application.

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.

A FULL LINE OF AIR BEARINGS

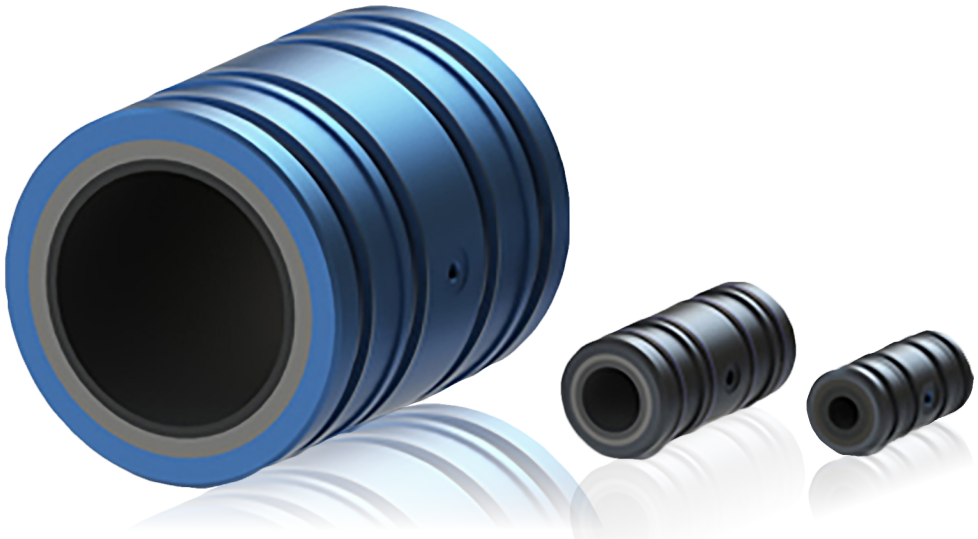
- Bearings
- Air Bushings
- Flat Round Air Bearings
- Flat Rectangular Air Bearings
- OAV Roller Air Bearings
- OAV X-Spin Roller Air Bearings
- Thrust Air Bearings
- Thrust Air Bushings
- Vacuum Pre-Loaded Air Bearings
- Temperature Controlled Air Bearings
- Modular Air Bearings
- Assemblies
- Air Bearing Guides
- Linear Motion Guides
- Mounting Components
- Balls
- Clamp On Shaft Precision Face Collars
- Housing
- Mounting Blocks
- Shaft End Support
- O-Rings
- Shafts
- Mounting Screws
- Tubing and Fittings
- Air Filters and Regulators
- Bread Plates

MAIN FEATURES OF PRODUCTS:

- Zero friction
- Indefinite operating life
- Air is clean, contaminant free, and helps promote clean environments
- High accuracy components
- High accuracy motion
- High speeds
- Higher damping
- Position accuracy better than 0.1 microns
- Ultra precise linear and rotary motion
- Manufactured from aircraft quality material

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. If the specific bearing type is not known, contact an OAV ® Air Bearing representative to request engineering support.



The OAV® Air Bushing is designed to make air bearings available for use with both pre-existing and existing designs based on round shaft guides. These components run on standard precision steel shafts, and are available in Metric or English sizes. OAV® provides an option to use titanium and other special materials to maximize stiffness and load capacity.

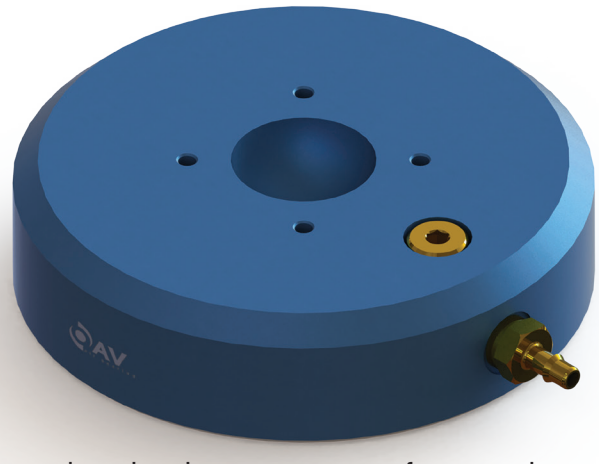
ENGLISH

Part Number	ID Size	Radial Stiffness (lbs/µ in)	Radial Load Max (lbs)	Pitch Moment (lbs-in)	Bushing Outside Diameter (+.005/-.000in)	Flow Rate (SCFH)
OAV0250IB	0.250 in	0.01	2.9	0.125	0.634	3.00
OAV0312IB	0.312 in	0.039	4.4	2.74	0.634	4.40
OAV0375IB	0.375 in	0.04	4.4	2.75	0.634	4.50
OAV0500IB	0.500 in	0.06	9.5	7.5	0.932	5.98
OAV0750IB	0.750 in	0.13	34.4	10	1.250	8.98
OAV1000IB	1.000 in	0.19	51.6	17	1.532	11.97
OAV1500IB	1.500 in	0.41	126.2	28	2.346	17.96
OAV2000IB	2.000 in	0.63	198	46	2.918	23.94
OAV3000IB	3.000 in	0.91	298	63	3.917	35.92

METRIC

Part Number	ID Size	Radial Stiffness (N/µ m)	Pitch Moment (N-m)	Radial Load Max (N)	Bushing Outside Diameter (+.13/-.00mm)	Flow Rate (SCFH)
OAV006MB	6mm	2	0.013	12.4	16.10	2.84
OAV008MB	8mm	7	0.28	19.4	16.10	4.40
OAV010MB	10mm	7	0.29	20.6	16.10	4.70
OAV013MB	13mm	11	0.8	42.5	23.67	6.12
OAV020MB	20mm	23	1.1	160	31.75	9.42
OAV025MB	25mm	34	1.9	226.3	38.91	11.78
OAV040MB	40mm	72	3.1	593.8	59.59	18.85
OAV050MB	50mm	110	5.2	866.3	74.12	23.57
OAV075MB	75mm	159	7.1	1300.0	99.49	35.42

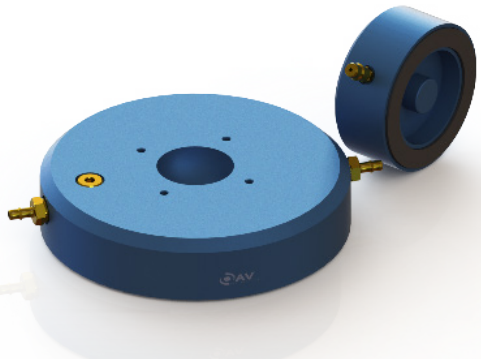
OAV® FLAT ROUND AIR BEARINGS



OAV® Flat Round Air Bearings work on level, non-porous surfaces such as granite, aluminum, glass, and ceramics. OAV® offers a variety of sizes which can easily be used to customize air bearing systems. The OAV® Vacuum Preloaded Air Bearings utilizes a combination of air pressure and vacuum space to allow the air bearings to be held down whilst simultaneously being lifted from the surface.

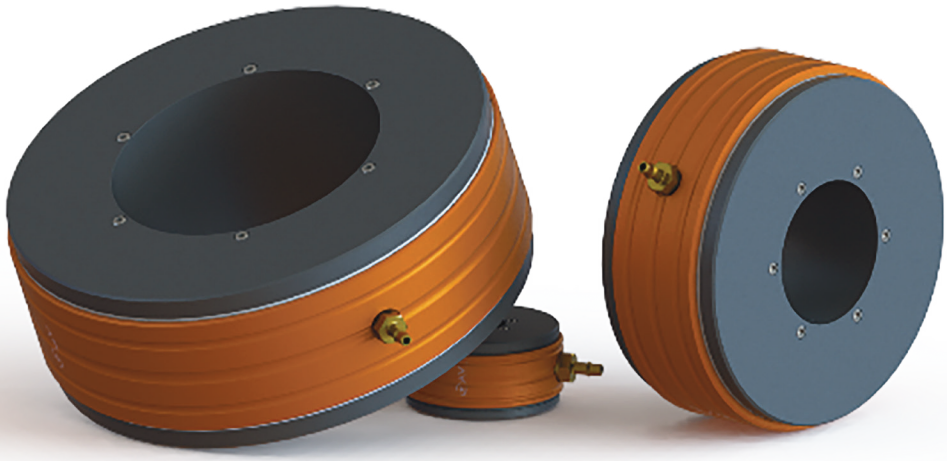
Part Number	Diameter Size	Ideal Load (N)	Flow Rate NLPM	Stiffness (N/µ m)	Weight (grams)
OAVR025R	25mm	98	0.6	18.4	14
OAVR040R	40mm	254	0.93	29.43	34
OAVR050R	50mm	392	1.2	60.71	61
OAVR065R	65mm	664	1.5	91.98	149
OAVR080R	80mm	1189	1.9	116.94	231
OAVR100R	100mm	1856	2.4	182.64	436
OAVR125R	125mm	2897	3.0	285.13	1028
OAVR150R	150mm	4535	3.6	446.31	2085
OAVR200R	200mm	8064	4.8	793.64	4765

OAV® VACUUM PRELOADED AIR BEARINGS



The OAV® Vacuum Pre-Loaded Air Bearing works on flat, non-porous surfaces such as granite, aluminum, glass, and ceramics. Its round design allows for smooth, frictionless motion. We offer a variety of sizes that can easily be used for custom air bearing systems. The OAV® Vacuum Pre-Loaded Air Bearing combines the use of air pressure and vacuum, allowing for the air bearing to be held down while simultaneously being lifting from surface.

Part Number	Size	Ideal Load (N)	Flow Rate (NLPM)	Stiffness (N/µ in)	Weight (grams)
OAVR050RV	50mm	46	1.1	13	98
OAVR080RV	80mm	113	1.3	30	253
OAVR100RV	100mm	173	2.3	48	382



The OAV® Roller Air Bearing offers ultra-precise capabilities to replace your conventional bearings. This development proves our positioning as one of the most innovative and forward thinking air bearing manufacturer. OAV® Roller Air Bearing is an ultra-precise, hard-installable, fixed bearing. The result is no friction, no contact, requires no maintenance, an indefinite operating life, and no heat generation at high speeds. Our roller air bearings come with 7075 aircraft quality aluminum, porous carbon media, and an input pressure range of 40 psi - 100 psi.

ENGLISH

Part Number	ID Size	Bearing Outside Diameter (OD) Size	Radial Load (lbs)	Axial Load (lbs)	Axial and Radial Error Motion (lbs/µ in)	Flow Rate (SCFH)	Max Rotational Speed(RPM)
OAV RL0500	0.500 in	1.7500in +.0000/-.0005	6.5	27.0	0.9	5	>70,000
OAVRL0750	0.750 in	2.7500in +.0000/-.0005	22.6	85	0.9	15	>60,000
OAVRL1000	1,000 in	3.5000in +.0000/-.0005	28.6	155	0.9	15.5	>45,000
OAVRL1500	1.500 in	4.0000in +.0000/-.0005	56.2	185	1.1	16.1	>40,000
OAVRL2000	2.000 in	4.2500in +.0000/-.0005	70.1	175	1.1	17.5	>35,000
OAVRL3000	3.000 in	5.5000in +.0000/-.0005	124.8	260	1.1	31	>33,000

METRIC

Part Number	ID Size	Bearing Outside Diameter (OD) Size	Radial Load (N)	Axial Load (N)	Axial and Radial Error Motion (N/µ m)	Flow Rate (SCFH)	Max Rotational Speed(RPM)
OAVRL13M	13mm	44.5mm + .00/-.01	28.9	120.1	0.023	4.97	>70,000
OAVRL20M	20mm	70mm +.00/-.01	100.5	378.1	0.023	15	>60,000
OAVRL25M	25mm	90mm +.00/-.01	127.2	689.5	0.023	15.5	>45,000
OAVRL40M	40mm	100 +.00/-.01	250.0	822.9	0.027	16.1	>40,000
OAVRL50M	50mm	110mm +.00/-.01	311.8	778.4	0.027	39.3	>35,000
OAVRL75M	75mm	140mm +.0000/-.01	555.1	1156.5	0.027	26	>33,000

OAV® THRUST AIR BEARING & BUSHINGS

Our patent pending OAV® Thrust Air Bearing is a breakthrough innovation in air bearing technology. For the first time, an air bearing is available that fully integrates and works on three-way frictionless surface. OAV® Thrust Air Bearing configurations run on standard size shafting for fixed or linear motion while maximizing rotational motion with extreme precision and zero friction. They are made using aerospace quality aluminum.

BEARING SIZE

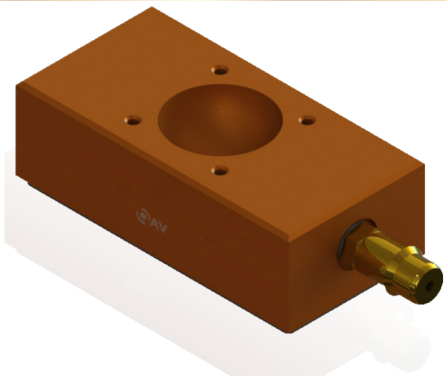
Part Number	ID Size	OD Size	Radial Load (N)	Thrust Load (N)	Radial Stiffness (N/μ m)	Flow Rate (NLPM)
OAVTR32i13	13mm	31.75 + 0.13	10.7	81.4	2.6	3.8
OAVTR60i20	20mm	59.59 + 0.13	52.0	373.7	5	7.4
OAVTR60i25	25mm	59.59 + 0.13	65.4	302.9	7.3	7.0
OAVTR100i50	50mm	99.49 + 0.13	190.8	862.1	24	13.5
OAVTR150i75	75mm	150mm	286.5	2215.2	34.8	19.9

OAV® Air Bearings have higher stiffness and excellent geometric performance. OAV® Thrust Air Bearings preload both horizontal and vertical surfaces with opposing thin films pressure. This maintains the perfect gap for ultimate tolerance. The OAV® Air Bearing surface design equally distributes the air and pre-loads over the entire surface area; the result is outstanding stiffness and maximized performance.

BUSHING SIZE

Part Number	ID Size	Outside Diameter OD Size(mm)	Radial Load (N)	Thrust Load (N)	Radial Stiffness (N/μ m)	Max Rotational Speed
OAVTB16i04	4mm	16.1	9.3	16.0	5	>150,000
OAVTB32i13	13mm	32	43.2	81.4	11	>86,500
OAVTB60i20	20mm	59.59 + 0.13	244.2	373.7	23	>60,000
OAVTB60i25	25mm	59.59 + 0.13	305.1	302.9	34	>50,000
OAVTB100i50	50mm	99.49 + 0.13	871.4	862.1	110	>20,000
OAVTB150i75	75mm	150	1306.9	2215.2	159	>13,250

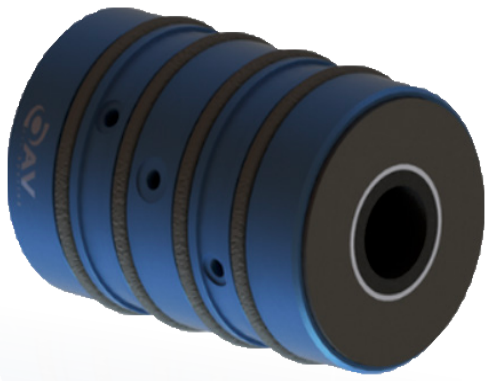
OAV® FLAT RECTANGULAR AIR BEARINGS



We offer a line of flat rectangular air bearing components designed to meet the non-contact requirements at low cost while yielding high performance. 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 as well as the custom sizing made to order upon request.

Part Number	Size	Ideal Load (N)	Flow Rate (NLPM)	Stiffness (N/µ in)	Weight (grams)
OAVF20L40	20X40mm	161	0.90	15.77	25
OAVF25L50	25X50mm	250	1.1	24.53	47
OAVF25L100	25X100mm	499	1.9	49.06	163
OAVF40L50	40X50mm	401	1.3	39.42	55
OAVF40L80	40X80mm	637	1.8	62.63	143
OAVF50L100	50X100mm	1184	2.3	116.51	295
OAVF100L200	100X200mm	5136	4.5	505.44	1877
OAVF1000L100	1000X100mm	20697	21.0	2,037.10	11,164
OAVCB6060	1250mm OAV Bar		0.63(SCFM)	0.04N/micron	2.13kg

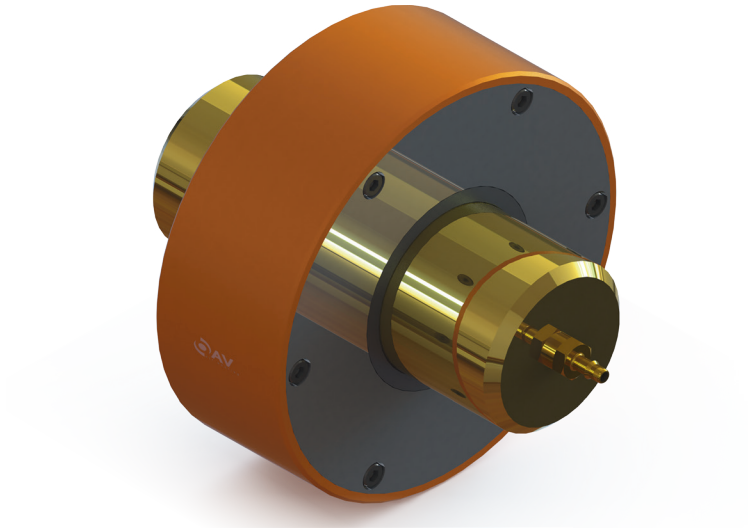
OAV® TEMPERATURE CONTROLLED THRUST AIR BUSHINGS



Our Temperature Controlled Thrust Air Bushing is best for applications under exposure to extremely high speeds, high ambient temperatures, and hot processes. OAV® engineers can adjust to keep the air bearings cool factoring with material type, fluid flow and airflow so you can operate under high-temperatures without sacrificing precision or quality. OAV® Air Bearings have higher stiffness and excellent geometric performance. Our bushings preload both horizontal and vertical surfaces with opposing thin films of pressure. This maintains the perfect gap forultimate tolerance. OAV® Air Bearings surface design equally distributes the air and preloads it over the entire surface area; the result is outstanding stiffness and maximized performance.

Part Number	Size ID	Radial Load (N)	Thrust Load (N)	Flow Rate (SCFH)	Radial Stiffness (N/µ m)	Cooling Flow Rate(SCFH)
OAVTB60i20W	20mm	240.2	373.7	15.6	23	52.3
OAVTB100i50W	50mm	871.4	862.1	28.5	110	67.3

OAV® X-SPIN ROLLER

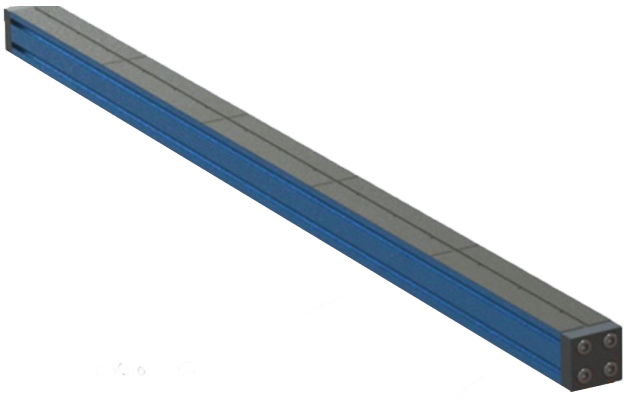


The Outer Spin Rotary Air Bearing® provides the ability to spin outer rings with an incredible accuracy of TIR± 1 millionths inches (.025 microns) while maintaining zero friction and contact, zero maintenance, no generation of thermal energy at high speeds, and a limitless operating life. This ultra-precise, hard-installable innovation is here to replace conventional bearings with unmatched improvements and efficiency.

Part Number	Bearing Inside Dia. (ID) Size +.01/.00	Radial Load Capacity (N)	Thrust Load (NLPM)	Radial Stiffness (N/µ m)	Bearing Outside Diameter (OD)
OAVRL13MX	13mm	57.8	133.5	11	44.5mm +.00-.01mm
OAVRL40MX	40mm	178.4	320.3	68	100mm+.00-.01mm
OAVRL75MX	75mm	578.3	1245.5	159	140mm-.01mm

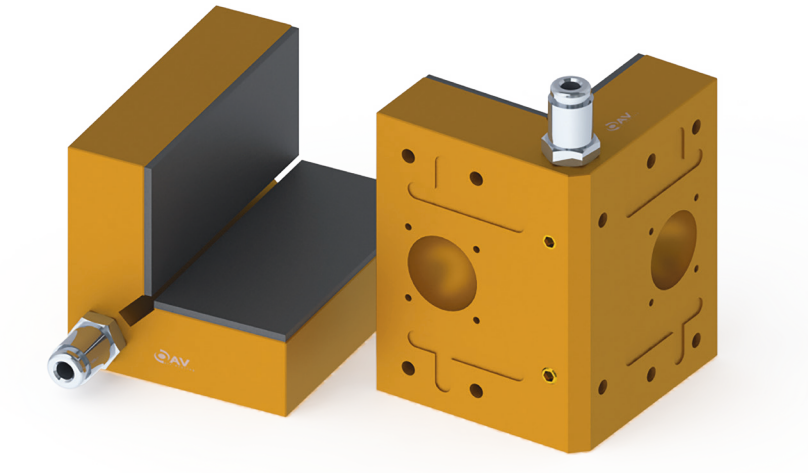
OAV® AIR BEARING BARS

The OAV® Air Bearing Bar is produced with profile design for easy retrofitting into existing applications or designing into new applications. It generates an evenly distributed film of gas between the surface and the substrate. Because of low gas viscosity, friction losses by viscous shearing lead to the avoidance of mechanical contact. The combination of the air pressure and vacuum allow the bearing bar to hold the substrate down while simultaneously lifting it from surface for ultimate precision and fly height. The fly height range of 20 to 120 microns maintains a stability of ±5 microns.



Part Number	Size	Fly Height	Fly Height Range	Weight	Stiffness (N/µ)	Flow Rate (SCFM)
OAVCB6060	1250mm	80microns	20-120 microns	4.7lbs	0.04	0.63

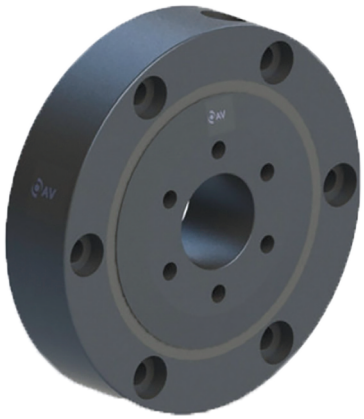
OAV® MODULAR AIR BEARING



OAV® Air Bearings generate evenly distributed gas films between the surface and the substrate. Because of low gas viscosity and friction losses by viscous shearing, mechanical contact is avoided. Modular air bearings are manufactured from aircraft quality lightweight material and come ready to install.

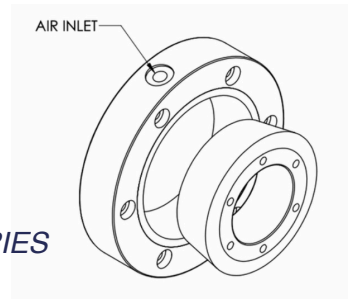
Part Number	Bearing Size	Ideal Load X (N)	Ideal Load Y (N)	Flow Rate (SCFH)	Radial Stiffness (N/µ m)	Fly Height (µ)
OAV90DG50	38x50mm	160	160	3.4	14	4

OAV® TAPERED-ROLLER AIR BEARINGS

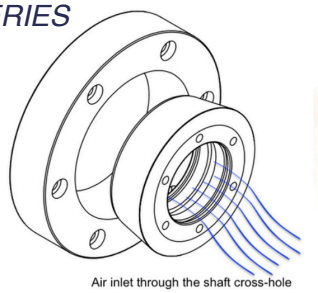


The tapered bearing is one of the most commonly used forms of roller air bearings in the industry. The OAV® Tapered Air Bearing consists of two main components: the inner assembly, and the outer-cage. They are typically mounted in opposing pairs on a shaft. Air supply is sent through the shaft with a cross-hole or inlet from the outer-cage. The OAV® Tapered Roller Air Bearing has standard sizes available up to a 75mm ID outer-cage spin or inner-race spin with options.

M SERIES



MX SERIES



Air inlet through the shaft cross-hole

Part Number	ID Size	Radial Load (lbs)	Axial Load (lbs)	Radial Stiffness (N/µ m)	Flow Rate (SCFH)
OAV-TPR13M	13mm	46.5	27.9	24	3.68
OAV-TPR20M	20mm	46	27.6	35	5.22
OAV-TPR25M	25mm	71.5	42.9	64	5.66
OAV-TPR40M	40mm	116.6	70	72	9.23
OAV-TPR50M	50mm	179.5	107.7	98	14.21
OAV-TPR75M	75mm	333.6	200.1	170	26.4

Part Number	ID Size mm	Radial Load (lbs)	Axial Load (lbs)	Radial Stiffness (N/µ m)	Flow Rate (SCFH)
OAV-TPR13MX	13	43.2	25	21	3.42
OAV-TPR20MX	20	63.8	38.3	33	5.04
OAV-TPR25MX	25	68.2	40.9	62	5.39
OAV-TPR40MX	40	108.7	65.2	68	8.6
OAV-TPR50MX	50	179.5	107.7	98	14.21
OAV-TPR75MX	75	324	194.4	168	25.6

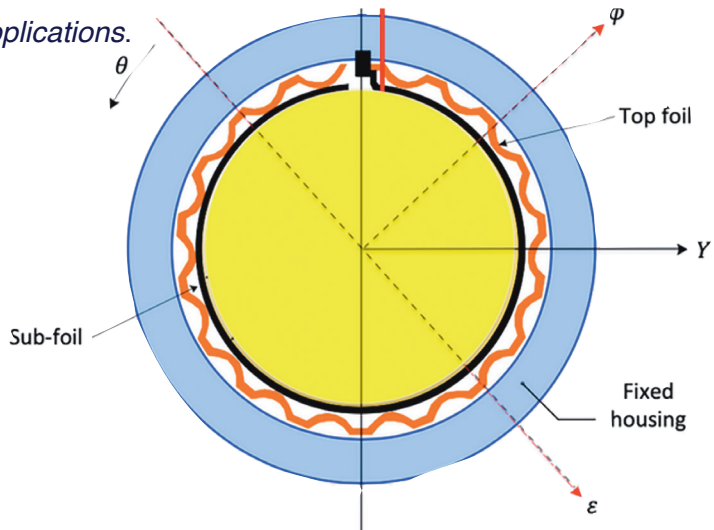
The purpose of this novel design by OAV® is to focus on eliminating the adverse effects of rotational speed, unbalance eccentricity, and rotor mass on the non-linear response. We use a combined approach that treats air and structure as two computation areas to solve common issues, reach higher load capacities, achieve better damping effects, and solve the start-up, and stopping concerns of foil air bearings.

OAV® Foil Bearings are suitable for many high-speed applications.

- Turbo machinery
- Aircraft
- Micro turbine generators

Advantages

- Higher efficiency
- Increased reliability
- Higher speed capability
- Quieter operation
- Wider operating temperature range
- High vibration and shock load capacity
- No scheduled maintenance

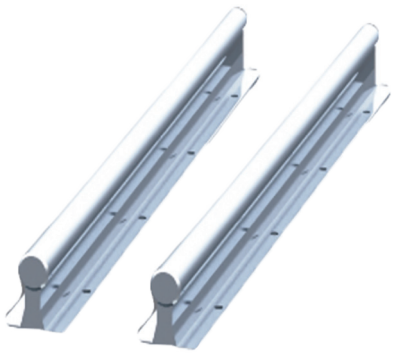


PRE-STOCK (FRAME) SIZES ARE AVAILABLE FOR EASY RETROFIT
REQUEST DETAIL

COMPONENTS

SUPPORT RAIL SHAFTS

Stainless steel shafts with a support rail for stable setup, which eliminates bending and stops linear bearings from rotating.



Shaft Part Number	Size	Tolerance	Compatible with	Lengths
Open Pillow Air Bearing (English)				
OAVSRS0500	0.500	+.0000/-0.0007	OAVRGL0500	12 or 24 in
OAVSRS1000	1.000	+.0000/-0.0007	OAVRGL1000	12 or 24 in
Open Pillow Air Bearing (Metric)				
OAVSRS012m	12mm	+.00/.02mm	OAVRGL0500	300 or 600 mm
OAVSRS025m	25mm	+.00/.02mm	OAVRGL1000	300 or 600 mm

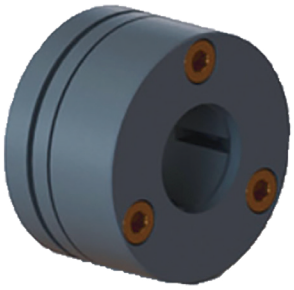
SHAFTS

Our standard shafts have a surface finish better than 16 RMS and a tolerance of 0.0007.
The standard length for metric parts are 300mm & 600mm. For English sizes, the standard length is 12 in and 24 in.

Shaft Number	Size	Tolerance	Compatible With	Lengths
Air Bushing (Metric)				
OAV06MMSHAFT	6mm	+.00/.02mm	OAV006MB	300 or 600mm
OAV08MMSHAFT	8mm	+.00/.02mm	OAV008MB	300 or 600mm
OAV10MMSHAFT	10mm	+.00/.02mm	OAV010MB	300 or 600mm
OAV13MMSHAFT	13mm	+.00/.02mm	OAV013MB	300 or 600mm
OAV20MMSHAFT	20mm	+.00/.02mm	OAV020MB	300 or 600mm
OAV25MMSHAFT	25mm	+.00/.02mm	OAV025MB	300 or 600mm
OAV40MMSHAFT	40mm	+.00/.02mm	OAV040MB	300 or 600mm
OAV50MMSHAFT	50mm	+.00/.02mm	OAV050MB	300 or 600mm
OAV75MMSHAFT	75mm	+.00/.02mm	OAV075MB	300 0r 600mm
Air Bushing (English)				
OAV0250SHAFT	0.250in	+.0000/-0.0007	OAV0250IB	12 or 24in
OAV0312SHAFT	0.312in	+.0000/-0.0007	OAV0312IB	12 or 24in
OAV0375SHAFT	0.375in	+.0000/-0.0007	OAV0375IB	12 or 24in
OAV0500SHAFT	0.500in	+.0000/-0.0007	OAV0500IB	12 or 24in
OAV0750SHAFT	0.750in	+.0000/-0.0007	OAV0750IB	12 or 24in
OAV1000SHAFT	1.000in	+.0000/-0.0007	OAV1000IB	12 or 24in
OAV1500SHAFT	1.500in	+.0000/-0.0007	OAV1500IB	12 or 24in
OAV2000SHAFT	2.000in	+.0000/-0.0007	OAV2000IB	12 or 24in
OAV3000SHAFT	3.000in	+.0000/-0.0007	OAV3000IB	12 or 24in

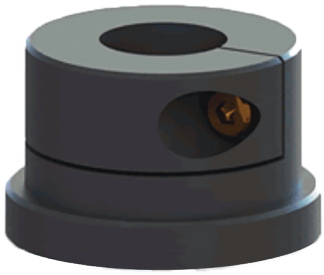
CLAMP ON SHAFT PRECISION FACE COLLARS

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



Part Number	Shaft Size	Compatible with Thrust Bushing	Compatible with Thrust Bearing
C13TB2	13mm	OAVTB32i13	OAVTR32i13
C20TB2	20mm	OAVTB60i20	OAVTR60i20
C25TB2	25mm	OAVTB60i25	OAVTR60i25
C50TB2	50mm	OAVTB100i50	OAVTR100i50
C75TB2	75mm	OAVTB150i75	OAVTR150i75

BUSHING FACE COLLARS



Part Number	Shaft Size	Compatible with Thrust Bushing	Compatible with Thrust Bearing
C04TB1	4mm	OAVTB16i04	N/A
C13TB1	13mm	OAVTB32i13	OAVTR32i13
C20TB1	20mm	OAVTB60i20	OAVTR60i20
C25TB1	25mm	OAVTB60i25	OAVTR60i25
C50TB1	50mm	OAVTB100i50	OAVTR100i50
C75TB1	75mm	OAVTB150i75	OAVTR150i75

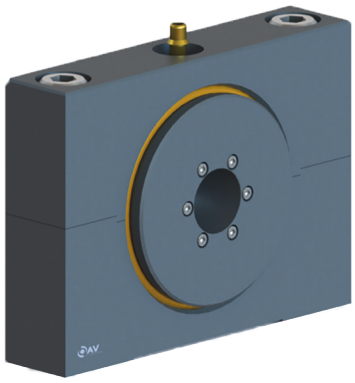
RETAINING PLATES

This high quality aluminum anodized components meets aerospace quality specifications. The 0.0006 mm tolerance is always parallel and easy to install.

Part Number	B.C Diameter	Flat Rectangular Air Bearing Part #	Round Air Bearing Part #
OAVBR13R18	18	OAVF20L40 OAVF25L50	N/A
OAVBR13R21	21.6	OAVF40L50 OAVF40L80 OAVF50L100	OAVR040R OAVR050R OAVRo65R
OAVBR20R32	32	N/A	OAVR080R OAVR100R OAVR125R
OAVBR25R40	40	OAVF100L200R	OAVR150R OAVR200R

MOUNTING BLOCKS

We offer aluminum housing blocks in English and Metric sizes. They are made from air craft quality aluminum and are anodized with Mil spec. for ultimate quality. The ideal component for your assembly - easy to install, and provide a fast solution with standard sizes.

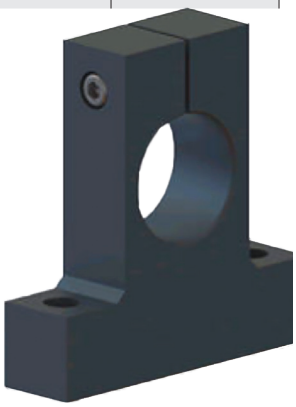


Part Number	Recommended Roller Air Bearing (mm)	Recommended Roller Air Bearings (in)
MB13RL	OAVRL13M	
MB20RL	OAVRL20M	
MB25RL	OAVRL25M	
MB40RL	OAVRL40M	
MB50RL	OAVRL50M	
MB75RL	OAVRL75M	
MB0500RL		OAVRL0500
MB0750RL		OAVRL0750
MB1000RL		OAVRL1000
MB1500RL		OAVRL1500
MB2000RL		OAVRL2000
MB3000RL		OAVRL3000

Part Number	Recommended Air Bearing (mm)	Recommended Air Bearing (in)	Recomended Thrust Air Bushing
MBi0250	OAV006MB, OAV008MB OAV010MB	OAV0250IB, OAV0312IB, OAV0375IB	OAVTB16i04
MBi0500	OAV013MB	OAV0500IB	
MBi0750	OAV020MB	OAV0750IB	OAVTB32i13
MBi1000	OAV025MB	OAV1000IB	
MBi1500	OAV040MB	OAV1500IB	OAVTB60i20, OAVTB60i25
MBi2000	OAV050MB	OAV2000IB	
MBi3000	OAV075MB	OAV3000IB	OAVTB100i50
MBi150i75	OAVTB150i75	N/A	

SHAFT END SUPPORT

These black anodized aluminum end support blocks are lightweight and strong for the end mounts to support precision shafting. Available in English and Metric sizes.



ENGLISH

Shaft Size	Part Number
.250 Shaft End Support	SEMI-OAV0250
.375 Shaft End Support	SEMI-OAV0375
.500 Shaft End Support	SEMI-OAV0500
.750 Shaft End Support	SEMI-OAV0750
1.000 Shaft End Support	SEMI-OAV1000
1.500 Shaft End Support	SEMI-OAV1500
2.000 Shaft End Support	SEMI-OAV2000
3.000 Shaft End Support	SEMI-OAV3000

METRIC

Shaft Size	Part Number
6mm Shaft End Support	SEMM-OAV06
10mm Shaft End Support	SEMM-OAV10
13mm Shaft End Support	SEMM-OAV13
20mm Shaft End Support	SEMM-OAV20
25mm Shaft End Support	SEMM-OAV25
40mm Shaft End Support	SEMM-OAV40
50mm Shaft End Support	SEMM-OAV50
75mm Shaft End Support	SEMM-OAV75

O-RINGS

The O-Rings meet MIL-R-83248C and ASTM D2000/SAE J200 specifications. They offer excellent resistance, and their temperature range is from -15° to +400° F. They have a hardness of A15, with a color of black.

Compatible with	O-Ring Part Number
Air Bushings (Metrics)	
OAV006MB	OAV0250RG
OAV010MB	OAV0375RG
OAV013MB	OAV0500RG
OAV020MB	OAV0750RG
OAV025MB	OAV1000RG
OAV040MB	OAV1500RG
OAV050MB	OAV2000RG
OAV075MB	OAV3000RG
Air Bushings (English)	
OAV0250IB	OAV0250RG
OAV0375IB	OAV0375RG
OAV0500IB	OAV0500RG
OAV0750IB	OAV0750RG
OAV1000IB	OAV1000RG
OAV1500IB	OAV1500RG
OAV2000IB	OAV2000RG
OAV3000IB	OAV3000RG
Thrust Air Bushings	
OAVTB16i04	OAV0250RG
OAVTB32i13	OAV0750RG
OAVTB60i20	OAV1500RG
OAVTB60i25	OAV1500RG
OAVTB100i50	OAV3000RG
OAVTB150i75	OAV150i75RG

MOUNTING SCREWS

This high carbon stainless meets aerospace quality specifications. With ball end configurations, 0.0006 mm tolerance is always parallel and easy to install.

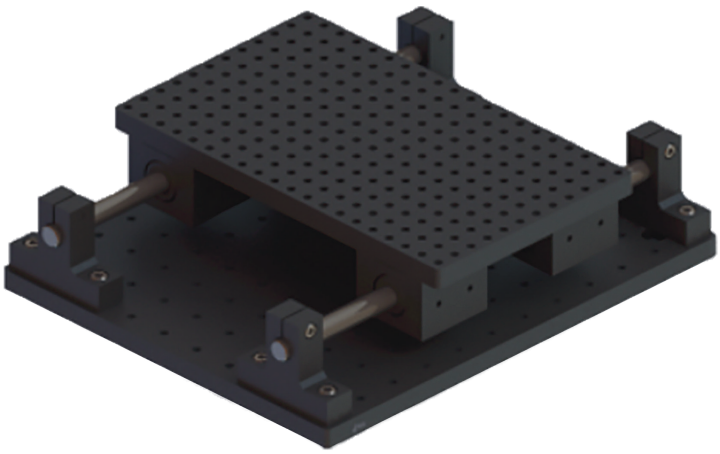
Part Number	Size	Compatible With
		Flat Rectangular Air Bearings
OAV13MSCREW	13mm	OAVF20L40
OAV13MSCREW	13mm	OAVF25L50
OAV13MSCREW	13mm	OAVF40L50
OAV13MSCREW	13mm	OAVF40L80
OAV13MSCREW	13mm	OAVF50L100
OAV25MSCREW	25mm	OAVF100L200
		Flat Round Air Bearings
OAV13MSCREW	13mm	OAVR025R
OAV13MSCREW	13mm	OAVR040R
OAV13MSCREW	13mm	OAVR050R
OAV13MSCREW	13mm	OAVR065R
OAV20MSCREW	20mm	OAVR080R
OAV20MSCREW	20mm	OAVR100R
OAV20MSCREW	20mm	OAVR125R
OAV25MSCREW	25mm	OAVR150R
OAV25MSCREW	25mm	OAVR200R
		Vacuum Preloaded Air Bearings
OAV13MSCREW	13mm	OAVR050RV
OAV20MSCREW	20mm	OAVR080RV
OAV25MSCREW	25mm	OAVR100RV

BALLS

This high carbon stainless steel ball is one of the hardest stainless steels and meets the ASTM A276, ASTM A756 AND AMS 5630, and MIL- SPEC MS19063B specifications. The sphecificity is within 0.0006 mm.

Air Bearings	B.C Diameter	Ball Diameter	Hole Size	Ball Retainer
FLAT RECTANGULAR (4X45 ° Holes)				
OAVF20L40	18	13	M1.6X0.35-6H	OAVBR13R18
OAVF25L50	18	13	M1.6X0.35-6H	OAVBR13R18
OAVF40L50	21.6	13	M3X0.5-6H	OAVBR13R21
OAVF40L80	21.6	13	M3X0.5-6H	OAVBR13R21
OAVF50L100	21.6	13	M3X0.5-6H	OAVBR13R21
OAVF100L200	40	25	M3X0.5-6H	OAVBR25R40
FLAT ROUND (4X45 ° Holes)				
OAVR025R	N/A	13	M3X0.5-6H	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

ASSEMBLIES



OAV® Air Bearing Linear Slides are a high precision and accurate air slide assembly. Our bearings provide you with the confidence of integrated bearing system motions and dynamic responses way better than conventional roller bearings.

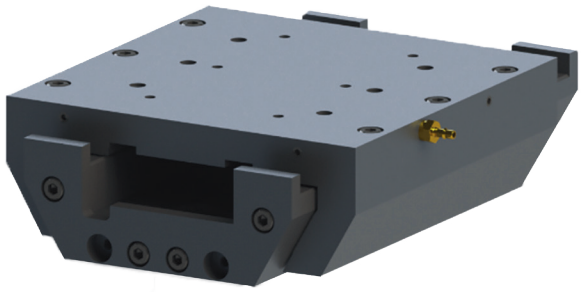
OAV® Air Bearing Linear Slide assemblies combine an accurate guide surface with an air slide ready-fit for installation. This provides the user with the convenience of integrated guide and bearing systems.

We provide designs that are integrated into your product and we can quickly develop a design based on the application or specific requirements. We provide detailed drawings and 3-D CAD models, can analyze complex issues associated with applications from nanometer accuracy positioning to standard calculations.

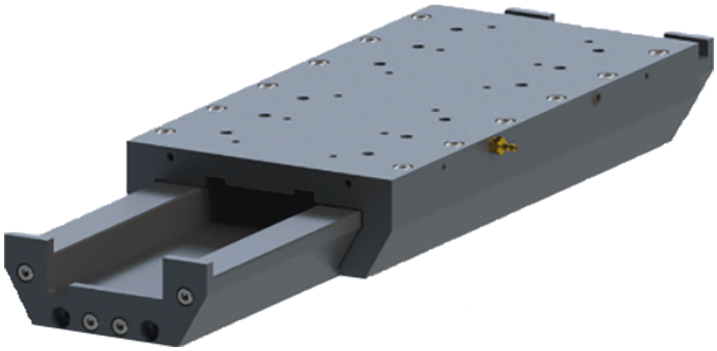
DOVETAIL SERIES

The OAV® Profile Dove-tail Series Rail Guides are manufactured using premium grade aircraft quality material with precise linear accuracy and flatness that is fibration-free and provides maintenance-free motion. The guide comes ready to install, with an integrated locking brake function resulting from the pre-tensioning of the air bearing, allowing for ultimate accuracy and positioning.

OAV® Profile Dovetail Series Rail Guides® consists of the next generation OAV Air Bearing® and is manufactured from aircraft quality lightweight aluminum 7075-T6 linear guides.



DOV150150



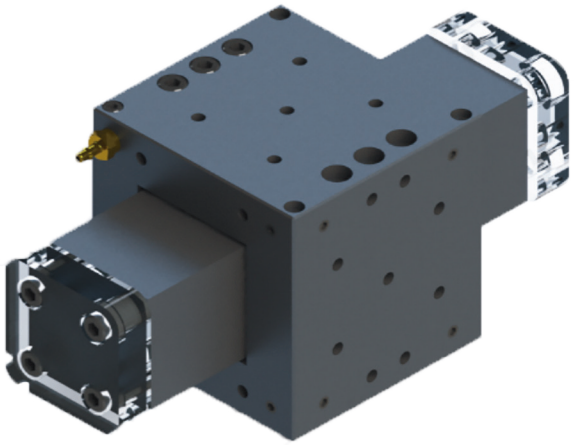
DOV150300

Title	Specification
Part#	DOV150150
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	150mm x 150mm
Travel	50mm/100mm/200mm/300mm or Custom Travel
Guide bar Length	Custom
Assembly Height	55mm
Carriage Weight	1.3kg (2.8lb)
Total Weight	1.95 kg (4.2 lb) (100mm Travel)
Z direction Load	352 lb (1565 N)
Y direction Load	304 lb (1352 N)
Air Flow	17 nlpm
Pitch	285 lbs-in (32 N-m)
Roll	324 lbs-in (37 N-m)
Yaw	140 lbs-in (16 N-m)
Y Stiffness	670N/micron
Z Stiffness	730 N/micron

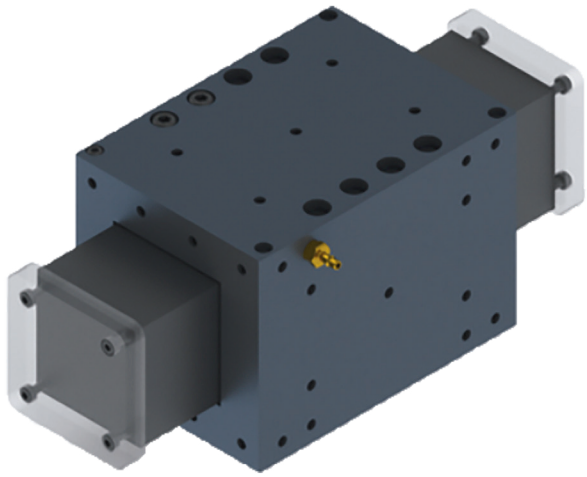
Title	Specification
Part#	DOV150300
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	150mm x 300mm
Travel	50mm/100mm/200mm/300mm or Custom Travel
Guide bar Length	Custom
Assembly Height	55mm
Carriage Weight	2.6 kg (2.7lb)
Total Weight	3.89kg (8.5lb)(200mm Travel)
Z direction Load	704 lb (3130 N)
Y direction Load	608 lb (2704 N)
Air Flow	23 nlpm
Pitch	950 lbs-in (107 N-m)
Roll	990 lbs-in (112 N-m)
Yaw	396 lbs-in (45 N-m)
Y Stiffness	1609 N/micron
Z Stiffness	2176 N/micron

BOX SERIES

OAV® Profile Box-Series Rail Guides are manufactured from aircraft quality lightweight material, have ultra-precise linear straightness and flatness, and are vibration and maintanence-free. They are ready to install, and have an integrated locking brake function, through pretensioning of the air bearing, for ultimate accuracy positioning.



BX4040



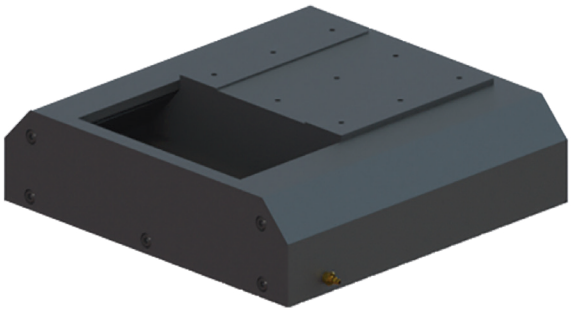
BX5050

Title	Specification
Part#	BX4040
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	80mm x 80 mm and 75mm Length
Travel	50mm/100mm/200mm/300mm or Custom Travel
Guide bar Length	40mm X40mm
Assembly Height	80mm
Carriage Weight	.86 kg (1.89lb)
Total Weight	2.8 kg (6.1lb) (100mm Travel)
Z direction Load	124 lb (551N)
Y direction Load	124 lb (551N)
Air Flow	4.6 nlpm
Pitch	78 N-m
Roll	78 N-m
Yaw	78 N-m
Y Stiffness	183N/micron
Z Stiffness	183N/micron

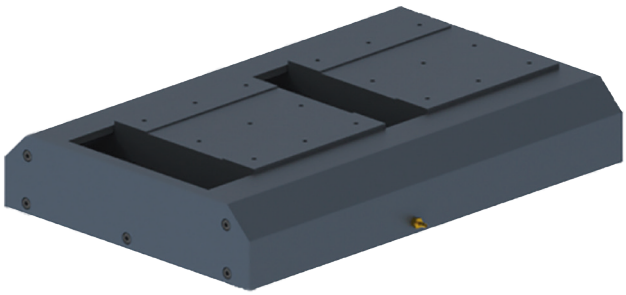
Title	Specification
Part#	BX5050
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	90mm x 90 mm and 125mm Length
Travel	50mm/100mm/200/mm/300mm or Custom Travel
Guide bar Length	50mmX50mm
Assembly Height	90mm
Carriage Weight	1.6 kg (3.5lb)
Total Weight	5.76 kg (12.6lb) (100mm Travel)
Z direction Load	356 lb (1583N)
Y direction Load	356 lb (1583N)
Air Flow	5.1 nlpm
Pitch	160 N-m
Roll	144 N-m
Yaw	160 N-m
Y Stiffness	353N/micron
Z Stiffness	353N/micron

U-SERIES

The OAV® Profile U-series Rail Guides with double carriages can be used separately or attached to each other. They are manufactured from aircraft quality lightweight aluminum material. The air supply port is located in the guide with a couple location options for ultimate accuracy positioning and flexibility.



US150150



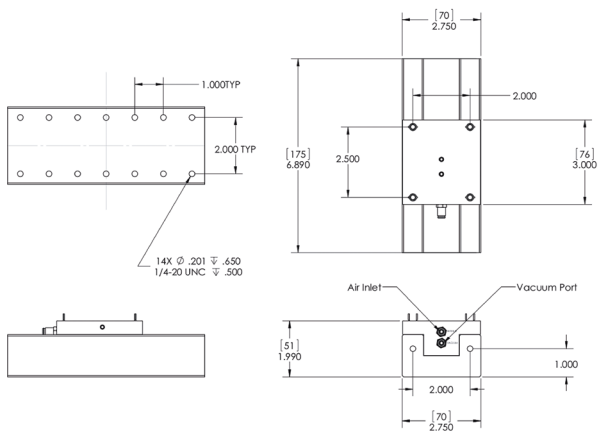
US150300

Title	Specification
Part#	US150150
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	150x150
Travel	100mm
Guide Base Length	250mm / Custom
Assembly Height	68mm
Assembly Width	280mm
Carriage Weight	7lb
Total Weight	19lb
Z direction Load	918 lb (4083N)
Y direction Load	230 lb (1023 N)
Air Flow	38 nlpm @100mm Travel
Pitch	356 N-m
Roll	406 N-m
Yaw	210 N-m
Y Stiffness	3801 N/micron
Z Stiffness	4106 N/micron

Title	Specification
Part#	US150300
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	150x150
Travel	100mm
Guide Base Length	400mm/Custom
Assembly Height	68mm
Assembly Width	68mm
Carriage Weight	7 lb Each Carriage
Total Weight	35 lb
Z direction Load	1830 lb (8140N)
Y direction Load	380 lb (1690)
Air Flow	42 NLPM @ 100mm Travel
Pitch	356 N-m
Roll	406 N-m
Yaw	210 N-m
Y Stiffness	3801 N/micron
Z Stiffness	4106 N/micron

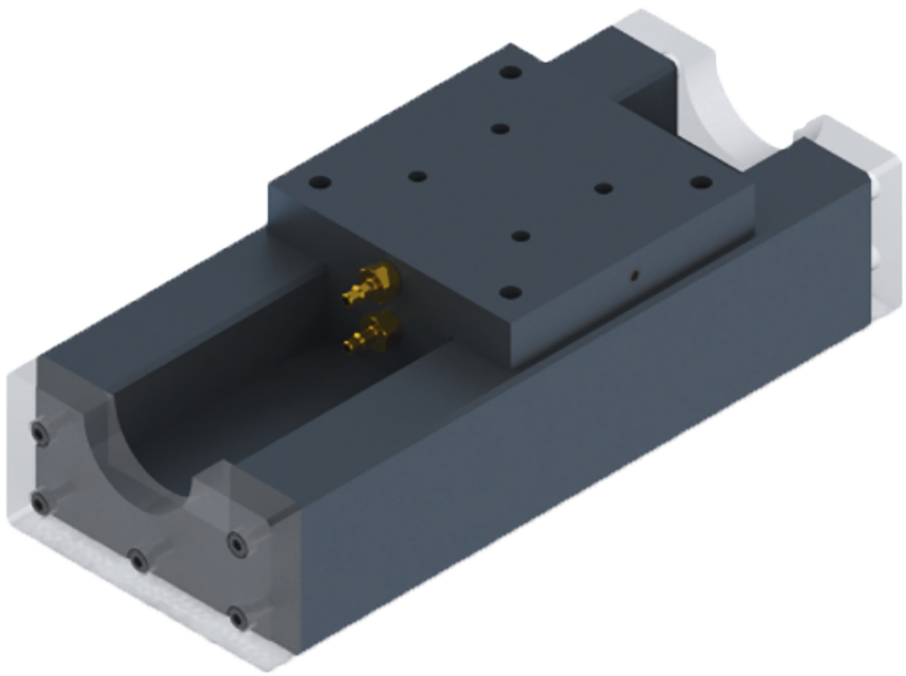
T-SERIES RAIL GUIDE

OAV® Profile T-series Rail Guides are manufactured from aircraft quality lightweight material. OAV® Vacuum Preloaded Air Bearing uses a combination of air pressure and a vacuum to hold it down while simultaneously lifting it from the surface for ultimate precision.



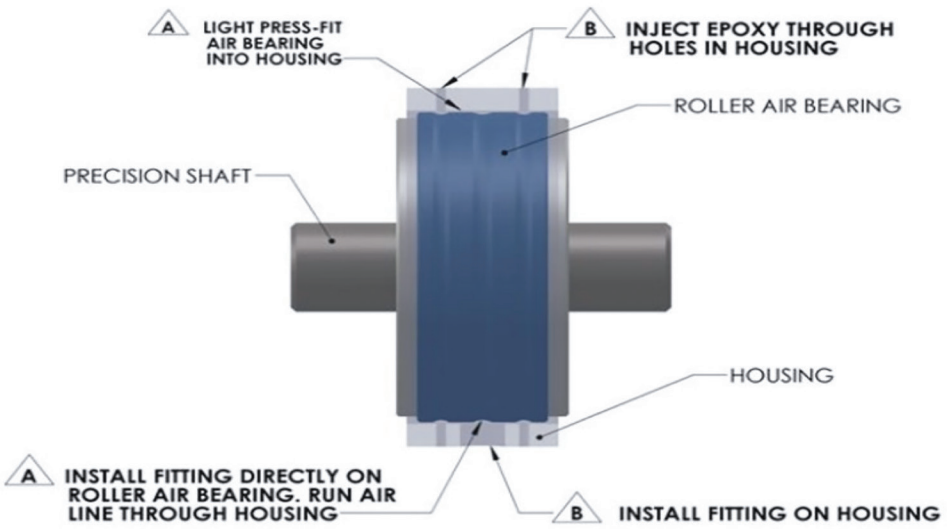
Title	Specification
Part#	TS7575
Local Straightness	.25μm per 25mm travel
Maximum error	2μm per 1000mm travel
Flatness	.0005mm or .00002inc
Carriage Size	70mm x 76mm
Travel	100mm/200mm/300mm/ Custom
Guide Length	190mm/ Custom
Assembly Height	55mm
Carriage Weight	.24 lb (.11kg)
Total Weight	1.37 lb (.62kg) 100mm travel
Z direction Load	90 lb (400N)
Y direction Load	20 lb (88N)
Air Flow	1.3 NLPM
Pitch	11 N-m
Roll	19 N-m
Yaw	33N-m
Y Stiffness	28 N/micron
Z Stiffness	30N/micron

TS-7575



ROLLER AIR BEARING DESIGN & INSTALLATION GUIDE

The basic methods to mount the linear Roller Air Bearing® is to transition fit both externally and internally. 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 fit. Another means of installation is to coat the bearing with an adhesive (carefully covering the bearing OD) and insert it into the mount, or inject epoxy through the holes in the housing.

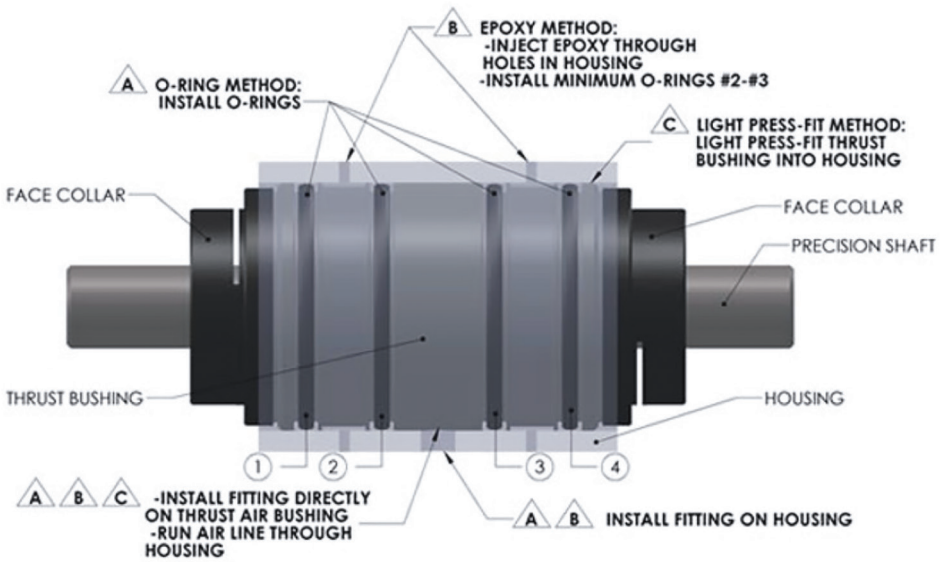


OAV® Roller Air Bearings			Metric Tolerance Value in Millimeter	
Application	Desired Fit Type	Desired Fit	Use Shaft Diameter	Use Housing Diameter
Preloaded Assemblies	Bonding (No adhesive air port)	.010 to .020	d - .015 d - .020	D +.010 D +.015
Low speed, or spring pre-load	Loose	.002 to .012	d - .007 d - .012	D +.002 D +.007
Medium Speed	Transition	.005 to .005	d - .000 d - .005	D - .000 D - .005
High Speed	Light Press	.000 to .010	d +.005 d -.000	D - .005 D - .010

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

THRUST AIR BEARING DESIGN & INSTALLATION GUIDE

Typical configuration: Thrust air bushings slide over the shaft just like air bushings. The only differences is that thrust air bushings have face collars clamped to the shaft on both sides in order to keep the thrust air bushings from moving linearly. OAV® Mounting Blocks can be used to hold the thrust air bushings. If a custom-designed housing is used, make sure to follow the same guidelines 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. Statical 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:

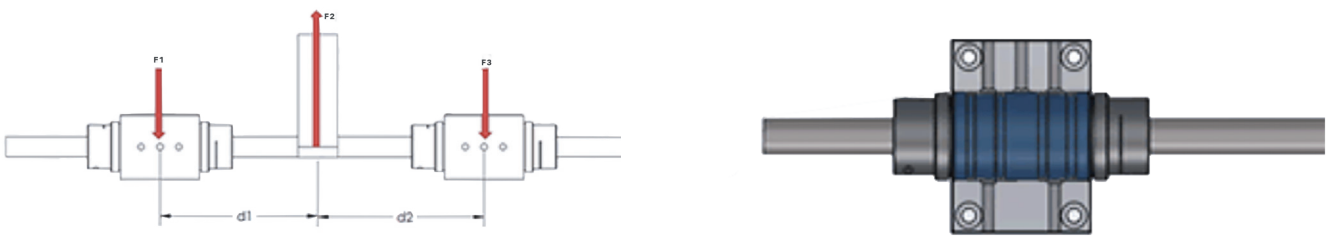


Figure 1. The drive belt in between both thrust air bushings. This is recommended, as the tension on the belt will be distributed amongst both thrust air bushings as shown in the equations below.

$F3 = F1 * d1/(d1+d2)$

$F2 = F1 * d2/(d1+d2)$

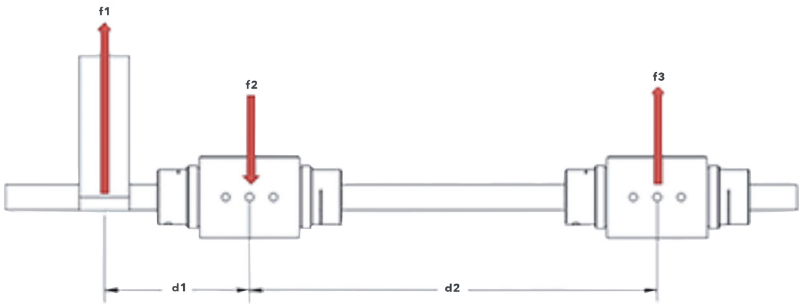


Figure 2. The drive belt outside the two thrust air bushings. This configuration works best with a small distance d1 and long distance d2. The corresponding load equations are below.

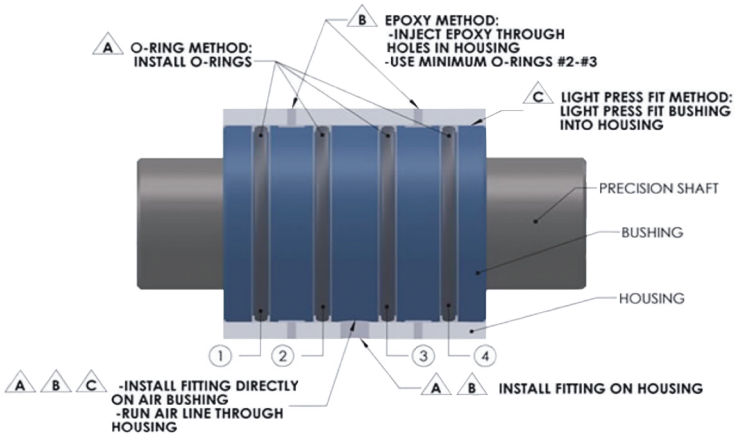
F2=F1*(d1/d2+ 1)

F3 = F1* d1/d2

Consider the gap between the bushing and the 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 the following formula: Length of the left face collar + length of thrust air bushing + length of right face collar

AIR BUSHING DESIGN & INSTALLATION GUIDE

Typical configurations consist of one shaft and one bushing, or two parallel shafts with two to four bushings. Generally, the air bushings are inserted inside of a mounting block or inside the bore of a customer-designed housing. The customer-designed housing must be designed in a way such that the air supply is forced into the air ports of the bushings.
The three methods of installation are epoxy, o-rings, or a light-press fit. OAV® mounting blocks allow for the 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 that 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 also provide this information.

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

Other considerations:
Air bushings rely on the straightness of the shaft. Design so that the deflection/displacement of the shaft is minimal.
Installing bushings with o-rings:
1) First do a quick visual inspection to ensure that 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 gauges to assure that the shafts are at an equal distance from both ends. Parallelism is crucial for optimal 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 ensure 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 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 gauses to ensure 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 the air fitting directly into the air bushings as shown above.

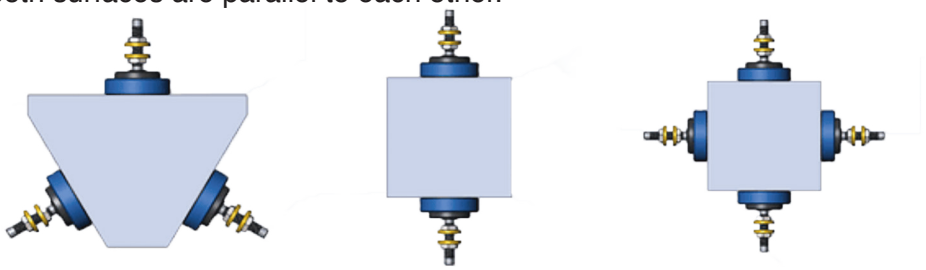
FLAT AIR BEARING DESIGN & INSTALLATION GUIDE

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 4 different ways.

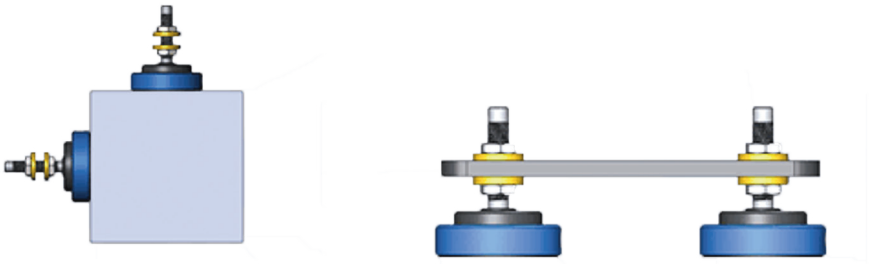
1) Opposite bearing: The most common way is to preload with a bearing on the opposite end. This requires more space and adds more weight, but it provides for more stiffness and load capacity. To achieve the highest stiffness and balance, it is recommended to make sure the two bearings are placed opposite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



When preloading with other air bearings, the preload force needs to be considered in order to determine the appropriate size bearing.

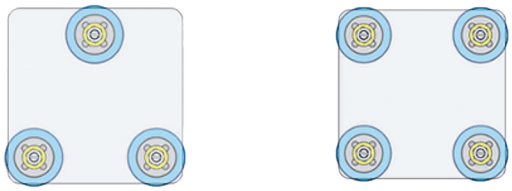
Preloading with other air bearings is typically utilized to provide a load capacity in both directions, as well as for increasing the stiffness.

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.



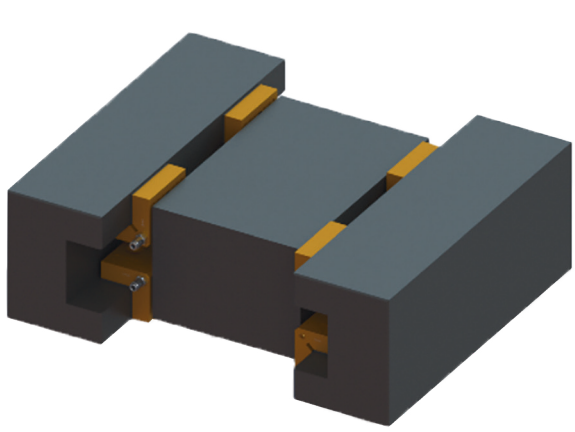
Other considerations: It is best to keep the resulting force of the load distribution in the center of the bearing. In order to determine the proper size of the bearing, it is best to ask the following questions:

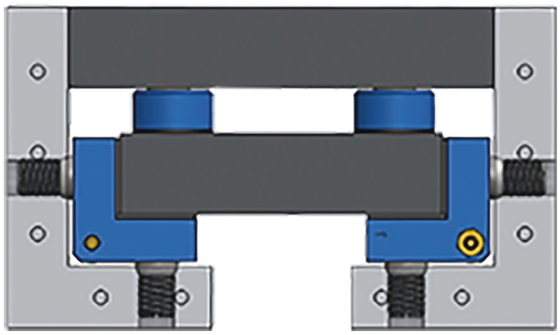
-Where is the resulting load located on the bearing?
-What is the surface roughness of the guide?
-What is the maximum load being applied to the bearing?

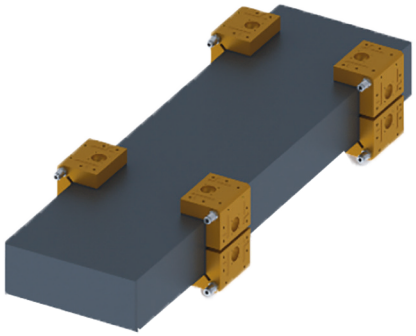
Keep in mind that the load capacities for each bearing are based on the maximum load being applied to the center of the bearing. Smoother surface finishes will always result in a better performance. However, if a smooth surface finish is not possible, you will need a bigger bearing and high input pressure,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

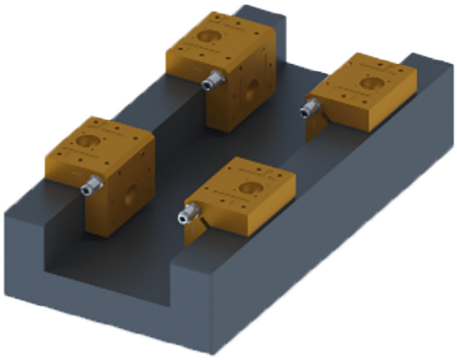
When supporting a load on a flat surface, it is most reliable to use 3 bearings (rather than 4). Assuming that the location of the load is maintained between the three bearings, this will add the most stability. 3 bearings are especially best when the guide surface is not perfectly flat because the bearings 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.

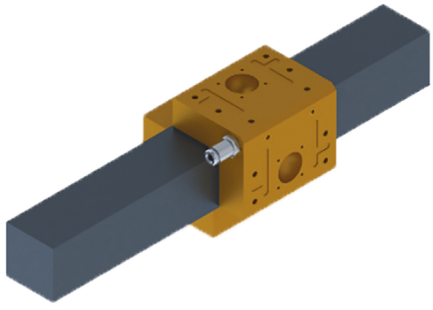
MODULAR AIR BEARING DESIGN & INSTALLATION GUIDE











Preload: Modular air bearings can be preloaded in many 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 for more stiffness and load capacity. To achieve the highest stiffness and balance, it is recommended to make sure the two bearings are placed opposite of one another, and that both surfaces are parallel to each other.

FAQ

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.

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 isoproply alcohol and let it dry.

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.

What is the recommended air quality 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 on dirt particle size at 5 microns, dew point at -4 deg F, oil/vapour content at 1 mg per cubic meter.

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 also used. Different gases will provide different results. The specifications listed by OAVCO are based on compressed air.

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.

Can I download solid files and drawings?
Yes, you can click on the product link and each size will have a solid file and drawing.

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.

How do I install OAV® Air Bearings?
It is important to read the Design Guide found here. This information will help you design around the air bearing.

How much air pressure do I use?
It is best to start with 40 PSI and gradually increase until desired results are achieved. Our standard air bearings are designed to function between 40PSI and 100 PSI.

How much do air bearings cost?
Pricing will vary based on the quantity. Contact OAV® Air Bearings for a quote.
http://oavco.com/purchase.html

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.

How small can you manufacture custom size?
We can manufacture as small as 3mm ID air bearings.

How fast can a bearing rotate?
Classic bearings work to help one surface slide along another by minimizing the points of friction between the two. Imagine sliding a puck across a hockey table without using the air. There's friction at all points where the puck is touching the surface. But if you turn the air on, suddenly that puck is racing across the table.

Below is standard size air bearing speeds (RPM)
0.25 Inch 140,000RPM
13 mm 76,500RPM
20 mm 50,000RPM
25mm 40,000RPM
40mm 25,000RPM
50mm 20,000RPM
75mm 13,250RPM

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.

What is the accuracy of these OAV® Air Bushings?
Ultra-precise linear and rotary motion linear accuracy: 10μin/in, 100μin/36 in Rotary Accuracy: ±1μin TIR Roll/Pitch/Yaw: 0.25 arcsec/in Linear Repeatability: ±10μin Rotary Repeatability: 1μin Positioning Resolution: to ±1 encoder count.

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.

What is the 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.

Can I use an OAV® Air Bushing for a 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.

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