OAV

HIGH QUALITY FRICTIONLESS MOTION SYSTEMS

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INNOVATION

We believe in promoting innovation and entrepreneurial ideas both within OAV and in conjunction with our clients. We encourage collaboration and are willing to partner with our clients to promote new ideas, new processes, and new products.

Innovation is best served by collaboration. Innovation is a process that involves multiple exercises in the attempt to develop and design new systems and products to better accomplish a given task.

Markets are primarily responsive to profitability and quality. Innovation is essential to one's ability to remain on the multi-dimensional cutting edge in relation to cost containment (and profitability), quality (a better mousetrap must be designed to outperform the old one), productivity (responding to the need to increase production and decrease the time required without sacrificing quality), and enhancing durability (so as to maintain quality over time thereby reducing replacement, reducing down time, and reducing associated labor costs.)

OAV is committed to developing human and technological resources to do things differently in order to increase productivity.

For a business or an organization to develop a competitive advantage, it must be able to adapt to changing trends and new technologies. One can develop an advantage through new technology, improving quality, enhancing durability, or reducing costs. Ideally, innovation fosters improvements in all dimensions.

Example of Industries that use OAV Air Bearings for disruptive innovation

Metrology
Automotive Industry
Optomechanics
Semiconductor Industry
Aerospace Industry
Energy Industry
Medical Industry
Audio Industry

With those explanations in hand, the theory of disruptive innovation went beyond simple correlation to a philosophy of causation as well. The critical components of that have been tested and validated through many industries.

OAV® AIR BUSHINGS

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 precision shafts, and are available in Metric or English sizes. OAV® provides an option to use other special materials to maximize stiffness and load capacity.

CUSTOM DESIGN

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, and can analyze complex issues associated with applications from nanometer accuracy positioning to standard calculations.

SIZE	0.250 Inch ID	0.312 Inch ID	0.375 Inch ID	0.500 Inch ID	0.750 Inch ID
Part Number	OAV0250IB	OAV0312IB	OAV0375IB	OAV0500IB	OAV0750IB
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 X 0.5	M3 X 0.5	M3 X 0.5	M3 X 0.5	M3 X 0.5
Lifetime	Infinite	Infinite	Infinite	Infinite	Infinite
Radial Load Max	2.9 lbs (13.1 N)	4.4 lbs (19.4)	4.4lbs (19.8 N)	9.5 lbs (42.3 N)	34.4 lbs (153.0 N)
Radial Stiffness	0.01 lbs/ µ in (2 N/ µm)	.039lbs/µ in (7 N/µ m)	.04lbs/µ in (7 N/µ m)	0.06 lbs/µ in (11 N/µ m)	0.13 lbs/µ in (23 N/µ m)
Pitch Moment Max	0.125 lbs-in (0.013 N-m)	2.74 lbs-in (.28 N-m)	2.75 lbs-in (.29 N-m)	7.5 lbs-in (0.8 N-m)	10 lbs-in (1.1 N-m)
Bushing Inside Diameter (ID)	0.2507 in + .0002 / - .0000 in	0.3125 in +. 0002 / - .0000 in	0.3757 in + .0002 / - .0000 in	0.5007 in +.0002 / - .0000 in	0.7507 in +.0002 / - .0000 in
Bushing Outside Diameter (OD)	0.634 in + .005 / - .000 in	0.634 in +.005 / - .000 in	0.634 in + .005 / - .000 in	0.932 in +.005 / - .000 in	1.250 in +.005 / - .000 in
Bushing Length	1.250 in	1.25 in	1.25 in	2.000 in	2.000 in
Bushing Weigth	9.80 g	8.7 g	8.8 g	33.9 g	51.6 g
Recommended Shaft Outside Diameter (OD)	0.2500 in + .0000 / - .0007 in (g6)	0.3125 in +.0000 / - .0007 in (g6)	0.37500 in + .0000 / - .0007in (g6)	0.5000 in +.0000/ -.0007in (g6)	0.7500 in +.0000/ -.0007in (g6)
Flow Rate	3 SCFH	4.40 SCFH	4.50 SCFH	5.98 SCFH	8.98 SCFH
Housing Bore size O- Ring Method	.661 in + .005 / - .000 in	.661 in + .005 / - .000 in	.661 in + .005 / - .000 in	0.947 in + .000 / - .005 in	1.265 in + .000 / - .005 in
Housing Bore size Light Press Fit Method	.635 in + .000 / - .001 in	.635 in + .000 / - .001 in	.635 in + .000 / - .001 in	.908 in +.000 / - .001 in	1.251 in + .000 / - .001 in

SIZE	1.00 Inch ID	1.50 Inch ID	2.00 Inch ID	3.00 Inch ID
Part Number	OAV1000IB	OAV1500IB	OAV2000IB	OAV3000IB
Housing Material/Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft QualityAluminum/ Mil Spec Hard Anodize	7075 Aircraft QualityAluminum/Mil Spec Hard Anodize	7075 Aircraft QualityAluminum/Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 X 0.5	M3 X 0.5	M3 X 0.5	M3 X 0.5
Lifetime	Infinite	Infinite	Infinite	Infinite
Radial Load Max	51.6 lbs (229.5 N)	126.2 lbs (561.4 N)	198.0 lbs (880.8 N)	298.0 lbs (1325.6 N)
Radial Stiffness	0.19 lbs/µ in (34 N/µ m)	0.41 lbs/µ in (72 N/µ m)	0.63 lbs/µ in (110 N/µ m)	0.91 lbs/µ in (159 N/µ m)
Pitch Moment Max	17 lbs-in (1.9 N-m)	28 lbs-in (3.1 N-m)	46 lbs-in (5.2 N-m)	63 lbs-in (7.1 N-m)
Bushing (ID)	1.0007 in + .0002 / - .0000 in	1.5007 in + .0002 / - .0000 in	2.0007 in + .0002 / - .0000 in	3.0007 in + . 0002 / - .0000 in
Bushing (OD)	1.532 in +.005 / - .000 in	2.346 in + .005 / - .000 in	2.918 in + .005 / - .000 in	3.917 in + .005 / - .000 in
Bushing Length	2.250 in	3.000 in	3.500 in	3.500 in
Bushing Weigth	79.5 g	266.0 g	446.4 g	620.2 g
Recommended Shaft Outside Diameter (OD)	1.0000 in + .0000 / - .0007 in (g6)	1.5000 in +c.0000 / - .0007 in (g6)	2.0000 in + .0000 / - .0007 in (g6)	3.0000 in + .0000 / - .0007 in (g6)
Flow Rate	11.97 SCFH	17.96 SCFH	23.94 SCFH	35.92 SCFH
Housing Bore size O- Ring Method	1.547 in + .000 / - .005 in	2.361 in + .000 / - .005 in	2.933 in + .000 / - .005 in	3.953 in + .000 / - .005 in
Housing Bore size Light Press Fit Method	1.533 in + .000 / - .001 in	2.347 in + .000 / - .001 in	2.920 in + .000 / - .0013 in	3.918 in + .000 / - .0015 in

Breaking Waves of Progress: Experimental Testing of Wave Energy Converters equipped with OAV Air Bushings

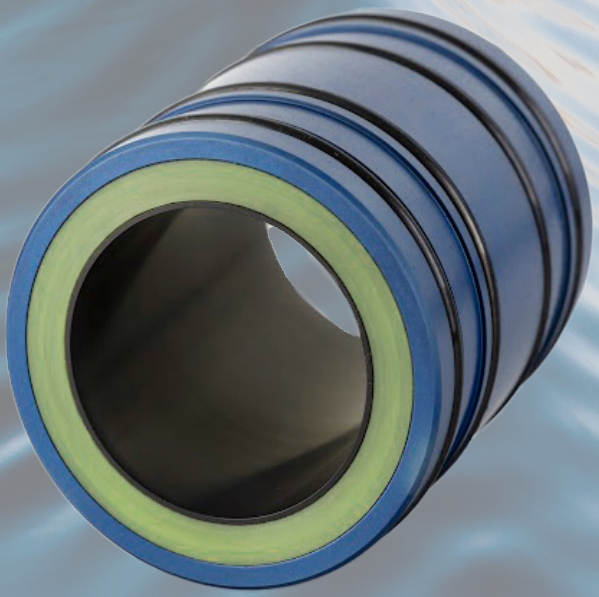
Wave energy is a renewable form of energy which is largely untapped. Wave energy converters (WECs) are devices designed to harness this energy source and convert it to electricity. The last decades a considerable effort has been made by industry and academia to bring WECs to a commercial stage. There is a need for available real-life data to validate numerical models in the wave energy sector. However, publicly available databases from WEC array experiments are limited due to the high cost and complexity of conducting such experiments. The 'WECfarm' project, initiated by Ghent University, aims to improve the understanding of interactions between the individual WECs within an array, and address the need for experimental data on WEC array tests. A team from the Coastal Engineering Research Group of Ghent University, Belgium performed experiments focused on the extraction of wave energy using an array of five point absorber WECs. Similar to offshore wind turbines, multiple point absorber WECs will be installed in an array configuration, to increase the total capacity, and to benefit from the economies of scale. Whereas wind turbines always interact destructively due to wake effects, WECs can interact constructively, since hydrodynamic interactions between the WECs occur through radiation and diffraction of waves, changing the direction of the incoming wave energy.

The point-absorber 'WECfarm' WEC consists of a floating buoy to capture energy from waves coming from different directions. The WECs are equipped with a permanent magnet synchronous motor (PMSM), addressing the need for WEC array tests with an accurate and actively controllable Power Take-Off (PTO). The WEC array control and data acquisition are realized with a Speedgoat real-time target machine, offering the possibility to implement advanced WEC array control strategies in the MATLAB-Simulink environment.

The team emphasized the significance of OAV Air Bushings in the context of WECs to exclude unwanted friction in the linear guiding system. The surge wave excitation force yields a moment on the linear guiding system. This moment can be decoupled in normal forces by a configuration of three air bushings. The air bushings are characterized by a load versus pressure curve, where one 40 mm OAV air bushing can cope with a maximum radial load of 720 N, for a nominal pressure of 5.5 bar. A configuration of three OAV 40 mm air bushings guarantees a permanent layer of air between the guide shafts and the bushings for the most extreme wave conditions, resulting in zero-friction linear guiding on the condition of a proper alignment. To obtain the air gap, a compressor with a two-stage air filter supplies these air bushings with clean and dry air under a nominal pressure of 5.5 bar. The OAV 40 mm air bushings require a shaft's outside diameter of 40.00 mm +0.00/-0.02 mm (tolerance class g6). Figure 1 shows a rendering of a single 'WECfarm' WEC, and Figure 2 shows a schematic of the data acquisition and control flow.

The OAV Air Bushings are pivotal components in the design of the 'WECfarm' WEC, as the experiments target high quality data with low uncertainties. The air bushings exclude the variability in mechanical losses and energy dissipation associated with traditional bearing systems, as for example ball or plain bearings. Additionally, the use of air bushings enhance the controllability and responsiveness of the WEC system, allowing for more precise and efficient power capture from the waves. The team opted for OAV air bushings due to superior pricing, quality, and technical support during the project.

The experimental setup was tested in the Coastal & Ocean Basin Ostend, Belgium, which is a wave basin with an L-shaped wavemaker of 20 by 20 m. Figure 3 and 4 show the experimental setup of the five-WEC array at the wave basin. To maximize power absorption, a control system tailored to the WEC array needs to be implemented. Control strategies aim to achieve resonance by altering the dynamics of the WEC system, as most power is produced during resonant absorption. The research team investigated how the WEC array layout should be optimized simultaneously with the applied control strategy to maximize the power absorption. System identification tests were executed to obtain an accurate dynamic model of the WEC array. Proportional (resistive) and Proportional-Integral (reactive) controllers were designed and tested accordingly.



SIZE	6 mm ID	8 mm ID	10 mm ID	13 mm ID
Part Number	OAV006MB	OAV008MB	OAV010MB	OAV013MB
Housing Material/ Finish	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize
Input Pressure	.28 Mpa to .68 Mpa (40 to 100 PSI)	.28 Mpa to .68 max Mpa	.28 Mpa to .68 max Mpa	40 psi - 100 max psi
Porous Material	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 X 0.5	M3 X 0.5	M3 x 0.5	M3 x 0.5
Lifetime	Infinite	Infinite	Infinite	Infinite
Radial Load Max	12.4 N (2.8 lbs)	19.4 N (4.4 lbs)	20.6 N (4.6 lbs)	42.5 N (9.6 lbs)
Radial Stiffness	2 N/µm (0.01 lbs/µin)	7 N/µm (0.039 lbs/µin)	7 N/µm (0.04 lbs/µin)	11 N/µm (.06 lbs/µin)
Pitch Moment Max	0.013 N-m (.125 lbs-in)	0.28 N-m (2.74 lbs-in)	0.29 N-m (2.75 lbs-in)	0.8 N-m (7.5 lbs-in)
Bushing (ID)	6.018 mm + .005/-.000	8.018 mm + .005/-.000	10.018 mm + .005/-.000	13.018 mm + .005/-.000
Bushing (OD)	16.10 mm + .13/-.00	16.10 mm + .13/-.00	16.10 mm + .13/-.00	23.67 mm + .13/-.00
Bushing Length	31.75 mm	31.75 mm	31.75 mm	50.80 mm
Bushing Weigth	8.6 g	8.7 g	8.6 g	32.5 g
Recommended Shaft (OD)	6.00 mm + .00/-.02 (g6)	8.00 mm + .00/-.02 (g6)	10.00 mm + .00/-.02 (g6)	13 mm + .00/-.02 (g6)
Flow Rate	2.84 SCFH	4.40 SCFH	4.70 SCFH	6.12 SCFH
Housing Bore size O- Ring Method	16.790 mm + .127/-.000	16.790 mm + .127/-.000	16.79 mm + .127/-.000	24.05 mm + .000/-.127
Housing Bore size Light Press Fit Method	16.125 mm + .000/-.025	125 mm + .000/-.025	16.125 mm + .000/-.025	23.070 mm + .000/-.025

20 mm ID	25 mm ID	40 mm ID	50 mm ID	75 mm ID	90 mm ID
OAV020MB	OAV025MB	OAV040MB	OAV050MB	OAV075MB	OAV090MB
7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
.28 Mpa to .68 max Mpa (40 psi to 100 psi)	.28 Mpa to .68 max Mpa (40 psi to 100 psi)	.28 Mpa to .68 max Mpa (40 psi to 100 psi)	.28 Mpa to .68 max Mpa (40 psi to 100 psi	.28 Mpa to .68 max Mpa (40 psi to 100 psi)	.28 Mpa to .68 max Mpa (40 psi to 100 psi)
Carbon	Carbon	Carbon	Carbon	Carbon	Carbon
M3 x 0.5	M3 x 0.5	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Infinite	Infinite	Infinite	Infinite	Infinite	Infinite
160 N (36.0 lbs)	226.3 N (50.9 lbs)	593.8 N (133.5 lbs)	866.3 N (194.8 lbs)	1300.0 N (292.3 lbs)	2000 N (449.6 lbs)
23 N/µm (0.13 lbs/µin)	34 N/µm (0.19 lbs/µin)	72 N/µm (0.41 lbs/µin)	110 N/µm (0.63 lbs/µin)	159 N/µm (0.91 lbs/µin)	245 N/µm
1.1 N-m (10 lbs-in)	1.9 N-m (17 lbs-in)	3.1 N-m (28 lbs-in)	5.2 N-m (46 lbs-in)	7.1 N-m (63 lbs-in)	8.9 N-m
20.018 mm + .005/-.000	25.018 mm + .005/-.000	40.018 mm + .005/-.00	50.018 mm + .005/-.000	75.018 mm + .005/-.000	90.018 mm + .005/-.000
31.75 mm + .13/-.00	38.91 mm + .13/-.00	59.59 mm + .13/-.00	74.12 mm + .13/-.00	99.49 mm + .13/-.00	113.25 mm
50.80 mm	57.15 mm	76.20 mm	88.90 mm	88.90 mm	110 mm
49.1 g	72.0 g	249.1 g	443.0 g	688.1 g	907.9 g
20.00 mm + .00/-.02 (g6)	25.00 mm +.00/-.02 (g6)	40.00 mm + .00/-.02 (g6)	50.00 mm + .00/-.02 (g6)	75.00 mm + .00/-.02 (g6)	90.00 mm + .00/-.02 (g6)
9.42 SCFH	11.78 SCFH	18.85 SCFH	23.57 SCFH	35.42 SCFH	52.5 SCFH
32.130 mm + .000/-.127	39.290 mm + .000/-.127	59.97 mm + .000/-.127	74.50 mm + .000/-.127	100.4 mm + .000/-.127	113.9 mm + 0/-.127
31.780 mm + .000/-.025	38.935 mm + .000/-.025	59.630 mm + .000/-.025	74.150 mm + .000/-.035	99.525 mm + .000/-.040	113.28 mm + 0/-.035

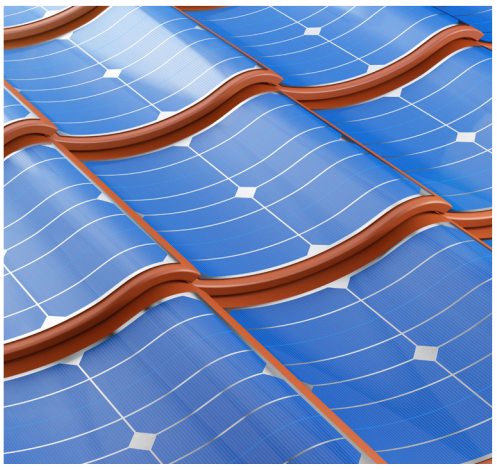
OAV® TAPERED-ROLLER AIR BEARINGS

The tapered bearing is one of the most commonly used forms of roller bearings in many industries. OAV is proud to be the first to introduce the Tapered Roller Air Bearing. Consisting 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 75 mm ID outer-cage spin or inner-race spin with options.

Size	13 mm ID	20 mm ID	25 mm ID
Part Number	OAV-TPR13M	OAV-TPR20M	OAV-TPR25M
Housing Material/Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	M3 x 0.8	M3 x 0.8	M5 x 0.8
Radial Stiffness	0.06 lb/µ in (10.7 N/µ m)	0.15 lb/µ in (26 N/µ m)	64 N/µm
Pitch Moment Max	4.4 lbs-in (0.5 N-m)	14.16 lbs-in (1.6 N-m)	2.8 N-m
Radial Load Max	20.7 lbs (92.08 N)	34.5 lbs (153.46 N)	71.5 lbs
Axial Load Max	12.4 lbs (55.16 N)	20.7 lbs (92.08 N)	42.9 lbs
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/0.023 (µm)	.9 µin / 0.023 (µm)	.9 µin/0.023 (µm)
Bearings Inside Diameter (ID)	13 mm + .013/-.00	20 mm + .013/-.00	25 mm + .013/-.00
Bearing Outside Diameter (OD)	53 mm + .00/-.013	70 mm + .00/-.013	70 mm + .00/-.013
Bearing Width	13 mm	15 mm	15 mm
Weight	.148 lb (67 g)	0.28 lb (127.0 g)	.28 lb (127 g)
Shaft Diameter	13 mm	20 mm	25 mm
Housing Bore size Light Press Fit Method	53 mm + .0013/-.013	70 mm + .013/-.00	70 mm + .013/-.00
Flow rate	3.68 SCFH	5.22 SCFH	5.66 SCFH

Size	40 mm ID	50 mm ID	75 mm ID
Part Number	OAV-TPR40M	OAV-TPR50M	OAV-TPR75M
Housing Material/Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	M3 x 0.8	M3 x 0.8	M5 x 0.8
Radial Stiffness	0.41 lb/µ in (72 N/µm)	0.56 lb/µin (98 N/µm)	0.97 lb/µ in (170 N/µ m)
Pitch Moment Max	27.4 lbs-in (3.1 N-m)	33.6 lbs-in (3.8 N-m)	62.8 lbs-in (7.1 N-m)
Radial Load Max	116.6 lbs (518.9 N)	179.5 lbs (798.8 N)	333.6 lbs (1484.5 N)
Axial Load Max	70 lbs (311.5 N)	107.7 lbs (479.3 N)	200.1 lbs (890.4 N)
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/0.023 (µm)	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)
Bearings Inside Diameter (ID)	40 mm + .013/-.00	50 mm + .013/-.00	75 mm +.013/-.00
Bearing Outside Diameter (OD)	90 mm + .00/-.013	100 mm + .00/-.013	148 mm +.00/-.013
Bearing Width	19 mm	24 mm	29 mm
Weight	0.5 lb (230 g)	0.76 lb (345 g)	2.02 lb (916 gram)
Shaft Diameter	40 mm	50 mm	75 mm
Housing Bore size Light Press Fit Method	90 mm + .013/-.00	100 mm + .013/-.00	148 mm +.013/-.00
Flow rate	9.23 SCFH	14.21 SCFH	26.4 SCFH

OAV® X-SPIN TAPERED-ROLLER AIR BEARINGS MX



Size	13 mm ID	20 mm ID	25 mm ID
Part Number	OAV-TPR13MX	OAV-TPR20MX	OAV-TPR25MX
Housing Material/Finish	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize
Side Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	Through Shaft Cross-Hole	Through Shaft Cross-Hole	Through Shaft Cross-hole
Radial Stiffness	0.12 lb/µ in (21 N/µ m)	0.19 lb/µ in (33 N/µ m)	0.35 lb/µ in (62 N/µm)
Pitch Moment Max	8 lbs-in (0.9 N-m)	17.7 lbs-in (2.0 N-m)	23 lbs-in (2.6 N-m)
Radial Load Max	43.2 lbs (192.2 N)	63.8 lbs (283.9 N)	68.2 lbs (303.5 N)
Axial Load Max	25 lbs (111.3 N)	38.3 lbs (170.4 N)	40.9 lbs (182.0 N)
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/0.023 (µm)	.9 µin / 0.023 (µm)	.9 µin/0.023 (µm)
Bearings Inside Diameter (ID)	13 mm + .013/-.00	20 mm + .013/-.00	25 mm + .01/-.00
Bearing Outside Diameter (OD)	53 mm + .00/-.013	70 mm + .00/-.013	70 mm + .00/-.013
Bearing Width	13 mm	12 mm	15 mm
Weight	.13 lb (37 g)	0.28 lb (127.0 g)	.27 lb (121 g)
Shaft Diameter	13 mm	20 mm	25 mm
Housing Bore size Light Press Fit Method	53 mm + .013/-.00	70 mm + .013/-.00	44.48 mm + .02/-.00
Flow rate	3.42 SCFH	5.04 SCFH	5.39 SCFH

Size	40 mm ID	50 mm ID	75 mm ID
Part Number	OAV-TPR40MX	OAV-TPR50MX	OAV-TPR75MX
Housing Material/Finish	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize	7075 Aircraft Quality Alumi-num/Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	Through Shaft Cross-Hole	Through Shaft Cross-Hole	Through Shaft Cross-Hole
Radial Stiffness	0.39 lb/µ in (68 N/µ m)	0.55 lb/µ in (96 N/µ m)	0.96 lb/µ in (168 N/µ m)
Pitch Moment Max	25.7 lbs-in (2.9 N-m)	32.7 lbs-in (3.7 N-m)	59.3 lbs-in (6.7 N-m)
Radial Load Max	108.7 lbs (483.7 N)	174.7 lbs (777.4 N)	324 lbs (1441.8 N)
Axial Load Max	65.2 lbs (290.1 N)	104.8 lbs (466.4 N)	194.4 lbs (865.1 N)
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/0.023 (µm)	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)
Bearings Inside Diameter (ID)	40 mm + .013/-.00	50 mm + .013/-.00	75 mm +.013/-.00
Bearing Outside Diameter (OD)	90 mm + .00/-.013	100 mm + .00/-.013	148 mm +.00/-.013
Bearing Width	19 mm	24 mm	29 mm
Weight	0.5 lb (230 g)	0.74 lb (336 g)	2.02 lb (916 gram)
Shaft Diameter	40 mm	50 mm	75 mm
Housing Bore size Light Press Fit Method	90 mm + .013/-.00	100 mm + .013/-.00	148 mm +.013/-.00
Flow rate	8.6 SCFH	13.83 SCFH	25.6 SCFH

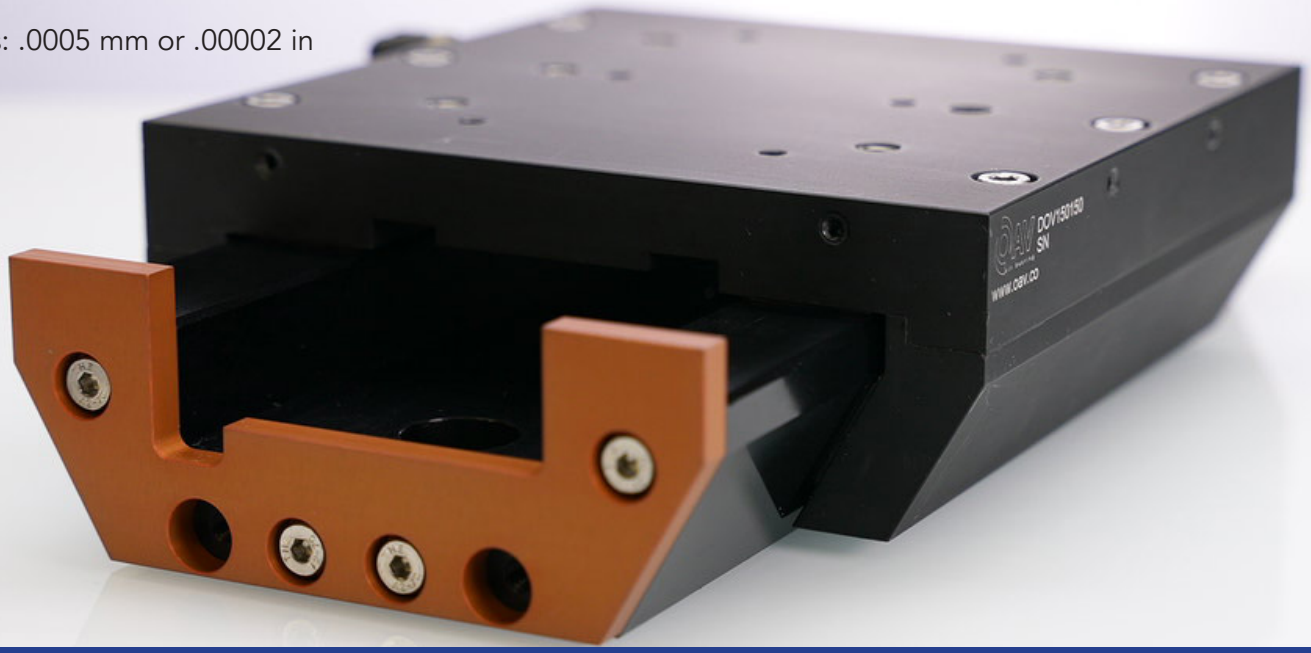
OAV® LINEAR AIR BEARING GUIDES

OAV Profile Rail Guides consist of next generation OAV technology and is manufactured using aerospace quality material. OAV Air Bearing Guides include the Box Series, T-Series, U-Series, and the Dovetail Series. OAV Air Bearings offers a wide range of styles, sizes and unique features produced for easy retrofitting into both new and existing applications.

Standard OAV Air Bearing Guide Tolerances

Local Straightness: .25 µ per 25 mm travel with a maximum error of 2 µ per 1000 mm travel

Flatness: .0005 mm or .00002 in



SIZES AND SPECIFICATIONS		
Part Number	DOV150150	DOV150300
Local Straightness	.25 µm per 25 mm t ravel	.25 µm per 25 mm travel
Maximum error	2 µm per 1000 mm travel	2 µm per 1000 mm travel
Flatness	.0005 mm or .00002 in	.0005 mm or .00002 in
Carriage Size	150 mm x 150 mm	150 mm x 300 mm
Travel	50 mm/100 mm/200 mm/300 mm or Custom Travel	50 mm/100 mm/200 mm/300 mm or Custom Travel
Guidebar Length	Custom	Custom
Assembly Height	55 mm	55 mm
Carriage Weight	1.3 kg (2.8 lb)	2.6 kg (2.7 lb)
Total Weight	1.95 kg (4.2 lb) (100 mm travel)	3.89 kg (8.5 lb) (200 mm travel)
Z direction Load	352 lb (1565 N)	704 lb (3130 N)
Y direction Load	304 lb (1352 N)	608 lb (2704 N)
Air Flow	17 NLPM	23 NLPM
Pitch	285 lbs-in (32 N-m)	950 lbs-in (107 N-m)
Roll	324 lbs-in (37 N-m)	990 lbs-in (112 N-m
Yaw	140 lbs-in (16 N-m)	396 lbs-in (45 N-m)
Y Stiffness	670 N/µ	1609 N/µ
Z Stiffness	730 N/µ	2176 N/µ

CASE STUDIES

OAV® DOVETAIL LINEAR AIR BEARING

Precision of Tribometer Testing on Laboratory-Grown Dendritic Snow for Evaluating Cross-Country Ski Performance.

Tribometers play a crucial role in measuring friction and wear. A full-scale ski-snow tribometer was developed by the Department of Civil and Environmental Engineering at the Norwegian University of Science and Technology to test ski-snow friction with greater precision using the OAV Dovetail Linear Air Bearing. The precision of the tribometer varied based on snow type, speed, and surface preparation.

International ban on fluorine-containing waxes and ski bases has led to increased research on minimizing ski-snow friction. Despite this, quantifying ski-snow friction in a precise and representative way still remains a challenge, and manufacturers rely mostly on full-scale field testing. Although laboratory studies for friction have been conducted, there are still some limitations with the current setups, such as severe polishing and limited sample size. To address these limitations, a modified linear tribometer was produced, capable of testing full-sized cross-country skis at speeds up to 8 m/s on testbeds made with laboratory-grown dendritic snow. This setup provides better control and can produce the same type of snow repeatedly, allowing for more precise measurements of ski-snow friction. Consisting of a mobile carriage driven by a servo motor, the modified tribometer carriage includes a fork, air bellow, the OAV Dovetail Linear Air Bearing, two vertical load cells, a horizontal load cell, and a system for data acquisition and transmission. During a run, there is a phase of acceleration, constant speed, and deceleration, with the length of the constant speed phase varying from 2.50 to 5.50 m depending on the chosen acceleration of the motor. The vertical load can be adjusted from 50 N to 800 N, and the applied load is distributed over the entire length of the binding with the center of mass approximately 12 cm behind the front of the binding, which is similar to a skier's weight distribution and center of mass over the ski. The force from the air bellow is transmitted through the fork to the two vertical load cells, which sit on top of the OAV Dovetail Linear Air Bearing. The ski is connected to the bottom of the air bearing, which can slide without friction, and the angle of the OAV Dovetail Linear Air Bearing is adjusted with a screw and digital level. The resistance force of the ski on the snow is measured by a horizontal load cell placed between the housing and slider of the air bearing.

The OAV Dovetail Linear Air Bearing allows for the ski-snow friction to be measured with incredibly accurate precision. The sliding mechanism of the air bearing allows for the ski to glide without any friction. The air bearing in the modified tribometer provides greater control for the precise measurements, which is critical for developing and testing new ski wax and base materials that align with the international ban of fluorine-containing waxes and ski bases.

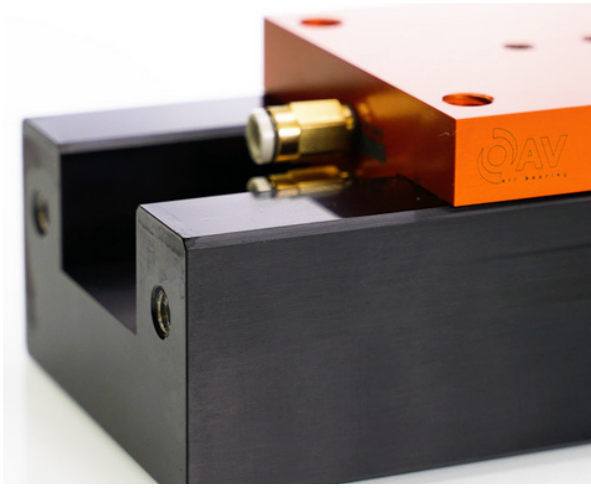
The motor controller gradually reduces acceleration during the second half of the acceleration phase using a sinusoidal ramp (S-ramp) to reduce the impact of inertia. The horizontal force during acceleration is significant due to the added inertia force of the ski and slider. The air dragis negligible due to the measured air drag being less than 0.4% of the total force when compared to the average friction force. The horizontal force is the ski-snow friction force, while the normal force is measured by two vertical load cells. The friction coefficient is calculated by dividing the horizontal force by the vertical force. Vibrations during the measurement are reduced by removing data points at the start and end of the measurement area. The spectral analysis is used to identify the major frequency and average amplitude of the force data.

The precision of the tribometer was assessed at three levels. At level 1, the precision of the friction measurement unit was determined by measuring the coefficient of friction for 50 consecutive runs on a single track. The variation of the measurement series around their linear trendlines was used to estimate the standard deviation and the relative standard deviation for each track. At level 2, the precision within a single testbed was determined by running the test ski 50 times on different parallel tracks within the same testbed. The standard deviation of all μ measurements was calculated around the value of μfit,i, and the relative value for the standard deviation was obtained. The variation between different testbeds was determined at level 3 by finding the linear fit for all measurements in all the tracks of all the testbeds and calculating the standard deviation of the μ measurements around this line. The text notes that tribometer snow tracks polish over time until an ice-like surface is obtained, and the coefficient of friction for a classic roller ski was measured as a comparison. The accuracy of the tribometer was assessed by comparing the absolute μ values obtained in the test to those obtained in other studies.

Since the friction level variations for different snow surfaces and ski properties are generally large, the authors complemented the comparison of friction values from different studies by testing the rolling resistance of a classic roller ski. The results showed that the reported tribometer's accuracy is acceptable at the friction level of a roller ski, which is generally comparable to that of a racing cross-country ski. Additionally, the standard deviation of the 50 roller ski runs at 6 m/s was 0.000227, indicating a high precision of 0.96%. The results suggest that the reported tribometer can achieve high precision even at lower friction levels, and the precision within a single track is relatively high, especially for aged snow.

The authors found that the dendritic structure of new snow changes more rapidly than aged snow, resulting in a greater reduction in the pore space and an increase in density over 50 runs. The surface topography of the new snow testbed also showed a reduction in the visibility of dendritic features after the test, while aged snow appeared more polished and flatter.

SIZES AND SPECIFICATIONS		
Part Number	BX4040	BX5050
Local Straightness	.25 µm per 25 mm travel	.25 µm per 25 mm travel
Maximum error	2 µm per 1000 mm travel	2 µm per 1000 mm travel
Flatness	.0005 mm or .00002 in	.0005 mm or .00002 in
Carriage Size	80 mm x 80 mm and 75 mm length	90 mm x 90 mm and 125 mm length
Travel	50 mm/100 mm/200 mm/300 mm or Custom Travel	50 mm/100 mm/200 mm/300 mm or Custom Travel
Guidebar Size	40 mm x 40 mm	50 mm x 50 mm
Assembly Height	80 mm	90 mm
Carriage Weight	.86 kg (1.89 lb)	1.6 kg (3.5 lb)
Total Weight	2.8 kg (6.1 lb) (100 mm travel)	5.76 kg (12.6 lb) (100 mm travel)
Guide Bar length	Custom	Custom
Z direction Load	124 lb (551 N)	356 lb (1583 N)
Y direction Load	124 lb (551 N)	356 lb (1583 N)
Air Flow	4.6 nlpm	5.1 nlpm
Pitch	78 N-m	160 N-m
Roll	78 N-m	144 N-m
Yaw	78 N-m	160 N-m
Y Stiffness	183 N/µ	353 N/µ
Z Stiffness	183 N/µ	353 N/µ



CASE STUDIES

A Quantum Physical View of Time Crystals: OAV Air Bearing Used To Stabilize the Electrodynamic Shaker's Resonances for Experimentations on Non-Equilibrium Physics of Droplets

The Optical Sciences Centre at the Swinburne University of Technology in Melbourne, Australia aimed to better understand the behavior of liquid droplets bouncing on the surface of a fluid bath through a quantum physical lens. When droplets are subject to periodic forcing, they may begin to "walk" on the surface of the fluid, a result of each impact of the droplet with the fluid surface triggering a capillary wave, and the subsequent gradients in the fluid surface driving the planar motion of the droplets. The team characterized these droplets as "droplet time crystals" (DTC), which are periodically driven systems that exhibit a persistent oscillatory response with an integer multiple of the driving period. The main components of the experiment included the electrodynamic shaker, the OAV Air Bearing [OAVBX5050], the fluid bath, the droplet printer, and the optical imaging system used to observe and process the information from the experiments. Using a custom optical table that rested on passive vibration isolation legs for elimination of external noise, the driving force was provided by an electrodynamic shaker bolted onto a layer cake structure, which rested on machine mounts. The shaker was connected to the OAV Air Bearing through a drive rod, and the air bearing was mounted on an aluminum plate on top of the optical table, connected to a high-purity compressed air supply. The fluid bath was leveled, and the air bearing assembly was clamped in place before the air bearing slider bar was connected to the drive rod. The design assembly can be seen in the below graphic.

Droplet Time Crystals System Set-Up Using Air Bearing; The OAV Air Bearing was a crucial component in the assembly. Indeed, the OAVBX5050 was used to reduce the transverse vibrations through stabilization of the entire system due its smooth and ultra-precise frictionless motion. Frictionless motion in the axial direction prevented adverse motion in the transverse plane. The team chose an air bearing with a large enough surface area to maintain the total payload to a minimum, reducing the shaker resonances.

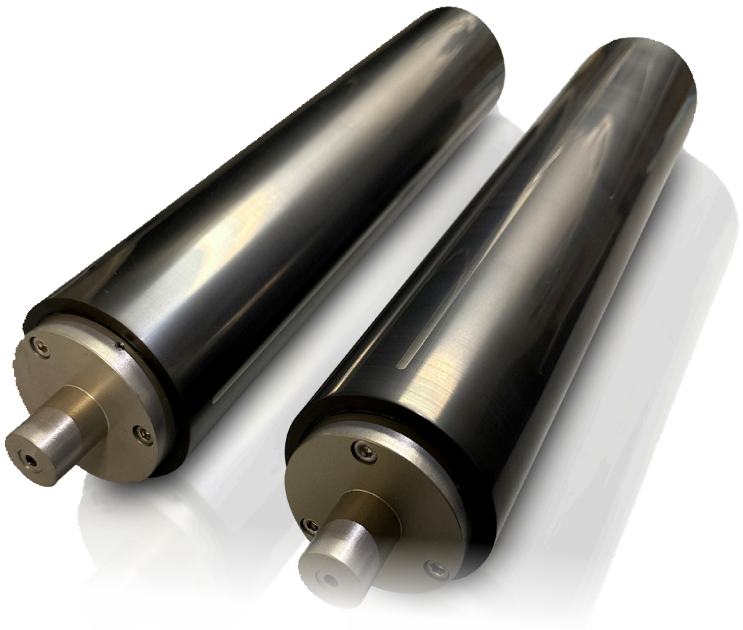
The fluid bath had a fluid containing diameter of 100 mm, with mass totaling to 570 g. It was mounted on an air bearing slider bar and was precisely aligned by tilting the whole optical table using a two-axis digital level. Vibrations of the bath were measured using two piezoelectric single-axis accelerometers. Droplets were introduced onto the fluid bath surface using a droplet printer consisting of a computer-controlled two-axis linear translation stage and a piezoelectric droplet generator. The droplet generator utilized a 35 mm diameter piezoelectric buzzer disk and M6 threaded brass nozzle with 0.1-1.0 mm nozzle size. The fluid was pumped into the generator by a peristaltic pump, and the fluid level was set using a micrometer translation stage. The droplets' motion was tracked via a top view camera and a side view camera.

In the experiment, multiple subsystems were used to control the data acquisition and measurement. A computer was used to generate the driving signal for the shaker and read the accelerometer data, both at a 32 kHz sampling rate. The signals were monitored using a digital storage oscilloscope and a software feedback loop maintained a fixed driving amplitude. A droplet printer was used to deposit droplets onto the fluid surface and two microcontrollers were used to monitor temperature probes and the droplet printer. The cameras were triggered manually and the images were processed manually. However, all subsystems were integrated and controlled by a single workstation. Baseline measurements were performed to characterize the mechanical resonance properties of the shaker and study its dependence on payload. The shaker resonances were found to conform to the expectations and were in good agreement with previous studies.

The laboratory had air conditioning system to maintain 0.5 °C temperature stability, monitored by two PT100 platinum RTD probes and a microcontroller. Calibration was done relative to each other at 21 °C ambient temperature. The fluid used for the experiments was silicone oil with density of 950 kg/m3 and viscosity of 20 cSt at 25 °C. The thermal characterization depicted that the temperature of the fluid and the air remained within the air conditioning system specifications. However, the high-speed imaging light (135 W LED) could generate turbulent air currents and affect the droplet dynamics, so it should only be turned on when necessary. These adverse effects can be eliminated by protecting the fluid bath with enclosures. Continuous measurement of fluid temperature is not necessary unless extreme precision is required. When the fluid bath vibrated above a certain frequency-dependent amplitude, called the Faraday threshold, Faraday waves emerged on the fluid surface. The authors observed Faraday patterns with square and triangular unit cells that repeated at a lower frequency than the driving frequency of the fluid bath. The authors also introduced droplets onto the fluid surface and observed that they stably bounced in a (2,1) mode, where their center of mass undergoes vertical periodic oscillations at half the driving frequency of the fluid bath. The droplets also supported internal vibrational modes in free space. The authors fixed the driving frequency and amplitude and studied the effect of varying the droplet size on the droplet's bouncing dynamics.

The droplet printer-generator produced arbitrary two-dimensional patterns of droplets on a bath. The resulting structures were determined by droplet-droplet interactions. An example of this is a square lattice of droplets, which after 5 minutes, undergoes a transmutation to a triangle lattice. This is a non-trivial phenomenon as the system is driven far from the Faraday threshold and the preference for a triangle lattice over a square lattice cannot be explained by energy conservation or higher packing fraction alone. The observed behavior is due to complex, self-consistent interplay between wave-mediated many-body interactions between the droplets and subtle boundary effects.

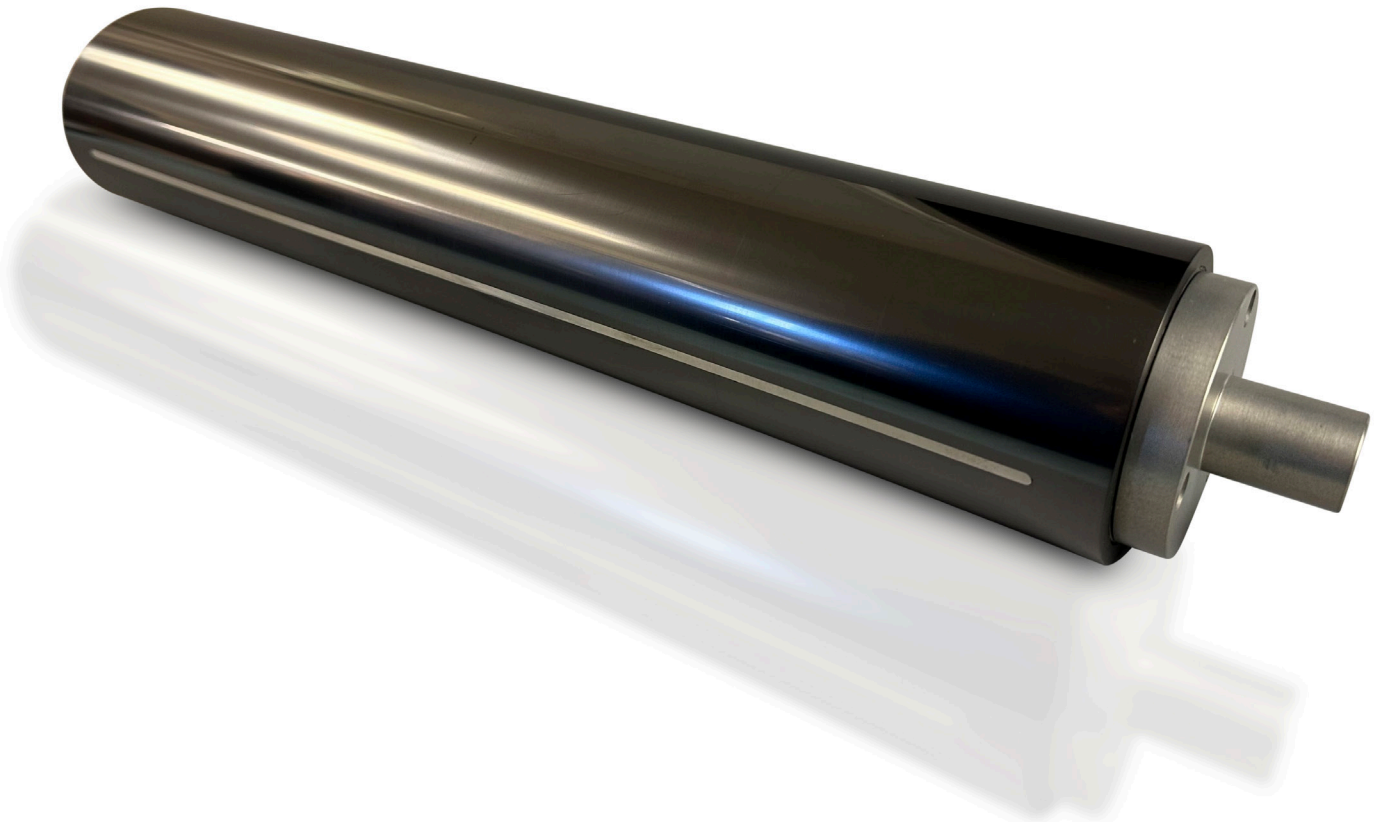
OAV® ROLL TO ROLL CONTACTLESS



OAV Roll-to-roll (R2R) processing, also known as web processing or reel-to-reel processing, is an important class of substrate-based manufacturing processes in which additive and subtractive processes are used to build structures in a non contact continuous manner. OAV web rollers are off-the-shelf and can be custom designed to be suited for many applications.

For fine film and web substrate handling, OAV Air Turns AT75600 feature porous media variable surface activation - 120 deg, 240 deg, 360 deg - and combined with pressure adjustment to suit the application, allow for optimized flow, web suspension, and web tension control. This is controlled with simple rotation of the end cap that only takes moments to secure. Air turns can be retrofitted to replace existing traditional contact roller conveyors, either with the standard size or custom fitting to match the existing assembly. Contactless handling reduces handling damage and material contamination, reducing costs associated with material scrap and rework. Costs associated with maintenance are reduced as well, with little scheduled maintenance and an indefinite operating life when run within recommended guidelines. Application markets include flexible electronics, flexible photovoltaics, printed/flexible thin film batteries, fuel cells and electrolyzers, multilayer capacitors, thick film sensor materials, anti-static, release, reflective and anti-reflective coatings, barrier coatings, building products, chemical separation membranes.

OAV Air Turns can be used with Air Bearing Bars OAVCB6060 to suit material handling needs for combined linear conveyance.



OAV® X-SPIN ROLLER AIR BEARINGS

The Outer Spin Rotary Air Bearing provides the ability to spin outer rings with an incredible accuracy of TIR± 1 millionths inches (.025 µm) while maintaining zero friction and contact, zero maintenance, no generation of thermal energy at high speeds, and an infinite operating life. This ultra-precise, hard-installable innovation is here to replace conventional bearings with unmatched improvements and efficiency. OAV Air Bearings offers products that have significantly higher levels of stiffness with superb geometric performance. The OAV External Spin Rotary Air Bearing preloads both the horizontal and vertical surface with an opposing thin film of pressure, maintaining the perfect gap and optimal levels of tolerance. The OAV Air Bearings surface design equally distributes the air and preloads it over an entire surface area, resulting in outstanding stiffness as well as maximized performance levels.

OAV X-SPIN ROLLER AIR BEARING			
Size	13 mm ID	40 mm ID	75 mm ID
Part Number	OAVRL13MX	OAVRL40MX	OAVRL75MX
Housing Material/Finish	Aircraft Quality Aluminum	Aircraft Quality Aluminum	Aircraft Quality Aluminum
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	OAV Carbon Graphite	OAV Carbon Graphite	OAV Carbon Graphite
Pressure Port Threads	TBD	TBD	TBD
Radial Load Capacity	13.0 lbs (57.8 N)	40.1 lbs (178.4 N)	130.0 lbs (578.3 N)
Thrust Load	30.0 lbs (133.5 N)	72.0 lbs (320.3 N)	280.0 lbs (1245.5 N)
Radial Stiffness	11 N/µm (0.06 lbs/µin)	68 N/µm (0.41 lbs/µin)	159 N/µm (0.91 lbs/µin)
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µ)	± 1 millionths in (.025 µ)
Bearing Inside Diameter (ID	13 mm + .01/-.00	40 mm + .01/.00	75 mm + .01/.00
Bearing Outside Diameter (OD)	44.5 mm + .00/-.01	100 mm + .00/-.01	140 mm + .00/- .01
Bearing Width	22 mm	36 mm	51 mm
Bearing Weight	.15 lb	1.14 lb	2.2 lb
Shaft Diameter	13 mm + .01/.00	40 mm + .01/.00	75 mm + .01/.00
Housing Bore size Light Press Fit Method	44.48 mm + .02/-.00	99.98 mm + .02/-.00	139.98 mm + .02/-.00
Flow rate	15 SCFH	21 SCFH	39 SCFH

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.

SIZES AND SPECIFICATIONS				
Size	20 mm x 40 mm	25 mm x 50 mm	25 mm x 100 mm	40 mm x 50 mm
Part#	OAVF20L40	OAVF25L50	OAVF25L100	OAVF40L50
Housing Material/Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load	161 N (36 lbs)	250 N (56 lbs)	499 N (112 lbs)	401 N (90 lbs)
Porous Material	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 x 0.5	M3 x 0.5	M5 x 0.8	M5 x 0.8
Stiffness	15.77 N/µ (0.09 lbs/µin)	24.53 N/µ (0.14 lbs/µin)	49.06 N/µ (0.28 lbs/µin)	39.42N/µ (0.23 lbs/µin)
Flow	0.90 NLPM (2.0 SCFH)	1.1 NLPM (2.4 SCFH)	1.9 NLPM (4.0 SCFH)	1.3 NLPM (2.9 SCFH)
Fly Height	5 µ	5 µ	5 µ	5 µ
Bearing Height	13 mm	17 mm	25 mm	13 mm
Bearing Weight	25 g	47 g	163 g	55 g
Flatness	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)

SIZES AND SPECIFICATIONS				
Size	40 mm x 80 mm	50 mm x 100 mm	100 mm x 200 mm	100 mm x 1000 mm
Part#	OAVF40L80	OAVF50L100	OAVF100L200	OAVF100L1000
Housing Material/Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load	637 N (143 lbs)	1184 N (266 lbs)	5136 N (1154 lbs)	20697 N (4651 lbs)
Porous Material	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Stiffness	62.63 N/µ (0.36 lbs/µin)	116.51 N/µ (0.67 lbs/µin)	505.44 N/µ (2.89 lbs/µin)	2,037.10 N/µ (11.63 lbs/µin)
Flow	1.8 NLPM (3.8 SCFH)	2.3 NLPM (4.8 SCFH)	4.5 NLPM (9.6 SCFH)	21.0 NLPM (44.6 SCFH)
Fly Height	5 µ	5 µ	5 µ	5 µ
Bearing Height	20 mm	25 mm	39 mm	42 mm
Bearing Weight	143 g	295 g	1877 g	11,164 g
Flatness	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)

VACUUM PRE-LOADED AIR BEARINGS

OAV Vacuum Preloaded Air Bearings work on flat, nonporous surfaces such as granite, aluminum, glass, and ceramics. The round design allows for smooth, frictionless motion. OAV Vacuum Preloaded Air Bearings combine the use of vacuum and air pressure, creating superior damping. It allows the air bearing to press down while simultaneously being lifted from the surface. By combining vacuum and air pressure, these bearings offer advantages for many applications across various industries. The vacuum preloaded air bearings can be optimized by adjusting the vacuum and pressure separately, allowing precise control over the fly height and stiffness.

The vacuum preloaded line replaces part of the bearing's surface area with a dedicated vacuum pressure zone. Fine-tuning of this vacuum/ pressure setup achieves superior damping, resulting in the need for only one flat guide surface rather than two.

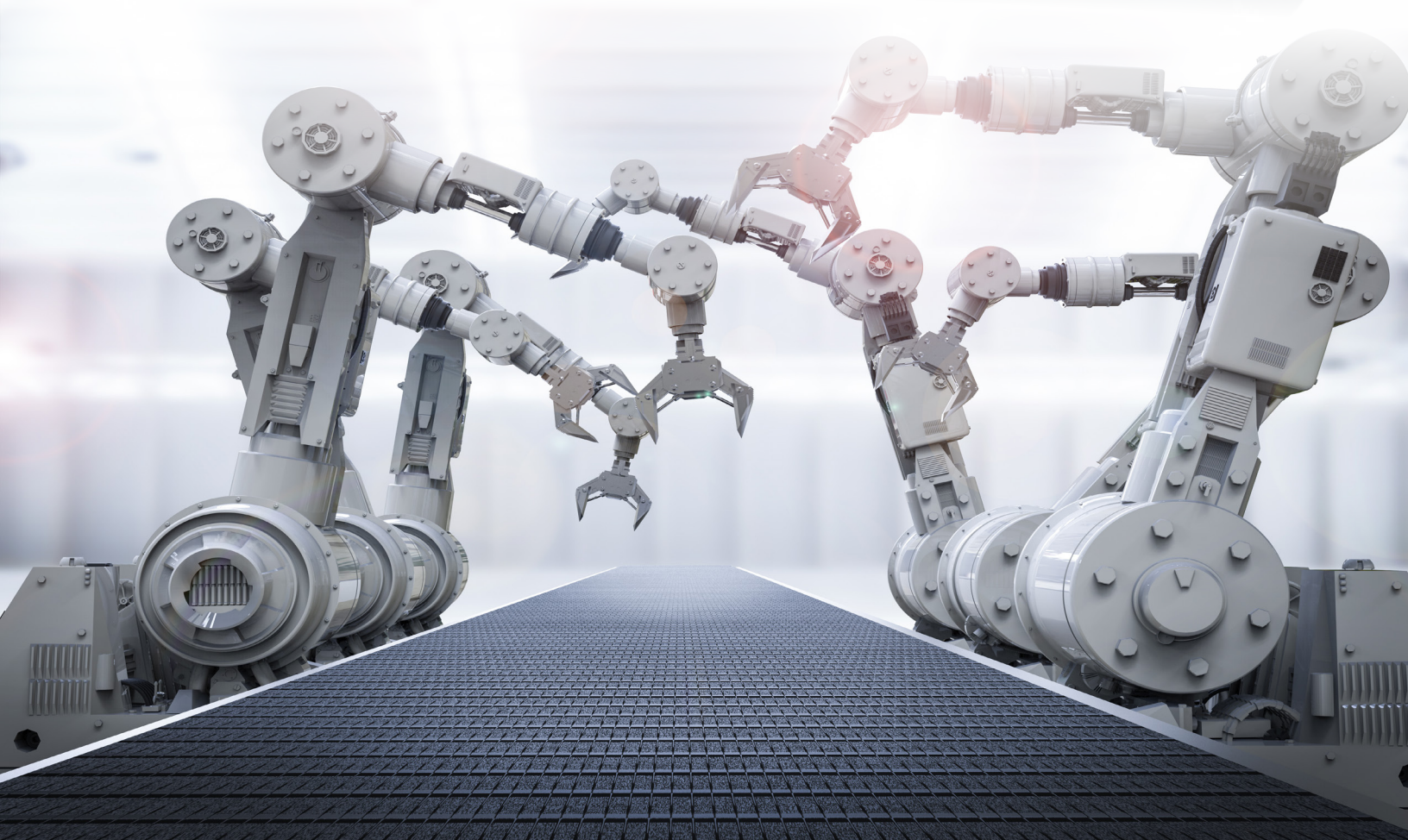
Size	50 mm	80 mm	100 mm
Part Number	OAVR050RV	OAVR080RV	OAVR100RV
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Input Vacuum	15 in Hg	15 in Hg	15 in Hg
Ideal Load	46 N (10.4 lbs)	113 N (25.3 lbs)	173 N (38.8 lbs)
Stiffness	13 N/µ (0.08 lbs/µin)	30 N/µ (0.17 lbs/µin)	48 N/µ (0.28 lbs/µin)
Flow Rate	1.1 NLPM (2.4 SCFH)	1.3 NLPM (2.8 SCFH)	2.3 NLPM (4.9 SCFH)
Fly Height	5 µ	5 µ	5 µ
Bearing Size	50 mm	80 mm	100 mm
Bearing Height	22 mm	22 mm	22 mm
Bearing Weight	98 g	253 g	382 g
Housing Material/ Finish	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/ Mil Spec Hard Anodize
Porous Media Material	Carbon	Carbon	Carbon
Flatness	0.001 mm (0.00004 in)	0.001 mm (0.00004 in)	0.001 mm (0.00004 in)
Presssure/Vacuum Port Threads	M3 x 0.5	M5 x 0.8	M5 x 0.8

Size	20 mm X 40 mm	25 mm X 50 mm	40 mm X 50 mm	40 mm X 80 mm	50 mm X 100 mm
Part Number	OAVF20L40V	OAVF25L50V	OAVF40L50V	OAVF40L80V	OAVF50L100V
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Input Vacuum	15 in Hg (50.8 kPa)	15 in Hg (50.8 kPa)	15 in Hg (50.8 kPa)	15 in Hg (50.8 kPa)	15 in Hg (50.8 kPa)
Ideal Load	116 N (26 lbs)	185 N (41 lbs)	303 N (68 lbs)	463 N (104 lbs)	735 N (165 lbs)
Stiffness	10 N/micron (0.058 lbs/µ in)	16 N/micron (0.096 lbs/µ in)	26.5 N/micron (0.15 lbs/µ in)	38.4 N/micron (0.22 lbs/µ in)	73 N/micron (0.42 lbs/µ in)
Flow Rate	1.44 SCFH	1.78 SCFH	2.2 SCFH	2.8 SCFH	3.62 SCFH
Fly Height	5 µ	5 µ	5 µ	5 µ	5 µ
Bearing Height	13 mm	13 mm	17 mm	15 mm	25 mm
Bearing Weight	22.5 gram	8 g	73 g	104 g	285 g
Housing Material/ Finish	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized
Porous Media Material	Carbon	Carbon	Carbon	Carbon	Carbon
Flatness	0.0005mm(.00002in)	0.0005mm(.00002in)	.0005mm(.00002 in)	0.0005 mm (0.00002 in)	.0005mm(.00002 in)
Pressure/ Vacuum Port Threads	M3x0.5	M3x0.5	M5 x 0.8	M5 x 0.8	M5 x 0.8

OAV® FLAT ROUND AIR BEARINGS

OAV Flat Air Bearings represent a pivotal innovation in precision engineering. These non-contact bearings employ a thin film of pressurized air to create a frictionless, zero-wear surface, allowing for minimalistic design while maximizing performance. Particularly suited for high-speed and high-precision applications, flat air bearings offer enhanced stability, accuracy, and repeatability, making them an ideal choice for rotary and linear applications in fields ranging from semiconductor manufacturing to metrology.

OAV's Flat Round Air Bearing product line works on level, non-porous media such as granite, aluminum, glass, and ceramics. OAV offers a variety of sizes that can easily be customized for various applications.



HIGH PERFORMANCE

Flat Round Air Bearings can be used in both linear and rotary motion applications.

Size	25 mm	40 mm	50 mm	65 mm
Part Number	OAVR025R	OAVR040R	OAVR050R	OAVR065R
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load	98 N (22 lbs)	254 N (57 lbs)	392 N (88 lbs)	664 N (149 lbs)
Stiffness	18.4 N/µ (0.11 lbs/µ in)	29.43 N/µ (0.17 lbs/µ in)	60.71 N/µ (0.35 lbs/µ in)	91.98 N/µ (0.53 lbs/µ in)
Flow Rate	0.6 NLPM (1.3 SCFH)	0.93 NLPM (2.0 SCFH)	1.2 NLPM (2.5 SCFH)	1.5 NLPM (3.2 SCFH)
Fly Height	5 µ	5 µ	5 µ	5 µ
Bearing Height	13 mm	13 mm	13 mm	20 mm
Bearing Weight	14 g	34 g	61 g	149 g
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Porous Media Material	Carbon	Carbon	Carbon	Carbon
Flatness	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)
Pressure Port Thread	M3 x 0.5	M5 x 0.8	M5 x 0.8	M5 x 0.8

80 mm	100 mm	125 mm	150 mm	200 mm
OAVR080R	OAVR100R	OAVR125R	OAVR150R	OAVR200R
20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
1189 N (267 lbs)	1856 N (417 lbs)	2897 N (651 lbs)	4535 N (1019 lbs)	8064 N (1812 lbs)
116.94 N/µ (0.67 lbs/µ in)	182.64 N/µ (1.04 lbs/µ in)	285.13 N/µ (1.63 lbs/µ in)	446.31 N/µ (2.55 lbs/µ in)	793.64 N/µ (4.53 lbs/µ in)
1.9 NLPM (4.0 SCFH)	2.4 NLPM (5.1 SCFH)	3.0 NLPM (6.4 SCFH)	3.6 NLPM (7.7 SCFH))	4.8 NLPM (10.1 SCFH)
5 µ	5 µ	5 µ	5 µ	5 µ
20 mm	25 mm	35 mm	50 mm	70 mm
231 g	436 g	1028 g	2085 g	4765 g
7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Carbon	Carbon	Carbon	Carbon	Carbon
0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)
M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8

OAV® ROLLER AIR BEARINGS

The OAV Roller Air Bearing is here to replace conventional bearings with advanced and optimal efficiency. A breakthrough innovation from OAV Air Bearings. An ultra precise, hard-installable replacement for conventional bearings. The result: no friction, no contact, no maintenance, no heat generation at high speeds, and an infinite operating life.
OAV Air bearings have higher stiffness and excellent geometric performance.
OAV Roller Air Bearings preload both the horizontal and vertical surface with opposing thin film pressure, maintaining the perfect gap for ultimate precision. OAV Air Bearings surface design equally distributes the air and pre-load over a entire surface area; the result is outstanding stiffness and maximized performance.

Size	0.500 ID	0.7500 ID	1.000 ID	1.500 ID	2.000 ID	3.000 ID
Part Number	OAVRL0500	OAVRL0750	OAVRL1000	OAVRL1500	OAVRL2000	OAVRL3000
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Side Material/ Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Lifetime	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite
Radial Load Max	6.5 lbs (28.9 N)	22.6 lbs (100.5 N)	28.6 lbs (127.2 N)	56.2 lbs (250.0 N)	70.1 lbs (311.8 N)	124.8 lbs (555.1 N)
Axial Load Max	27.0 lbs (120.1 N)	85 lbs (378.1 N)	155 lbs (689.5 N)	185.0 lbs (822.9 N)	175.0 lbs (778.4 N)	260.0 lbs (1156.5 N)
Total Indicated Runout (TIR)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)	1.1 µin/(0.027 µm)	1.1 µin/(0.027 µm)	1.1 µin/(0.027 µm)
Bearings Inside Diameter (ID)	0.500 in + .0005/-.0000	0.7500 in + .0005/-.0000	1.0000 in + .0005/-.0000	1.500 in + .0005/-.0000	2.0000 in + .0005/-.0000	3.0000 in + .0005/-.0000
Bearing Outside Diameter (OD)	1.7500 in + .0000/-.0005	2.7500 in + .0000/-.0005	3.5000 in + .0000/-.0005	4.0000 in + .0000/-.0005	4.2500 in + .0000/-.0005	5.5000 in + .0000/-.0005
Bearing Width	.865 in	1.25 in	1.375 in	1.625 in	1.750 in	2.000 in
Weight	.17 lb	.58 lb	1.1 lb	1.44 lb	1.7 lb	2.9 lbs
Shaft Diameter	0.5000 in	0.7500 in	1.000 in	1.500 in	2.000 in	3.000 in
Housing Bore size Light Press Fit Method	1.7493 in + .0007/-.0000	2.7493 in + .0007/-.0000	3.4993 in + .0007/-.0000	3.9993 in + .0007/-.0000	4.2493 in + .0007/-.0000	.4993 in + .0007/-.0000
Flow rate	5 SCFH	15 SCFH	15.5 SCFH	16.1 SCFH	17.5 SCFH	31 SCFH

Size	13 mm ID	20 mm ID	25 mm ID	40 mm ID	750 mm ID	75 mm ID
Part Number	OAVRL13M	OAVRL20M	OAVRL25M	OAVRL40M	OAVRL50M	OAVRL75M
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Side Material/ Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon	Carbon
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Pressure Port Threads	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Lifetime	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite
Radial Load Max	28.9 N (6.5 lbs)	100.5 N (22.6 lbs)	127.2 N (28.6 lbs)	250.0 N (56.2 lbs)	311.8 N (70.1 lbs)	555.1 N (124.8 lbs)
Axial Load Max	120.1 N (27 lbs)	378.1 N (85.0 lbs)	689.5 N (155 lbs)	822.9 N (185.0 lbs)	778.4 N (175.0 lbs)	1156.5 N (260.0 lbs)
Total Indicated Runout (TIR)	± 1 millionths Life-time in (.025 µm)	± 1 millionths Life-time in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths of an in (.025 µm)	± 1 millionths in (.025 µm)	± 1 millionths in (.025 µm)
Axial and Radial Error Motion	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)	.9 µin/(0.023 µm)	1.1 µin/(0.027 µm)	1.1 µin/(0.027 µm)	1.1 µin/(0.027 µm
Bearings Inside Diameter (ID)	13 mm + .01/-.00	20 mm + .01/-.00	25 mm + .01/-.00	40 mm + .01/-.00	50 mm + .01/-.00	75 mm + .01/-.00
Bearing Outside Diameter (OD)	44.50 mm + .00/-.01	70 mm + .00/-.01	90 mm + .00/-.01	100 mm + .00/-.01	110 mm + .0000/-.01	140 mm + .0000/-.01
Bearing Width	22 mm	31.8 mm	34.9 mm	41.3 mm	44.5 mm	50.8 mm
Weight	.17 lb	.58 lb	1.1 lb	1.44 lb	2.7 lbs	2.9 lbs
Shaft Diameter	13 mm	20 mm	25 mm	40 mm	50 mm	75 mm
Housing Bore size Light Press Fit Method	44.48 mm + .02/-.00	69.98 mm + .02/-.00	89.98 mm + .02/-.00	99.98 mm +.02/-.00	109.98 mm + .02/-.00	139.98 mm + .02/-.00
Flow rate	4.97 SCFH	15 SCFH	15.5 SCFH	16.1 SCFH	39.3 SCFH	26 SCFH

OAV® THRUST AIR BEARINGS AND BUSHINGS

The 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 a three-way frictionless surface. OAV's Air Bearing configurations run on standard-sized shafting for fixed, linear motion while maximizing rotational motion with ultra precision and zero friction using aerospace-quality aluminum.

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

THRUST AIR BEARINGS

Size	13 mm ID	20 mm ID	25 mm ID	50 mm ID	75 mm ID
Part Number	OAVTR32i13	OAVTR60i20	OAVTR60i25	OAVTR100i50	OAVTR150i75
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 x 0.5	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Lifetime	Infinite	Infinite	Infinite	Infinite	Infinite
Radial Load Capacity	10.7 N (2.4 lbs)	52.0 N (11.7 lbs)	65.4 N (14.7 lbs)	190.8 N (42.9 lbs)	286.5 N (64.4 lbs)
Thrust Load Capacity	81.4 N (18.3 lbs)	373.7 N (84.0 lbs)	302.9 N (68.1 lbs)	862.1 N (193.8 lbs)	2215.2 N (498.0 lbs)
Radial Stiffness	2.6 N/µm (0.01 lbs/µin)	5 N/µm (0.03 lbs/µin)	7.3 N/µm (0.04 lbs/µin)	24 N/µm (0.14 lbs/µin)	34.8 N/µm (0.20 lbs/µin)
Pitch Moment Max	0.8 N-m (7.5 lbs-in)	1.1 N-m (10 lbs-in)	1.9 N-m (17 lbs-in)	5.2 N-m (46 lbs-in)	7.1 N-m (63 lbs-in)
Bearing Inside Diameter (ID)	13.018 mm + .005/-.000	20.018 mm + .005/-.000	25.018 mm + .005/-.000	50.018 mm + .005/-.000	75.018 mm + .005/-.000
Bearing Outside Diameter (OD)	31.75 mm + .13/-.00	59.59 mm + .13/-.00	59.59 mm + .13/-.00	99.49 mm + .13/-.00	150 mm + .13/-.00
Bearing Length	12.7 mm	16.5 mm	16.5 mm	19.6 mm	19.6 mm
Bearing Weight	12.8 g	95.7 g	86.7 g	266.3 g	476.4 g
Recommended Shaft Outside Diameter (OD)	13 mm - .02	20 mm - .02	25 mm - .02	50 mm - .02	75 mm - .02
Flow Rate	8.1 SCFH (3.8 NLPM)	15.6 SCFH (7.4 NLPM)	14.8 SCFH (7.0 NLPM)	28.5 SCFH (13.5 NLPM)	42.1 SCFH (19.9 NLPM)
Housing Bore Size Light Press Fit Method	31.775 mm + .000/-.025	59.630 mm + .000/-.025	59.630 mm + .000/-.035	99.525 mm + .000/-.035	150.04 mm + .000/-.04

Size	4 mm ID	6 mm ID	8 mm ID	13 mm ID	20 mm ID	25 mm ID	50 mm ID	75 mm ID
Part Number	OAVTB16i04	OAVTB24i06	OAVTB24i08	OAVTB32i13	OAVTB60i20	OAVTB60i25	OAVTB100i50	OAVTB150i75
Housing Material/Finish	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon	Carbon	Carbon	Carbon
Pressure Port Threads	M3 x 0.5	M3 x 0.5	M3 x 0.5	M3 x 0.5	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8
Lifetime	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite	Infinite
Radial Load Capacity	9.3 N (2.1 lbs)	20.9 N (4.7 lbs)	32.6 N (7.4 lbs)	43.2 N (9.7 lbs)	244.2 N (54.9 lbs)	305.1 N (68.6 lbs)	871.4 N (195.9 lbs)	1306.9 N (293.8 lbs)
Thrust Load Capacity	16.0 N (3.6 lbs)	28.4 N (6.4 lbs)	25.4 N (5.7 lbs)	81.4 N (18.3 lbs)	373.7 N (84.0 lbs)	302.9 N (68.1 lbs)	862.1 N (193.8 lbs)	2215.2 N (498.0 lbs)
Radial Stiffness	5 N/µm (0.03 lbs/µin)	5.1 N/µm (0.027 lbs/µin)	8 N/µm (0.043 lbs/µin	11 N/µm (0.06 lbs/µin)	23 N/µm (0.13 lbs/µin)	34 N/µm (0.19 lbs/µin)	110 N/µm (0.63 lbs/µin)	159 N/µm (0.91 lbs/µin)
Pitch Moment Max	0.013 N-m (0.125 lbs-in)	0.4 N-m (3.6 lbs-in)	0.5 N-m (4.6 lbs-in)	0.8 N-m (7.5 lbs-in)	10 lbs-in (1.1 N-m)	17 lbs-in (1.9 N-m)	46 lbs-in (5.2 N-m)	7.1 N-m (63 lbs-in)
Thrust Bushing Inside Diameter (ID)	4.018 mm + .005/-.000	6.018 mm + .005/-.000	8.018 mm + .005/-.000	13.018 mm + .005/-.000	20.018 mm + .005/-.000	25.018 mm + .005/-.000	50.018 mm .005/-.000	75.018 mm + .005/-.000
Thrust Bushing Outside Diameter (OD)	16.10 mm + .13/-.00	23.67 mm + .13/-.00	23.67 mm + .13/-.00	31.75 mm + .13/-.00	59.59 mm + .13/-.00	59.59 mm + .13/-.00	99.49 mm + .13/-.00	150 mm + .13/-.00
Bushing Length	33 mm	53.34 mm	53.34 mm	52.8 mm	79.2 mm	79.2 mm	91.4 mm	91.4 mm
Bushing Weight	13.8 g	30.8 g	30.8 g	86 g	465 g	416.9 g	1237.9 g	2899.9 g
Recommended Shaft Outside Diameter (OD)	4.00 mm - .02	6.00 mm - .02	8.00 mm - .02	13.00 mm - .02	20 mm - .02	25 mm - .02	50 mm - .02	75 mm - .02
Flow Rate	4.2 SCFH (2.0 NLPM)	2.9 SCFH (1.4 NLPM)	2.9 SCFH (1.4 NLPM)	12 SCFH (5.7 NLPM)	15.6 SCFH (7.4 NLPM)	14.8 SCFH (7.0 NLPM)	28.5 SCFH (13.5 NLPM)	42.1 SCFH (19.9 NLPM)
Housing Bore Size O-Ring Method	16.79 mm + .000/-.127	24.05 mm + .000/.-.127	24.05 mm + .000/.-.127	32.13 mm + .000/-.127	59.97 mm + .000 /-.127	59.97 mm + .000/-.127	100.4 mm + .000/-.127	151.94 mm + .000/-.127
Housing Bore Size Light Press Fit Method	16.125 mm + .000/ -.025	23.070 mm + .000/ -.025	23.070 mm + .000/ -.025	31.775 mm + .000/-.025	59.630 mm + .000/-.025	59.630 mm + .000/-.035	99.525 mm + .000/-.035	150.04 mm + .000/-.04

OAV® MODULAR AIR BEARINGS

The OAV Modular Air Bearing design subdivides motion systems into smaller installable parts. They can be independently installed and then used in different systems and shapes. OAV Modular Air Bearings make use of industry standards for interfaces.

OAV Modular Air Bearings offer many benefits such as reduction in cost, shorter installation time, flexibility in design, augmentation, and exclusion. It is a complete offering of air bearings produced with the design for easy retrofitting into existing applications or designing into new applications for ultimate accuracy positioning.

OAV Air Bearings generate evenly distributed gas films between surface and the substrate. Because of low gas viscosity and friction losses by viscous shearing, mechanical contact is avoided. Our modular air bearings are manufactured with aerospace quality material. They are ultra-precise with exceptional linear straightness and flatness. Vibration and maintenance-free, ready to install.

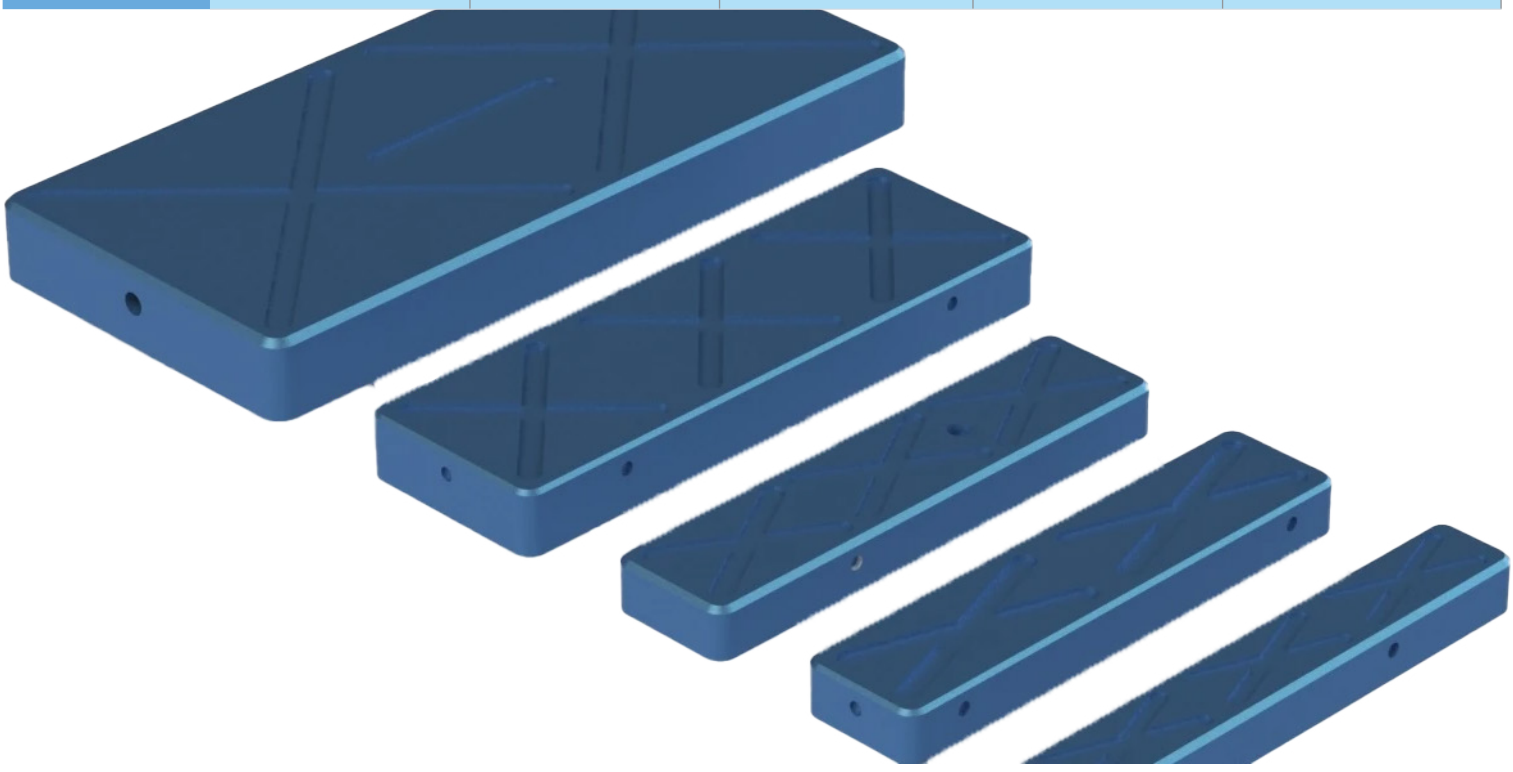
38 MM X 38 MM X 50 MM MODULAR CORNER AIR BEARING	
Size	38 mm x 50 mm
Part Number	OAV90DG50
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load X	160 N (35 lbs)
Ideal Load Y	160 N (35 lbs)
Stiffness	14 N/µ (0.08 lbs/µin)
Flow	1.6 NLPM (3.4 SCFH)
Fly Height	4 µ
Bearing Size	38 mm x 50 mm
Bearing Height	38 mm
Bearing Weight	91 g
Housing Material/Finish	Aluminum Hard Anodized
Porous Media Material	Carbon
Flatness	0.0005 mm (0.00002 in)
Pressure Port Thread	M5 x 0.8

55 MM X 55 MM X 80 MM VACUUM PRELOADED MODULAR CORNER AIR BEARING	
Size	40 mm x 80 mm
Part Number	OAVMOD40L80V
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load	530 N (119 lbs)
Stiffness	48 N/µ (0.27 lbs/µin)
Hold Down Force @50.8 kPa	66.75 N (0.27 lbs/µ in)
Flow	1.5 NLPM (3.16 SCFH)
Fly Height	5 µ
Bearing Size	40 mm x 80 mm
Bearing Height	15 mm
Bearing Weight	259 g
Housing Material/Finish	Aluminum/Anodized
Porous Media Material	Carbon
Flatness	0.0005 mm (0.00002 in)
Port Thread	M5 x 0.8

OAV® EPOXY BONDED AIR BEARINGS

Epoxy bonded air bearings utilize a thin layer of epoxy to bond the surface of the air bearing to the supporting structure, offering higher precision, no friction, and longer life. The thin layer of epoxy serves as a cushion, allowing for higher stiffness, greater accuracy and frictionless movement while maintaining a low-profile. Additionally, epoxy bonded air bearings are able to withstand wide temperature ranges, vibrations, shock, and other harsh environmental conditions.

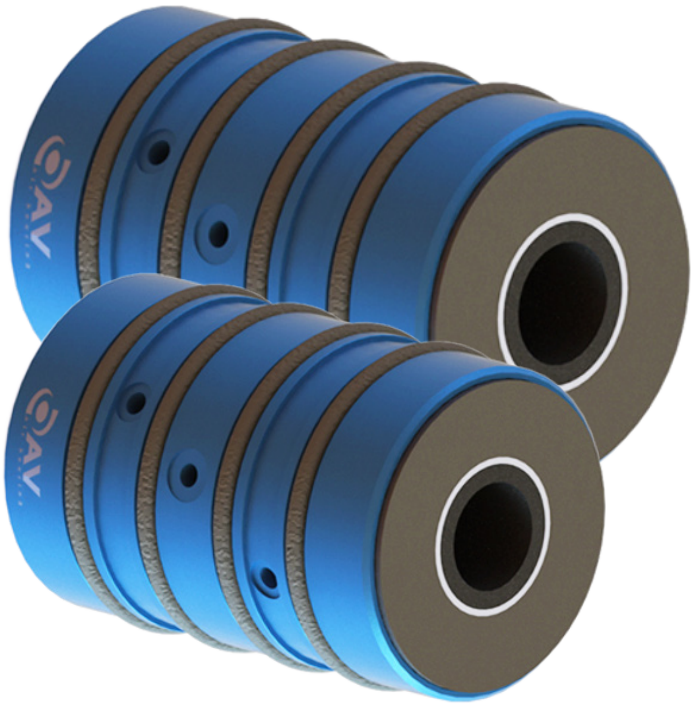
EPOXY BONDED AIR BEARINGS					
Size	23 mm x 98 mm	16 mm x 100 mm	24 mm x 100 mm	38 mm x 118 mm	15 mm x 72 mm x 150 mm
Part Number	OAVBB2398	OAVBB16100	OAVBB24100	OAVBB38118	OAVBB70150
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Ideal Load	374 N (84 lbs)	265 N (59.5 lbs)	398 N (89 lbs)	934 N (210 lbs)	2846 N (639.8 lbs)
Flow	2.2 SCFH	2.2 SCFH	2.3 SCFH	7 SCFH	1.4 NLPM
Fly Height	5 µ	5 µ	5 µ	5 µ	5 µ
Bearing Height	10 mm	10 mm	10 mm	12.5 mm	15 mm
Bearing Weight	51 g	38 g	56 g	129 g	320 g
Housing Material/ Finish	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized	Aluminum/Anodized
Porous Material	Carbon	Carbon	Carbon	Carbon	Carbon
Flatness	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)	0.0005 mm (0.00002 in)
Pressure Port Threads	M3 x 0.5	M3 x 0.5	M3 x 0.5	M5 x 0.8	M5 x 0.8



OAV® TEMPERATURE CONTROLLED THRUST AIR BUSHINGS

TEMPERATURE CONTROLLED THRUST AIR BUSHINGS		
Size	20 mm ID	50 mm ID
Part Number	OAVTB60i20W	OAVTB100i50W
Housing Material/Finish	OAV Confidential	7075 Aircraft Quality Aluminum/Mil Spec Hard Anodize
Input Pressure	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)	20 psi - 100 max psi (0.13 MPa to 0.68 MPa)
Porous Material	Carbon	Carbon
Pressure Port Threads	M3 x 0.5	M5 x 0.8
Lifetime	Infinite	Infinite
Radial Load Capacity	54.9 lbs (240.2 N)	871.4 N (195.9 lbs)
Thrust Load Capacity	84 lbs (373.7 N)	862.1 N (193.8 lbs)
Radial Stiffness	0.13 lbs/µin (23 N/µm)	0.63 lbs/µin (110 N/µm)
Pitch Moment Max	10 lbs-in (1.1 N-m)	46 lbs-in (5.2 N-m)
Bearing Inside Diameter (ID)	20 mm	50.018 mm + .005/.000
Bearing Outside Diameter (OD)	60 mm	100 mm
Bearing Length	79.2 mm	92 mm
Bearing Weight	435 g	550 g
Recommended Shaft Outside Diameter (OD)	20 mm - .02 mm	50 mm - .02 mm
Cooling Type	Liquid or Cool Air flow	Liquid or Cool Air flow
Cooling Flow rate	52.3 SCFH	67.3 SCFH
Temperature	TBD	TBD
Flow Rate	15.6 SCFH (7.4 NLPM)	28.5 SCFH (13.5 NLPM)

High-Temperature Thrust Air Bearings are made for applications under exposure to extremely high speeds, ambient temperatures, and very hot processes. The material type and fluid/airflow allow for operation under these extreme environmental conditions without the need to sacrifice precision or quality. OAV Thrust Air Bearings preload both the horizontal and vertical surfaces with opposing thin films of pressure, maintaining the perfect gap for ultimate tolerance. The surface design equally distributes and pre-loads air over the entire surface area, resulting in outstanding levels of stiffness and maximized performance.



The temperature control bearings have three ports – the center port for bearing operating air, and ports on either side the inlet and "exhaust" of temperature control fluid. Operating air and temperature control fluid do not interact withing the bearing. Any fluid can be used, but air is most common. Operating air inlet and circulating fluid inlet should be independent feeds to control pressure, flow, and temperature as needed.

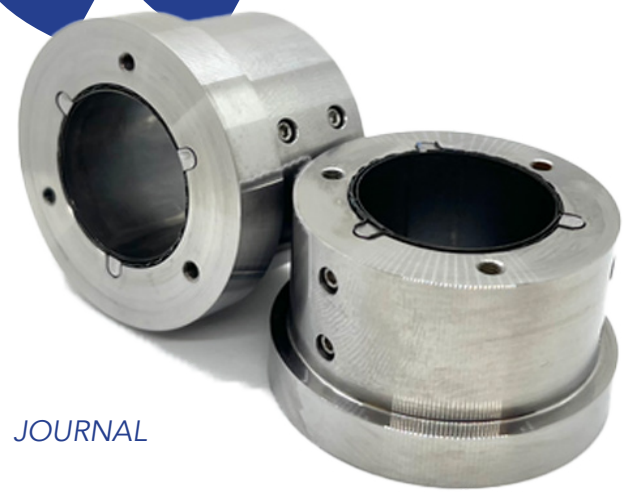
Extreme Temperature Conditions

At temperatures below freezing, water will be drawn out of the air and can crystallize internally, impeding flow and degrading performance of the bearing. This crystallization can occur in both operating air and temp control fluid when air is used. Severity and likelihood of occurrence are dependent on severity of temperature, operating pressures, flows, ambient humidity. This can be counter acted by using:

1) An in-line air heater
2) Compressed air dehumidifier
3) Pure compressed gas, such as helium or nitrogen (where practical), due to the homogenous state lacking water contamination.

At high temperatures, maximum exposure temperature is dependent on application and precision needs, and control may be aided with refrigeration of air and circulating fluid.

OAV® FOIL AIR BEARINGS



JOURNAL

The development of foil bearings began in the early 1970s to provide rotational guidance for gas turbine shafts. Foil bearings, also known as a foil air bearings, is a type of air bearing where the surface is supported by a compliant, spring-loaded foil journal lining. Once the surface is spinning fast enough, the air pushes the foil away from the surface so that no contact and no wear occurs. The surface and foil are separated by the high pressure from the air, generated by the rotation that pulls gas into the bearing via the viscosity effects. OAV Foil Bearings can operate under the most demanding systems without the requirement for external supply. OAV's advanced method makes the OAV Foil Bearings unmatchable.

FOIL JOURNAL AIR BEARINGS				
Size	13 mm	20 mm	25 mm	40 mm
Part Number	FB-J13-L20	FB-J20-L25	FB-J25-L28	FB-J40-L35
Lift Off Speed	5000 rpm	5000 rpm	5000 rpm	5000 rpm
Load Capacity	160 N	380 N	520 N	1150 N
Shaft Size	13 mm	20 mm	25 mm	40 mm
Bearing Length	20 mm	25 mm	28 mm	35 mm
Rotation Direction	CW or CCW	CW or CCW	CW or CCW	CW and CCW
Generation	4th OAV Advanced	4th OAV Advanced	4th OAV Advanced	4th OAV Advanced

THURUST

OAV Foil Bearings are suitable for many high-speed applications such as turbomachinery, aircraft, microturbine generators, and high-speed projects.
It gives many advantages from higher efficiency, to increased reliability, higher speed capabilities, and quieter operations. OAV Foil Bearings are oil free and offer wide operating temperature ranges, high vibration and shock load capacity, and no scheduled maintenance.

FOIL THRUST AIR BEARINGS				
Size	13 mm	20 mm	25 mm	40 mm
Part Number	FB-T13-X57	FB-T20-X65	FB-T25-X75	FB-T40-X120
Lift Off Speed	5000 rpm	5000 rpm	5000 rpm	5000 rpm
Load Capacity	195 N	380 N	630 N	1350 N
Shaft Size	13 mm	20 mm	25 mm	40 mm
Bearing Width	2.95 mm	2.95 mm	2.95 mm	5.45 mm
Bearing OD	57 mm	65 mm	75 mm	120 mm
Rotation Direction	CW or CCW	CW or CCW	CW or CCW	CW or CCW
Generation	4th OAV Advanced	4th OAV Advanced	4th OAV Advanced	4th OAV Advanced

AIR BEARING

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