

Osborne Engineering Limited

OEV Vertical Thrust and Guide Bearing

General Description

The Osborne Vertical Bearing is a comprehensive self contained standard assembly comprising a thrust collar, thrust and journal bearing pads, cooling mechanism and outer casing. Additional monitoring and ancillary features are incorporated to meet customer requirements. Radial and axial loads are transmitted through the thrust collar to the corresponding thrust and journal pads which support the load by generating and sustaining a hydrodynamic oil film. Preloaded journal pads are provided as standard to offer increased stability together with handed thrust pads to maximise on load carrying capacity. The internal components operate within an oil flooded chamber facilitating operation in demanding and otherwise corrosive environments. For applications which require electrical insulation, bearing assemblies can be supplied with an insulated thrust collar. Outer housings are supplied primed for weather resistance, ready for final coating. Customer specific paint requirements can also be accommodated.

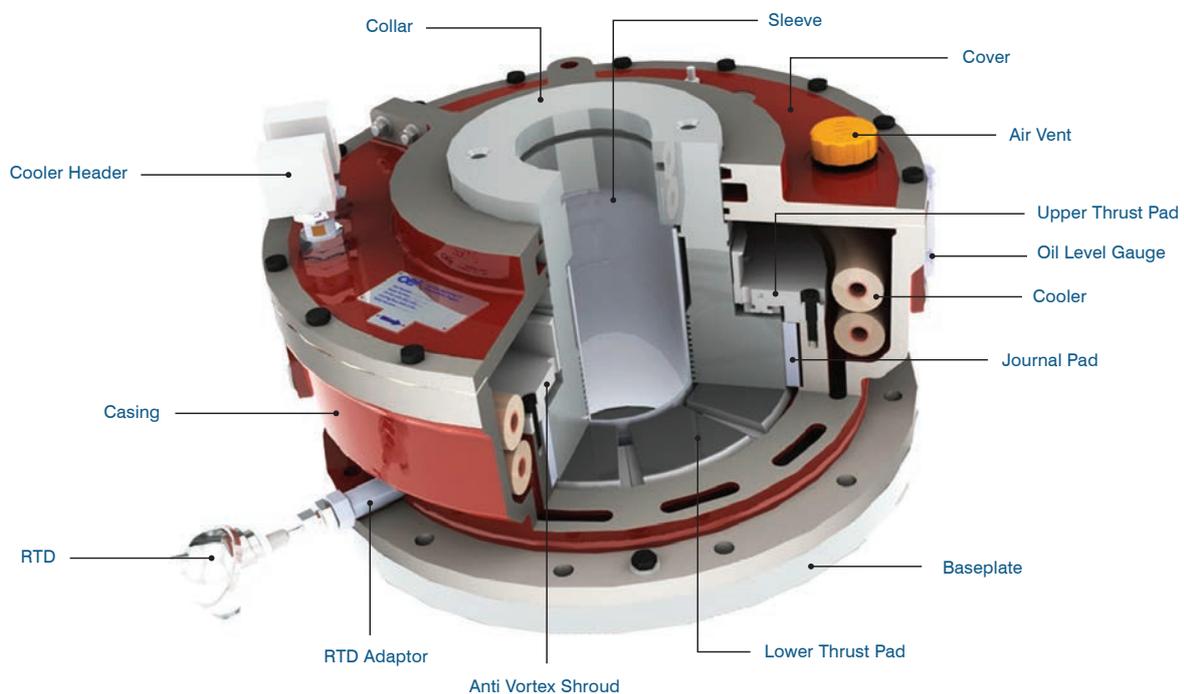
Typical Applications

Vertical pumps

Motors

Hydro generators

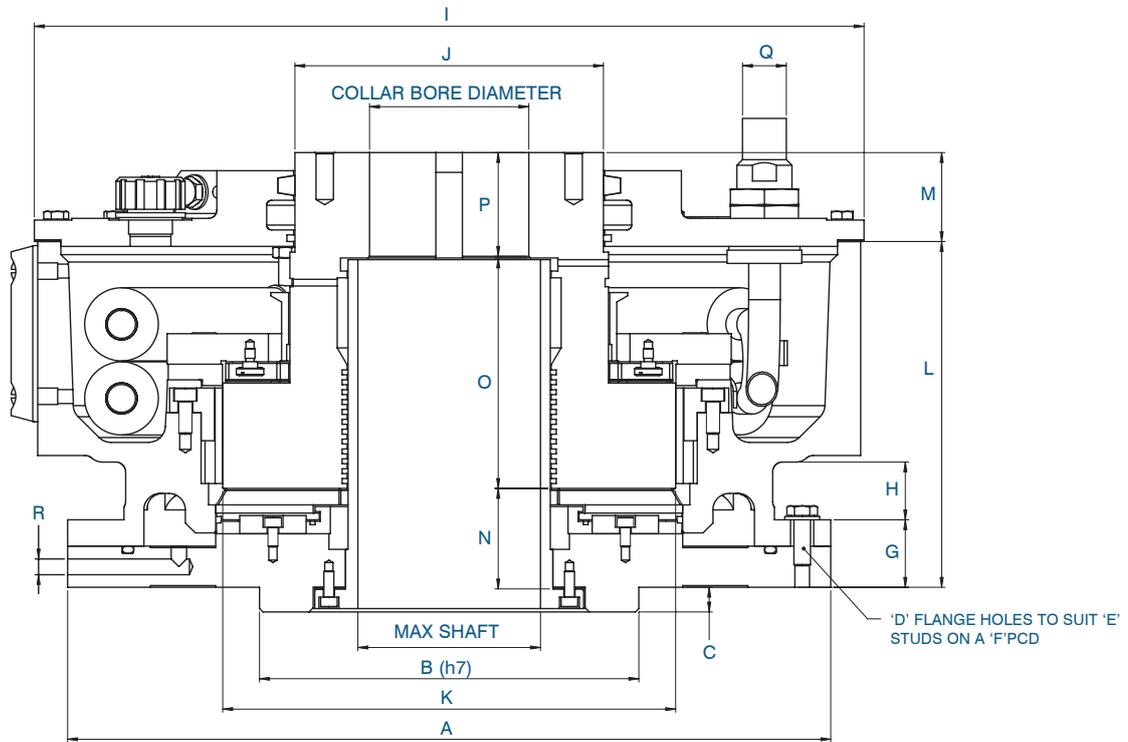
Hydro turbines



Vertical bearing selection guide

SIZE	Maximum Shaft			Maximum Downwards Startup Thrust Load (kN)			Maximum Downwards Running Thrust Load (kN)			Max Upward Startup Load (kN)	Max Upward Running Load (kN)	Approx Max Radial Load (kN)
	S	M	L	S	M	L	S	M	L	↑	↑	→
OEV 6	68	89	105	29	23	17	42	33	20	16	19	5.5
OEV 7	78	107	126	43	32	25	62	47	29	20	29	7.4
OEV 8	90	131	153	62	45	35	97	56	40	32	47	9.8
OEV 9	115	160	187	89	66	51	155	115	89	45	77	15.6
OEV 10	142	190	222	123	93	72	215	163	126	55	95	21.7
OEV 11	165	225	263	174	131	101	309	229	177	87	149	29.3
OEV 12	192	256	300	224	171	132	392	299	230	108	185	39.5
OEV 13	216	293	343	296	224	172	518	391	302	143	246	48.2
OEV 14	256	352	411	422	315	243	739	552	426	173	298	73

Maximum downward startup thrust values shown in the table above equate to a maximum starting thrust pressure of 2.4MPa. If actual starting pressures exceed this value provision for high pressure oil lift (jacking) can be provided. The maximum upward start up and running thrust load values will be supported by a tilting pad thrust bearing assembly. However if load and duration values are sufficiently low a whitmetal location face (bump) can be provided.



Vertical bearing standard dimensions

External and machine facing dimensions

CODES	A	B		C	D	E	F	G	H	I	J		K	L		M	N	O	P	Q	R	
SIZE	S	M, L									S	M, L		EXTENDED				EXTENDED				
OEV 6	310	140	169	12	8	M12	279.5	30	28	355	105	133	161	141	174	42	43	93	126	47	G1/2"	G1/4"
OEV 7	358	165.1	191	12	10	M16	324	35	34	375	133	159	191	157	196	45	49	104	143	49	G1/2"	G1/4"
OEV 8	418	190.5	220	12	10	M16	380	38	34	435	137	183	217	182	228	50	52	125	171	55	G1/2"	G1/4"
OEV 9	460	228.6	256	15	10	M16	425.5	41	34	500	186	227	273	210	-	54	60	140	-	64	G3/4"	G1/4"
OEV 10	552	279.4	309.9	15	12	M20	508	50	40	575	235	261	324	245	-	70	70	165	-	80	G3/4"	G3/8"
OEV 11	610	330	355.9	15	12	M20	568	60	40	630	268	310	382	280	-	85	85	180	-	100	G3/4"	G3/8"
OEV 12	698	368	398.9	15	12	M20	654	65	40	718	315	356	437	305	-	100	95	200	-	110	G3/4"	G3/8"
OEV 13	813	400	457.7	15	12	M24	770	70	50	825	360	407	501	345	-	105	105	235	-	110	G3/4"	G1/2"
OEV 14	914	440	532.7	15	12	M24	864	75	50	938	457	485	595	380	-	115	115	260	-	120	G3/4"	G1/2"

Lubrication Methods

The OEV bearing range is designed for two types of cooling. Completely self contained water cooled or circulating oil cooled using an external lubrication system. Water cooling is provided using our standard Cupro-Nickel wire wound cooling tube, other materials can also be used depending upon specification requirements, such as titanium and stainless steel. Circulated oil cooling is utilised when cooling water is not available or cooling tubes are not desirable.

Temperature Measurement

Temperature measurement is the preferred condition monitoring tool for most bearing assemblies. OEV bearing assemblies can be supplied with RTD's for accurate measurement of the thrust pad, journal pad & oil bath temperatures. Local dial thermometers can also be added for simple temperature reading. All of these instruments can be fitted with thermowells allowing removal without the need to drain oil from the bearing. Customer preferred instruments can be incorporated into our designs or details of our preferred standard instruments can be provided upon request.



Oil circulation path during bearing operation

Transportation Weights (Kg)

SIZE	6	7	8	9	10	11	12	13	14
S	60	85	128	168	305	448	630	924	1342
M	56	79	115	165	280	405	575	830	1190
L	53	75	108	148	250	355	504	733	1008

Oil Sump Capacity (Litres)

SIZE	6	7	8	9	10	11	12	13	14
ALL	2.3	4.5	6.5	8	13.5	17.8	26	43	57

Locking Collar Keyway (mm)

KEY	2 x 2	5 x 5	10 x 8	16 x 10	22 x 14	32 x 18	45 x 25	63 x 32
SHAFT	10 - 22	22 - 44	44 - 65	65 - 95	95 - 150	150 - 230	230 - 350	330 - 500

Custom Design Vertical Bearings

OEL also offer vertical thrust and guide bearing designs which can accommodate shaft sizes and thrust loads above the values of the standard OEV range. Vertical guide bearing assemblies can also be supplied, including split bearing assemblies for certain shaft configurations. Where thrust load verification during testing is required, load measuring capability can be provided via the use of load cells located in the lower thrust pads.

For information on these additional products please refer to our Standard Guide Bearing Catalogue or contact OEL directly.

Technical Documentation

With every order OEL engineers will provide a detailed arrangement drawing, operating and maintenance instruction manual and comprehensive bearing performance prediction calculation providing the following information;

- Oil bath temperature
- Required oil viscosity grade
- Bearing power loss
- Maximum operating pressure
- Minimum film thickness
- Cooling water requirements

Ordering Code

OEV - Series - Thrust requirement - Shaft variant - Cooling method

Series = 6,7,8,9,10,11,12,13,14

S = Single thrust, D = Double thrust

S = Small shaft, M = Medium shaft, L = Large shaft

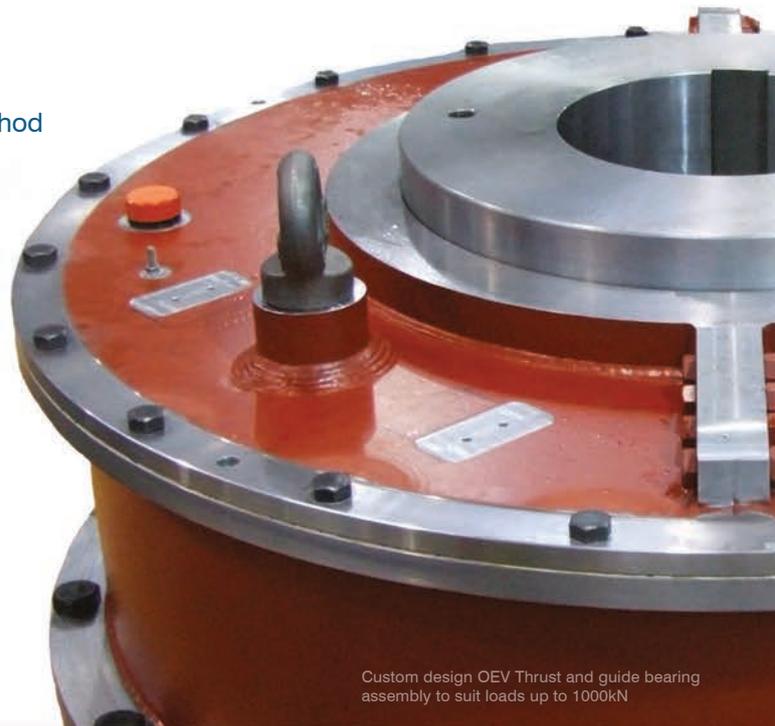
W = Water cooled, C = Circulating oil cooled

Example 1 = OEV-9-D-M-W

Example denotes an OEV series 9 suited for double thrust loading with a medium sized shaft, water cooled.

Example 2 = OEV-13-S-L-C

Example denotes an OEV series 13 suited for single thrust loading with a large sized shaft, circulating oil cooled.



Custom design OEV Thrust and guide bearing assembly to suit loads up to 1000kN

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