

Marine and naval line shaft bearings



**Michell
Bearings**



About Us

As the inventor of the hydrodynamic bearing over 100 years ago, Michell Bearings has continued to develop its products to meet the changing needs of industry.

The company's in-house design engineers work alongside its specialist manufacturing team in the UK to provide customers with high quality, innovative hydrodynamic white metal and PTFE lined bearings serving a range of industrial, commercial marine and naval markets.

In order to support critical applications in industries where products are required to meet stringent specifications and perform in demanding environments, Michell Bearings has developed a range of unique performance software tailored to its products. This provides more accurate and reliable performance predictions than with any other commercially available software. Results from the software, which are backed up by years of product research and development testing, give customers peace of mind and confidence in Michell Bearings ability to deliver safe and reliable bearing solutions.

Our product range includes:

- Vertical Guide Bearings (V)
- Advanced Vertical Thrust and Guide Bearings (AV)
- Large Vertical Thrust and Guide Bearings (LV)
- Thrust Bearings for marine applications
- Industrial Horizontal Bearings (IH)
- Heavy Duty Thrust Bearings (HD)
- Marine Propeller Shaft Bearings (MA & MT)
- Self-aligning Pedestal Bearings (NSA)
- Omega Thrust Rings
- Omega Equalised Thrust Rings
- Journal Pad Units
- Special designs to individual customer specification

Quality

- The quality system operated at Michell Bearings for design and support of our products is approved to BS EN ISO 9001:2015
- Our management system has been certified to the health, safety and environmental standard BS EN ISO 14001:2015
- Michell Bearings also complies with the occupational health and safety standard BS OHSAS 18001:2007.



Overview of Line Shaft Bearings

Michell Bearings marine and naval line shaft bearings have been designed to support radial downward loads and are fully self-contained, general purpose, modular assemblies.

Our products can be designed in line with Marine Classification Society regulations in order to meet the most demanding marine standards such as shock and ice class requirements. Our naval products are in operation with 38 navies on over 460 naval vessels across the world, as well as 71 cruise vessels with 13 cruise lines.

Basic information required at enquiry stage:

- Project details
- Quantity of bearings
- Shaft diameter
- Radial loading data
- Speed ranges
- Preferred cooling type
- Preferred oil type
- Water inlet temperature

Technical Features of Line Shaft Bearings

Cooling

The Michell Bearings marine and naval line shaft bearing range offers two types of cooling methods:

- Water cooling using high performance cooling coils available in cupronickel
- Where conditions allow, air cooling can be considered
- The choice depends on operational duty and specification requirements.

Instrumentation

All instrumentation can be physically supplied or provision made in the design and can either be compliant to end user specification or our own standard design. Examples include:

- Temperature measurement – oil bath and white metal surfaces using a combination of the following methods:
 - Dial type thermometer for local measurement
 - Resistance temperature detector (RTD) or thermocouples for remote measurement
 - Use of thermowells to facilitate the replacement of instruments without the need to dismantle the bearing
- Provision for vibration or shaft displacement measurement

Sealing

A range of end seals are available which prevent oil leakage and allow continued operation under flooded compartment conditions.

Non-standard features

- High pressure jacking lift incorporated in the journal bush
- Any other customer or specification specific requirements

Technical documentation

With every order Michell Bearings will provide:

- A detailed arrangement drawing
- An Operating and Maintenance Instruction Manual
- A comprehensive bearing performance prediction including:
 - Oil viscosity grade
 - Thrust and journal pad geometry
 - Minimum oil film thickness
 - Maximum pad operating temperatures
 - Power losses
 - Bearing oil bath temperature
 - Cooling requirement

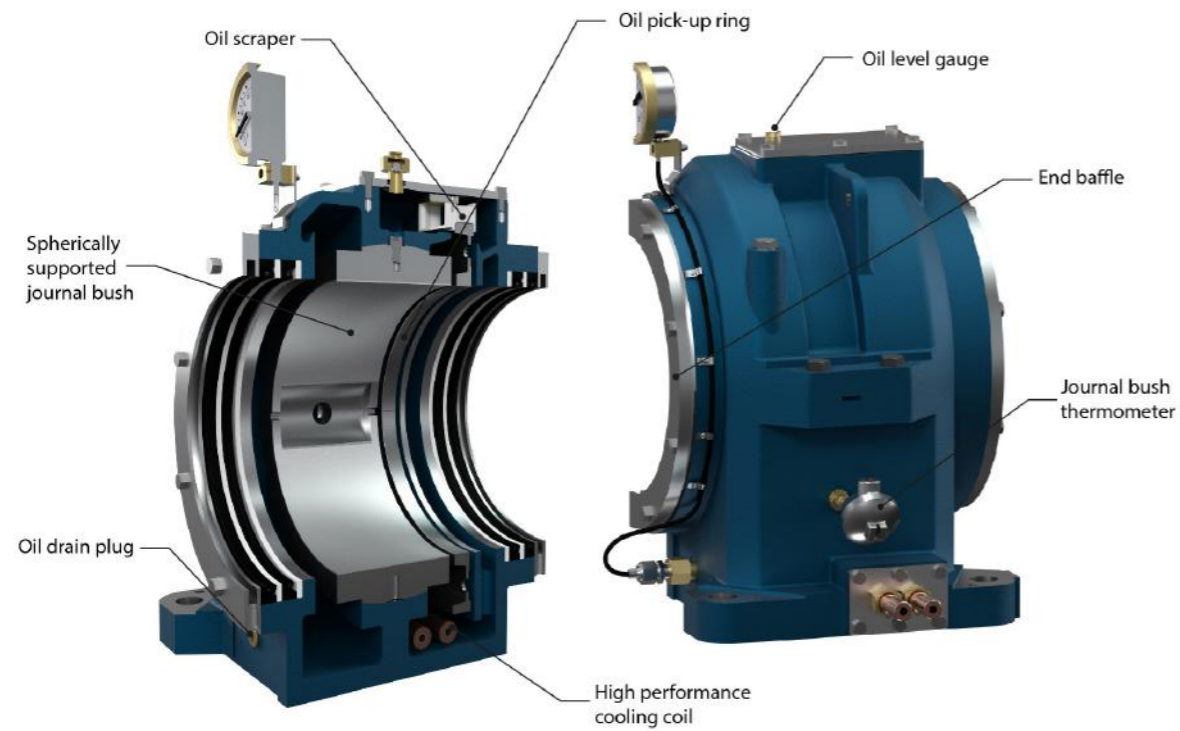
Commerical Line shaft MSA Bearing

Overview of the MSA Bearing

The Michell Bearings Marine Line shaft Bearing, known as the MSA Series, has been designed and developed as a self-contained, general purpose, standard range of bearings for supporting the radial downward loads of the line shaft.

Key features:

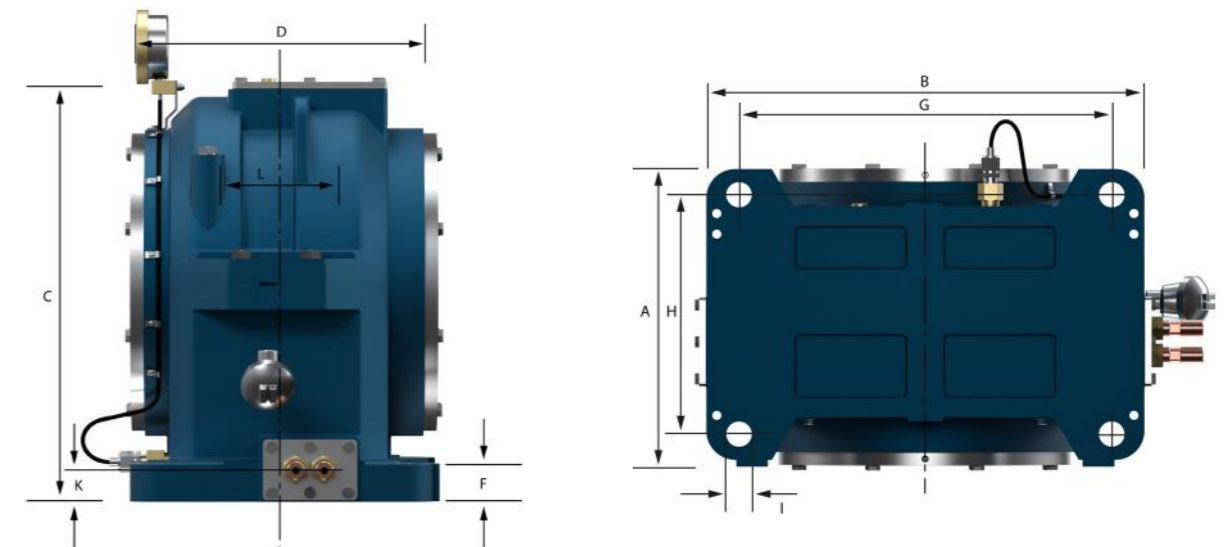
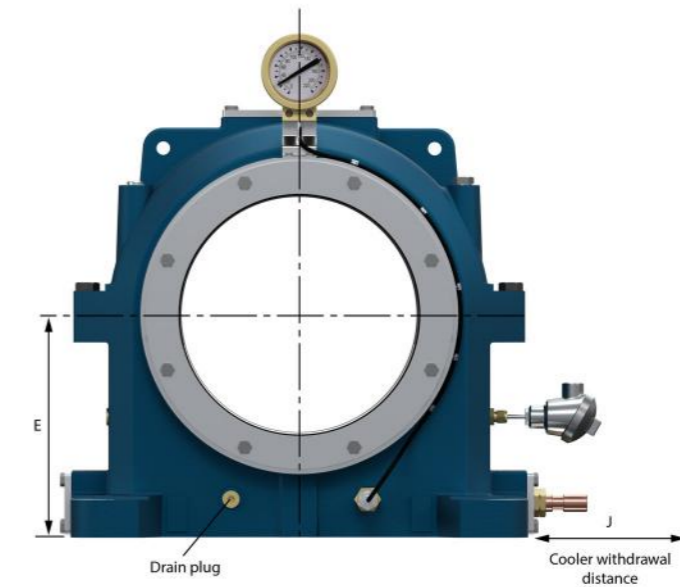
- Ten frame sizes covering shaft diameters from 255mm to 579mm
- Radial load capacity up to 275kN
- Available with water cooling or air cooling
- Radial loads are supported by a spherically seated, whitmetal lined journal bush which is supplied in halves



MSA Series Dimensions

MSA Frame Size	Shaft min.	Shaft max.	A	B	C	D	E	F	G	H	I	J	K	L
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MSA274	255	274	400	550	521	273	270	40	460	333	33	420	40	130
MSA299	275	299	410	580	541	296	280	45	490	345	33	545	42	145
MSA329	300	329	430	640	581	320	300	50	550	350	33	595	42	155
MSA359	330	359	450	670	621	332	325	60	570	370	39	625	50	170
MSA389	360	389	480	720	678	375	350	60	620	400	39	670	50	185
MSA419	390	419	540	840	749	439	380	65	730	430	45	765	55	200
MSA449	420	449	560	850	793	433	410	60	740	450	45	785	60	215
MSA489	450	489	590	940	862	460	440	60	800	480	45	860	60	235
MSA529	490	529	640	1020	912	476	470	70	885	500	52	930	60	255
MSA579	530	579	670	1060	972	530	500	80	925	560	52	970	60	275

Technical Information



Notes:

1 - Dimensions stated are subject to confirmation following order and detail design drawings being completed.

2 - Centre flange bearings are available as a bespoke product, please contact us for further details.

3 - Dimension D is for standard end baffles only. Specified dimensions will change if additional sealing is required.

MSA Water-cooled Technical Data

MSA Frame Size	Shaft dia mm	Speed (rpm)																	
		15	25	50	75	100	125	150	200	250	300	325	350	375	440	475	550	575	600
	mm	Maximum Journal Load Kn																	
MSA274	255	35	52	57														57	
	260	37	54	58														58	
	265	38	55	59														59	
	270	39	57	60														60	
MSA299	275	44	65	69														69	
	280	46	66	70														70	
	285	47	68	71														71	
	290	48	70	72														72	
	295	49	71	74														74	74
MSA329	300	53	77	80														80	
	305	54	79	81														81	
	310	56	81	83														83	83
	315	57	82	84														84	84
	320	58	84	85														85	85
	325	59	86	87														87	87
MSA359	330	67	95	97														97	
	340	70	98	100														100	
	350	73	100	103														103	
	355	74	103	104														104	
MSA389	360	81	113	115														115	
	370	84	115	118														118	
	380	87	118	121														121	
	385	89	120	123														123	
MSA419	390	97	130	134														134	
	395	99	131	136														136	
	400	100	133	138														138	
	410	104	136	141														141	
	415	405	139	143														143	
MSA449	420	114	152	156														156	
	430	118	156	159														159	
	440	121	158	163														163	
	445	123	161	165														165	
MSA489	450	136	177	182														182	
	460	140	180	186														186	
	470	143	184	190														190	
	480	147	188	194														194	
	485	149	190	196														196	
MSA529	490	162	200	215														215	
	500	167	205	220														220	
	510	171	209	224														224	
	520	175	215	229														229	
	525	177	217	231														231	
MSA579	530	206	230	251														251	
	540	211	235	256														256	
	550	215	240	261														261	
	560	220	245	265														265	
	570	225	250	270														270	
	579	229	255	275														275	

Oil Viscosity

ISO VG	220	150	100	68
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Load diagram - water cooled (water inlet temperature 35°C)

MSA Air-cooled Technical Data

MSA Frame Size	Shaft dia mm	Speed (rpm)													
		15	25	50	75	100	125	150	200	250	300	325	350		
	mm	Maximum Journal Load Kn													
MSA274	255	26	40	57										57	57
	260	27	41	58										58	58
	265	28	42	59										59	59
	270	29	43	60										60	60
MSA299	275	33	49	69										69	
	280	34	50	70										70	
	285	35	51	71										71	
	290	36	52	72										72	
	295	37	53	74										74	
MSA329	300	40	59	80										80	
	305	41	60	81										81	
	310	42	61	83										83	
	315	43	62	84										84	
	320	44	64	85										85	
	325	45	65	87										87	
MSA359	330	50	72	97										97	
	340	51	74	100										100	
	350	54	78	103										103	
	355	55	79	104										104	
MSA389	360	61	88	115										115	
	370	63	91	118										118	
	380	65	94	121										121	
	385	66	95	123										123	
MSA419	390	74	106	134										134	
	395	75	108	136										136	
	400	76	109	138										138	
	410	79	112	141										141	
	415	80	114	143										143	
MSA449	420	87	124	156										156	
	430	89	127	159										159	
	440	92	130	163										163	
	445	93	132	165										165	
MSA489	450	103	147	182										182	
	460	106	150	186										186	
	470	109	154	190										190	
	480	112	157	194										194	
	485	113	159	196										196	
MSA529	490	125	176	215										215	
	500	128	179	220										220	
	510	131	183	224										224	
	520	134	187	229										229	
	525	135	189	231										231	
MSA579	530	147	205	251										251	
	540	150	209	256										256	
	550	153	213	261										261	
	560	156	216	265										265	
	570	159	220	270										270	
	579	162	223	275										275	

Oil Viscosity

ISO VG	220	150	100	68
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Load diagram - air cooled (ambient temperature 48°C)

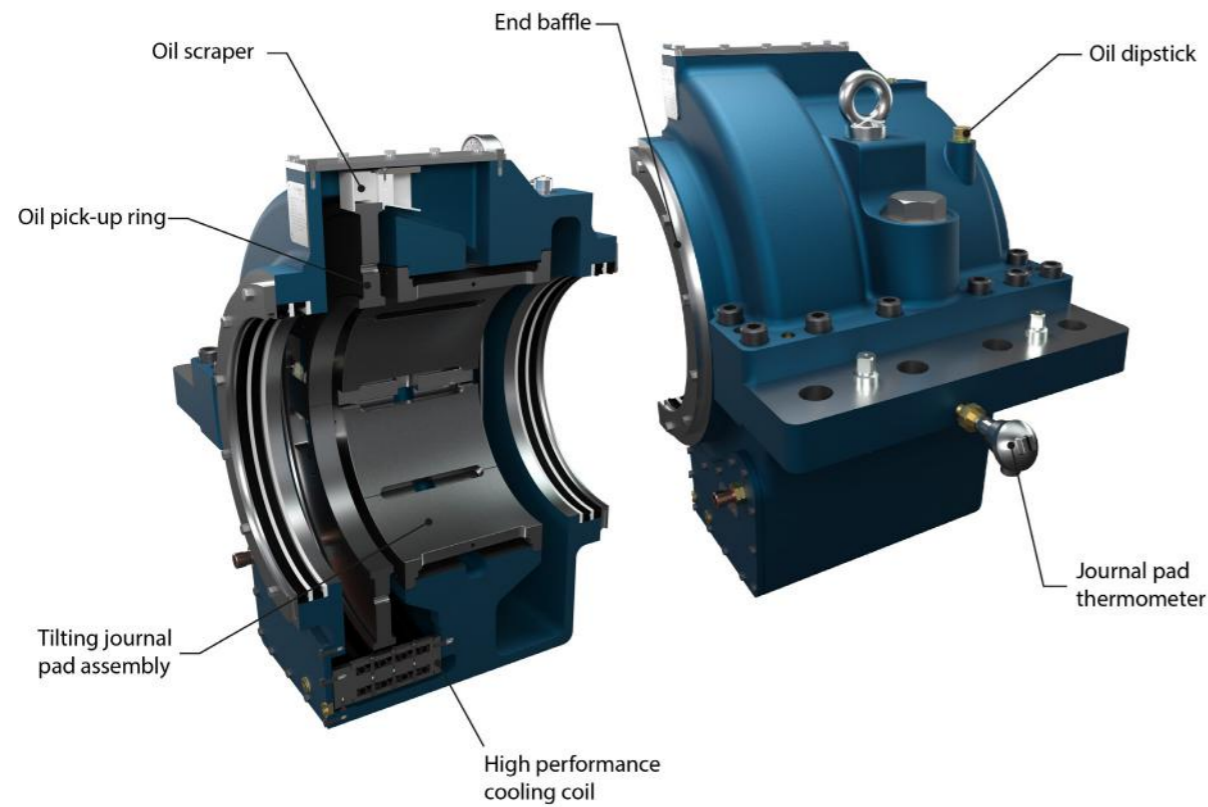
Naval Line shaft NPL Bearing Centre Flange Mounted

Overview of the NPL Bearing

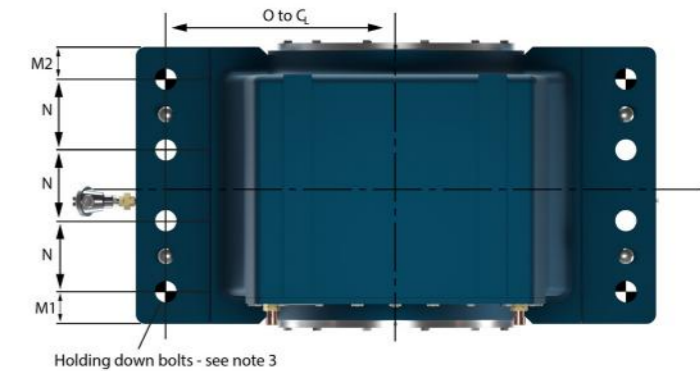
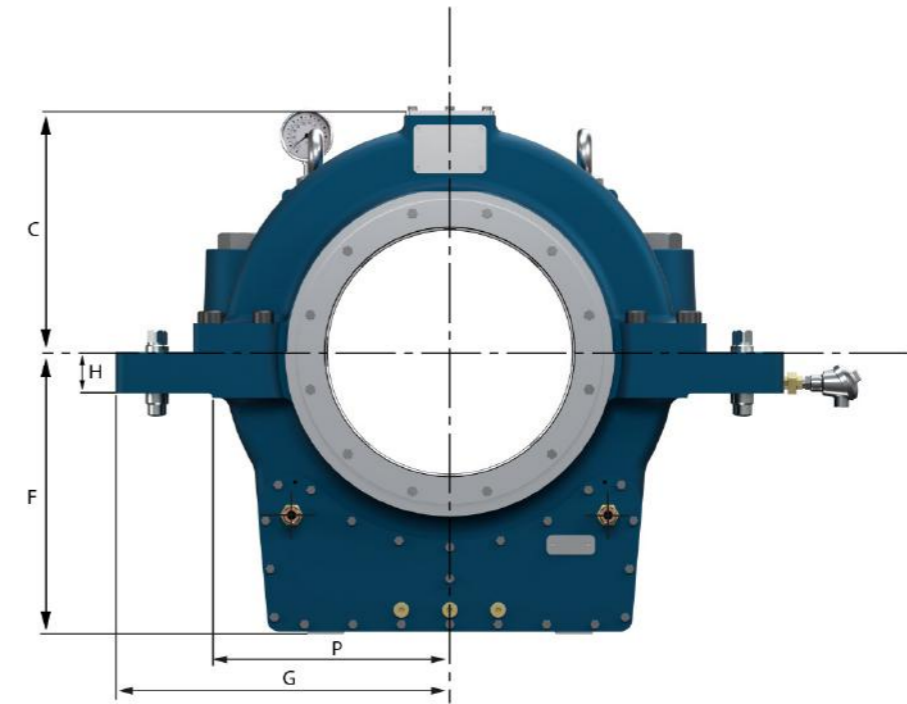
The Michell Bearings Naval Line Shaft Bearing, known as the NPL Series, has been designed and developed as a self-contained, general purpose, standard range of bearings for supporting the radial downward loads of the line shaft.

Key features:

- Seven bearing frame sizes
- Shaft diameters from 250mm to 750mm
- Available with water cooling or air cooling
- Centre flange mounting or pedestal mounting available
- Tilting journal pads or spherical bush options available



Technical Information



NPL Series Centre Flange Mounted Dimensions

NPL Frame Size	Shaft min.	Shaft max.	A	B	C	D	E	F	G	H	I	J	K	L	M1	M2	N	O	P	Q
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2	250	300	270	210	350	205	145	410	450	65	8	M36	34	39	50	50	120	400	340	273
3	300	350	315	255	365	255	190	445	470	80	8	M36	34	39	60	60	150	420	360	323
4	350	400	340	275	429	275	205	515	515	100	10	M36	34	39	55	55	115	470	420	348
5	400	450	360	300	430	290	230	525	515	75	10	M36	34	39	84.5	89.5	115	470	420	362
6	450	550	405	340	500	330	260	585	640	85	8	M56	54	62	85.5	85.5	188	550	480	398
7	550	650	475	395	640	390	300	770	810	110	8	M64	62	70	115	100	205	720	640	462
8	650	750	530	440	736	440	350	900	940	130	8	M72	70	78	110	110	250	850	740	518

Notes:

- 1 - Dimensions stated are subject to confirmation following order and detail design drawings being completed
- 2 - Contact us for confirmation of maximum operating loads per bearing frame size
- 3 - 'I' holes for 'J' holding down bolts
 Ø 'K' for fitted bolts marked ⊕
 Ø 'L' for clear bolts marked ⊕

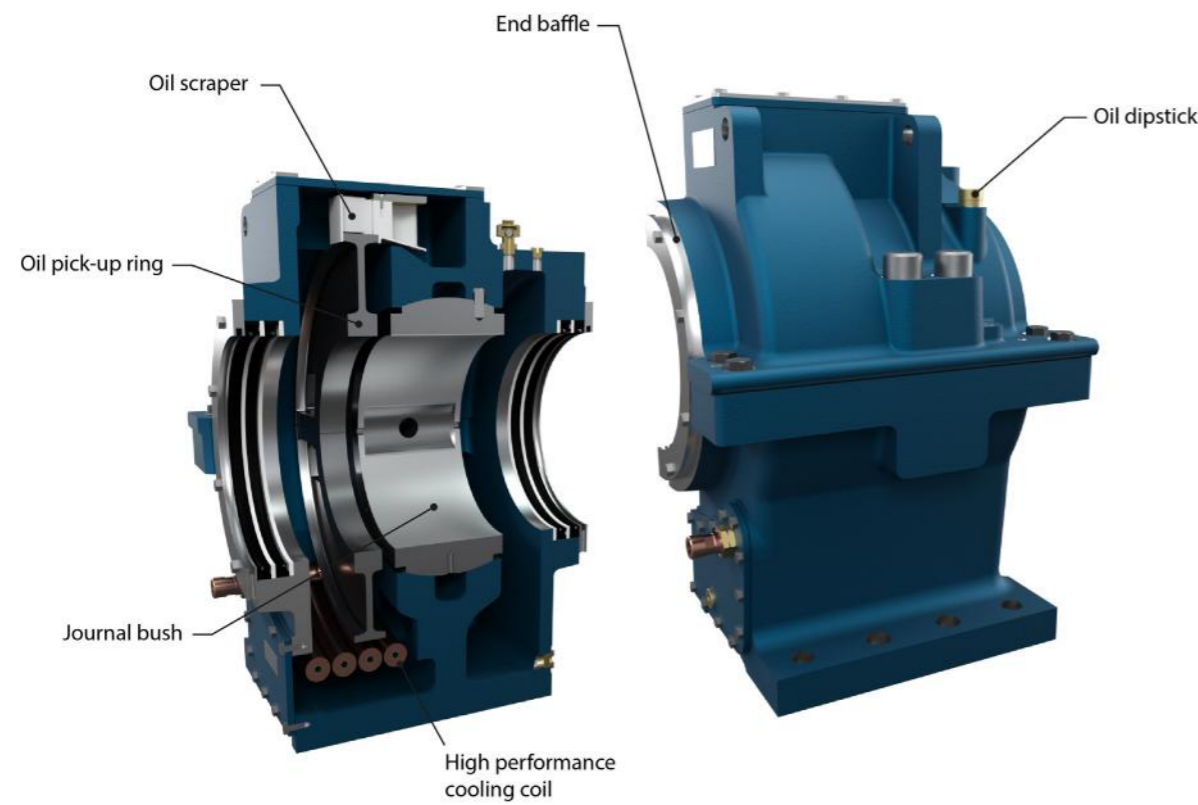
Naval Line Shaft NPL Bearing Pedestal Mounted

Overview of the NPL Bearing

The Michell Bearings Naval Line Shaft Bearing, known as the NPL Series, has been designed and developed as a self-contained, general purpose, standard range of bearings for supporting the radial downward loads of the line shaft.

Key features:

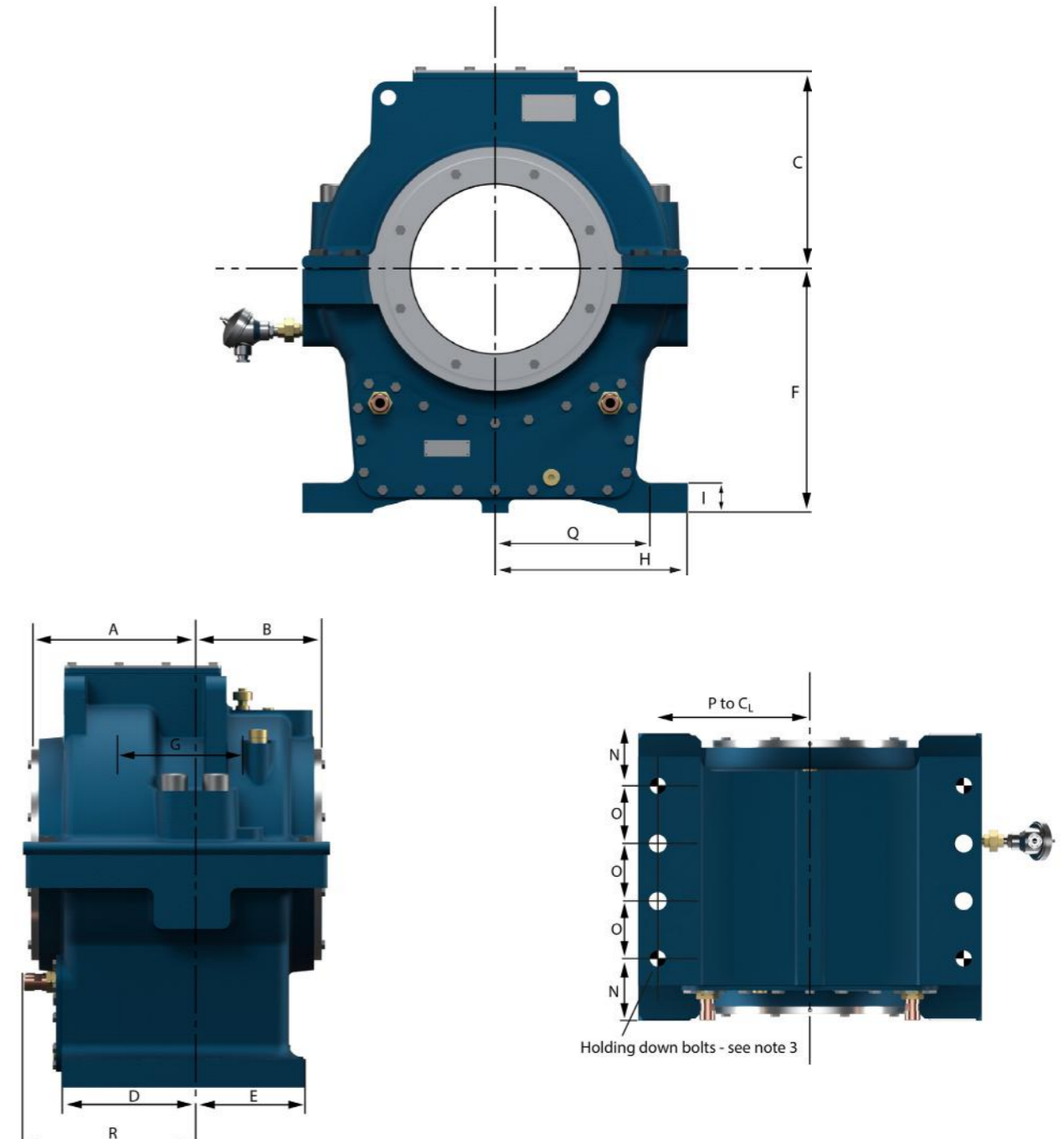
- Seven bearing frame sizes
- Shaft diameters from 250mm to 750mm
- Available with water cooling or air cooling
- Centre flange mounting or pedestal mounting available
- Tilting journal pads or spherical bush options available



NPL Series Pedestal Mounted Dimensions

NPL Frame Size	Shaft min.	Shaft max.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2	250	300	270	210	350	205	145	420	160	335	40	8	M36	34	39	40	90	295	250	273
3	300	350	315	255	365	255	190	455	185	360	50	8	M36	34	39	42.5	120	320	280	323
4	350	400	340	275	429	275	210	540	210	420	60	10	M36	34	39	34.5	104	370	320	348
5	400	450	360	300	430	290	230	540	290	470	60	10	M36	34	39	42.5	115	420	370	362
6	450	550	405	340	500	330	260	610	330	550	75	8	M56	54	62	70	150	480	405	398
7	550	650	475	395	640	390	300	810	420	675	90	8	M64	62	70	75	180	590	500	462
8	650	750	530	440	736	440	350	940	490	760	100	8	M72	70	78	95	200	675	580	518

Technical Information



Notes:

1 - Dimensions stated are subject to confirmation following order and detail design drawings being completed

2 - Contact us for confirmation of maximum operating loads per bearing frame size

3 - 'J' holes for 'K' holding down bolts
 Ø 'L' for fitted bolts marked \oplus
 Ø 'M' for clear bolts marked \ominus

Our Total Customer Support Model

The Michell Bearings customer support model ensures our customers have peace of mind throughout the lifetime of our products and the solutions we engineer for them.

We know that bearing failure is serious; that downtime is expensive and with this in mind, exacting maintenance and servicing is key. If the worst happens speed of response is critical to ensure repair of existing parts or availability of replacement and spare parts.

Our global network and 24 hour manufacturing capability ensures Michell Bearings can react quickly and efficiently to the requirements of our customers. We have the in-house technical expertise to undertake virtually any whitemetal bearing repair, whether on an original Michell Bearings product or any other manufacturer's product.

However, service is the key to preventing bearing failure. Our dedicated service team, all highly trained engineers, travel all over the world to carry out both installation and routine service work in both the marine and industrial sectors.

Michell Bearings offers tailored, structured maintenance programmes to ensure bearing reliability. Whether scheduled or unplanned our diagnostic and corrective maintenance is vital to the continued smooth running of your operations and the satisfaction of your customers.



Michell Bearings
Waldrige Way
Simonside East Industrial Park
South Shields
Tyne and Wear
NE34 9PZ

+44 (0) 191 273 0291

Michell Bearings (India) LLP
8D Attibele Industrial Area
Hosur Road
Bangalore
562107

+91 80 278 20202

sales@michellbearings.com
www.michellbearings.com

