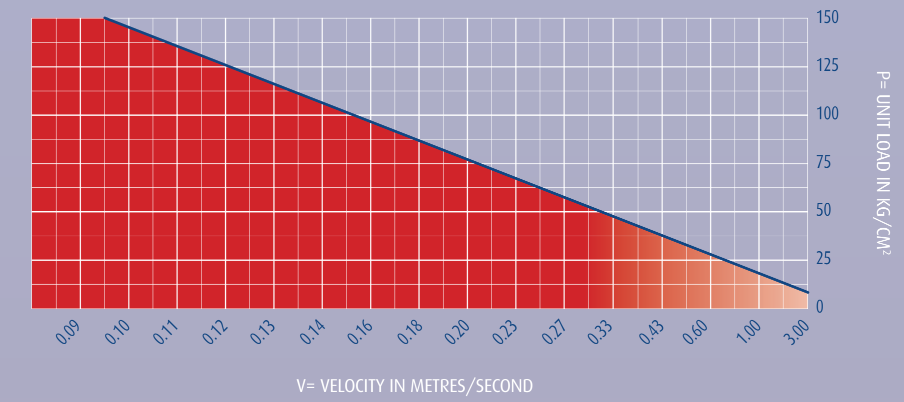
BEARING DESIGN GUIDE

NYLACAST
ENGINEERING PLASTIC SOLUTIONS

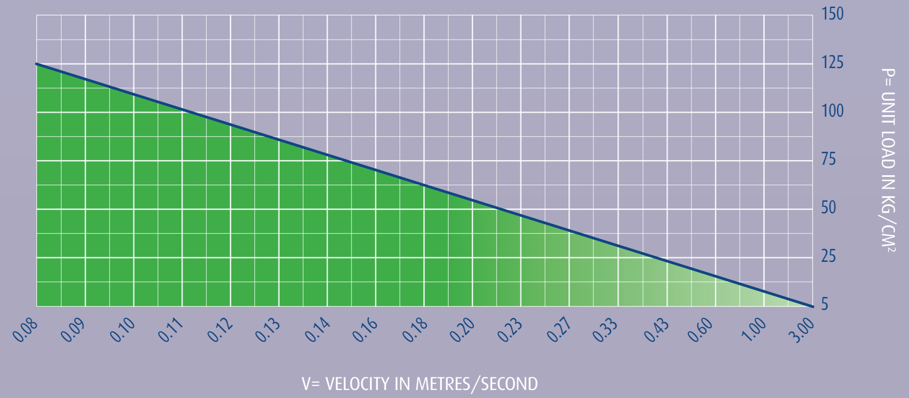
Nylacast have been pioneering polymers for over 40 years and are recognised world-wide as specialist in polymer bearing design and application. Polymers offer significant benefits, although unlike metals, polymer materials are dimensioned differently due to their elastomeric characteristics and heat variations must be considered during initial bearing design parameters. The chart below gives a detailed guide on polymer design parameters.

FIG. 1

P.V. CALCULATIONS FOR NYLUBE



P.V. CALCULATIONS FOR OILON



- Always observe Pressure Velocity (P.V.) values (Fig 1.)
- Interference fits must be compensated for in bore dimensions (Fig 2.)
- Observe shaft allowance versus shaft diameter (Fig 3.)
- Aim to use 1:1 ratio of shaft diameter to bearing length
- Use minimum wall thickness - within practical considerations - this factor avoids unnecessary heat build up in the bearing
- Shaft finish - Hardened and ground shafts are preferred - 0.4 - 0.6µm is adequate for most applications
- Check running clearance: Minimum bearing I.D. = Max shaft diameter + running clearance + press fit
- Data given is applicable to bearings with ends free to expand under normal working conditions. When ends are constricted or the bearing runs emersed in water, then increase clearance values by 50%

FIG. 2

MINIMUM INTERFERENCE FIT/BEARING O/D

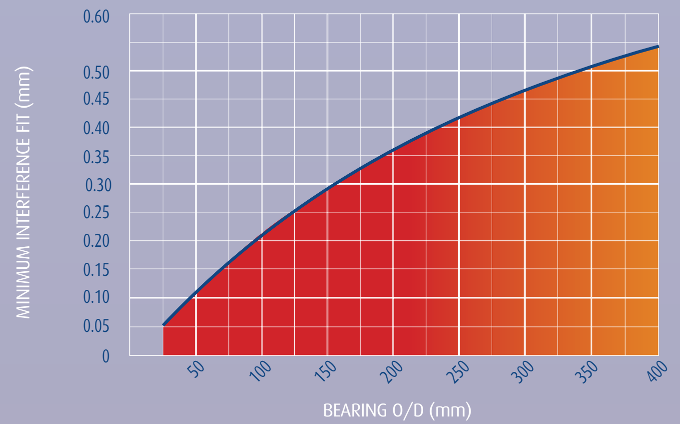
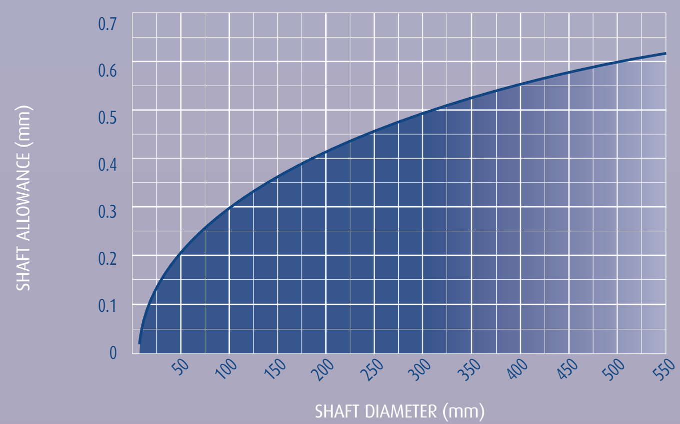


FIG. 3

SHAFT ALLOWANCE/SHAFT DIAMETER



THE INFORMATION ABOVE IS INTENDED AS A BRIEF TECHNICAL GUIDE. FOR SPECIFIC APPLICATIONS CONSULT NYLACAST'S TECHNICAL ADVICE DEPARTMENT.

BEARING MATERIAL COMPARISON

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	DENSITY	TENSILE STRENGTH	COMPRESSIVE STRENGTH	SHORE HARDNESS	COEFFICIENT OF FRICTION	CONTINUOUS OPERATING TEMP	WEAR RESISTANCE INDEX	PRICE INDEX	PERFORMANCE OVER COST INDEX	BEARING MATERIALS COMPARISONS
	g/cm3	N/mm2	N/mm2	'D' SCALE	SAMPLE ON STEEL	°C	UNITS	UNITS	UNITS	COMMENTS
NYLUBE	1.15	70 - 75	85 - 100	80 - 85	0.08 0.10	-80 +125	45/50	1.25	35	Nylube is the 'state of the art' wear resisting cast polyamide, with an enviable track record dating back over more than two decades.
OILON	1.12	65 - 70	85 - 100	80 - 85	0.10 0.13	-80	25	1	25	The world's finest liquid lubricated cast polyamide, with over 25 years in the field, Nylacast's 'fit and forget' workhorse grade.
MOLY	1.14	60 - 80	90 - 105	80 - 88	0.2 0.3	-80 +125	6	0.6	10	Long since superseded by both the above, MOS2 loaded grades exhibit slightly improved wear properties over natural cast polyamide 6.
CAST NYLON 6 G/F	1.24	40 -80	105 - 120	80 - 90	-	-80 +125	-	0.8	-	Not generally used as a bearing grade but used mainly in abrasive applications where cutting action is more adequately resisted.
CAST NYLON 6 NATURAL	1.14	70 - 90	90 - 100	80 - 85	0.25 0.45	-80 +120	5	0.5	10	General purpose cast polyamide 6 natural.
EXTRUDED NYLON 66	1.15	60 - 85	95 - 105	80 - 85	0.3 0.45	-80 +100	5	0.8	6	Injection moulding/extrusion grade.
P.T.F.E.	2.1/2.3	30 - 40	NA	60 - 65	0.1 0.2	-250 +260	25	4	6	Excellent temperature resistance coupled to low frictional properties.
HIGH DENSITY POLYETHYLENE	0.94	19 - 35	NA	60 - 70	0.2 0.25	-85 +95	4.5	0.5	9	General purpose polymer with excellent overall physical properties, however, of limited value for bearings where loads are relatively high.
POLYACETAL	1.4	50 - 55	95 - 105	65 - 70	0.3	100	5	2	2.5	First class polymer mainly used for injection mouldings to extrusions. Engineering uses generally limited to small bearings i.e., other equipment etc.
PHOSPHOUR BRONZE	9	280	-	-	-	-	1	3	0.33	Traditional bearing material which has largely been superseded by a variety of polymers.

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Nylacast Ltd
480 Thurmaston Boulevard, Leicester, LE4 9LN
t: 0044 (0) 116 276 8558 f: 0044 (0) 116 274 1954
e: sales@nylacast.com

Nylacast LLC
1349 Cumberland Street, Lebanon, PA, 17046
USA t: 001 717 2705600 f: 001 717 2709760
e: sales@nylacastusa.com

Nylacast South Africa (Pty) Ltd
PO Box 30445, Jet Park, Johannesburg SA
t: 00 2711 3977077 f: 00 2711 3977017
e: nylacast@mweb.co.za

www.nylacast.com