

Industrial Grease Selection — NLGI, Base Oil, Thickener

cBallast · NLGI 6th ed. · Selection guide

The four selection dimensions

Semi-solid lubricant = thickener dispersed in base oil + additives. Four properties fully specify: NLGI consistency grade (firmness), base oil (fluid doing the work), thickener chemistry (holds oil in place), operating temperature envelope. Getting all four right separates L10 bearing life from half-life failure.

NLGI grades

NLGI	Penetration (mm/10)	Consistency	Use
000	445-475	Fluid	Central lube of low-speed gears
00	400-430	Semi-fluid	Central lube, closed gearboxes
0	355-385	Very soft	Cold-climate central lube
1	310-340	Soft	Central lube, low ambient
2	265-295	Medium (default)	General bearings, chassis, wheel hubs
3	220-250	Firm	High-speed bearings, vertical shafts
4	175-205	Hard	Sealed-for-life bearings
5	130-160	Very hard	Rolling mills, plain bearings
6	85-115	Block	Railway journal boxes

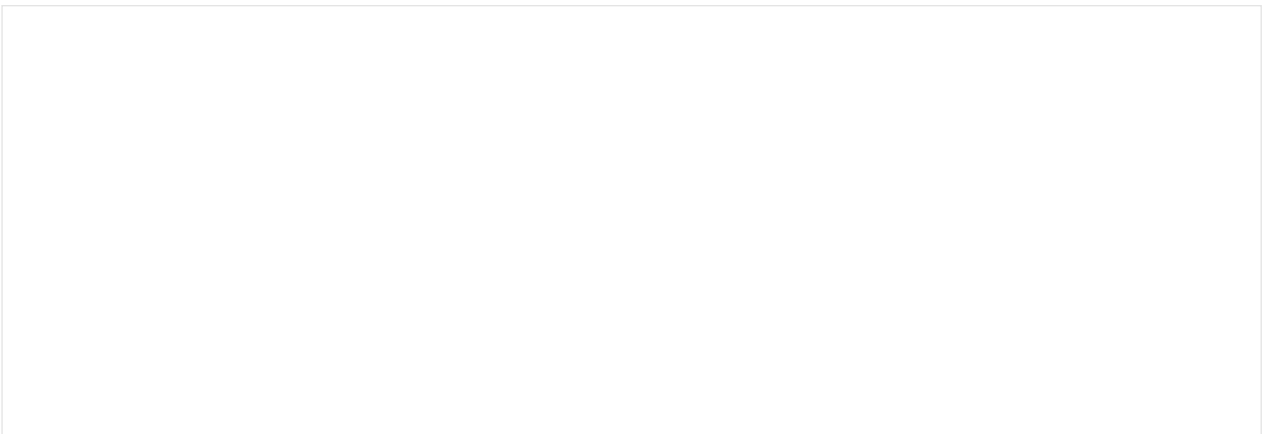
Base oil

Base oil	Temp C	Cost	Notes
Mineral	-20 to +120	Low	Standard general industrial
PAO	-50 to +180	Medium	Wide range, low volatility
Ester	-60 to +200	Med-high	High-temp bearings, aerospace
PAG	-40 to +200	High	Water-glycol compatible, retrofit
Silicone	-70 to +260	High	Extreme temp, electrical isolation
PFPE	-70 to +260	Very high	Oxygen service, aggressive chem

Thickener

Thickener	Drop point C	Water res	Notes
Lithium	180	Good	Most-used general-purpose
Lithium complex	260	Very good	Higher-temp multi-purpose
Calcium	110	Excellent	Legacy chassis, weather-resistant
Calcium sulfonate complex	300	Excellent	Marine, corrosion, high-temp
Aluminium complex	250	Excellent	Food-grade NSF H1
Polyurea	250	Very good	Sealed-for-life electric motor
Bentonite (clay)	Non-melting	Good	High-temp oven doors, chains
PTFE	260	Excellent	Chemically inert, food, high-

temp



Common industrial + marine greases

Product	NLGI	Base	Thickener	Temp C
Mobil Mobilith SHC 220	2	PAO	Li complex	-40 to +180
Shell Gadus S3 V220C	2	Mineral	Li complex	-25 to +140
Klüber Isoflex NBU 15	2	Ester/mineral	Ba complex	-40 to +130
SKF LGMT 2	2	Mineral	Li	-30 to +120
SKF LGHP 2	2-3	Mineral/PAO	Polyurea	-40 to +150
SKF LGWA 2 wheel	2	Mineral	Li complex EP	-30 to +140
Molykote BR2 Plus	2	Mineral	Li + MoS2	-30 to +130
Chesterton 622	2	Mineral	Ca sulfonate	-30 to +180

Selection procedure

1) Ambient temp — pour point below coldest, flash point above bearing max.
 2) Speed — calc speed factor $n \times dm$ (rpm $\times$ mean bearing dia mm). <400,000 = NLGI 2 Li. >600,000 = lower viscosity, polyurea/Li-complex.
 3) Water exposure — Ca-sulfonate / Al-complex.
 4) Load — heavy/shock = EP additive.
 5) Compatibility — always confirm on top-up. Li broadly compatible; polyurea + Ca-sulfonate notoriously incompatible.

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