

# GREASE DATA

## Types of lubricating greases

Lubricating grease with metallic soap thickener		Lubricating grease with non-metallic soap thickener		Adhesive lubricants	
(plain soaps, mixed soaps, complex soaps of various metal bases, e. g. Ca, Na, Li, Al, etc.)		Organic and inorganic solids, e. g. alumina (bentonite, silica gel, polyurea, soot and paint)			
Mineral oil as liquid phase	Synthetic liquids as liquid phase (silicones, ester, polyglycols, polyalphaolefins)	Mineral oil as liquid phase	Synthetic liquids as liquid phase (fully synthetic lubricating grease)	Lubricants that can be sprayed with solid lubricants	Bitumen-containing lubricants

## Greases overview

Thickener		Base oil	Drop point [°C]	Operation temperature range [°C]		Water resistance	Protection against corrosion	Natural EP-behaviour	Price relation	Remarks	
Soaps	Normal	Calcium	Mineral oil	80/105	-35	+50/60	+++	+	++	0.8	Good sealing effect against water
		Sodium	Mineral oil	160/180	-40	+120	-	++	+	0.9	Dissolves in water
		Lithium	Mineral oil	180/200	-40	+120/140	+	+	+	1.0	Emulsifies water
		Aluminium	Mineral oil	100/120	-30	+80/100	++	+++	+	2.5-3.0	Swells in water
	Complex	Calcium	Mineral oil	>260	-30	+140 (200)	++	++	++	0.9-1.2	Hardens under high temperature
		Sodium	Mineral oil	>240	-30	+130	+	+	+	3.5	Hardens under high temperature
		Lithium	Mineral oil	>250	-30	+150	++	+	+	4.0-5.0	Little used, special cases
		Aluminium	Mineral oil	>250	-30	+140 (200)	++	+	+	2.5-4.0	Little used, special cases
		Lithium Calcium	Mineral oil	170/180	-30	+120/130	++	+	+	1.3	Water-resistant and durable
	Non-soaps	Inorganic	Bentonite	Mineral oil	without	-25	+150/200	++	-	+	6.0-10.0
Aerosil (Gel)			Mineral oil	without	-20	+150/180	++	-	-	5.0	Acid- and base-resistant
Organic		Polyurea	Mineral oil	>250	-25	+150/200	++	+	+	6.0	High-speed bearings
Soaps	Normal	Lithium	Ester	>190	-40	+130	++	+	+	5.0-6.0	Grease for low temperatures
		Lithium	Polyalphaolefin	>190	-60	+140	++	+	+	3.0-4.0	Grease for low temperatures
		Lithium	Silicone oil	>190	-40	+170	+++	-	-	20.0	Grease for low-high temperatures
	Complex	Lithium	Ester	>260	-40	+160	+++	+	+	6.0-8.0	Grease for low temperatures
		Barium	Ester	>260	-40	+130	++	+++	+++	7.0	Grease for low temperatures
		Barium	Polyalphaolefin	>260	-60	+150	++	+++	+++	6.0	Grease for low temperatures
		Sodium	Silicone oil	>220	-40	+200	+	+	-	20.0-25.0	Grease for low-high temperatures
Non-soaps	Inorganic	Bentonite	Polyalphaolefin	without	-60	+180	++	-	+	10.0-15.0	Grease for low temperatures
		Bentonite	Ester	without	-40	+180	++	-	+	10.0-12.0	Grease for low temperatures
		Aerosil (Gel)	Silicone oil	without	-40	+200	++	-	-	30.0-40.0	Grease for low-high temperatures
	Organic	Polyurea	Silicone oil	>250	-40	+200	+++	+	-	35.0-40.0	High temperature grease
		Polyurea	Polyphenyl ether	>250	>0	+220	+++	+	+	100.0	High temperature grease
		PTFE	Silicone oil	without	-40	+250	+++	+	-		High temperature grease

Source: Meler-Peter, Hansheirich, Bernhardt, Frank (Eds.), Compendium Marine Engineering: Operation – Monitoring – Maintenance, 2009, by courtesy of PMC Media House GmbH: www.pmcmedia.com

# GREASE DATA

## SAE Viscosity grades for engine lubricants according to DIN 51511

SAE viscosity class	Apparent viscosity at -18 °C according to DIN 51377 mPa s °C		Kinematic viscosity at 100 °C according to DIN 51 550 mm <sup>2</sup> /s	
	min	max.	min	max.
5W	Up to 1250	–	3.8	–
10W	Over 1250	Up to 2500	4.1	–
15W <sup>1)</sup>	Over 2500	Up to 5000	5.6	–
20W	Over 5000	Up to 10000	5.6	–
20	–	–	5.6	Under 9.3
30	–	–	9.3	Under 12.5
40	–	–	12.5	Under 16.3
50	–	–	16.3	Under 21.9

<sup>1)</sup> 15W is identified as footnote in SAE J 300.  
Multigrade Oil is a lubrication oil with viscosity of -18 °C that falls within the range of one of W viscosity grades and with viscosity of 100 °C, lies in one of the viscosity grades that are not classified as W.  
Compare ISO VG and SAE – see annex A of DIN 51517 part 1.

## SAE Viscosity grades for axle and standard transmission, but not for fluid gear

SAE viscosity class	Maximum temperature for apparent viscosity of 150 000 mPa s according to DIN 51398 °C	Kinematic viscosity at 100 °C according to DIN 51 550 mm <sup>2</sup> /s	
		min	max.
75W	- 40	4.1	–
80W	- 28	7.0	–
85W	- 12	11.0	–
90	–	13.5	Under 24.0
140	–	24.0	Under 41.0
250	–	41.0	–

## Short description of cone penetration of worked greases, NLGI-class of greases in accordance with DIN 51818

Class	Worked penetration	Description	Application				
			Gear transmission lubrication	Suitable for central lubrication systems	Lubrication for anti-friction and wheel bearings	Journal bearing lubrication	water pump lubrication
000	445 to 475	Flowing (like highly viscous oil)	✓	✓			
00	400 to 430	Very soft, weak fluidity	✓	✓			
0	355 to 385	Soft, semi-fluid	✓	✓			
1	310 to 340	Soft	✓	✓	✓	✓	
2	265 to 295	Ointment-like		✓	✓	✓	
3	220 to 250	Nearly solid, medium hard			✓	✓	
4	175 to 205	Hard			✓		✓
5	130 to 160	Very hard (like soap)					✓
6	85 to 115	Hard (block grease, grease briquettes)					

## Additional identification letter for operation temperature

Additional upper letters	Upper service temperature	Behaviour in relation to water according to DIN 51807 part 1 and assessment level
C	+ 60 °C	0-40 or 1-40
D		2-40 or 3-40
E	+ 80 °C	0-40 or 1-40
F		2-40 or 3-40
G	+ 100 °C	0-90 or 1-90
H		2-90 or 3-90
K	+ 120 °C	0-90 or 1-90
M		2-90 or 3-90
N	+ 140 °C	As mutually agreed
P	+ 160 °C	
R	+ 180 °C	
S	+ 200 °C	
T	+ 220 °C	
U	over + 220 °C	

Source: Meler-Peter, Hansheirlich, Bernhardt, Frank (Eds.), Compendium Marine Engineering: Operation – Monitoring – Maintenance, 2009, by courtesy of PMC Media House GmbH: www.pmcmedia.com