

1. LUBRICANTS

GREASE CHARACTERISTICS

(physical, chemical and mechanical properties, packaging)

Lubricants: description	UNIVERSAL	UNIVERSAL +	HEAVY DUTY	HEAVY DUTY +
NLGI consistency grade	2	2	2	2
Base oil	Mineral	Mineral	Mineral	Mineral
Thickener / type of soap	Lithium	Lithium / Calcium	Lithium with EP additives	Lithium with EP additives
Colour	Amber	Light Brown	Amber	Brown
Base oil viscosity (cSt) - at 40°C	115	220	115	150
- at 100°C	11	6,5	11	15
Service temperature range (°C)	From -25 to +140	From -30 to +130	From -25 to +140	From -30 to +150
Drop point (°C) DIN ISO2176	> 190	> 170	> 190	> 190
Suitable for medium loads P<C/5	+		++	
Suitable for high loads P<C/5	-		++	
Suitable for low speeds n.Dm <100,000	+		+	
Suitable for high speeds n.Dm >100,000	+		+	
Properties in humid environments, in the presence of water	++		++	
Suitable for low-amplitude oscillations	+		+	
Suitable for vibrations when shutdown	-		-	
Adhesion	+		+	
Low torque	+		+	
Low noise levels	+		+	
Anti-corrosion protection	++		++	
Resistance to chemical agents	-		-	
Pumpability	++		++	
Sizes available	400 g cartridge 1 kg can 5 kg bucket 23 & 50 kg drums	Lubricator BOOSTER	400 g cartridge 1 kg can 5 kg bucket 23, 50 and 190 kg drums	Lubricator BOOSTER
Remarks	Previous name: MS		Previous name: EP	

N.Dm: rpm x mean diameter (millimetres)

++ Excellent performance

+ Good performance

- Not recommended

/ Not applicable

VIB	HIGH TEMP	FOOD AL / FOOD	FOOD CHAIN OIL	CHAIN OIL	ULTRA HIGH TEMP	HIGH SPEED +
2	2	2	/	/	2	2
Semi-synthetic	Semi-synthetic	Paraffinic mineral / PAO	Ester + PAO	Ester + PAO	Perfluorinated polyether synthetic	Ester + SHC
Lithium /Calcium	Polyurea	Aluminium complex	/	/	PTFE	Lithium /Calcium
Light Brown	Light Brown	Pale yellow /	Colourless	Pale green	White	Light brown
360	160	248 / 195	220	320 (*)	460	25
25	18	24 / 22	26	28 (*)	40	5.8
From -20 to +140	From -40 to +160	From -25 to +120 / -30 to +120	-30 à +120	From -20 to +250	From -30 to +260	From -45 to +120
> 190	> 250	> 200 / > 220	Pour Point <-30	Pour Point -25	Not measurable (*)	> 180
+	+	+	/	/	++	+
++	-	+	/	/	++ (**)	-
++	+	+	/	/	++	-
-	+	+	/	/	+	++
+	+	+	/	/	+	++
++	++	+	/	/	++	+
-	-	-	/	/	-	++
++	++	+	/	/	++	+
-	+	+	/	/	-	++
-	+	-	/	/	-	++
+	+	+	/	/	+	++
-	-	-	/	/	++	-
++	++	++	/	/	++	++
400 g cartridge 1 kg can 50 kg drum Lubricator BOOSTER	400 g cartridge 1 kg can Lubricator BOOSTER	Food AL: 400 g cartridge 1 kg can Food: Lubricator BOOSTER	READY BOOSTER	Lubricator BOOSTER	800 g cartridge	1 kg can
Previous name: VX	Previous name: HT	Meets NSF requirements as an H1 product	Meets NSF requirements as an H1 product	*Base oil viscosity at 20°C = 1200cSt	* According to standard DIN 2176, the drop point of this grease cannot be determined, i.e. this grease fails to melt **If T<200°C Meets INS H1 requirements.	Pay attention to quantity, and grease levels

1. LUBRICANTS

E. SELECTING AN NTN-SNR GREASE SUITABLE for your applications

PREVAILING OPERATION	OPERATING LIMITS		EXAMPLES OF APPLICATIONS
	TEMPERATURE °C	SPEED	
General usage	UNIVERSAL -25 to +140 UNIVERSAL + -30 to +130	< maximum bearing speed	Industry and automobile: Agricultural equipment, general mechanical devices, handling equipment, electrical tools, car wheel bearings, etc.
High loads	HEAVY DUTY -25 to +140 HEAVY DUTY + -30 to +150	< 2/3 maximum bearing speed	Arduous applications in heavy industry: Iron and steel, construction, transport, conveyors, lifting devices, high-power electric motors, water pumps, presses, truck wheel hubs, etc.
High temperature	-40 to +160	< 2/3 maximum bearing speed	Textile machines, paper transformation machines, hot fans, dryers, tensioning rollers, vehicle water pumps, etc.
	-30 to +260	< 2/3 maximum bearing speed	Corrugated board production, the plastic industry, textile drying machines, rolling tail pipes, copy machines. Electric motors operating at very high temperatures, furnace equipment, kiln cars, etc. Registered H1: can be used in food-processing industries.
Low temperature	Down to -45	< 2/3 maximum bearing speed	Aviation, special devices.
High speed	-20 to +120	< 4/3 maximum bearing speed	Machine tool spindles, textile machine spindles, miniature electric motors.
Humidity	-30 to +140	< 2/3 maximum bearing speed	Washing machines.
High-amplitude impacts or vibrations Centrifugation Rotating outer ring	-20 to +130	< 2/3 maximum bearing speed	For quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, drilling and boring. Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc.
Food usage	-25 to +120	< 2/3 maximum bearing speed	Applications where accidental contact with food is technically possible: Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc.
Use in food processing Chain oil	-30 à +120	/	Applications in the food and pharmaceutical industry: Straight, bevel and worm gearing, main bearings, pivots, articulations as well as for the lubrication of lifting, drive and transmission chains even at low temperatures.
High-temperature chain oil	-25 to +250	/	Applications in the textile and plastics industries with all types of oil-lubricated chains: Levelling machines, stenter frames, multi-layer systems, festoon steamers, dryers, coating units.

TYPICAL RECOMMENDATIONS	EXPERTS & TOOLS RECOMMENDATIONS
Mineral oil. Traditional soap (lithium, calcium, etc.) Grade 2 consistency is generally used for large bearings or bearings with specific operating properties. Reduced performance above 90°C (continuous).	UNIVERSAL or UNIVERSAL +
Similar to general purpose greases with extreme pression additives.	HEAVY DUTY or HEAVY DUTY +
Polyurea thickener with highly viscous or semi-synthetic mineral base oil. Important: greases with silicon base oil have reduced resistance when subjected to high loads.	HIGH TEMP
Completely synthetic grease. The grease is not miscible with mineral and synthetic based products of different types. The proper operational efficiency of this product can only be achieved when the components to be lubricated are thoroughly clean and free from other grease. H1 registrations: occasional contact with food.	ULTRA HIGH TEMP
Base oil with very low viscosity. Important: the grease becomes fluid if temperature >80°C.	HIGH SPEED +
Oil with very low viscosity.	
Traditional grease doped with anti-corrosion additive.	UNIVERSAL or HEAVY DUTY (normal or +)
Grease with grade 2 consistency and high adhesion.	VIB
Meets NSF requirements as an H1 product. *NSF: National Sanitation Foundation /H1: Occasional contact with food.	FOOD AL
Meets NSF requirements as an H1 product. *NSF: National Sanitation Foundation /H1: Occasional contact with food.	FOOD CHAIN OIL
Oil with good adhesion and good creep properties (spreading).	CHAIN OIL

1. LUBRICANTS

GREASE COMPATIBILITY

It is not generally advised to mix two lubricating greases.

If two greases are mixed (e.g.: when grease is changed in a lubrication system), check the compatibility of the two greases, i.e. of their base oils and their thickeners.

OIL	MINERAL	PAO POLY ALPHA-OLEFIN	ESTER	P. POLY GLYCOL	POLYPHENYL ETHER	SILICONE (METHYL)	SILICONE (PHENYL)	FLUORINATED
MINERAL	C							
PAO POLY ALPHA-OLEFIN	C	C						
ESTER	C	C	C					
P. POLY GLYCOL	NC	NC	C	C				
POLYPHENYL ETHER	C	C	C	NC	C			
SILICONE (METHYL)	NC	NC	NC	NC	NC	C		
SILICONE (PHENYL)	C	C	C	NC	C	C	C	
FLUORINATED	NC	NC	NC	NC	NC	NC	NC	C

LEGEND C : Compatible - NC : Not Compatible.

THICKENER	ANHYDROUS CALCIUM SOAP	CALCIUM COMPLEX SOAP	LITHIUM SOAP	LITHIUM COMPLEX SOAP	LITHIUM / CALCIUM SOAP	ALUMINIUM COMPLEX SOAP	BENTONE SILICA GEL	POLYUREA	FLUORINATED
ANHYDROUS CALCIUM SOAP	C								
CALCIUM COMPLEX SOAP	NC	C							
LITHIUM SOAP	C	NC	C						
LITHIUM COMPLEX SOAP	C	C	C	C					
LITHIUM / CALCIUM SOAP	C	NC	C	C	C				
ALUMINIUM COMPLEX SOAP	C	NC	NC	NC	NC	C			
BENTONE SILICA GEL	C	NC	NC	NC	NC	NC	C		
POLYUREA	C	C	C	C	NC	C	NC	C	
FLUORINATED	NC	NC	NC	NC	NC	NC	NC	NC	C

LEGEND C : Compatible - NC : Not Compatible.

1. LUBRICANTS

WHAT THE EXPERTS SAY:

- Only appropriate lubrication can guarantee the optimal operation of bearings and the related mechanical assembly.
- 55% of premature bearing failure is caused by inappropriate lubrication.**
- Inadequate lubrication will substantially shorten the service life of the bearing.
- Bearing lubrication is often neglected due to the difficulty of accessing bearings and the operator's lack of lubricant knowledge.
- Selecting the right lubricant, the right lubrication method, the precise quantity required for the bearing and the frequency of monitoring the lubrication are all critical points.

A. PRINCIPLE AND BENEFITS OF GOOD LUBRICATION

- A film of lubricant (oil film) between the balls or rollers and the bearing raceway prevents **wear and seizure**.
- Lubrication protects components **from corrosion**.
- Lubrication also protects the components **from liquids** and external pollution, and evacuates wear debris.
- Lubrication reduces **friction**, reducing the power consumed by the machine, and thereby providing **energy savings**.
- Circulating oil distributes heat and contributes to the thermal equilibrium of the machine.

The service life of the bearing is directly related to the effectiveness of the oil film, which depends on:

- the type of lubricant; its specific heat capacity, resistance to vibrations, etc.
- the load and speed of the bearing.

Greases for general use do not always meet the specific requirements of some applications. Bearings requested to operate in specific load, speed or temperature conditions, or in the presence of water, humidity or vibrations, require the use of carefully selected grease.

NTN-SNR has carried out research in this field with the leading international lubricant manufacturers for more than half a century. We therefore have knowledge and practical experience for most lubricants used with bearings.

B. SELECTING YOUR TYPE OF LUBRICATION

	OIL LUBRICATION	GREASE LUBRICATION
ADVANTAGES	<ul style="list-style-type: none"> • Good penetration into the bearing • Good physical and chemical stability • Cooling • Easy lubricant control: volume and level 	<ul style="list-style-type: none"> • Clean mechanisms • Simplified sealing • Protection • Simple assembly • Easy handling • Reduced or no lubricant replacement required • Option to use pre-greased bearings
DISADVANTAGES	<ul style="list-style-type: none"> • Sealing required for assembly • Inadequate protection against corrosion and humidity in case of extended periods of non-running • Time delay, if it is necessary to start independent circulation prior to rotation of the bearing 	<ul style="list-style-type: none"> • Higher friction coefficient than oil • Reduced heat transfer • The bearing must be dismantled and washed in order to be replaced (if necessary) • No option to check the level of grease, therefore grease levels must be reliable or periodic top-up is required to compensate for leaks, pollution and aging

C. GREASE CHARACTERISTICS

Grease is a product with a semi-fluid to solid consistency, obtained by blending a thickening agent (soap) with a liquid lubricant (mineral or synthetic oil).

Additives may be included to obtain specific properties. The growing use of grease-lubricated bearings, combined with the development of 'greased for life' lubrication, makes grease a critical element in the bearing. The service life of the bearing and its behaviour in various environments significantly depends on the properties of the grease used.

Physical and chemical characteristics:

Consistency

- NLGI (National Lubrication Grease Institute) grades correspond to a value of worked penetration in the grease (according to test specification ASTM/D217)
- For bearings, the consistency generally adopted is grade 2 (normal).

Viscosity of basic oil: generally defined in cSt (mm²/S) at 40°C.

Density: approx. 0.9

Drop point: the temperature at which the first drop of a sample liquefied by heating drips.

Approximately: 180°C/260°C depending on the composition of the grease. The maximum service temperature of the grease is always well below the drop point.

NLGI GRADES	WORKED PENETRATION	CONSISTENCY
0 1	385 - 355 340 - 310	Semi-fluid Very soft
2 3	295 - 265 250 - 220	Soft Normal
4	205 - 175	Firm

Functional characteristics

The working conditions imposed on the lubricant (rolling, mixing) require special greases for bearings which cannot be selected simply on the basis of their physical and chemical characteristics.

The NTN-SNR Research and Test Centre is continuously testing to approve bearings, enabling us to offer advice on the most suitable grease for each application.

Approval specifications are based on the following criteria:

- endurance for ball bearings
- endurance for roller bearings
- water resistance
- resistance to high and low temperatures
- adhesion (centrifugation)
- resistance to vibrations (false brinelling)
- resistance to high speeds
- etc.

Other criteria can be added depending on the final results required by the customer. Selecting a type of grease will represent the best compromise based on the specifications for the application.

D. TECHNICAL CHARACTERISTICS OF LUBRICANTS AND MAKING A CHOICE

The grease will be selected on the basis of operating conditions, which must be defined as precisely as possible: temperature, speed, load, environment, vibrations and any other specific limitations inherent to the application.

Select which grease to use with the assistance of your NTN-SNR contact.

The table on the pages 12 & 13 provides initial guidance.

1. LUBRICANTS



UNIVERSAL Multi purpose



Grease for general usage, in industry or for automobiles.

▶ 10

STANDARD APPLICATIONS

Agricultural equipment, washing machines, handling equipment, general mechanical devices, low-power electric motors, car wheel bearings, small tools, etc.

BENEFITS

Good properties in the presence of water, excellent protection against wear and corrosion.

TEMPERATURE RANGE

from -25°C to +140°C



HEAVY DUTY High Load



Top quality grease for very high-pressure applications, suitable for many applications, intended for arduous applications in heavy industry: metallurgy, construction, transport, etc.

▶ 10

STANDARD APPLICATIONS

Conveyors, lifting devices, truck wheel hubs, high-power electric motors, water pumps, presses, etc.

BENEFITS

Excellent performance under heavy loads, including high speeds, good properties in the presence of water, excellent protection against wear and corrosion.

TEMPERATURE RANGE

from -25°C to +140°C



VIB Vibrations & Shocks



This grease is an ideal lubricant for parts subjected to extensive vibrations or impact. Recommended for quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, boring, etc.

▶ 11

STANDARD APPLICATIONS

Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc.

BENEFITS

Excellent resistance to impact, vibrations and heavy loads, excellent resistance to water guaranteeing long-term lubrication.

TEMPERATURE RANGE

from -20°C to +140°C



HIGH TEMP High temperature



This grease is the ideal solution for long-term lubrication at high temperatures up to +150°C. Accepts occasional peaks at +175°C.

▶ 11

STANDARD APPLICATIONS

Textile machines, paper transformation machines, hot fans, dryers, tensioning rollers, vehicle water pumps, etc.

BENEFITS

Extremely long resistance to high temperatures, excellent protection against wear and corrosion, for ball and roller bearings, for horizontal and vertical shafts.

TEMPERATURE RANGE

from -40°C to +160°C



FOOD AL Food Sure

Multi-purpose grease for the food and pharmaceutical industries. Complies with NSF-H1* recommendations*.

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STANDARD APPLICATIONS

At any point where accidental contact with food is technically possible. Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc.

BENEFITS

Wide range of service temperatures, good protection against corrosion, good resistance to washing with hot and cold water, and many disinfectant solutions and detergents.

TEMPERATURE RANGE

from -25°C to +120°C

* NSF: National Sanitation Foundation /H1: Occasional contact with food.



FOOD CHAIN OIL

Food-grade oil for chains designed for the food-processing and pharmaceutical industry. Complying with NSF-H1* recommendations.

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STANDARD APPLICATIONS

Straight, bevel and worm gearing, main bearings, pivots, articulations as well as for the lubrication of lifting, drive and transmission chains even at low temperatures.

ADVANTAGES

Wide range of operating temperatures, remains very stable over time and resists oxidation, good protection against wear and corrosion as well as a resistance to seizing. Neutral in relation to sealants and paints.

TEMPERATURE RANGE

-30°C to +120°C

* NSF: National Sanitation Foundation/H1: occasional contact with food.



CHAIN OIL

Synthetic oils for high-temperature chains.

11



STANDARD APPLICATIONS

Textile and plastic injection machines: in levelling equipment, stenter frames, multi-layer systems, festoon dryers, festoon steamers and coating units.

For all types of stenter chains lubricated with oil (roller chains, clips with ball bearings, sliding with guide bar) and chain/chain shaft articulations.

BENEFITS

Excellent lubrication, even with the presence of high temperatures and loads, excellent spreading properties, ensuring the rapid formation of a film of lubrication, excellent resistance to loads and wear, good adhesion therefore no spray, little formation of residue thanks to 100% synthetic components.

TEMPERATURE RANGE

from -20°C to +250°C



ULTRA HIGH TEMP - Extreme High Temperature

This grease is for long-term lubrication for any type of bearing subjected to extreme temperatures. Registered H1: can be used in food-processing industries.

11



STANDARD APPLICATIONS

Textile drying machines, corrugated board production units, the plastic industry, rolling tail pipes, copy machines, furnace equipment, kiln cars, electric motors operating at extreme temperatures, etc.

BENEFITS

For very high service temperatures up to +260°C, good ability to absorb pressure, excellent resistance to aggressive agents, compatible with most plastics and seals.

TEMPERATURE RANGE

from -30°C to +260°C



HIGH SPEED + Spindles

Low-temperature grease for very high speeds.

11



STANDARD APPLICATIONS

Textile machine spindles, spindles in power-operated tools running at high speeds (milling shafts, lathes, grinders, drills, etc.)

BENEFITS

Reduced running-in time for spindle bearings, excellent resistance to water (protects against the premature failure of bearings and reduces maintenance costs), reduced bearing temperature due to low friction torque (extended bearing service life), synthetic oil + low-viscosity ester ensuring a wide range of service temperatures and excellent cold temperature resistance

TEMPERATURE RANGE

from -45°C to +120°C