



**FOOD GRADE LUBRICANTS**



## Matrix Specialty Lubricants

Matrix Specialty Lubricants is a company based in The Netherlands, producing and marketing specialty lubricants and greases.

Matrix Specialty Lubricants was created by a nucleus of industry specialists with a collective experience of many years working for major oil companies. Our vision is to harness new technology and, with the expertise of our chemists, provide the correct lubricant for each application. It is just a matter of knowledge.

Specific product information is available in our brochures and most of the technical data sheets can be found on our website: [www.matrix-lubricants.com](http://www.matrix-lubricants.com). Our main products are divided into groups with the most common being presented in our brochures. The most up to date information can always be found on our website.



## Bio Lubricants

This group of products includes biodegradable hydraulic, gear, and other lubricants as well as a range of greases and concrete mould release agents. High performance, long life, low toxicity and biodegradability are key factors within this product group.

## Compressor, Vacuum and Refrigeration Fluids

A comprehensive range of gas and refrigeration compressor fluids providing long life and low maintenance costs in combination with high efficiency. The range consists of mineral, and synthetic (hydro treated, PAO, POE, Alkyl Benzenes, Di-Ester, Ester, PAG, PFPE) based lubricants with performance up to 12.000 hour drain intervals.

## Food Grade Lubricants

A complete range of fluids, lubricants and greases for applications whenever a food grade lubricant is required. The high performance Foodmax® line is NSF and InS approved and includes a range of spray cans.

## Industrial Specialty Products

This product group includes a range of specialty chain lubricants, gear oils, transformer oils and many more products. All the products exceed performance expectations contributing to lower maintenance costs.

## Greases and Pastes

An extensive range of specialty greases and pastes, including polyurea, calcium sulphonate, aluminium, barium, silicon, inorganic and PFPE. By using the latest technology and materials we are able to provide high performance and problem solving products.

## Metal Working Fluids and Rust Preventatives

This line of products includes the latest technology soluble metal working fluids, neat cutting oils, cold and hot forging, quenching, drawing and stamping products.

## Specialty Base Oils and Dispersions

These base oils are used in the formulation of metalworking fluids, biodegradable hydraulic fluids, top tier 2 stroke engine oils, mould release agents and many more. They include DTO, TOFA and various types of esters. Another range includes both technical and pharmaceutical white oils. The Matrix line of D-MAX colloidal dispersions contains products based on graphite, MoS2, PTFE and Boron Nitride (hBn). These can be used as additives, lubricants and processing products.

## Cleaners

A range of process and workplace cleaners, both for the industry as well as for food processing plants. The cleaners for the Food Industry are NSF H-1, C-1 and K-1 approved.



## Food Grade Lubricants

The food processing industry presents unique challenges to lubricant formulation engineers, lubricant marketers, plant lubrication engineers and equipment designers. It is never desirable for lubricants to be allowed to contaminate raw materials, work-in-progress or finished product, the consequences of a lubricant contaminated product are rarely more acute than in the food processing industry. As such, lubricants used in this industry have requirements, protocols and performance expectations that exceed typical industrial lubricants.

Matrix Specialty Lubricants has developed an extensive range of food grade lubricants which even outperform high-tech industrial lubricants and greases. We continue to develop and add new products to the existing extensive portfolio. For any special product request do not hesitate to seek the assistance of your local Matrix representative.

**NSF is a registration authority which approve lubricants and greases according to various requirements concerning food contact. In the overview below you will find a description of the most common lubricant approval categories.**

**H1 – Lubricants for incidental food contact (so called food grade lubricants):** Products permitted for use as lubricants and anti-rust agents, or as release agents on gaskets or seals of tank closures, where there is possibility of incidental food contact.

**H2 – Lubricants for no food contact:** These products are used on equipment and machine parts in locations where there is no possibility of the lubricant or the lubricated part contacting edible products.

**H3 – Soluble oils:** These products are used to prevent rust on hooks, trolleys, and similar equipment. Treated equipment which contacts edible products should be cleaned by washing or wiping before putting the equipment back into service.

**HT1 – Heat transfer fluids with incidental contact:** These products are used in primary and secondary heating and cooling systems in food processing facilities. Products permitted for use as heat transfer fluids when there is possibility of incidental food contact.

**3H – Release agents:** These products are used on grills, loaf pans, cutters, boning benches, chopping boards or other hard surfaces in contact with meat and poultry food products to prevent food from adhering during processing.

**K1 – Cleaners:** This product is chemically acceptable as a solvent cleaner for use in non-processing areas of official establishments operating under the Federal Meat and Poultry Products Inspection Program. After using the product, equipment and utensils must be thoroughly washed with an acceptable detergent solution and rinsed with potable water to remove all traces of the cleaner before being returned to the processing area.

**K2 – Cleaners:** This product is chemically acceptable as a solvent for cleaning electronic instruments and devices which will not tolerate aqueous cleaning solutions in official establishments operating under the Federal Meat and Poultry Products Inspection Program. Before using this compound, food products and packaging material must be removed from the area or carefully protected. This compound must be used in a manner so that all odors associated with the compound are dissipated before food products or packaging material are re-exposed in the area.

**A1 – Cleaners:** This product is acceptable for use as a general cleaning agent on all surfaces or for use with steam or mechanical cleaning devices in all departments. Before using this compound, food products and packaging materials must be removed from the room or carefully protected. After using this compound, surfaces must be thoroughly rinsed with potable water.

**C1 – Cleaner:** This product is acceptable for use as a general cleaner/degreaser in inedible product processing areas and/or exterior areas of official establishments operating under the Federal Meat, Poultry, Shell Egg Grading, and Egg Products Inspection Programs provided that it is not used to mask odors resulting from unsanitary conditions and that any characteristic odor or fragrance does not penetrate into the edible product area.

### Kosher Certification

The line of Foodmax® lubricants, greases, cleaners and spray cans are officially Kosher certified.

### Halal Certification

The line of Foodmax® lubricants, greases, cleaners and spray cans are officially Halal certified.



21469:2006





General Lubricants

The lubrication of numerous lubrication points found in the food industry.

Hydraulic Lubricants

A large portion of equipment in the food processing industry is operated by hydraulic systems. Although hydraulic systems are used relatively far from the process, the risk of contamination is large because the high operating pressures can cause leakages to travel a long distance. Matrix has developed three types of food grade hydraulic fluids to suit specific performance requirements.



Foodmax® Basic

Paraffin food grade oil for general lubrication purposes. Can be used in authorized industrial operations wherever there is the possibility of food contact (for both humans and animals). Foodmax® Basic can be used as a general lubricant in various applications in the food processing industry. Additionally it gives excellent results as general lubricant in the textile, knitwear, food and tin container industry, whenever very high cleanliness level is required.

Foodmax® AW

Foodmax® AW is non-toxic and formulated using specially selected highly refined base stocks in combination with the latest additive technology. Foodmax® AW is suitable for applications where incidental contact with food or raw materials is possible during the production process. Thanks to the very low pour point Foodmax® AW PAO is better suited to low temperature applications in comparison to Foodmax® AW. Foodmax® AW 22 is a higher performance alternative to soap/water mixtures for the lubrication of conveyor belts in the beverage industry.

Foodmax® AW PAO


Foodmax® AW PAO is non-toxic and formulated using specially selected synthetic base stocks in combination with the latest additive technology. Foodmax® AW PAO is suitable for applications where incidental contact with food or raw materials is possible during production. Because of its great performance characteristics and carefully chosen additives, Foodmax® AW PAO oils can be used in most applications in the food manufacturing and processing industry including small enclosed gearboxes. Foodmax® AW PAO 46 Premium contains a UV marker for tracing leakages in for example paper machines.


Foodmax® BIO HVI

Food grade and biodegradable hydraulic fluid, a truly unique combination of a non-toxic (food grade) fluid and biodegradability. This makes the product suitable for application where both characteristics are needed. Examples can be found in hydraulic systems which are operated in food processing which takes place in environmental sensitive areas such as the fishing industry.



Foodmax® Selection Table

Foodmax® 	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	Basic Lub	Hydraulic	Gear	Chain	Compressor	Vacuum pump	Dry Conveyor	Heat Transfer	NSF Category
Foodmax® Basic 15	15	15	> 100	-21	180									H1, HX1, 3H
Foodmax® Basic 32	32	32	> 100	-12	190									H1, HX1, 3H
Foodmax® Basic 68	68	68	> 100	-12	240									H1, HX1, 3H
Foodmax® Basic 150	N/A	140	N/A	-12	> 250									H1
Foodmax® Basic 200	N/A	200	N/A	-10	> 220									H1

Foodmax® 	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	Basic Lub	Hydraulic	Gear	Chain	Compressor	Vacuum pump	Dry Conveyor	Heat Transfer	NSF Category
Foodmax® AW 22	22	22	105	-24	165									H1
Foodmax® AW 32	32	32	105	-24	170									H1
Foodmax® AW 46	46	46	105	-21	180									H1
Foodmax® AW 68	68	68	105	-21	200									H1
Foodmax® AW 100	100	100	100	-21	215									H1
Foodmax® AW PAO 22	22	22-24	> 130	< -61	232									H1
Foodmax® AW PAO 32	32	29-35	> 135	< -55	242									H1
Foodmax® AW PAO 46	46	42-50	> 135	< -55	265									H1
Foodmax® AW PAO 46 Premium	46	42-50	> 135	< -55	265									H1
Foodmax® AW PAO 68	68	62-74	> 135	< -55	265									H1
Foodmax® AW PAO 100	100	90-110	> 130	< -55	265									H1
Foodmax® BIO HVI 32	32	29-35	> 190	< -39	> 280									H1
Foodmax® BIO HVI 46	46	42-50	> 190	< -39	> 280									H1
Foodmax® BIO HVI 68	68	59-77	> 190	< -39	> 280									H1

Gear Lubricants

Gearboxes are seen everywhere in food processing plants. Most of the time they are relatively small and will operate at both low and high temperatures. Depending on the circumstances and type of gearbox the right choice can be made from Foodmax® Gear, Gear PAO or Gear PAG.

Foodmax® Gear

Food grade range of lubricants for gears, bearings and transmissions. Foodmax® Gear is a range of lubricants in which a combination of the latest base stock technology together with special additives delivers a very high performance. All base components used for the formulation are non-toxic and food grade. Also suitable as chain oil when a non-sticky lubricant is required.

Foodmax® Gear Extreme

Foodmax® Gear Extreme 100 is based on pharmaceutical white oils, esters and special additives. Foodmax Gear Extreme 460 & 680 are based on polyalphaolefins (PAO) and esters that provide a great lubrication. Due to its EP additives and high viscosity index offer an excellent service under severe loading conditions and extreme temperatures. Foodmax® Gear Extreme are food grade premium performance oils for all kind of gears, gear boxes, differentials, and industrial equipment. Foodmax® Gear Extreme 100 emulsifies with water creating a stable emulsion.


Foodmax® Gear PAO

Range of fully synthetic food grade gear oils, particularly suited for the lubrication of drive chains, conveyor chains, gearboxes and reduction units. Foodmax® Gear PAO 680 and 1000 contain special additives that extend relubrication intervals. These lubricants can also be used as chain oils. Foodmax® Gear PAO is specially designed for low temperature applications. Foodmax® Gear PAO 220 Premium contains a UV marker for tracing leakages in for example paper machines.

Foodmax® Gear PAG

Foodmax® Gear PAG is a synthetic oil with excellent anti-wear properties, high stability to oxidation and a low pour point. It is neutral to metals including aluminum alloys and copper. It resists mechanical shearing, is very stable to ageing and has very good viscosity temperature characteristics. Foodmax® Gear PAG is suitable for the most severely loaded gearboxes. Foodmax® Gear PAG is not miscible with other synthetic and mineral fluids.

Foodmax® Selection Table

<div>Foodmax®</div>	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	Airline Lub	Basic Lub	Hydraulic	Gear	Chain	Compressor	Vacuumpump	Slideways	NSF Approval	Temp.			Load	
															High	Medium	Low	High	Medium
Foodmax® Gear 68	68	68	130	< -20	> 200									H1					
Foodmax® Gear 100	100	100	118	< -18	> 200									H1					
Foodmax® Gear 150	150	150	118	< -15	> 200									H1					
Foodmax® Gear 220	220	220	120	< -12	> 220									H1					
Foodmax® Gear 320	320	320	120	< -12	> 240									H1					
Foodmax® Gear 460	460	460	121	< -12	> 250									H1					
Foodmax® Gear 680	680	680	120	< -12	> 250									H1					
Foodmax® Gear PAO 68	68	68	> 140	< -52	> 250									H1					
Foodmax® Gear PAO 100	100	100	> 140	< -50	> 265									H1					
Foodmax® Gear PAO 150	150	150	> 140	< -45	> 260									H1					
Foodmax® Gear PAO 220	220	220	> 140	< -45	> 260									H1					
Foodmax® Gear PAO 220 Premium	220	218	> 145	-35	280									H1					
Foodmax® Gear PAO 320	320	320	> 150	< -45	> 260									H1					
Foodmax® Gear PAO 460	460	460	> 160	< -40	> 260									H1					
Foodmax® Gear PAO 680	680	680	> 160	< -35	> 265									H1					
Foodmax® Gear PAO 1000	1000	1000	> 200	< -40	> 265									H1					
Foodmax® Gear PAG 150	150	162	202	-39	278									H1					
Foodmax® Gear PAG 220	220	220	210	-40	240									H1					
Foodmax® Gear PAG 320	320	320	220	-40	240									H1					
Foodmax® Gear PAG 460	460	460	240	-30	240									H1					
Foodmax® Gear PAG 680	680	680	272	-33	287									H1					
Foodmax® Gear PAG 1000	1000	1000	284	-30	296									H1					
Foodmax® Gear Extreme 100	100	100	118	< -18	> 200									H1					
Foodmax® Gear Extreme 460	460	460	> 180	< -35	> 260									H1					
Foodmax® Gear Extreme 680	680	680	> 190	< -35	> 260									H1					



Compressor and Vacuum pump

Compressed air and vacuum pumps are vital components in any food production or processing plant. Cleanliness of the equipment, temperature resistance and lifetime of the lubricant can influence the reliability of compressors and vacuum pumps to a great extent.

Foodmax® Air

The superior performance characteristics of Foodmax® Air mean it can be used safely in all types of compressors and vacuum pumps. The product is based on a fully synthetic base oil and specially selected additives. Foodmax® Air has an excellent oxidation stability and long life at very high temperatures. Foodmax® Air 32 can be used as an airline lubricant.


Foodmax® Air PAO

Foodmax® Air PAO oils are food grade, non-toxic, synthetic oils developed for all types of compressors and compressor pumps used in the food, beverage and pharmaceutical industries.

Foodmax® BIO Air

Biodegradable and food grade compressor and vacuum pump fluid based on synthetic base fluids. They are used successfully in equipment which operate under severe conditions and where a food grade and/or environmentally friendly lubricant is required. Foodmax Bio Air Series are also designed for use in the food and beverage industries where incidental contact from lubricants may occur. Ready biodegradable according to OECD 301B.

Foodmax® Selection Table

Foodmax® 	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	Airline Lub	Basic Lub	Hydraulic	Gear	Chain	Compressor	Vacuum pump	Slideways	NSF Category	Temp.		
															High	Medium	Low
Foodmax® Air 32	32	32	> 110	< -30	235									H1			
Foodmax® Air 46	46	46	> 110	< -30	240									H1			
Foodmax® Air 68	68	68	> 110	< -30	240									H1			
Foodmax® Air 100	100	10	> 110	< -30	250									H1			
Foodmax® Air 150	150	150	> 110	< -30	265									H1			
Foodmax® Air PAO 32	32	32	> 141	< -50	> 260									H1			
Foodmax® Air PAO 46	46	46	> 141	< -50	> 260									H1			
Foodmax® Air PAO 68	68	68	> 141	< -50	> 265									H1			
Foodmax® Air PAO 100	100	100	> 140	< -50	> 265									H1			
Foodmax® Air PAO 150	150	150	> 140	< -40	> 265									H1			
Foodmax® BIO Air 32	32	33	141	-45	255									H1			
Foodmax® BIO Air 46	46	46	140	-39	260									H1			
Foodmax® BIO Air 68	68	65	140	-36	260									H1			
Foodmax® BIO Air 100	100	101	139	-36	265									H1			



Chain and Conveyors Lubricants

Food is very often transported in a food production plant by means of chains and conveyors. As this equipment is often exposed to water, cleaning agents and extreme temperature variations, it is extremely important to select the right product.

Foodmax® Chain

Fully synthetic food grade oil with characteristics that make it particularly suited for the lubrication of drive chains and conveyor chains, gearboxes and reduction units. Contains special additives that extend relubrication intervals significantly; does not contain any mineral components. Foodmax® Chain can be used in incidental contact with food and raw materials.

Foodmax® Chain LT

Foodmax® Chain LT is based on a blend of synthetic hydrocarbons and is inhibited against oxidation to give a long wet film life over a wide temperature range. Foodmax® Chain LT is designed for the lubrication of conveyor chains and bearings running continuously at low temperatures, down to minimum of -50 °C. Foodmax® Chain LT is also suitable for spiral freezers.


Foodmax® Chain HT-X


Foodmax® Chain HT-X is based on highly polar biodegradable base oil and is inhibited against oxidation to give a long wet film life at high temperatures. The highly polar molecules strongly adhere to the surface and withstand high temperatures, at the same time separating the moving parts thanks to its highly viscous lubricating film which is maintained at these high temperatures. Foodmax® Chain HT-X can go up to 290-300°C, and is therefore suitable for bread ovens in bakeries. Foodmax® Chain HT-X will reduce wear on chains by using the latest available technology. It possesses outstanding anti wear capacity and resistance against high temperatures and shows outstanding evaporation properties.


Foodmax® Mammut Oil

Foodmax® Mammut Oil is a food grade product formulated to dissolve sugar from chains, slides and moulds. It has been developed specially for the confectionery market and any application involving sugar. Foodmax® Mammut Oil first rinses sugar off before it starts to lubricate and protect the chain.

Foodmax® Chain Selection Table

<div>Foodmax®</div>	Temperature Range °C								ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	4-Ball Wear Test		NSF Category
	-45	-30	-15	0	50	100	150	250						Welding Load, kg	Wear Scar. 40 kg, 1 hr, mm	
Foodmax® Chain 68									68	68	130	-20	> 200	160	-	H1
Foodmax® Chain 100									100	100	118	-18	> 200	160	-	H1
Foodmax® Chain 150									150	150	118	-15	> 200	160	-	H1
Foodmax® Chain 220									220	220	120	-12	> 220	160	-	H1
Foodmax® Chain 320									320	320	120	-12	< 240	160	-	H1

<div>Foodmax®</div>	Temperature Range °C								Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	4-Ball Wear Test		NSF Category
	-45	-30	-15	0	50	100	150	300					Welding Load, kg	Wear Scar. 40 kg, 1 hr, mm	
Foodmax® Chain LT									15	> 140	-60	> 220	160	0.45	H1
Foodmax® Chain HT-X									120 - 170	185	-32	275	> 200	0.30	H1
Foodmax® Chain HT-X 220									200 - 240	180	-32	> 285	> 200	0.30	H1

<div>Foodmax®</div>	Temperature Range °C								ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	NSF Category	
	-45	-30	-15	0	50	100	150	250							
Foodmax® Mammut Oil 10									10	10	N/A	-20	> 100	H1	
Foodmax® Mammut Oil 25									25	24	N/A	-20	> 100	H1	



Greases

The use of grease in the food production process is almost endless. This in combination to wet environments, excessive cleaning with chemicals and extreme temperature variations makes choosing the right grease of major importance. In the past, food grade greases were developed to be non-toxic and provided minimum performance. The latest generation of Matrix calcium sulphonate food grade greases however are outperforming most high-tech industrial grades.

Many happy customers report that the performance of these greases is almost too good to be food grade.



Foodmax® Grease ALU M

Foodmax® Grease ALU-M is a range of aluminum complex greases designed for the lubrication of almost any application requiring a food grade lubricant. The Foodmax® Grease ALU M series are formulated with complex soap, additive package and authorized solid lubricants. They possess excellent lubricating properties and are highly water-resistant, perfect when a combination of water and high load resistance is required. Foodmax® Grease ALU M series can be used in a large variety of applications including bearings operating within a temperature range of -20 to 150 °C.

Foodmax® Grease ALU P

Foodmax® Grease ALU P is an aluminium complex grease designed for the lubrication of almost any application which requires a food grade lubricant with good low temperature properties. Foodmax® Grease ALU P series are formulated with complex soap, pharmaceutical grade synthetic PAO oils.

Foodmax® Grease ASP 2

Foodmax® Grease ASP 2 is an aluminum complex grease designed for the lubrication of almost any type of application which requires a food grade lubricant. Foodmax® Grease ASP 2 is formulated with a complex soap, synthetic base oil, additive package and solid lubricants. Thanks to the superior resistance to water ASP 2 is very suitable for the lubrication of chains operated in very wet conditions such as food conveyor chains. Foodmax® Grease ASP can resist higher temperatures and loads in comparison to Foodmax® Grease ALU M.

Foodmax® Grease HD 2

Foodmax® Grease HD 2 is an aluminum complex grease designed for the lubrication of almost any type of application which requires a food grade lubricant. Foodmax® Grease HD 2 is formulated with a complex soap, high viscosity synthetic base oil and additive package.

Foodmax® Grease CAS M 2

Foodmax® Grease CAS M 2 is a member of a family of technologically advanced greases which have been developed by complexing modified overbased calcium sulfonates. This technology is characterized by exceptional mechanical stability, high dropping point, high load carrying performance, reduced wear and excellent resistance to water and corrosion. This technology equals and, in many ways, outperforms other premium, high-temperature greases such as lithium complex and aluminum complex.

Foodmax® Grease CAS S HS

Foodmax® Grease CAS S HS is a member of a family of technologically advanced greases which have been developed by complexing modified overbased calcium sulfonates. This technology is characterized by exceptional mechanical stability, high dropping point, high load carrying performance, reduced wear, and excellent resistance to water and corrosion. This technology equals and, in many ways, outperforms other premium, high-temperature greases such as lithium complex and aluminum complex.

Foodmax® Grease CAS S LS

Foodmax® Grease CAS S LS is a member of a family of technologically advanced greases which have been developed by complexing modified overbased calcium sulfonates. This technology is characterized by exceptional mechanical stability, high dropping point, high load carrying performance, reduced wear, and excellent resistance to water and corrosion. This technology equals and, in many ways, outperforms other premium, high-temperature greases such as lithium complex, aluminium complex and polyurea. NLGI 1 is available for better pumpability requirements.

Foodmax® Grease Clear

Foodmax® Grease Clear is a food grade grease which is suitable for the lubrication of a wide range of applications including plain and rolling element bearings in slaughter houses, canning and bottle factories or any other food processing plants. Foodmax® Grease Clear is very suitable for the lubrication of plastic components and O-rings. It is a gel-like grease consisting of non-melting and non-toxic components. The grease possesses excellent anti-wear properties because of the added PTFE.

Foodmax® Grease LT

Foodmax® Grease LT is specially developed for applications where a food grade grease with very low temperature characteristics is required. Foodmax® Grease LT is designed for the lubrication of bearings and other applications in cold-store plants and freezing tunnels and chambers. Also to lubricate 'cold equipment' like air-conditioning fans and refrigerators.

Foodmax® Grease Inor 3-H

Foodmax® Grease Inor 3-H is a non-toxic grease designed for direct contact with food. It has a wide temperature range containing anti-wear and other additives. Foodmax® Grease Inor 3-H is suitable for all plain and anti-friction bearings as well as sliding surfaces.

Foodmax® Grease TF-S

Foodmax® Grease TF-S is a synthetic food grade grease containing PTFE. The combination of the synthetic base fluid and added solids reduces friction to a great extent and will provide lubrication under all circumstances including boundary lubrication. Shows excellent compatibility with elastomers and plastics.

Foodmax® Grease Fluor HT

Foodmax® Grease Fluor HT 2 is a non-flammable white grease developed from a perfluoroalkyl-polyether type oil, with micronized PTFE as thickener and anti-corrosion additive. It is physically and chemically totally inert except for fluorinated solvents and thermal and ionising radiation. All the raw materials used in the manufacturing process appear in the positive list of the FDA (Food and Drugs Administration).

Foodmax® Grease SI

Very adherent silicone grease, designed to provide perfect sealing and smooth operation in water taps. Insoluble in water, extends the working life and reduces wear of ceramic disks. Approved by health authorities and Water Byelaws Scheme per BS-6920.

Foodmax® OGL

Foodmax® OGL is an H-1 grease for incidental contact with food, designed primarily for open gear applications where a soft grease is called for crushing and other applications, widely found in sugar cane processing. Also suitable for wire rope lubrication.

Foodmax® Assembly Paste

White, non-toxic, grease-like compound with a high solid lubricant content designed for use as an assembly lubricant for lubricating bushes, sliding surfaces, small open plastic or metal gears and anti-seize compound for threaded fasteners. The compound is designed to prevent damage during start up and protect against premature wear during the running-in period.

NLGI: Classifying stiffness of a Grease:

NLGI Class	Worked Penetration	General Consistency
000	445-475	Liquid
00	400-430	Mildly liquid
0	355-385	Semi liquid
1	310-340	Very weak
2	265-295	Weak
3	220-250	Semi solid
4	175-205	Solid
5	130-160	Very solid
6	085-110	Firm



Foodmax® Grease Selection Table: Behaviour and Applications

<div>Foodmax®</div>		Grease Type			Behavior to Physical Agents							Behavior to Chemical Agents							Application																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

AC = Aluminium Complex, Ca = Calcium, Cas = Calcium Sulphonate, SS = Semi Synthetic, S = Synthetic, Si = Silicon, Pe = Perfluorinated, P = PTFE, I = Inorganic

Foodmax® Grease Selection Table: Temperature Range and NLGI Classifications

<div>Foodmax®</div>	NLGI								Temperature Range °C															NSF Category
	000	00	0	1	1,5	2	3	-60	-50	-40	-30	-20	-10	0	50	80	120	160	220	260	280	300		
Foodmax® OGL																							H1	
Foodmax® Grease ALU M																							H1	
Foodmax® Grease ALU P																							H1	
Foodmax® Grease ASP																							H1	
Foodmax® Grease HD																							H1	
Foodmax® Grease CAS M																							H1	
Foodmax® Grease CAS S HS																							H1	
Foodmax® Grease CAS S LS																							H1	
Foodmax® Grease TF-S																							H1	
Foodmax® Grease LT																							H1	
Foodmax® Grease SI																							H1	
Foodmax® Grease Inor 3-H																							3H	
Foodmax® Grease Fluor HT																							H1	
Foodmax® Grease Clear																							H1	

X = als een anti-seize



Automatic Lubricators



Regular and Lubeshuttle cartridges



Food Grade Metal Processing Fluids

In today's modern packaging and machine manufacturing, H-1 is quickly becoming a requirement from the food industry to their suppliers. These stamping, conservation, forming and cutting fluids comply with strict standards on food safety.

Food Grade Cleaners

Our range of cleaners are used throughout food and beverage manufacturing plants. Either to clean parts, tools and surfaces as well as for personal hygiene.



Foodmax® Basic

Foodmax® Basic 150 & 200 are ideal fluids in the forming of tin cans offering good anti-wear properties and reduction of production waste.

Foodmax® Anti Rust 9

Foodmax® Anti Rust 9 is a food grade high quality oil-based rust preventive that forms a thin oily film that gives long term protection to ferrous and non-ferrous metals.

Foodmax® 1001 HE

Foodmax® 1001 HE is a low viscosity oil formulated for stamping and forming applications. It contains special polar compounds for more effective operation. Correct use of Foodmax® 1001 HE results in low or no residues leading to less costs for cleaning and degreasing of parts after the process. Applications can be found for example in stamping beverage cans and the production of aluminium screw caps. Foodmax® 1001 HE-2 is also suitable as solvent cleaner.

Foodmax® P

A food grade synthetic water soluble fluid for forming applications such as caps of wine bottles. It is used for stamping, drawing and bending of aluminum. Foodmax® P is essentially free of oils, solvents, silicones and chlorine.

Foodmax® Cut 30

Food grade synthetic oil for cutting operations. Foodmax® Cut 30 is applied spraying in Minimum Quantity Lubrication systems for sawing, milling and drilling for all type of metals. It is a neat oil, providing a high chemical stability and good oxidation resistance, free of chlorine compounds and readily biodegradable.

Foodmax® Clean

Foodmax® Clean is a very effective general purpose cleaner and degreaser formulated from a citrus derivative which is non-toxic, biodegradable and InS C1 approved.

Foodmax® Clean E

Powerful degreaser for electrical contacts. Especially suitable for the safe and effective cleaning of electronic components. Evaporates quickly. Foodmax® Clean E will dry rapidly without leaving residues and is compatible with most plastics and elastomers. Foodmax® Clean E is registered NSF-K2.

Foodmax® Clean S

A high performance food grade solvent cleaner for oil, grease and other contaminants. The cleaner is rapid drying, without leaving any residues, provides limited sanitizing properties. Foodmax® Clean S can be used for general cleaning including on stainless steel and aluminum parts where residues and moisture have to be dissolved.

Foodmax® Clean M

Foodmax® Clean M is a food grade (NSF H1) and biodegradable degreaser leaving no residues after evaporation. Foodmax® Clean M has temporary penetrating and lubrication properties. Often used replacing products like acetone, white spirit, toluene and trichloroethylene. Foodmax® Clean M easily removes oil, grease, tar, resin, glue residues paint and other contaminants. NSF H1 approved.

Foodmax® Clean BIO

A true multi-functional cleaner. Foodmax® Clean BIO is a water based detergent/degreaser, which is biodegradable over 90% and has anti-bacterial properties. It is a very effective degreaser suitable to clean many pollutants like grease (animal, vegetable, mineral), oils, organic deposits, glue and combustion residues. This cleaner is free of solvents.

Cleanmax Hand CT

Cleanmax Hand CT is an effective solvent-free citrus hand cleaner for removal of heavy dirt. Suitable for use in garages, workshops, paint and decorating industry or at home. Cleanmax Hand CT is formulated with natural ingredients, contains skin-friendly abrasives and has a fresh citrus fragrance.

Foodmax® Clean Wipes & Wipes Plus

Two types of wipes for dual purpose of cleaning of hands as well as for surfaces. For dry removal of grease, dirt and any other kind of pollution without the use of water. Highly effective cleaner for surfaces of machines, tools and parts. Foodmax Clean Wipes Plus contains a hand scrub and is dermatologically tested for safe use on skin.

Foodmax® Clean Ultra

Foodmax® Clean Ultra is a solvent degreaser leaving no residues after evaporation. Foodmax Clean Ultra is a safe alternative to more hazardous products like Kerosine and White Spirit. Foodmax® Clean Ultra easily removes oil, grease, and other contaminants. Foodmax® Clean Ultra can be used for dewaxing and removal of other coatings. Suitable to clean surfaces before repainting or bonding. Because of the restless evaporation Foodmax® Clean Ultra is also suitable for the cleaning of electrical and electronic components.

Foodmax® Characteristics

Food Grade Metal Processing Fluids	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	NSF Category
Foodmax® Basic 150	N/A	140	N/A	-12	> 250	H1
Foodmax® Basic 200	N/A	200	N/A	-10	> 220	H1
Foodmax® Anti Rust 9	N/A	2.5	N/A	N/A	75	H1
Foodmax® 1001 HE-2	N/A	2	N/A	N/A	68	H1
Foodmax® 1001 HE-3	N/A	2.1	N/A	N/A	62	H1
Foodmax® P 220	220	220	N/A	-35	250	H1
Foodmax® Cut 30	N/A	31	N/A	-8	210	H1

Food Grade Cleaners	Odour	Pour Point °C	Flash Point °C	NSF Category
Foodmax® Clean	Citrus	-46	125	C1
Foodmax® Clean E	Odourless	N/A	N/A	K2
Foodmax® Clean S	Odourless	N/A	> 40	K1
Foodmax® Clean M	Odourless	N/A	N/A	H1
Foodmax® Clean BIO	Odourless	N/A	Non-Flammable	A1
Cleanmax Hand CT	Citrus	N/A	N/A	N/A
Foodmax® Clean Ultra	Odourless	N/A	61	H1

Food Grade Can Seamer Fluids	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	NSF Category
Foodmax® CTL 150	150	150	118	< -15	> 200	H1
Foodmax® CLE 150	150	150	120	-12	245	H1

Food Grade Can Seamer Fluids

Can seaming is a demanding application. Friction, heat and wear can't be avoided. These products help to reduce wear, eliminate corrosion while securing uptime in critical production processes.

Miscellaneous Food Grade

In this section you can find a number of various lubricants and fluids which are key for a proper operation of food processing equipment. Heat transfer fluids is one of them and they very often represent a high risk of causing contamination since a leakage may not be discovered for a long time. Other general purpose products are Foodmax® Silicon oils, Foodmax® DDO dough divider oils and food grade cleaners.

Foodmax® CTL

Foodmax CTL 150 is specially developed for use in can seamers when a total loss emulsifying lubricant is required. Foodmax CTL provides viscosity control in the presence of water and excellent load-carrying properties and corrosion inhibitor to protect seamer components. It works as an emulsifier where contamination of the oil free water, juices and sugar to transport this to the recirculation tank for easy removal.

Foodmax® CLE

Foodmax® CLE is a high performance problem solver for use in the canning industry. It is formulated to lubricate main turrets, bearings, chains and gears. Foodmax® CLE provides viscosity control in the presence of water and excellent load-carrying properties and corrosion inhibitor to protect seamer components. It works as an emulsifier where contamination of the oil with water, juices and sugar may occur to eliminate free water. Specially developed for use in can seamers like Angelus where re-circulation systems are installed. When a 'total loss emulsifying lubricant is required use Foodmax CTL 150.

Foodmax® CP

Foodmax® CP is a food grade synthetic cutting oils to lubricate corrugating rolls and cutting systems in the corrugated and paper and factories processing cardboard packaging. Foodmax® CP is also biodegradable. Foodmax® CP is recommended for the lubrication of cutters, disc-cutting systems and to preserve and clean corrugated rolls.

Foodmax® DDO

Foodmax® DDO is produced from highly refined vegetable based oil and special additives to warrant a trouble free operation when used as a dough divider oil.

Foodmax® Freeze

Foodmax® Freeze is an inhibited propylene glycol specialist fluid for use in HVAC (Heating, Ventilation, Air Conditioning) systems, industrial heat transfer systems, food industry chilling and freezing systems. Foodmax Freeze are typically used in secondary cooling systems found in slaughterhouses and breweries.

Foodmax® HTF

Foodmax® HTF (Heat Transfer Fluid) fluids are made with food grade synthetic base fluids. They are formulated to be very thermally and oxidative stable and are further enhanced with proprietary additives that greatly extend their life over normal and other synthetic food grade heat transfer fluids. They provide exceptional performance in a number of food related heat transfer applications.

Foodmax® ACF-T

Foodmax® ACF-T is an advanced food grade lubricant specially formulated for lubricating conveyors. Blended from medicinal oils with selected additives that provides high resistant to oxidation and good demulsifying properties. It is fortified with additives and PTFE that provides antiwear performance and tackiness to minimize oil drippings.

Foodmax® DCF

Food grade 'dry' conveyor fluid & release agent`. Foodmax® DCF 15 can be used to lubricate conveyors used to transport PET bottles, glass bottles, carton packaging and other type of packaging used in the food, beverage and dairy industry. The product also prevents sticking of dough to belts and metal slats in high- temperature ovens without altering the flavor of the foodstuff. NSF 3-H approved.

Foodmax® SPO

Foodmax SPO 460 is an advanced food grade lubricant specially formulated for use in cookers, steam peelers, gear boxes and numerous food processing equipment application. It is a washable product and helps to emulsify water.

Foodmax® Pump Fluid P

Advanced hose pump lubricant, ideal for cooling and lubricate peristaltic hose pumps to prevent abrasion and to assist in the dissipation of heat.

Foodmax® TCF

Hook and trolley fluid for the meat processing industry. Foodmax TCF is suitable for the lubrication of hook and trolley systems as well as the lubrication of chains and conveyors. Thanks to the superior anti-rust properties the product can also be used as a rust preventative.

Foodmax® Silicon

Foodmax® Silicon are special fluids developed to lubricate applications which suffer from high temperatures and where water and other contaminants are found. Foodmax® Silicon can also be used as heat transfer fluids in circulating systems and hot bath applications.

Foodmax® Characteristics

Miscellaneous Food Grade						
Foodmax®	ISO VG	Kinematic Viscosity 40 °C	VI	Pour Point °C	Flash Point °C	NSF Category
Foodmax® CP 15	15	16	132	-12	240	H1
Foodmax® DDO	32	32	180	-15	300	3H
Foodmax® Freeze	N/A	N/A	N/A	< -55	N/A	HT1
Foodmax® HTF 32	32	41	91	-10	200	H1, HT1
Foodmax® ACF-T	32	32	N/A	-18	210	H1
Foodmax® DCF 15	15	15	N/A	0	Non-Flammable	H1, 3H
Foodmax® SPO 460	460	460	N/A	-12	> 250	H1
Foodmax® Pump Fluid P	N/A	82	N/A	-33	170	H1
Foodmax® TCF 46	46	46	120	-18	>210	H1

Foodmax®	Kinematic Viscosity 25 °C	Pour Point °C	Flash Point °C	NSF Category
Foodmax® Silicon 50	35-65	< -50	> 300	H1
Foodmax® Silicon 100	100	< -50	> 300	H1
Foodmax® Silicon 350	350	< -50	> 300	H1
Foodmax® Silicon 10000	10000	< -50	> 300	H1



**Foodmax® Spray Cans**  
Aerosols are easy to use and allow mechanics to apply lubricants and greases at the right concentration in the correct location.

**Foodmax® Clean**  
Foodmax® Clean is a food grade cleaner and degreaser. This non-toxic formulation has been formulated to effectively clean grease and oil residues, formulated from natural citrus oil derivative which is non-toxic, non-caustic and biodegradable and can be used safely with minimal protective equipment.

**Foodmax® Clean E**  
Powerful degreaser for electrical contacts. Especially suitable for the safe and effective cleaning of electronic components. Evaporates quickly. Foodmax® Clean E will dry rapidly without leaving residues and is compatible with most plastics and elastomers. Foodmax® Clean E is registered NSF-K2.

**Foodmax® Clean S**  
Foodmax® Clean S is a high performance food grade solvent cleaner for oil, grease and other contaminants. The cleaner is rapid drying without leaving any residues and has limited sanitizing properties. Foodmax® Clean S is NSF-K1 approved.

**Foodmax® Clean M**  
Foodmax® Clean M is a food grade and biodegradable degreaser leaving no residues after evaporation. Foodmax® Clean M has temporary penetrating and lubrication properties. Often used replacing products like acetone, white spirit, toluene and trichloroethylene. Foodmax® Clean M easily removes oil, grease, tar, resin, glue residues paint and other contaminants. NSF H-1 certified.

**Foodmax® DDO**  
Foodmax® DDO is produced from highly refined vegetable based oil and special additives to warrant a trouble free operation when used as a dough divider oil.

**Foodmax® DWF**  
Foodmax® DWF is a food grade multi-purpose penetrating lubricant with excellent water displacing properties. It is a non-toxic lubricating, penetrating and dewatering lubricant and is ideal for use on light loaded chains, bearings and slides in food and clean environments. Working temperature -30 °C to 145 °C.

**Foodmax® Easy**  
Foodmax® Easy is a universal lubricant for use in food processing equipment where incidental contact with food may occur. Suitable for most applications where medium load resistance is required. Foodmax® Easy can be used as a non sticky general lubricant for chains, bearings and slides with low load, hinges and as a cleaning and conserving agent for stainless steel. Additionally Foodmax® Easy can be used as a food grade mould release oil. NSF H1 + 3H certified.

**Foodmax® Extreme**  
Foodmax® Extreme is based on highly polar biodegradable ester base oil and is inhibited against oxidation to give a long wet film life at high temperatures. Foodmax® Extreme is fortified with hBN (Hexagonal Boron Nitride) which acts as solid lubricant providing superior anti wear properties and more lubrication at temperatures far above 300 °C. The highly polar molecules strongly adhere to the surface and withstand high temperatures, at the same time separating the moving parts due to its highly viscous lubricating film maintained at these high temperatures. hBN will provide boundary lubrication when the ester stops.

**Foodmax® Grease**  
Foodmax® Grease is a high performance food grade white grease, sticky and water/steam resistant. Suitable for open gears, slides, conveyors and bearings. Also suitable to use as an assembly paste. Temperature range -40 to 180 °C and up to 1200 °C as assembly grease (dry). H1 for the use in food processing equipment where incidental contact with food may occur.

**Foodmax® Grease CAS**  
Foodmax® Grease CAS Foodmax Grease CAS is a high-performance food grade grease in a spray can based on calcium sulphonate technology and a high viscosity synthetic base oil. This sticky grease is suitable for open gears, slides, conveyors, bearings, moisture laden environments or whenever low speeds are a challenge. Unsuitable for environments where chlorine based cleaners are used. Foodmax® Grease CAS is resistant to water, steam and contaminants and has a wide working temperature range. NSF H1 approved.

**Foodmax® Inor 3-H**  
Direct contact food grease, release agent & lubricant, designed for use on e.g. mixers, slicers, mincers, seals and where contact with food-stuff cannot be avoided. Foodmax Inor 3H is suitable for use as a release agent on grills, ovens, loaf pans, boning benches, hopping boards and other hard surfaces that come in contact with food stuff to prevent the adherence during processing.

**Foodmax® MF**  
Foodmax MF® spray is a high performance product formulated from special synthetic base oils and additives. Because of its tacky nature Foodmax MF will adhere strongly to metal surfaces very well resulting in very good water resistance.

**Foodmax® Multi**  
Foodmax® Multi is a very adhesive white food grade lubricant in a spray package. The spray contains a food grade synthetic fluid as well as a 4% food grade solid lubricant (PTFE). Lubrication of chains, conveyors, slides, joints, mould slides, small bearings or any other application which requires a food grade high performance lubricant. Also suitable for textile, paper and graphic arts, plastic and elevator industry. Also provides excellent performance in motorcycle chain lubrication and in high speed go-kart transmission chains.


**Foodmax® PTFE-C**  
Foodmax PTFE-C® is suitable for applications in the food, pharmaceutical and other clean industries where wet and sticky lubricants cannot be accepted and a 100% dry lubricant is the only solution.

**Foodmax® Silicon**  
Foodmax® Silicon is a silicone based, anti-adherent and lubricating fluid with very high temperature resistance. H1 approved for use in food processing equipment where incidental contact with food may occur. Excellent lubricant for packaging transport lines and for low load applications. Also suitable as anti adherent for any type of equipment, demoulding of all type of plastics and rubbers and surface polisher.

**Foodmax® TFD**  
Waxy and PTFE-reinforced lubricant for dusty environments. Foodmax TFD is a clean, non-toxic and non-staining semi-dry lubricant providing excellent low friction properties and reduces static. The water repellent film lubricates at low speeds and medium loads. Foodmax TFD is designed for repetitive movement applications in environments where a non-sticky lubricant is required.

**Foodmax® V-Belt**  
Belt dressing spray to warrant trouble free running and preservation of V-belt drives in food and non-food environments.

Foodmax® Spray Cans Selection Table

<div>Foodmax®</div>	Chains	Slides	Open Gear	Penetrating Oil	General Lubrication	Release Agent	Dewatering	Anti-corrosion	Preservation	Cleaning	NSF Category
Foodmax® Clean											C1
Foodmax® Clean E											K2
Foodmax® Clean S											K1
Foodmax® Clean M											H1
Foodmax® DDO											H1, 3H
Foodmax® DWF											H1
Foodmax® Easy											H1, 3H
Foodmax® Extreme											H1
Foodmax® Grease											H1
Foodmax® Grease CAS											H1
Foodmax® Inor 3-H											3H
Foodmax® MF											H1
Foodmax® Multi											H1
Foodmax® PTFE-C											Pending
Foodmax® Silicon											H1
Foodmax® TFD											H1
Foodmax® V-Belt											H1



Food Grade Lubricants for the Paper Industry

The very first step in manufacturing paper and carton food packages takes place at the producer of paper and board. In today's modern world and with the ever growing concerns for consumer safety and health awareness the technology of the lubrication and paper and board machines needs to be revised and changed dramatically.

Challenge	Solution
Parts subjected to steam and water	<i>Hydrolytic and thermally stable lubricants</i>
Elevated temperatures, either under normal or peak conditions	<i>Foodmax® lubricants are designed to handle temperature fluctuations and provide protection also in challenging thermal conditions</i>
High oil consumption in paper and board machines	<i>The use of Foodmax® circulation oils reduces oil consumption by 10%</i>
Increased wear as a result of frequent start-stop operations	<i>Foodmax® lubricants are designed to offer maximum protection on start-up</i>
Oil contamination by process chemicals	<i>Foodmax® circulation oils offer excellent filterability. Matrix offers oil analysis and trend monitoring to ensure performance</i>
Numerous amount of lubrication points	<i>High performance standards of Foodmax® lubricants allow standardization and rationalization of your current lubricants portfolio by using advanced technology</i>
Temperature control and grease degradation in high bearing speeds	<i>Reducing internal friction increases grease and bearing lifetime</i>
Lack of hydrodynamic lubrication in low speed and heavily loaded bearings	<i>High viscosity base oils and functional thickeners used in greases are the solution to premature wear and unexpected bearing breakdowns</i>
Static electricity build-up in high-flow filters in the wet end	<i>A zinc-free and non-toxic, high performance hydraulic lubricant that releases static electricity</i>
Strict OEM requirements	<i>A pro-active and knowledge based approach of OEM's by Matrix Specialty Lubricants</i>
Fulfill latest demands from food producers requesting food safe paper and board products	<i>Foodmax®: High technology food grade lubricants outperforming conventional oils</i>

Performance and Approvals

The food grade paper machine lubricants from Matrix Specialty Lubricants have been approved by the leading paper machine OEM's and meet performance requirements set out by the major paper machine manufacturers.

Matrix Specialty Lubricants is also partnering up with companies that offer solutions in process control, combining best of both technologies in tailor-made solutions for paper and board manufacturers that are looking to improve the quality control procedures. We are here to offer our knowledge for you to increase performance standards, quality of your products help you diversify and grow a competitive edge in the paper industry.

Product range

Application Type	Section	Products
Circulation Oils	Wet, press and dry section	Foodmax® Gear PAO Foodmax® Gear
Hydraulic Oils	Wet, press and dry section	Foodmax® AW PAO Foodmax® AW
Bearings	Low speed bearings	Foodmax® Grease CAS S 2 LS Foodmax® Grease Fluor HT 2
	High speed bearings	Foodmax® Grease CAS S 2 HS
	Laminating Plant	Foodmax® Grease ASP 2
Calendering Sections	Dry end	Foodmax® PMO SE
Heat Transfer Systems	Dry end	Foodmax® HTF
Conveyors	Transport	Foodmax® Chain
Assembly	Construction and maintenance	Foodmax® Assembly Paste
Compressors		Foodmax® Air Foodmax® Air PAO



Refrigeration

The production of food goes hand in hand with the cooling and freezing of the final product and raw materials. Most food production plants are therefore having all types of refrigeration equipment in place. Matrix Specialty Lubricants offers a large selection of high quality refrigeration lubricants including POE and PAG and special lubricants for ammonia refrigeration. Please check our Coolmax products in the refrigeration fluids brochure or check the website for more details.

Coolmax HTA 60 is NSF-H1 approved.



**Disclaimer**  
Information presented in this brochure is considered reliable, but conditions and methods of use, which are beyond our control, may modify results. Before adopting our products for commercial use, the user should confirm their suitability. In no case should recommendations or suggestions for the use of our products be understood to sanction violation of any patent.

KINEMATIC VISCOSITIES		GRADE SYSTEMS				SAYBOLT VISCOSITIES	
cSt 40° C	cSt 100° C	ISO	AGMA	SAE ENGINE OIL	SAE GEAR OIL	SUS 210° F	SUS 100° F
800	40	680	8			200	4000
600							3000
500		460	7		140	150	2500
400	30						2000
350		320	6			125	1900
300							1500
250	20			50		100	1250
200	16	220	5		90	90	1000
150		150	4	40		80	800
100		100	3	30	85 W	70	600
80	10					60	500
60	9	68	2		80 W	55	400
50	8			20		50	300
40	7	46	1			44	250
30	6						200
20	5	32			75 W		150
15	4	22		10 W		40	100
10		15		5 W			90
		10					70
							55

Viscosities can be related horizontally only. For example, the following oils have similar viscosities: ISO 460, AGMA 7 and SAE GEAR OIL 140. The viscosity/temperature relationships are based on 95 VI oils and are usable only for mono grade engine oils, gear oils and other 95 VI oils. Crankcase oils and gear oils are based on 100° C viscosity. The “W” grades are classified on low temperature properties. ISO oils and AGMA grades are based on 40° C viscosity.



Glossary of terms

Additive

A chemical added in small quantities to a product to improve certain properties. Among the more common petroleum product additives are: oxidation inhibitors for increasing the product's resistance to oxidation and for lengthening its service life; rust and corrosion inhibitors to protect lubricated surfaces against rusting and corrosion, demulsifiers to promote oil-water separation, VI improvers to make an oil's viscosity less sensitive to changes in temperature, pour-point depressants to lower the cold temperature fluidity of petroleum products, oiliness agents, anti-wear agents, and EP additives to prevent high friction, wear, or scoring under various conditions of boundary lubrication, detergents and dispersants to maintain cleanliness of lubricated parts, anti-foam agents to reduce foaming tendencies, and tackiness agents to increase the adhesive properties of a lubricant, improve retention, and prevent dripping or spattering.

Anhydrous

Free of water, especially water of crystallization.

Anti-Foam Agent

An additive that causes foam to dissipate more rapidly. It promotes the combination of small bubbles into large bubbles which burst more rapidly.

Anti-Oxidant

A chemical added in small quantities to a petroleum product to increase its oxidative resistance in order to prolong its storage and/or service life. The additive activates in two ways: by combining with the peroxides formed initially by oxidation paralyzing their oxidizing influence, or reacting with a catalyst to coat it with an inert film.

Anti-Wear Agent

An additive that minimizes wear caused by metal-to-metal contact by reacting chemically with the metal by forming a film on the surfaces under normal operating conditions.

Acid Number

Also referred to as NEUT or NEUTRALIZATION number: the specific quantity of reagent required to 'neutralize' the acidity or alkalinity of a lube oil sample. In service, the oil will, in time, show increasing acidity as the result of oxidation and, in some cases, additive depletion. Though acidity is not, of itself, necessarily harmful, an increase in acidity any be indicative of oil deterioration, and NEUT number is widely used to evaluate the condition of an oil in service. The most common measurement is ACID NUMBER, the specific quantity of KOH (potassium hydroxide) required to counterbalance the acid characteristics. How high an acid number can be tolerated depends on the oil and the service conditions, and only broad experience with the individual situation can determine such a value.

Auto-Ignition Temperature

Minimum temperature at which a combustible fluid will burst into flame without the assistance of an extraneous ignition source. This temperature is typically several hundred degrees higher than the flash and fire point.

Base Oils

Base stocks or blends used as an inert ingredient in the manufacturing of automotive and industrial lubricants.

Base Stocks

Refined petroleum oils that can either be blended with one another or supplemented with additives to make lubricants.

Base Oil Viscosity in a Grease

Because oil does the lubricating in a grease, and viscosity is the most important property of the lubricant, the viscosity of the base oil needs to be designed correctly for the application.

Boundary Lubrication

A form of lubrication effective in the absence of a full fluid film. Made possible by the inclusion of certain additives in the lubricating oil that prevent excessive friction and scoring by forming a film whose strength is greater than that of oil alone. These additives include oiliness agents, compounded oils, anti-wear agents, and extreme pressure agents.

Carbon Residue

Coked material formed after lubricating oil has been exposed to high temperatures.

Copper Strip Corrosion

Evaluation of a product's tendency to corrode copper or copper alloys. ASTM D130. Test results are based on the matching of corrosion stains.

Corrosion Inhibitor

A lubricant additive for protecting surfaces against chemical attack from contaminants in the lubricant.

Compatibility of a Grease

This is one of the most important grease properties. Whenever two incompatible thickeners are mixed, grease usually becomes soft and runs out of the bearing. When mixing different thickener types, consult supplier on compatibility. Some incompatible thickeners are aluminum and barium soaps, clay and some polyureas.

Consistency

NLGI grade is based on amount of thickener. Consistency describes the stiffness of the grease. NLGI 2 is the most common grade.

Demulsibility

A lubricant's ability to separate from water, an important consideration in the lubricant maintenance of many circulating systems.

Detergent

An additive which chemically neutralizes acidic contaminants in the oil before they become insoluble and fall out of the oil forming sludge. Particles are kept finely divided so that they can remain dispersed throughout the lubricant.

Dropping point

The temperature at which a grease changes from semi-solid to a liquid state under test conditions. It may be considered an indication of the high temperature limitation for application purposes.

Entrainment

Describing a state of an immiscible fluid component. Minute quantities of a fluid (typically water) can be dissolved or absorbed into the oil, but excess quantities can be most harmful to equipment due to the entrainment leaving gaps in the lubricated areas.

Emulsion

A mechanical mixture of two mutually insoluble liquids (such as oil and water).

EP agent

An additive to improve the extreme pressure properties of a lubricant.

Flash Point

Lowest temperature at which the air vapor from a sample of a petroleum product or other combustible fluid will "flash" in the presence of an ignition source. The flash can be seen in the form of a small spark over the liquid.

Fire Point

Lowest temperature at which a combustible fluid will burst into flame in the presence of an extraneous ignition source. Very little additional heat is required to reach the fire point from the flash point.

Foaming

A possible reaction of an oil when mixed with air. This entrained air can result in reduced film strength and performance reduction.

Foam Inhibitor

An additive which causes foam to dissipate more rapidly. It promotes the combination of small bubbles into large bubbles which burst more easily.

Four-Ball Tests

Two test procedures on the same principle. The Four Ball Wear Test is used to determine the relative wear-preventing properties of lubricants operating under boundary lubrication conditions. The Four Ball Extreme Pressure Test is designed to evaluate performance under much higher unit loads.

Hydrocarbons

Compounds of hydrogen and carbon of which petroleum products are typically examples. Petroleum oils are generally grouped into two parts: Naphthenics, which possess a high proportion of unsaturated cyclic molecules; and paraffinic, which possess a low proportion of unsaturated cyclic molecules.

Glossary of terms continued

Hydro Treating

A Gulf patented process used to make lubricant base stocks. In the process, lubricant feedstocks are reacted with hydrogen in the presence of a catalyst at very high temperature (400°C) and pressure (3000 plus psi). The process displaces impurities and unsaturated hydrocarbons.

Hydrodynamic Lubrication

A type of lubrication effected solely by the pumping action developed by the sliding of one surface over another in contact with an oil. Adhesion to the moving surface draws the oil into the high-pressure area between the surfaces, and viscosity retards the tendency to squeeze the oil out. If the pressure developed by this action is sufficient to completely separate the two surfaces, full-fluid-film lubrication is said to prevail.

ISO

International Standard Organization

Load Carrying Ability

Under high-load conditions, high-viscosity base stock is required and usually with an EP additive or solid additive like molybdenum disulfide.

NLGI: classifying stiffness of a Grease

The best way to define the consistency or stiffness of the grease is set out by the NLGI (National Lubricating Grease Institute). A test method defines the following grades according to a level of penetration measured at a temperature of 25°C. The consistency of the grease will change as soon as the temperature of the application will increase or decrease. When temperature falls below 25°C, the NLGI grade rises and the grease will appear more stiff.

On the other hand, as soon as the temperature will go beyond 25°C, the NLGI grade is reduced and the grease becomes less stiff.

Oxidation

A form of chemical deterioration to which all petroleum products are subject to, and involves the addition of oxygen atoms resulting in degradation. It is accelerated by higher temperatures above 25°C, with the rate of oxidation doubling by each 10°C increase. With fuels and lubricant oils, oxidation produces sludges, varnishes, gums, and acids, all of which are undesirable.

Oxidation Inhibitor

A chemical added in small quantities to a petroleum product to increase its oxidation resistance in order to prolong its storage and/or service life. The additive activates in two ways: by combining with the peroxides formed initially by oxidation, paralyzing their oxidizing influence, or reacting with a catalyst to coat it with an inert film.

Oil Separation of a Grease

For a grease to be effective, a small amount of oil must separate from the thickener (usually less than 3%).

Pumpability of a Grease

This is an important property when pumping grease in centralized systems at low temperatures. Most common test is Lincoln Ventmeter.

Pour Point

A widely used low temperature flow indicator, depicted as -15°C above the temperature to which a normal liquid petroleum product maintains fluidity. It is a significant factor in cold weather start-up. Paraffinic oils typically have higher pour points due to the formation of wax crystals, while many other lubricants reach their low pour points through an increase in viscosity.

Rust Inhibitor

A lubricant additive for protecting ferrous (iron and steel) components from rusting caused by water contamination or other harmful materials from oil degradation.

Shear Stress

A unit of frictional force overcome in sliding one layer of fluid along another. This is typically measured in pounds per square foot, with pounds representing the frictional force, and square feet representing the area of contact between the sliding layers.

Shear Stability

Grease needs to maintain its consistency under high shear conditions. The shear stability test measures the softening of grease when sheared for 10,000 or 100,000 double strokes with a grease worker. Loss of less than one NLGI grease grade signifies a stable thickener under high shear conditions.

Sludge

The collective name for contamination in a compressor and on parts bathed by the lubricating oil. This includes decomposition products from the fuel, oil, and particulates from sources external to the compressor.

Solvency

The ability to dissolve into a solution producing a homogeneous physical mixture. The degree of solvency varies along with the rate of dissolution depending on the amount of heat added to the solution.

Synthetic lubricants

Lubricants manufactured by a process, where a chemical conversion or transformation of one complex mixture of molecules into another complex mixture takes place.

Timken OK load

Measure of the extreme pressure properties of a lubricant.

Thickener for Grease

A grease consists of a base oil, additives and a thickener. There are soap and non-soap thickeners. Each thickener type provides unique characteristics to the grease.

Vapor Pressure

The measure of a liquid's volatility. The higher the pressure at a standard test temperature, the more volatile the sample, and the more readily it will evaporate.

Varnish

A deposit resulting from oxidation and polymerization of fuels and lubricants. Similar to but softer than lacquer.

Viscosity

Measure of a fluid's resistance to flow. This is typically measured as the time required for a standard quantity of fluid at a certain temperature to flow through a standard orifice. The higher the value, the more viscous the fluid. Viscosity varies inversely with temperature, so the measurements are always expressed together. Tests are typically conducted at 40°C and 100°C.

Viscosity Index

The measure of the rate of change of viscosity with temperature. Heating tends to make lubricants thinner, cooling makes them thicker. The higher a VI is on a particular fluid, the less of a change in viscosity there will be over a given temperature range. In determining the VI, two temperatures of viscosity are taken, one at 40°C and the other at 100°C.

Volatility

The property of a liquid that defines its evaporation characteristics. Of two liquids, the more volatile one will boil at a lower temperature and will evaporate faster when both liquids are at the same temperature. The volatility of petroleum products can be evaluated with tests for flash point, vapor pressure, distillation, and evaporation rate.

Water Resistance

Water washout test measures ability of a thickener to remain intact in bearing when submerged in water. Water spray-off measures ability of a thickener to remain in bearing in presence of water spray. Both of these tests measure percent grease removed.



