



WATER SOLUBLE METALWORKING FLUIDS



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.lubes-portal.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.



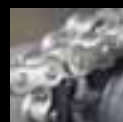
Compressor, vacuum and refrigeration fluids

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 a 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.



Grease and paste

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 & Rust Preventatives

This line of products include 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 include both technical and pharmaceutical white oils. The Matrix line of D-MAX colloidal dispersions contain products based on graphite, MoS₂, PTFE and Boron Nitride (hBn). These can be used as additives, lubricants and processing products.





Water soluble metalworking fluids

In today's high technology production facilities, coolants play a key role and are a vital part of the production process. Matrix extensive range of soluble metal working fluids provides a number of long lasting operational benefits. These include:

Reduce coolant use. Our soluble metalworking fluids are formulated using the latest technology and raw materials giving a very low use of coolants (drag out). This indirect saving contributes to an overall economical operation

Health, safety and environmental commitments. Our formulations allow you to reach your goals in terms of these issues

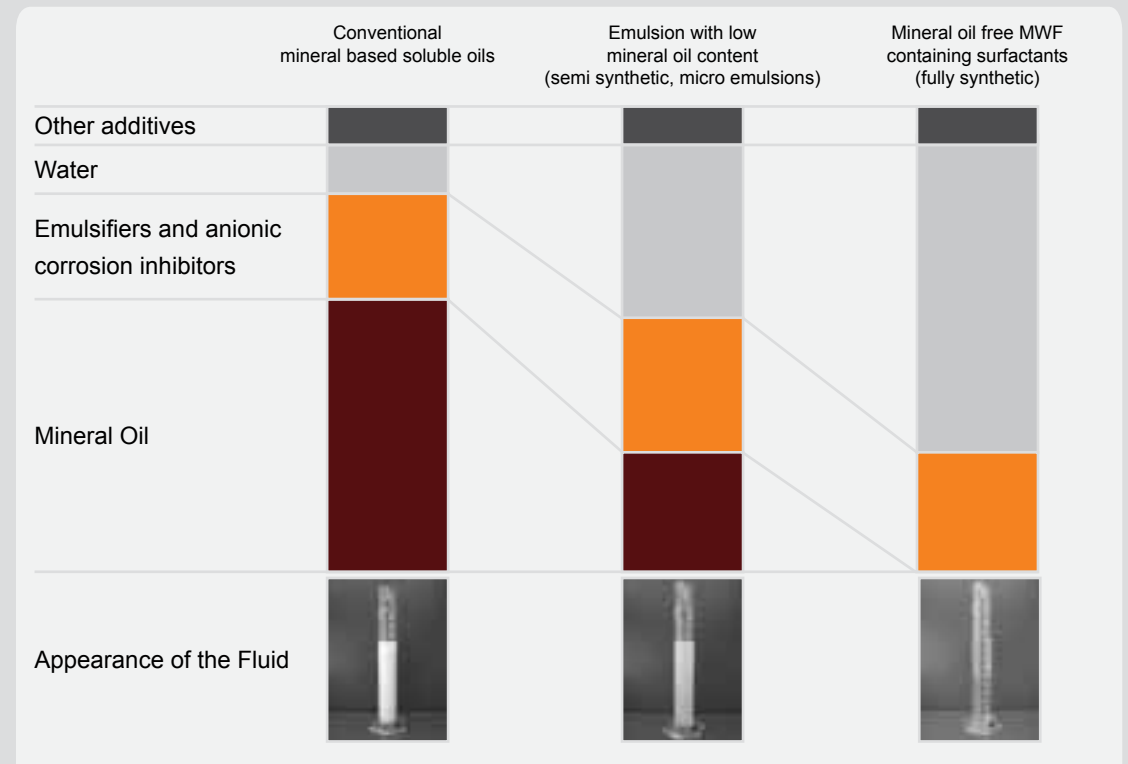
Trouble free operation. The latest technology and materials used in our products warrant trouble free operation which will increase your productivity and overall performance

Longer tool life. The excellent EP properties will increase tool life and contribute to lower operational costs

Matrix soluble metalworking fluids (Matrix Sol range) feature inverse solubility, they will become less soluble in water when the temperature of the solution increases. When in contact with hot tools or work pieces, the fluid comes out of solution coating the metal surfaces with a concentrated lubricant film, providing greater lubricity to protect the tools and increase heat removal.

Mineral – semi synthetic – Fully synthetic

Soluble metal working fluids can consist of different types of components, from conventional soluble oils to the most sophisticated synthetic fluids.



Metalworking fluids selection

In order to select the right product a number of criteria should be taken into consideration. In this brochure we have tried to highlight the majority of our products. Of course there will be customized needs. We challenge you to contact us in case you need a product which is not mentioned in this brochure. We will be more than happy to assist you in your challenge.

Maintenance lubricants

Slidemax

Is a range of specially compounded way guide lubricants. These have been developed to avoid or eliminate stick-slip in machine tool operation. Excellent demulsibility characteristics which allow easy skimming of the way guide lubricant from the coolant. Slidemax 68 is most suitable for horizontal way guides, Slidemax 220 works best for vertical way guides

Grease Barium Complex L 2 S

This grease is extremely resistant against coolants which makes it the perfect choice for the lubrication of high speed machine tool spindles and precision bearings and other machine tool applications. The low viscosity synthetic base oil (22 cSt @ 40 °C) provides excellent anti wear properties for longer component life in very high speed applications. Grease Barium Complex L 2 S is resistant against vapour, acid and alkaline solutions.

Water Soluble MWF selection table

	Mineral Oil Content	Water (°HF) Hardness	Concentration			Remark	Emulsion Appearance	Grinding	Cutting
			Grinding	Normal Operation	Severe Operation				
Matrix Sol Plus 108	N	0-60	3-5%			Synthetic	Transparent	Very Suitable	Possible
Matrix Sol Plus 105 FV	H	10-50	3-5%	4-6%	7-10%	Oily metal surface	Milky Translucent	Possible	Very Suitable
Matrix Sol G-2	N	All	3-4%			Synthetic	Transparent	Very Suitable	Possible
Matrix Sol 50 D	L	0-60	3-6%	4-6%		Less oily metal surface	Milky Translucent	Suitable	Very Suitable
Matrix Sol 444	H	5-40		4-8%		More oily metal surface	Milky		Very Suitable
Matrix Sol NS	N	0-60	3-5%	4-6%	6-10%	Synthetic	Transparent	Suitable	Very Suitable
Matrix Sol NS-R	N	0-60	3-6%			Synthetic	Transparent	Very Suitable	Possible
Matrix Sol LS	L	5-40	3-5%	4-6%	7-10%	Less oily Metal surface	Amber Translucent		Very Suitable
Matrix Sol Plus 70 CU	M	5-40	3-5%	4-6%	7-10%	Less oily Metal surface	Amber Translucent	Suitable	Very Suitable
Matrix Sol Plus 334	H	10-40	3-5%	5-7%	7-10%	Oily metal surface	Milky Translucent	Possible	Very Suitable
Matrix Sol Plus M	H	10-40	3-5%	5-7%	7-10%	Oily metal surface	Milky Translucent	Possible	Very Suitable
Matrix Sol 355	H	10-60		5-7%	7-10%	More oily metal surface	Milky Translucent		Suitable
Matrix Sol MG	H	5-40	3-5%	4-7%	7-10%	Oily metal surface	Milky Translucent	Possible	Very Suitable
Matrix Sol Plus 00*	H	5-40	3-5%	5-7%	7-10%	Oily metal surface	Milky Translucent		Very Suitable
Matrix Sol Plus 01*	M	5-40		5-7%	7-10%	More oily metal surface	Milky Translucent		Suitable

Legenda table

Oil content

(N) Nil

(L) Low (10-20%)

(M) Medium (20-40%)

(H) High (40-70%)

Very Suitable

Suitable

Possible

*Boron + amine free

Additives and cleaners

Despite the fact that modern metalworking fluids are designed and formulated to warrant trouble free operation, Matrix has developed a range of additives and cleaners which can be used to optimize the performance and trouble shoot in some cases.

Matrix Sol Clean

A combination of degreasing agents and disinfectant additives. The product is specially designed to clean and disinfect machines and systems that work with aqueous emulsions. Product can simply be added to the Metal Working Fluid and will clean tanks, piping, filters and more.

Matrix Sol FUN 100

Is an effective fungicide to preserve soluble metalworking fluids from yeast and molds

Matrix Sol AF

A concentrated anti foam fluid based on silicone compounds. It will break and avoid foam formation in aqueous systems.

Matrix SOL BAC 100

A broad spectrum bactericide to protect water soluble coolants against bacteria and other micro organisms

Operation					Main Application	Materials							Notes
Drilling	Milling	Tapping	Broaching	Reaming		Ferrous	Cast Iron	Hardened Steel/Alloys	Aeronautical Titanium	Aluminium	Yellow metals Copper, Brass	Non Metals	
					Ferrous	Green	Green					Orange	
	Green	Light Green	Orange	Orange	Ferrous-Alumi	Green	Orange	Orange		Light Green		Orange	
	Orange				Ferrous	Green	Green						Economical
	Green	Orange			Steel-Cast Iron	Green	Green					Light Green	
	Green	Orange		Orange	Universal	Light Green				Light Green	Orange		Economical
	Green	Green			Ferrous-All Kind	Green	Green	Green			Orange	Light Green	Good lubrication
	Orange				Ferrous	Green	Green				Orange	Light Green	
	Green	Green	Orange		Universal	Light Green	Orange	Light Green	Light Green	Green	Light Green	Light Green	Good lubrication
	Green	Light Green			Universal	Light Green	Orange	Orange		Light Green	Light Green	Light Green	All purpose coolant
	Green	Light Green	Orange	Orange	Aluminium	Light Green	Orange	Orange	Orange	Green		Orange	
	Green	Green	Orange	Orange	Universal	Light Green	Orange	Orange	Orange	Green	Light Green	Orange	All purpose coolant
	Light Green		Green	Green	Aluminium	Light Green		Green	Green	Light Green			Very good lubrication
	Green	Green		Orange	Ferrous	Green	Light Green	Orange		Orange		Orange	
	Green	Green	Orange		Universal	Green	Orange	Light Green	Light Green	Light Green	Green	Orange	All purpose coolant
	Light Green		Green	Green	Aluminium	Light Green		Light Green	Green	Green			Very good lubrication

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 may 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: Napthenics, 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 (400oC) 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 25oC, with the rate of oxidation doubling by each 10o 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 -15oC 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

Alubricant 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.

Common types of synthetic base oil include: Polyalpha olefins (PAO), Hydrocracked/Hydroisomerized, Unconventional Base Oils (UCBO), Organic Esters, Polyglycols (PAG).

Timken OK load

Measure of the extreme pressure properties of a lubricants.

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 40oC and 100oC.

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 40oC and the other at 100oC.

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.



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