WWW.UNIL.COM

LUBRICANTS FOR THE METALWORKING INDUSTRY



LIQUID TECHNOLOGY

MGO

METALWORKING FLUIDS

1 Water-soluble products for metalworking	p.04
1.1 Micro-emulsions	p.05
1.2 Emulsions	p.08
1.3 Solutions	p.11
2 Emulsion bath maintenance	p.12
3 Full cutting oils	p.14



1. WATER-SOLUBLE PRODUCTS FOR METALWORKING

1.1 MICRO-EMULSIONS

	Magnesium	Yellow metals	Aluminium	Cast iron	Steel and alloys	Stainless steel	Titanium
Sawing		E 209 NT E 215 NT			All emulsions M 140 M 145 NT	E 209 NT E 215 NT	E 209 NT E 215 NT
Tapping		E 20 M 140	Aero 405		E 25 EP E 35 EP E 209 NT	E 25 EP E 35 EP	E 25 EP E 35 EP E 209 NT E 215 NT
Drilling Milling	M 170 NT M 175 NT	M 145 NT M 170 NT M 175 NT	E 209 NT E 215 NT E 35 EP	M 16	E 203 NT E 215 NT M 140 M 145 NT	E 209 NT E 215 NT	E 209 NT E 215 NT
Longitudinal turning		All M 170 NT All M 175 NT micro- emulsions		All emulsions All micro- emulsions	E 25 EP E 35 EP	E 25 EP E 35 EP	
Grinding					Stargr Stargrin M M 17 M 17	d CO AM 16 0 NT	

-	Free from:							Su	iitable f	Notos	Refrac-	% to be			
Product	Boron	Boric acid	Sec- ondary amines	Sul- phur	Formal- dehyde	Yellow metals	AI	Steel & alloys	Cast iron	Stain- less steel	Ti	Mg	Notes	tometer index	used in water
Safecut M 16													micro- emulsion for all-round use	1.7	5 - 7
Safecut M 140													Excellent all- round micro- emulsion	1.1	5 - 10
Safecut M 170 NT													Low foaming	1.9	5 - 7
Safecut M 145 NT													Boron-free Safecut M 140	1.2	5 - 10
Safecut M 175 NT													Boron-free Safecut M 170 NT	1.9	5 - 7
Safecut Aero 405													A top quality product for aluminium, used in the aerospace sector	2	5 - 10



= Suitable, but not ideal

Product and description	Refractome- ter index	% to be used in water	Product and description	Refractome- ter index	% to be used in water
 Safecut M 16 * SAFECUT M 16 is an emulsifiable coolant that produces a translucent micro-emulsion in soft or hard water. This product contains no sulphur, chlorine, sodium nitrite, phenol or silicones and has an enhanced effect. SAFECUT M 16 is used for any processing of metal where the cooling and lubricating properties must be combined. SAFECUT M 16 gives excellent results with: Turning, including processes such as sawing and drilling. Production units where multiple processes are carried out. Numerically controlled lathes, even for roughing forged pieces at high speed. Conventional lathes and milling machines. Grinding operations. 	1.7	5 - 7	SAFECUT M 145 NT SAFECUT M 145 NT is an emulsifiable coolant that forms a transparent micro-emulsion in water It gives excellent results for any processing of metal where the cooling and lubricating propert must be combined, and is therefore usable as an all-round option within the water-soluble metalworking range. SAFECUT M 145 NT possesses exceptional properties for lubricating and cooling the most common machining operations on steel and yellow metals. SAFECUT M145 NT was developed to work without boron, secondary amines, chlorine, formaldehyde or nitrites. This combination of properties allows users to achieve an ecologicall responsible and user-friendly/safe tooling without sacrificing quality of workmanship or tool lit		5 - 10
Safecut M 140 * SAFECUT M 140 is an emulsifiable coolant that forms a translucent micro-emulsion in water. It gives excellent results for any processing of metal where the cooling and lubricating properties must be combined. SAFECUT M 140 is also free from formaldehyde. This fluid has exceptional properties for the lubrication and cooling of most common machining operations. SAFECUT M140: - Is suitable for all metals, both aluminium and stainless steel. - Has a strong cooling capacity - Prevents foaming - Protects against oxidation from 3% - Has a translucent colour	1.0	5 - 10	 SAFECUT M 175 NT SAFECUT M 175 NT is an emulsifiable oil that forms a translucent micro-emulsion in soft or hard water. SAFECUT M 175 NT contains a special additive package based on the latest boron-free technologies with exceptional anti-corrosion, antifoam, longevity and tolerance. SAF M 175 NT is also recommended for use in very soft water thanks to its low foaming capacity. SAFECUT M 175 NT can be used for all types of metal processing. This product is characterised by: Polyvalence in terms of the materials to be processed: steel, stainless steel, cast iron, magnes Perfect surface finish Exceptional performance at high cutting speeds Wetting and detergency properties 		5 - 7
Safecut M 170 NT * SAFECUT M 170 NT is an emulsifiable oil that forms a translucent micro-emulsion in soft or hard water. It contains a special formaldehyde-free additive package based on the latest technologies with exceptional anti-corrosion, antifoam, longevity and tolerance. This oil is also recommended for use in very soft water thanks to its low foaming capacity. SAFECUT M 170 NT can be used for all types of metalwork. It is characterised by its: - Polyvalence in terms of materials to be machined: steel, stainless steel, cast iron	1.9	5 - 7	Safecut Aero 405 SAFECUT AERO 405 is a formaldehyde- and boron-free micro-emulsion, developed for all difficu processing of metals where surface finish is important. Among other things, the product is use for milling, turning, sawing and drilling. SAFECUT AERO 405 was specially developed to meet the specifications of AEROSPACE ASN 42.302. It is therefore perfect for the processing of aluminium types such as 7175, 7075, 2024, et SAFECUT AERO 405 is also very suitable for the processing of steel and alloys because of its good resistance to higher pressures.	2.0	5 - 10

- Polyvalence in terms of materials to be machined: steel, stainless steel, cast iron
 Perfect surface finish
 Exceptional performance at high cutting speeds
 Wetting and detergency properties

1.2 EMULSIONS

	Free from:					Suitable for:							Refrac-	% to be		
Product	Boron	Boric acid	Sec- ondary amines	Sulphur	Formal- dehyde	Yellow metals	AI	Steel & alloys	Cast iron	Stain- less steel	Ti	Mg	Notes	tometer index	used in water	
Safecut E 20													All-round	1.2	5 - 10	
Safecut E 209 NT													Improved lubricating capacity and EP capacity	1.0	5 - 10	
Safecut E 215 NT													E 209, but without boron	1.0	5 - 10	
Safecut E 25 EP													Made for specific, difficult applications	1.0	5 - 15	
Safecut E 35 EP													Profiling without dilution	1.0	5 - 100	

Product and description

Safecut E 20 *

SAFECUT E 20 s SAFECUT E 20 is an emulsifiable coolant which forms a slightly translucent to water. The emulsion has excellent cooling as well as lubricating properties a SAFECUT E 20 is exceptionally suitable for the processing of steel but can be for both the processing of steel and its alloys and the processing of aluminiu SAFECUT E 20 is characterised by: - High cooling and lubricating power

- Absence of foam
- Protection against oxidation from 4% in water

Safecut E 25 EP

SAFECUT E25 EP SAFECUT E25 EP is an emulsion specially developed for all difficult processing titanium. This fluid contains a very high concentration of extreme pressure (E the most difficult processes without problems. SAFECUT E25 EP combines this superior performance with a boron and formal This makes it a user-friendly, safe and robust tool for the toughest operations. This product is not recommended for processing of copper-containing alloys.

Safecut E 35 EP

SAFECUT E 35 EP is a biostable emulsion specially developed for all difficult p stainless steel. This fluid contains a very high concentration of extreme press handle even the most difficult processes without problems.

Thanks to its specific friction-reducing additives, SAFECUT E 35 EP can also b for folding, profiling and punching of high-alloy steel and stainless steel.

= Yes

= Suitable, but not ideal

= No

	Refractome- ter index	% to be used in water
to milky emulsion in soft or hard and is free of formaldehyde. e used for all types of metalwork ium and copper alloys.	1.2	5 - 10
ng of steel, stainless steel and (EP) additives to handle even naldehyde-free formulation. s. s.	1.0	5 - 15
processing of steel and ssure additives (EP) to	1.0	5 - 100
be used undiluted with water		

Product and description	Refractome- ter index	% to be used in water
Safecut E 209 NT * SAFECUT E 209 NT is a formaldehyde-free product that has been specially developed for the processing of ferrous and non-ferrous metals. It is perfectly suitable for yellow metals, aluminium, steel and alloys, stainless steel and titanium. Due to the high percentage of mineral oil, SAFECUT E 209 NT is less suitable for processing of cast iron. The fine dust that is released during the machining of cast iron, in combination with the oil, causes the formation of sludge. SAFECUT E 209 NT creates a layer of foaming emulsion in water and can also be used in very soft water. SAFECUT E 209 NT can be perfectly used for processes such as turning, milling, drilling, sawing and tapping.	1.0	5 - 10
 Safecut E 215 NT SAFECUT E215 NT is an emulsifiable oil that becomes a white emulsion in soft or hard water. SAFECUT E215 NT contains an additive package based on the latest metalworking technologies and with additional focus on operator safety and environmental friendliness. Thanks to its improved formula for safety in use and care for the environment, this product is free from boron, formaldehyde, nitrite, phenol and secondary amines. SAFECUT E215 NT does not foam, leaves no sticky deposits and is ideal for turning and grinding (4-5%). SAFECUT E215 NT is the perfect partner for the processing of: Yellow metals (e.g.: copper parts for high-voltage cabins) Aluminium (parts made on CNC, milling, turning or for example machines producing aluminium frames such as window frames) 	1.0	5 - 10

such as window frames) - Steel and alloys - Stainless steel - Titanium

1.3 SOLUTIONS

	Free from:						Suitable for:							Refrac-	% to be
Product	Boron	Boric acid	Sec- ondary amines	Sulphur	Formal- dehyde	Yellow metals	AI	Steel & alloys	Cast iron	Stain- less steel	Ti	Mg	Notes	tometer index	used in water
Stargrind 50													Protection against oxidation from 1% in water	2.5	5 - 10
Stargrind CO AM													Rectification of tools, enhanced with protection against cobalt scavenging	1.5	5 - 15

= Suitable, but not ideal = Yes

* A boron-free alternative is available for these products. In time, these products will be replaced by the boron-free variant.

= No

Product and description	Refractome- ter index	% to be used in water
 Stargrind 50 Stargrind 50 is a clear synthetic fluid, biostable, which can be mixed with soft as well as hard water. The solutions obtained are transparent. STARGRIND 50 is specifically formulated to meet the most recent safety requirements (e.g. free from DEA (diethanolamine) and nitrites). STARGRIND 50 is suitable for general grinding work but also for the finishing of hardened steel. STARGRIND 50 is also used in tool grinding and can be used with diamond discs. STARGRIND 50 is the ideal choice for the grinding of rolling mills and the specialist grinding of forged steel. Transparent, even in hard water Excellent cooling capacity Very good lubricating and anti-wear properties Excellent anti-corrosive properties Good resistance to foam and fog formation Enables the grind to settle easily 	2.5	5 - 10
Stargrind CO AM STARGRIND CO AM is a synthetic refrigerant, clear and miscible with hard or soft water in all proportions, resulting in a translucent solution. STARGRIND CO AM is a coolant for all grinding operations, both coarse and fine.	1.5	5 - 15

2. Emulsion bath maintenance

Supermix

The supermix pump is a self-priming volumetric dosing pump for mixing ratios from 1 to 10% that can be easily adjusted from the outside. The pump is connected to the water mains, has a suction side for the metered concentrate, and supplies a mixture of the set concentration at the outlet.

Advantages:

- The pump already works at a very small water flow rate
 The pump operates at low pressure
 Practically silent operation
 Constant mixing ratio

- The water pressure provides the necessary energy for dosing. It therefore requires no electricity or compressed air .

Properties:

- Water flow rate: minimum 0.16 and maximum 41 litres per minute Water pressure: minimum 0.5 and maximum 4 bar Adjustable mixing ratio: minimum 1 and maximum 10% Connection: 3/4" .
- .
- .
- Dimensions: height 470 mm, width 160 mm, diameter 130 mm Weight: 1.7 kg .
- .

Refractometer

You can use a refractometer to check the current concentration of emulsions or solutions. When you apply a drop of the emulsion to the glass plate you can check the solution's Brix value. This value must be multiplied by the refractometer index of the oil to check the exact concentration. You can find the product's refractometer index in our brochures.





3. FULL CUTTING OILS

Application	Product	Viscosity	Mg	Yellow metals	AI	Steel & Alloys	Stain- less steel	Ti	Cast iron
Multiple processes:	Safelub S 702 AM	17 cSt							
Standardisation	Safelub I 952 AM	21 cSt							
Honing/Grinding	Safelub MG AM	9 cSt							
	Safelub DEC 2 AM	20 cSt							
	Safelub DEC HV	780 cSt							
Longitudinal turning	Kutilub DI AM	24 cSt							
	Kutilub FP 4 AM	15 cSt							
	Safelub I 952 AM	21 cSt							
Tanning	Kutilub DA 3 AM	32 cSt							
Tapping	Safelub RT 32 AM	32 cSt							
	Kutilub TF 9 W	160 cSt							
	Microspray MA AL	27 cSt							
For milling and sawing alumini-	Microspray BIO E 22	22 cSt							
um with a metering system	Safelub BIO 35	35 cSt							
	Safelub BIO ST	50 cSt							

Application	Product	Viscosity	Mg	Yellow metals	AI	Steel & Alloys	Stain- less steel	Ti	Cast iron
Electric discharge machining	Kutilub ER 1	2.4 cSt							
Coorguinding	Safelub MG AM	9 cSt							
Gear grinding	Safelub S 702 AM	17 cSt							
Gear cutting	Safelub BIO E	46 cSt							
Deep drilling	Kutilub FP 4 AM	15 cSt							
F	Form 925 CAS	30 cSt							
Forming/punching	Starform P 40 S	122 cSt							
	Microspray SCH	1.1 cSt							
	Form EV 770	1.6 cSt							
Forming/punching	Form EV 810	1.2 cSt							
with evaporation	Form EV 832	1.3 cSt							
	Form EV 883 SE	5 cSt							
	Form EV 4	1.5 Cst							

= Yes

= Suitable, but not ideal



MULTIPLE PROCESSES: STANDARDISATION

Product and description	Viscosity
Safelub S 702 AM Safelub S 702 AM is a thin chlorine-free cutting oil with a specifically formulated additive package that ensures excellent performance. This cutting oil can be applied without any problem for any processing of steel such as: turning, reaming, gear cutting, wire reels, etc.	17 cSt
Safelub I 952 AM Safelub I 952 AM is a chlorine-free, clear, odourless cutting oil for machining operations on all types of steel. Thanks to due to its specific additives, this oil can be used for the lubrication of difficult processes, both at high and low speeds.	21 cSt
HONING/GRINDING	
Product and description	Viscosity
Safelub MG AM	9 cSt

Safelub MG AM is specially developed for any processing of yellow metals where the material threatens to leave deposits on the cutting tools.

This cutting oil can also easily be used for the processing of certain steel types as well as for honing and profile grinding.

LONGITUDINAL TURNING

Product and description

Safelub DEC 2 AM

Safelub DEC 2 AM is a clear cutting oil on the basis of highly refined paraffinic hydrocarbons. This cutting oil was developed for the turning of brass and soft and semi-hard steels (except alloy steels and stainless steels).

Safelub DEC HV

SAFELUB DEC HV is a high-quality, universal fluid specially developed for pulling steel wire. Use of this product guarantees correct cleanliness of the wire for various diameters.

Kutilub DI AM

Kutilub DI AM is a thin cutting oil with a well-balanced additive package that ensures excellent cutting properties. This oil is specially formulated for the turning of stainless and alloy steels. Kutilub DI AM can also be used for turning and milling of these steels.

Kutilub FP 4 AM

15 cSt Kutilub FP 4 AM is a thin oil with anti-wear and EP properties (extreme pressure). Because of its multifunctional properties, this cutting oil is very suitable for the processing of various types of steel, even stainless and refractory steels. Kutilub FP 4 AM is formulated for deep drilling, reaming, profile grinding and other difficult processes.

Viscosity

20 cSt

780 cSt

24 cSt

TAPPING

Product and description	Viscosity
Safelub I 952 AM Safelub I 952 AM is a chlorine-free, clear, odourless cutting oil for machining operations on all types of steel [.] Thanks to due to its specific additives, this oil can be used for the lubrication of difficult processes, both at high and low speeds [.] Excellent tapping results.	21 cSt
Kutilub DA 3 AM Kutilub DA 3 AM is a cutting oil for the processing of all types of steel. Thanks to due to its specific additives, this oil can be used for the lubrication of difficult processes, both at high and low speeds.	32 cSt
Safelub RT 32 AM Safelub RT 32 AM is a highly additive cutting oil with a modified viscosity for heavy duty processing (e.g. tap operations, sawing operations, etc.) of very hard metals, even metals containing up to 50% chromium.	32 cSt
Kutilub TF 9 W Specifically formulated as a tapping and thread cutting oil for processing at slow speeds. Heavy additives resulting in a very strong product. The oil is water washable with a good surface finish.	160 cSt

MILLING AND SAWING ALUMINIUM WITH DOSING SYSTEMS

Product and description	Viscosity
Microspray MA AL Biodogradable all specially developed for aluminium but can also be used on pap ferrous metals. Suitable for tanning and	27 cSt

Biodegradable oil, specially developed for aluminium but can also be used on non-ferrous metals. Suitable for tapping and all milling and cutting operations.

Microspray BIO E 22

Microspray Bio E 22 is a high quality full oil based on synthetic esters suita alloyed steels and stainless steel. This cutting oil is developed for various cutting operations including gear cu and boring.

Microspray Bio E 22 is highly suitable for the processing of aluminium.

Safelub BIO 35

Safelub Bio 35 is a thin, biodegradable, ready-to-use cutting oil for the proce high silicon content. It is particularly suitable for cutting aluminium (profiles by drip lubrication.

Safelub BIO ST

Safelub Bio ST is a fully biodegradable high performance oil that ensures ex (including carbide profile tools) when cutting, drilling, tapping, chamfering, used for gear cutting with chisel or unwinding cutter machine. This cutting oil is suitable for the turning of alloyed and stainless steel. Due suitable for the processing of yellow metals.

ELECTRIC DISCHARGE MACHINING

Product and description

Kutilub ER 1

For the cooling and removal of micro-chippings with electric discharge mach

18

ble for processing all kinds of steel including cutting, cutting, drilling, tapping, chamfering	22 cSt
cessing of aluminium and its alloys, even with es) and can be applied by spraying as well as	35 cSt
excellent lubrication and protection of tools I, etc both at high and low speeds. It is also e to its strong EP additive, this product is not	50 cSt

	Viscosity
chining. Can harm rubber seals.	2.4 cSt

GEAR GRINDING

Product and description

Safelub MG AM

Safelub MG AM is developed for all processing of yellow metals where the material threatens to leave deposits on the cutting tools. This oil is specially designed for machining and for use with magnesium. This cutting oil can also easily be used for the processing of certain steel types as well as for honing and profile grinding.

Safelub S 702 AM

Safelub S 702 AM is a thin chlorine-free cutting oil with a specifically formulated additive package that ensures excellent performance. This cutting oil can be applied without any problem for any processing of steel such as: turning, reaming, gear cutting,

inis cutting oil can be applied without any problem for any processing of steel such as: turning, reaming, gear cutting, wire reels, etc.

GEAR CUTTING

Product and description	Viscosity
Safelub BIO E 46 SAFELUB BIO E are high quality solid cutting oils based on synthetic esters for processing all types of steel including alloyed steels and stainless steel. The SAFELUB BIO E fluids are developed for various cutting operations including, gear cutting, cutting, drilling, tapping, chamfering, boring; SAFELUB BIO E 46 is particularly suitable for the processing of aluminium. Note that, due to its additives, SAFELUB BIO E fluids are not suitable for yellow metals.	46 cSt

DEEP DRILLING

Viscosity

9 cSt

17 cSt

Product and description

Kutilub FP 4 AM

Kutilub FP 4 AM is a thin oil with anti-wear and EP properties (extreme pressure)[.] Because of its multifunctional properties, this cutting oil is very suitable for the processing of various types of steel, even stainless and refractory steels.

Kutilub FP 4 AM is formulated for deep drilling, reaming, profile grinding and other difficult processes.

FORMING/PUNCHING

Product and description

Form 925 CAS

Form 925 CAS is composed with a specially added high-pressure forming oil, s thickness sheet metal and press-cutting of all steels. FORM 925 CAS is also suitable for atomisation. Other applications: Due to the extreme pressure additives used, these oils can be used for other drawing and wire tapping processes

Starform P 40 S

Starform P40 S is a full synthetic based cutting oil with adapted viscosity for stainless steel, chromium/nickel, nimonic, Monel, etc.

This cutting oil is specially developed for broaching, thread-drawing, thread-cutting, tapping, bolt stuthered rolling, punching and other difficult processing of special alloys that are difficult to machine.

Viscosity

15 cSt

	Viscosity
suitable for light deep drawing of low	30 cSt
r applications, such as a number of wire	
r very difficult processing of special alloys:	122 cSt
-cutting, tapping, bolt striking, stamping,	

FORMING/PUNCHING WITH EVAPORATION

Product and description	Solvent	Viscosity
Microspray SCH Microspray SCH is a very fluid paraffinic oil, low-odour, transparent, volatile and sprayable This cutting oil can be used for cold forming of steel and light alloys, forming, sawing and punching and for cutting profiles.	99%	1.1 cSt
Form EV 770 Good for different forming processes such as folding, deep drawing, etc. The oil presents no risks whatsoever to final processing such as welding, painting, and this without prior degreasing!	96.4%	1.6 cSt
Form EV 810 Comparable with the EV 770 but with even faster evaporation.	98.9%	1.2 cSt
Form EV 832 Comparable with the EV 770 and the EV 810 but even more EP (so stronger). Moderate evaporation.	94.9%	1.3 cSt
Form EV 883 SE Product based on fatty alcohol. For forming and cutting steel to 5 mm. Long cutting tool life.	50%	5 cSt
Form EV 4 Ideal for forming sheet steel to a thickness of 15/10. Slow evaporation, misting and degreasing not required.	86.8%	1.5 Cst

QUALITY GUARANTEE

Unil Lubricants works on an exclusive basis with an extensive and high-performance laboratory. This laboratory is also commercially active in the field of condition monitoring. In this way, we can also offer solutions through proactive maintenance that can drastically extend the lifespan of your machine.

Various quality controls

All Unil lubricants are subjected to extensive quality controls both before, during and after production. The production manager takes a sample of the delivered product upon receipt of the base oils and other raw materials. The raw materials are only accepted and taken into production if they comply with all the predefined specifications.

After the production of a certain product, a sample is taken from the production tank. This sample undergoes a similar amount of tests as the first sample, where it is checked for viscosity at 40° C and 100° C, colour, viscosity index, but also for water content and content of phosphorus, zinc, magnesium, calcium and sulphur. In addition, additional critical tests may be imposed on products developed for specific applications.

After filling the products in smaller packages such as an IBC or a barrel, a third sample is taken. This sample undergoes the previous tests again to make sure that the quality from raw material to finished product is maintained.

Extra service

Customers of Unil Lubricants can also make use of the expertise of the laboratory services. By carrying out regular analyses, you will be able to carry out proactive maintenance. A proactive maintenance method focuses on the causes of machine wear and tear and defects. This strategy allows considerable savings in terms of machine maintenance, since it is possible to intervene before an issue or defect in the machine is visible. In this way, we can extend the service life of mechanical machines by up to 20%.

This not only ensures that you get the best product for your machine, but also that your machine can continue to run undisturbed with the best care.

If you would like to know more about our lab activities and its analyses, please contact your representative.



Bergensesteenweg 713 | BE-1600 Sint-Pieters-Leeuw Tel. +32 (0)2 365 02 00 | Fax. +32 (0)2 360 01 12 info@unil.com | www.unil.com | @UnilLubricants

