

METALTEC

METAL WORKING FLUIDS

high performance

range of specialist

metalworking
products



AZTEC OILS
THE LUBRICATION SPECIALISTS





METALTEC is a complete range of metalworking products comprising of water-soluble metalworking fluids, neat metalworking fluids and corrosion preventatives. We know selecting the correct metalworking fluid which has the right balance of safety and performance is an important step in protecting employees and improving productivity. Our products ensure compliance with the latest HSE guidelines whilst assisting in maximising efficiency to help keep running costs low.

- Many of our products are compatible with multiple metals to help reduce stock inventories and mitigate the risk of incorrect product selection.
- Downtime will be reduced, leading to increased production and lower maintenance costs.
- Greater biological stability allows longer fluid lifetimes, lower fluid consumption, less downtime and lower costs.
- The correct MWF will maintain the workpiece surface finish whilst extending tool life, reducing the necessity for additional finishing operations to save time and help minimise costs on purchasing and installing new tools.

SOLUBLE CUTTING OILS

METALTEC MIRACOOOL

Water Miscible or Soluble Metalworking Fluids:

There are detailed discussions in the industry with regards to the components used in metalworking fluid and the impact they have of the environment as well as the health of the operator. The **MIRACOOOL** range has been designed to be free of chemistries such as formaldehyde release biocides while giving the option to use boron derived or boron free chemistries to extend product life and provide corrosion protection.

What is water soluble MWF?

Water soluble metalworking fluids usually come in concentrated form and are designed to produce an emulsion when they are mixed with water, they are very popular in industry due to their affordable costs and the advantages they can offer in many machining and grinding processes. They are often grouped into three distinct categories; milky, semi-synthetic and synthetic.

What makes choosing the right product so important?

The selection process for choosing a soluble metalworking fluid can involve multiple aspects such as surface finish, tool wear, metals, type of machining, make up water but with the priority always being the health, safety and wellbeing of equipment operators.

Product Code	Product	Product Description
SOL048	MIRACOOOL 101 NP	High oil content soluble - General purpose
SOL037	MIRACOOOL 200 SR	Semi-synthetic - General purpose
SOL041	MIRACOOOL 201 XFP	Semi-synthetic Premium high performance
SOL034	MIRACOOOL 203 SM	Semi-synthetic - Softer metals, good hard water performance
SOL039	MIRACOOOL 204 HP	Semi-synthetic - Cast iron
SOL038	MIRACOOOL 205 HW	Semi-synthetic - Hard water
SOL040	MIRAGRIND 300	Synthetic grinding fluid
SOL036	MIRACOOOL 301 FS	Synthetic cutting fluid
SOL043	MIRAGRIND 302 TC	Synthetic grinding fluid, carbide grinding
SOL042	MIRACOOOL 600 AAL	Semi-synthetic - Premium high performance aluminium/aerospace

Product Code	System Cleaners	Product Description
SOL001	ACTICIDE MBS	Formaldehyde-free biocide, CIT, AOX & VOC-free.
SOL045	ACTICIDE 14	VOC-free system cleaner with a very broad spectrum of activity against bacteria, moulds & yeasts.
SOL046	ACTICIDE 45	A broad spectrum industrial microbiocide, algicide and fungicide, water and solvent miscible.
SOL013	MIRACOOOL SYSTEM CLEANER	A powerful machine and sump cleaner.

Products are not classified as carcinogenic under the regulations relating to formaldehyde release biocides.

• **MIRACOOOL 100 SERIES**

The first most common metalworking fluid is known as a ‘Soluble Oil’, ‘Suds’ or ‘Milky Soluble’ as the concentrate has a high oil content (>60%) and forms an opaque white emulsion which is ‘milky’ in appearance. Suitable to use on a variety of materials and machining applications and is commonly used for general purpose machining.

• **MIRACOOOL 200 SERIES**

Semi-synthetic metalworking fluids tend to produce a semi-translucent (hazy but not quite transparent) appearance when mixed with water, this is often called a micro emulsion. They have a lower mineral oil content (10% - 50%) and combine other chemical compounds to provide lubricity. These fluids have a lower tendency to foam, offer more resistance to tramp oil, provide a longer life and leave less oil on the work piece when compared with their high-oil counterparts. This enables them to be better suited to higher-performance, higher-pressure applications.

• **MIRACOOOL & MIRAGRIND 300 SERIES**

Synthetic metalworking fluids do not contain any oil and instead rely on synthetic and often water-soluble polymers to provide lubricity. These polymers are temperature sensitive so work best when the fluid, or more precisely, the cutting-edge increases in temperature. As there is no oil contained in these fluids and so they do not require the same amount of detergent emulsifiers, resulting in a much lower potential to foam. This makes synthetic fluids ideal for very high-performance, high-pressure cutting applications.

• **MIRACOOOL 600 SERIES**

High-performance cutting fluids that are focused on meeting the specific requirements of machining aluminium and aerospace alloys.

• **MIRACOOOL SERIES NUMBER:**

- 100 = High oil content/general purpose
- 200 = High-performance semi-synthetic
- 300 = Ultra-performance fully synthetic
- 600 = Specialist aerospace alloys & aluminium



	Contains Boron	Emulsion Appearance	Metals
	No	White Opaque (Milky)	Ferrous, Aluminium, Yellow
	Yes	Translucent	Cast Iron, Ferrous, Aluminium, Yellow
	No	Semi-translucent	Ferrous, Aluminium, Aluminium Alloys, Yellow, Nickel, Tungsten, Titanium
	No	Semi-translucent	Ferrous, Aluminium, Yellow
	Yes	Translucent	Cast Iron, Ferrous
	Yes	Semi-translucent	Ferrous, Aluminium, Yellow
	No	Transparent	Ferrous, Aluminium, Yellow, Nickel, Titanium
	No	Transparent	Ferrous, Aluminium, Yellow
	Yes	Transparent	Ferrous, Aluminium, Yellow
	Yes	Translucent	Aluminium, Aluminium Alloys

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NEAT METAL WORKING FLUIDS

METALTEC MIRACUT Neat Metalworking Fluids:

Neat metal working fluids consist of cutting, forming and drawing oils that are not miscible in water. They are manufactured from a blend of high-quality base oils, various performance, anti-wear, lubricity and anti-mist additives.

Our MIRACUT range utilises a combination of high-performance esters, phosphorus and sulphur additive technology, although caution should be taken with active sulphur as this can cause staining on yellow metals. Active sulphur is often required in the heavier machining or forming operations that are carried out on ferrous metals, where it is needed to provide additional lubricity under high loads.

Historically, chlorinated lubricity additives have been used throughout the industry as one of the major lubricity components, with a few applications proving difficult to find an alternative. Due to health, safety and environmental reasons short and medium chained chloro-paraffins are not used in the MIRACUT range, instead we only offer products based on the longer chain molecules.

Alternatively, we offer high-performance chlorine-free products to ensure compliance & help minimise disposal costs. MIRACUT makes use of an array of alternate additive technologies and compounds to remain at the forefront of changes in legislation.

Product Code	Product	Operation Severity	Applications
Chlorine-Free			
NEAT033	MIRACUT CF 5 AL	Light	Light machining
NEAT042	MIRACUT CF 8	Medium	Deep hole drilling, general machining, honing
NEAT011	MIRACUT CF 15	Medium/ Heavy	General machining
NEAT010	MIRACUT CF 25	Medium/ Heavy	General machining
NEAT048	MIRACUT CF 30 FS	Heavy	Tapping, thread cutting, general machining
NEAT032	MIRAFORM CF 40 FS	Heavy	Drawing, forming, cutting
NEAT074	MIRAFORM CF 250 FS	Heavy	Forming, drawing, swaging
Chlorinated			
NEAT043	MIRACUT HC 3	Light/Medium	Honing, fine finishing
NEAT008	MIRACUT C 8	Medium	Deep hole drilling, general machining
NEAT061	MIRACUT C 15	Medium/Heavy	General machining
NEAT071	MIRACUT C 20 FS	Medium/Heavy	General machining of ferrous metals, highly active EP
NEAT012	MIRACUT C 25	Heavy	General machining
NEAT036	MIRACUT C 30 FS	Heavy	Tapping, thread cutting, swaging, general machining
NEAT039	MIRADRAW C 90	Heavy	Heavy drawing lubricant
NEAT031	MIRADRAW C 100	Heavy	Drawing, forming, cutting
Vanishing & EDM			
NEAT064	MIRAFORM V 40	Light	Stamping, vanishing lubricant
NEAT022	MIRAFORM V 60	Light	Stamping, vanishing lubricant
NEAT058	MIRAFORM V 6/2	Light	Stamping, vanishing lubricant
NEAT049	MIRACUT EDM 2	Light	Spark erosion dielectric Fluid (Electric Discharge Machine)
NEAT004	MIRACUT EDM 3	Light	Spark erosion dielectric Fluid (Electric Discharge Machine), honing cast iron, HS machine non-ferrous
Biodegradable & Chlorine-Free			
NEAT063	MIRAFORM BIO 8 ME	Light	Light machining
NEAT055	MIRACUT BIO 10	Medium	Turning, milling, deep hole drilling
NEAT072	MIRACUT BIO 20	Medium/Heavy	Turning, milling, general machining
NEAT073	MIRACUT BIO 30	Heavy	Turning, milling, thread cutting, broaching, general machining
NEAT041	MIRACUT RSO	Light	Light machining

Series suffix: C = Chlorinated Bio = Biodegradable CF = Chlorine Free FS = Ferrous Materials Only



Materials	Viscosity @40°C, cSt	Colour	Chlorine	Sulphur	Active Sulphur	Ester	Flash Point °C
All Materials	5	Straw	No	No	No	Yes	>130
All Materials	7	Straw	No	Yes	No	Yes	>130
All Materials	15	Straw	No	Yes	No	Yes	>150
All Materials	25	Straw	No	Yes	No	Yes	>150
Ferrous only	26	Amber/Brown	No	Yes	Yes	Yes	>150
Ferrous only	34	Amber/Brown	No	Yes	Yes	Yes	>180
Ferrous only	250	Brown	No	Yes	Yes	Yes	>180
All Materials	7	Clear	Yes	No	No	Yes	>130
All Materials	8	Straw	Yes	Yes	No	Yes	>151
All Materials	15	Straw	Yes	Yes	No	Yes	>150
Ferrous Only	23	Amber	Yes	Yes	Yes	No	>150
All Materials	25	Straw	Yes	Yes	No	Yes	>150
Ferrous only	30	Dark brown	Yes	Yes	Yes	Yes	>180
All Materials	90	Colourless	Yes	No	No	No	>200
All Materials	100	Staw	Yes	No	No	No	>180
All Materials	2	Light Straw	No	No	No	Yes	>40
All Materials	2	Light Straw	No	No	No	Yes	>62
All Materials	2	Light Straw	No	No	No	Yes	>61
All Materials	2	Colourless	No	No	No	No	>62
All Materials	4	Colourless	No	No	No	No	>100
All materials	8	Straw	No	No	No	Yes	>130
All Materials	10	Straw	No	Yes	No	Yes	>130
All Materials	20	Straw	No	Yes	No	Yes	>150
All Materials	35	Straw	No	Yes	No	Yes	>200
All Materials	36	Straw	No	No	No	Yes	>200

RUST PREVENTATIVES

METALTEC MIRACOR

Corrosion Preventatives:

Traditional highly volatile solvent-based products have been reformulated using less volatile paraffinic diluents so they are no longer classified as flammable, this means our MIRACOR products are not classified under CLP as GHS02 Flammable, making them easier to store and transport. Extensive research has ensured that they rapidly displace water from components after machining whilst leaving an excellent protective and corrosion resistant film.

We can offer the following corrosion preventatives depending on the desired protective film type;

- **Oily** (MIRACOR 600 series)
- **Grease** (MIRACOR 700 series)
- **Soft-Wax** (MIRACOR 800 series)

The oil based MIRACOR 630 PL is a dual-purpose fluid, it has been meticulously developed as a sheet corrosion preventative whilst providing excellent pressing performance, this reduces the number of process and fluids required, crucially saving both time and money.



Contact:

Technical@aztecoils.co.uk

for assistance with selecting the best product to suit your requirements.



Product Code	Product	Description
RUS009	MIRACOR 600 PO	Solvent deposited thin oily film penetrating oil
RUS012	MIRACOR 610	Solvent deposited oily film dewatering fluid
RUS018	MIRACOR 625	Oil based rust preventative, sheet coating oil
RUS030	MIRACOR 630 PL	Oil based rust preventative with pressing performance
RUS017	MIRACOR 640 W	Water dilutable rust preventative
RUS022	MIRACOR 700	Solvent deposited thin greasy film dewatering fluid
RUS032	MIRACOR 710	Solvent deposited medium greasy film dewatering fluid
RUS015	MIRACOR 805	Solvent deposited soft waxy film
RUS027	MIRACOR DW	Dewatering fluid, no film
RUS014	MIRACOR SCAFFTECT	Short term corrosion protectant for scaffolding poles

600 number is oil film **700** number is grease film **800** number is wax film

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METAL WORKING FLUIDS

NOW AVAILABLE IN

60_L BARRELS



Film Type	Solids Content %	Diluent Flash Point °C	Dewatering	Corrosion Protection Indoor Months	Corrosion Protection Outdoor Months
Oil	10	>62	Yes	3 to 6	--
Oil	30	>62	Yes	6	3
Oil	100	>180	No	6	3
Oil	100	>180	No	18	6
Oil	N/A	Water	N/A	8	--
Grease	8	>62	Yes	8	3
Grease	30	>62	Yes	18	9
Soft Wax	20	>62	Yes	12	6
--	0	>62	Yes	--	--
Oil	30	>62	Yes	--	1

METALTEC

METAL WORKING FLUIDS



Soluble Metalworking Fluids: Best Practice

Cleaning

- Add system cleaner to the old fluid at the recommended dosage and circulate through the system for at least 8 hours prior to draining. Machining can continue during this period.
- When cleaning remember to remove the swarf from the tank as this can provide a source of re-infection.
- The water source may be contaminated with bacteria, it is therefore important to ensure the freshly made emulsion is monitored from make-up

Before using the soluble metalworking fluids, it is advised to consult the Metal Working Fluids section of the [Government HSE website](#) or the [UKLA guide](#).

Mixing soluble MWFs

- When selecting a product, it is important to consider the water quality, in particularly the water hardness as this can affect foaming and emulsion stability.
- Use a good quality water source that has not been left stagnant to avoid introducing bacteria into the system.
- Tap (towns water) or demineralised/deionised water can be used but avoid very cold water on makeup, if possible, to aid mixing.
- **Always add the metalworking fluid concentrate to water with agitation to avoid gelling or splitting of the emulsion.**
- To ensure the best performance, use a mixer tap or dosing unit to ensure a constant concentration.
- Before using the emulsion check that the pH and concentration are within the recommended limits. Remember to continue regular maintenance checks including dip slides to monitor any microbial infection.



Maintenance

- If replacing the cutting fluid, ensure that the sump has been cleaned & sterilised by using a system cleaner before introducing fresh emulsion.
- Coolant management charts are recommended for each machine to track the condition of the fluid at regular intervals for trend analysis. A deteriorating trend can be clearly observed so intervention can easily be made before it becomes an issue.
- Carry out regular and routine maintenance checks on your fluid:
 - **Appearance** – Emulsion stable? Colour? Does tramp oil separate on standing?
 - **Odour** – Foul odours are an indication of microbial activity.
 - **pH** – Microbial activity produces short chain acids that neutralise the alkali reserve of your metalworking fluid. This can cause corrosion and emulsion instability, in turn shortening the lifespan of the fluid. The pH should be >8.5, ideally >8.8 to achieve galvanic corrosion protection.
 - **Concentration** – A product has been designed to work at its recommended concentration so it is important to maintain the correct concentration to maximise product life.
 - **Dip Slides** – These are the classic means to monitor microbial infection. There are several different brands, but all include instructions.
- Water hardness and chlorides may also be useful to monitor depending on the water quality.
- When required, always top up with mixed emulsion and not just water, this will ensure emulsion stability.
 - To increase concentration, use a high concentration mix.
 - To reduce concentration, use a more dilute mix.
- Check that tramp oil is less than 2%, the use of a belt or disk skimmer is recommended.
 - Tramp oil can promote bacterial growth, result in aerosols and splitting of the emulsion.
- Keep fines and dissolved metals within controlled limits.
- Keep records of all fluid monitoring tests for five years.

Storage

- Packaging should not be left exposed to elements and drums should be laid horizontally to prevent contamination.
- Store product's indoors and avoid fluctuations in temperature.
- We recommend to store MIRACOOOL products between 5°C and 40°C.

Handling

- Wear suitable PPE – gloves, overalls, goggles etc.
- Cover any cuts or abrasions, ensure the dressing is waterproof.
- Avoid contact with metalworking fluids where possible.
- Wash hands with soap and water, especially before eating and drinking.
- Use barrier and after-work creams to help restore the skin's natural moisture.



Troubleshooting

Short fluid life

- This could be caused by several factors, commonly caused by contamination or poor housekeeping and fluid maintenance.

Bad smell

- Foul odours are typically caused by high levels of bacteria which also reduce fluid life and increase risks of respiratory problems.
 - Keeping the concentration at the correct level will help to prevent bacterial growth.
 - Depending on the level of bacteria, the system may require full clean-out and re-fill with fresh product.
 - Switching to a semi synthetic product or one with boron-based chemistry will help prevent the growth of bacteria.

Corrosion to machine beds or components

- Corrosion can be caused by using an incorrect product or a change in water quality, inadequate fluid concentration or be a result of contamination.

Foaming

- Foaming is often caused by soft water, contamination or air entrainment due to pump cavitation.
 - Make sure the correct product and water type is suitable for the application.
 - Keeping the concentration at the correct level helps prevent foaming.

Poor tool life

- If application is more arduous a product with better lubricity may be required.
- Fluid concentration drops, this will mean there is a lower lubricity content.
 - Check and monitor records, make the necessary adjustments to the MWF concentration.

Skin irritation

- High concentration, bacteria, and too much contact with the metalworking fluid can all contribute to skin irritation.
 - Keep direct contact with the fluid to a minimum, wash hands and wear appropriate PPE.

Equipment explained

Refractometer

- A refractometer quickly determines the concentration of the metalworking fluid.
- It does this by measuring the amount of light that travels through the fluid on a %Brix scale.
- A trend analysis can then be recorded.

Litmus paper or pH indicator strips

- pH is measured on a scale of 0-14 and most metalworking fluids are designed to be alkaline (i.e. pH 7-10).
- Contamination can hinder the pH leading to microbiological growth (bacteria, yeast and fungi) which produce acids and lower the pH. This causes instability and aerosols putting operators and personnel at risk.

Dip slides

- Dip slides are recommended as an essential and simple item to effectively measure the growth of bacteria, fungi and yeast.
- A dip slide contains growth media on both sides to support the growth of bacteria on one side and fungi on the other.
- The amount of growth expressed in CFU/gram can be obtained by comparing with a scale that accompanies the box of dip slides.

Incubator

- To allow a more accurate indication of bacteria, yeast and fungal growth an incubator is recommended to store dip slides after use to allow incubation at the correct temperature.
- It is usually recommended to set the incubation temperature between 25-37°C.
- 24-48 hours before reading bacteria and 3-5 days for fungi.

Tramp oil skimmer

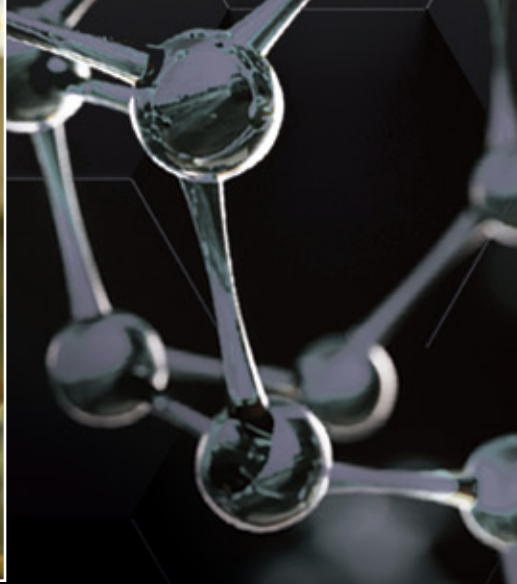
- An excess of tramp oil can lead to fluid instability but also promotes the growth of bacteria.
- Skimmers or vacuum systems can all be used to remove surface oil.

Mixer tap

- A mixer tap will ensure that you use the correct concentration/dilution of metalworking fluids in line with supplier recommendations.
- The dilution can be adjusted to ensure it is as effective as possible.

Swarf/fines removal

- A spinner can help to reduce metalworking fluid usage as it allows for the segregation of waste metal.
- A magnetic swarf collector tool will collect fines.
- In addition the fluid can often be recycled for use reducing MWF costs.



Aztec Oils on hand to support you



Aztec Oils are proud to offer premium levels of assistance to all our customers. We have a dedicated Technical Support team on hand to offer guidance on the correct use of our products.

Our expert team in our on-site laboratory continually test the quality and compliance of all our lubricants so our customers know that Aztec Oils is a brand they can trust.

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