



Essential guide for machining cutting fluids and oils



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"Our aim is to create a safer and more efficient workplace environment, helping to reduce downtime and improve production and ultimately, profitability."

Stewart Coull
MANAGING DIRECTOR

Machining cutting fluids and oils play a crucial role in modern manufacturing processes, particularly in metalworking operations such as milling, turning, grinding and drilling.

These cutting fluids and oils are specially formulated liquids applied to the cutting zone during machining to serve several essential functions: cooling the workpiece and cutting tool, lubricating the cutting interface, flushing away metal chips and debris, and preventing corrosion on both the machine and the workpiece.

The use of machining cutting fluids and oils helps improve efficiency, extend tool life, and enhance surface finish quality. However, not all fluids are the same. Various types exist to meet different machining conditions, materials, and performance requirements. The right choice depends on factors like cutting speed, workpiece material, tool geometry and environmental considerations.

Broadly, machining oils and fluids fall into four categories: water-miscible coolants, neat cutting oils, grinding oils and minimal quantity lubricants (MQLs). Each offers distinct benefits and is suited to specific applications. Understanding these types and their properties empowers workshops to select fluids that maximise productivity, reduce costs, and maintain a safe working environment.



Part 1

Blaser industry leader spotlight

Blaser Swissslube stands as one of the world's most respected and innovative manufacturers of machining cutting fluids and oils, with a reputation built over decades of commitment to quality, sustainability and performance.

Founded in 1936 in Switzerland, Blaser began as a modest company producing basic lubricants but quickly evolved into a pioneer in metalworking fluids, developing specialised products to meet the demanding needs of modern machining industries.

Today, Blaser is synonymous with cutting-edge technology in coolant development. Their portfolio includes a comprehensive range of water-miscible coolants, neat oils, grinding fluids, and minimal quantity lubricants designed to deliver optimum cooling, lubrication, and environmental safety. Blaser's innovations focus on enhancing tool life, surface finish, and process reliability, while also prioritising worker health and environmental responsibility.

One of Blaser's standout technological contributions is their development of advanced synthetic and semi-synthetic formulations that combine

excellent lubrication with effective cooling and long fluid life. These fluids are engineered to resist bacterial contamination, reduce foam, and simplify maintenance, all while improving machining speeds and reducing tool wear. Blaser also invests heavily in research to develop bio-based and biodegradable fluids, aligning with the growing global emphasis on sustainability in manufacturing.

For workshops seeking reliability and performance, Blaser's cutting fluids are a trusted choice, supported by expert technical service and global supply networks. Their ongoing commitment to innovation and quality ensures they remain at the forefront of machining fluid technology worldwide.



Part 2

Evolution of cutting fluids over the last 100 years

The history of cutting fluids mirrors the broader evolution of manufacturing technology, reflecting changing materials, processes and environmental priorities. Over the last century, cutting fluids have transformed from simple natural oils to highly engineered formulations designed to meet complex modern machining demands.

In the early 20th century, machining operations primarily relied on natural oils such as animal fats and vegetable oils, prized mainly for their lubricating



properties. Water-based solutions were less common, as the technology to formulate stable emulsions was not yet advanced. These early fluids offered basic cooling and lubrication but were limited in their effectiveness, particularly at higher cutting speeds.

As industrial production accelerated mid-century, the demand for higher performance cutting fluids grew. Synthetic and semi-synthetic fluids emerged, combining mineral oils with chemical additives to improve cooling, reduce friction, and extend fluid life. These fluids allowed manufacturers to push machining speeds higher while protecting tools and workpieces better than before.

In recent decades, growing awareness of health, safety and environmental

issues has driven significant innovation in cutting fluid technology. Concerns over bacterial growth in water-miscible coolants, skin irritation, and disposal challenges have prompted the development of fluids that are more stable, less toxic, and easier to maintain. Modern formulations often include biocides, corrosion inhibitors, and advanced lubricants, tailored for specific materials such as aerospace alloys or medical-grade stainless steels.

Additionally, advances in minimal quantity lubrication (MQL) techniques and synthetic fluids have helped reduce fluid consumption, waste, and environmental impact without compromising machining performance. The evolution continues as manufacturers increasingly seek fluids that balance high efficiency with sustainability and worker safety.

Understanding this progression helps workshops appreciate why selecting the right cutting fluid today involves more than just lubrication – it's a strategic choice that impacts productivity, quality and compliance.





Part 3

Water miscible coolants

Water miscible coolants, also known as soluble or semi-synthetic coolants, are among the most widely used cutting fluids in modern machine shops. They consist of a blend of water and soluble oils or synthetic additives, creating a stable emulsion that delivers excellent cooling combined with effective lubrication. The high-water content provides superior heat dissipation, which is crucial for high-speed machining and hard-to-machine materials, while the oil and additives reduce friction and wear at the cutting interface.

Jemtech offers a diverse range of water miscible coolants designed to meet various machining challenges:

B-Cool

A high-performance, chlorine- and boron-free coolant that excels in both ferrous and non-ferrous machining applications. Its advanced formulation provides excellent cooling and lubricity while maintaining a clean machining environment. B-Cool is renowned for its versatility, supporting high metal removal rates and extending tool life, all while minimising foam and ensuring easy maintenance.

Synergy

Formulated to offer a fine balance between synthetic and mineral oil components, providing excellent lubrication and cooling properties. It performs well in mixed materials machining and is valued for its low odour, clean running characteristics, and extended sump life, reducing fluid disposal costs and downtime.

Grindex

A cutting-edge, low-foaming coolant optimised for heavy-duty machining processes. Its innovative formula ensures excellent chip flushing and maintains sump cleanliness, which is critical in high-volume production settings. Grindex enhances productivity by reducing tool wear and preventing the build-up of deposits that can impair machining accuracy.

Vasco

A premium water miscible coolant tailored for the most demanding operations. It features exceptional corrosion protection and bio-stability, preventing bacterial growth and fluid degradation over extended use. Vasco's balanced formulation supports a wide range of materials, including stainless steels and aerospace alloys, delivering superior surface finishes and consistent machining performance.

Blasocut

Represents Blaser's advanced synthetic coolant technology, designed to meet the highest standards in industrial machining. It offers outstanding cooling capacity and lubrication without relying on mineral oils, which improves operator safety and environmental impact. Blasocut's stable emulsion supports high-speed cutting, reduces tool wear, and is particularly effective in demanding aerospace and medical machining environments.

Part 4



Neat cutting oils, sometimes called straight oils, are non-emulsifiable lubricants composed mainly of mineral or synthetic oils with various additives to enhance lubrication and protect against wear. Unlike water miscible coolants, neat oils do not contain water, which gives them excellent lubricity and film strength, making them ideal for operations where lubrication is more critical than cooling, such as tapping, threading, broaching, and machining of difficult materials like hardened steels.

Jemtech's range of neat cutting oils includes high-quality products engineered for diverse machining demands:

Neat cutting oils

Blasomill

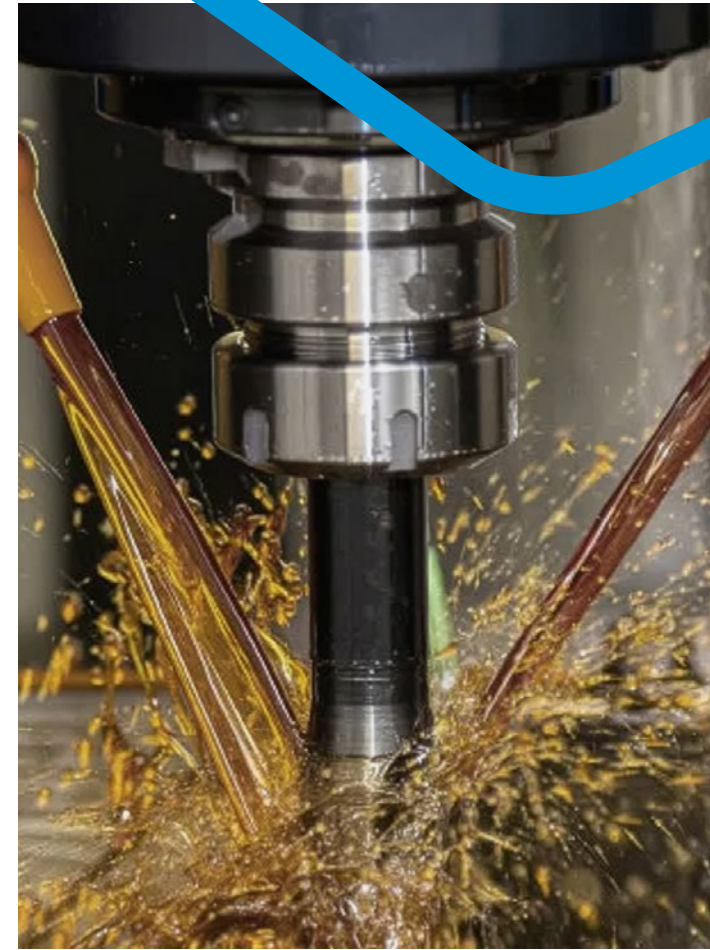
A high-performance neat oil that combines mineral oil with advanced additives to deliver excellent lubricity and oxidation stability. It provides superior surface finishes and extended tool life, especially in heavy-duty milling and turning applications. Its balanced formulation also helps reduce smoke and mist, improving operator comfort in the workshop.

Blasomill GT

An enhanced version designed for more challenging operations requiring greater lubricating properties and thermal stability. This oil performs exceptionally well on tough materials and high-pressure cutting conditions, maintaining a consistent oil film that reduces friction and tool wear even under extreme machining loads.

Vascomill

Offers a synthetic-based neat cutting oil designed for the highest performance machining tasks. It excels in environments requiring both lubrication and cleanliness, with low odour and minimal residue build-up. Vascomill's superior wetting and lubricating characteristics make it particularly suited to precision machining and aerospace components, where surface quality is hugely important.



Part 5



Grinding oils are specialised cutting fluids formulated to meet the unique demands of grinding operations, where lubrication and cooling must be finely balanced to prevent thermal damage to the workpiece and maintain surface integrity. These oils provide excellent lubrication to reduce friction and wear on grinding wheels and workpieces, while their viscosity and additive packages help suppress sparks and improve the wheel's cutting efficiency.

Jemtech's grinding oil portfolio includes premium products designed for both conventional and precision grinding applications:

Grinding oils

Blasogrind HC

High-quality grinding oil formulated to deliver superior lubrication and cooling performance. It's designed to extend grinding wheel life and minimise wheel loading, resulting in improved surface finishes and reduced downtime. The oil's excellent oxidative stability ensures a long service life, even under demanding conditions..

Blasogrind GTC 7

Engineered for high-performance grinding applications requiring exceptional thermal stability and lubricity. Its formulation reduces heat generation and wheel wear, enabling higher grinding speeds and improved productivity without sacrificing workpiece integrity. GTC 7 is ideal for precision components and demanding aerospace or automotive parts manufacturing.

Blasogrind GTS

Combines advanced additives with base oils to provide enhanced lubricity and corrosion protection. This grinding oil supports a wide range of materials and grinding techniques, including creep-feed and plunge grinding, helping maintain dimensional accuracy and surface quality throughout production runs.



Part 6



Minimal Quantity Lubrication (MQL) represents a modern, sustainable approach to machining fluids, delivering a precise, minimal amount of lubricant directly to the cutting zone in aerosol form. This technique drastically reduces fluid consumption, waste disposal, and workplace contamination, while maintaining excellent lubrication and cooling properties. MQL is especially valuable in high-precision and environmentally conscious manufacturing environments.

Jemtech offers advanced MQL products designed to optimise performance and sustainability:

Minimal Quantity Lubricants (MQLs)

Vascomill MMS FA1

A high-quality MQL lubricant that provides outstanding lubrication with minimal fluid volume. Its formulation ensures excellent wetting and penetration at the cutting interface, reducing friction and tool wear across a wide range of materials and machining operations. FA1's low viscosity promotes clean machine operation with minimal misting, improving operator comfort and environmental impact.

Vascomill MMS FA2

Builds on this with enhanced thermal stability and corrosion protection, making it ideal for more demanding machining processes. FA2 supports higher cutting speeds and pressures while maintaining consistent lubrication, extending tool life and improving surface finishes. It also meets strict environmental and safety standards, aligning with modern workshop sustainability goals.



Part 7

Health and safety aspects of cutting fluids

The use of cutting fluids significantly improves machining processes, but it also introduces important health and safety considerations that workshops must manage carefully. Many cutting fluids contain chemicals and additives that, if mishandled, can pose risks such as skin irritation, respiratory problems, and microbial contamination.

Regular monitoring and maintenance of fluid quality are essential to prevent the growth of harmful bacteria and fungi, especially in water-miscible coolants where microbial growth can cause unpleasant odours, fluid degradation, and even skin sensitisation among operators. Ensuring proper fluid concentration, cleanliness and biocide use helps mitigate these risks.

Proper personal protective equipment (PPE), including gloves and eye protection, should be used when handling fluids to avoid direct contact. Good workshop ventilation and mist extraction systems are also vital to reduce airborne exposure to aerosols and vapours.

Additionally, safe storage and disposal protocols must be followed to protect workers and comply with environmental regulations. Jemtech supports customers with expert advice on fluid management practices that enhance safety while maximising fluid life and performance.

Part 8

Environmental impact and sustainability of cutting fluids

Sustainability is an increasing priority in manufacturing, and cutting fluids are no exception. Traditional fluids can generate significant waste and contain environmentally harmful substances. Today, many manufacturers and suppliers, including Jemtech and Blaser, develop fluids that are biodegradable, free from harmful substances such as chlorine and boron, and designed for long service life to reduce waste.

Minimal Quantity Lubrication (MQL) techniques also contribute to sustainability by drastically reducing fluid consumption and disposal needs. Selecting fluids with low toxicity and ensuring responsible fluid management practices help workshops minimise environmental impact.

Recycling and proper disposal of used fluids are critical to meeting environmental standards. Many modern fluids are engineered for easier recycling and lower ecological footprint. Jemtech provides guidance and solutions to support sustainable fluid use that aligns with corporate social responsibility goals and regulatory compliance.

Part 9

Maintenance best practices for cutting fluids

Effective cutting fluid maintenance is key to ensuring consistent machining performance and extending fluid life, reducing operational costs, and protecting worker health. Regular monitoring of fluid concentration, pH, and microbial contamination helps detect problems early before they affect machining quality or safety.

Routine cleaning of sumps and filtration systems prevents sludge and tramp oils from accumulating, which can degrade fluid properties. Using high-quality additives and biocides according to supplier recommendations maintains fluid stability and reduces bacterial growth.

Training operators and maintenance staff on fluid handling procedures, including dilution, topping up, and disposal, promotes good fluid hygiene and reduces waste. Automated monitoring systems are increasingly used in advanced workshops for real-time fluid condition tracking, enabling proactive management.


Jemtech offers comprehensive technical support and training to help workshops implement cutting fluid maintenance best practices, ensuring machining fluids deliver optimal performance throughout their service life.



Part 10

Cutting fluids comparison chart

Type	Composition	Typical Applications	Key Advantages	Considerations
Water Miscible Coolants	Water + soluble oils/synthetics	General machining, milling, turning	Excellent cooling, good lubrication, long fluid life	Requires monitoring to prevent microbial growth
Neat Cutting Oils	Mineral or synthetic oils, no water	Threading, tapping, heavy-duty cutting	Superior lubrication and surface finish	Lower cooling capacity, potential smoke/mist
Grinding Oils	Special oils with high lubricity	Precision grinding, surface finishing	Reduces wheel wear, suppresses sparks, improves finish	Higher cost, requires careful handling
Minimal Quantity Lubricants (MQLs)	Highly refined oils applied as mist	High-precision, environmentally sensitive machining	Minimal fluid use, cleaner work environment, reduces waste	Requires specialised equipment, not for heavy cooling



Choosing the right machining cutting fluid is vital to achieving optimal performance, extending tool life, ensuring workplace safety, and supporting sustainability goals in your workshop. Whether you require the superior cooling of water miscible coolants, the exceptional lubrication of neat oils, the specialised protection of grinding oils, or the eco-friendly precision of minimal quantity lubricants, understanding their properties and applications empowers you to make informed decisions tailored to your machining processes.

Jemtech and Blaser offer a comprehensive range of cutting fluids backed by decades of expertise, advanced technology, and dedicated technical support. Selecting the right fluid and maintaining it properly will help maximise your machining efficiency, reduce downtime, and create a safer, cleaner working environment.

For personalised advice and product recommendations to suit your specific workshop needs, contact the Jemtech team today. Let us help you enhance your machining operations with the right cutting fluid solutions.

Call 01903 233373, email sales@jemtech.co.uk or visit our website for further info.



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