

METALWORKING

SOLUBLE COOLANTS

YOUR ADVANTAGE IN AN INDUSTRIAL WORLD



Tel: 01253 899240
Fax: 01253 899280
Email: info@gannonoils.com
Online: www.gannonoils.com

Gannon Oils Ltd
Unit 6 Sovereign Court
Wyrefields
Poulton Business Park
Poulton-le-Fylde
Lancashire FY6 8JX





THE EXPERTS IN COOLANT TECHNOLOGY

CASTROL OFFERS YOU A COMPREHENSIVE RANGE OF WORLD-CLASS SOLUBLE COOLANTS AND PRODUCT SUPPORT SERVICES THAT WILL HELP YOU TO:

- > **Increase your productivity and performance**
- > **Achieve your health, safety and environmental (HSE) commitments**
- > **Meet your machining requirements**
- > **Reduce coolant use**

For many years, Castrol has been at the leading edge of soluble coolant development. This has resulted in a world-class range of soluble coolants – and the technical expertise to support them globally.

We can offer you global process and applications expertise through our network of sales, engineering and research specialists. Our goal is to increase your productivity and help you achieve your important environmental targets.

You can trust Castrol to provide the right product for the job, across all your operations.

A CHOICE TO SUIT YOUR NEEDS

Castrol has a high-performance and versatile range of soluble coolants that will satisfy your machining and environmental requirements.

As the experts in coolant technology, our sales and technical support team will work with you to choose the right products for your operations, taking the following important factors into account:

- The machining process – speed, feed, depth of cut
- Material specifications
- Process compatibility
- Water quality
- Surface finish requirements
- System parameters – size, filtration
- Local legislative requirements
- Waste treatment

QUALITY AND RELIABILITY FROM START TO FINISH

CASTROL SOLUBLE COOLANTS GIVE YOU THE ADVANTAGE

Choosing our soluble coolants will boost your productivity and performance

- Increased feed and speeds reduce your cycle times
- Enhanced tool life cuts downtime and tooling costs
- Low foam technology permits use at high coolant pressures
- Easy-to-manage products let you focus on your core operations
- Enhanced wetting characteristics lead to low coolant drag out

Our products can help you to improve your HSE performance

- Bacteria-resistant technology reduces the need for tank side biocides
- Longer system life reduces the volume of waste fluid that needs to be treated
- Our range meets your local legislative requirements, e.g. boron, chlorine, phenol, nitrite-free
- Lowers the risk of fire compared with neat oils
- Our products can be used across a wide range of water hardness

We can meet your machining requirements

- Our comprehensive range meets your operational needs – from grinding to broaching, from ferrous metals to specialist aluminium alloys
- Multi-metal compatible fluids reduce the risk of metal incompatibility
- Our products provide a constant performance over wide ranges of water hardness
- Tool life is maximised through superior lubrication and cooling

Soluble coolants perform three critical tasks in the metalworking process:

Cooling

Measurements made during metal cutting show that 97% of the energy expended in cutting metals is converted into heat. Left uncontrolled in the absence of soluble coolants, this heat would render the cutting process impractical for two reasons:

- The cutting tool would lose its hardness
- The heat build-up in the work piece would make control of size tolerances impossible and could result in discolouration

Other performance characteristics

- Corrosion prevention
- Resistance to bacteria and fungus
- Low foam
- Good filterability
- Tramp oil compatibility
- Machine compatibility

Lubrication

In metal cutting there is friction, which also produces heat. A key purpose of a soluble coolant is to act as a lubricant to reduce the amount of friction between the cutting tool and the chip.

Inadequate lubrication may cause:

- Build-up edge causing chip welding and premature tool failure
- Deterioration of the surface finish of the work piece

Wash Action and Chip Removal

When performing any metal cutting operation, removing the chips and swarf from the work area is required.

Inadequate chip removal may cause:

- Deterioration of the surface finish and premature tool wear
- Tool breakage owing to improper chip evacuation in operations like deep-hole drilling and Mapal-reaming

CASTROL SOLUBLE COOLANTS MEET ALL MATERIAL REQUIREMENTS WHATEVER YOUR INDUSTRY



Cast Iron Machining

Cast iron materials are characterised in general by their minimum carbon content of 1.7%. Depending on this content, the machinability is influenced by the volume and the structure of the embedded graphite. In comparison to steel, cast iron materials are relatively easy to machine.

Cast iron materials are classified into three groups:

- Cast iron with laminate graphite
- Cast iron with nodular graphite
- Black malleable cast iron and white malleable cast iron

Castrol has a wide range of soluble coolants with excellent corrosion protection properties to meet your cast iron machining requirements.

Our soluble coolants for cast iron machining are under the 'Almaredge', 'Alusol', 'Clearedge', 'Hysol' and 'Superedge' names.

Aluminium Machining

Aluminium alloys are generally classified according to the content of specific elements found in the alloy, such as copper, zinc, manganese, silicon or magnesium.

Typically, the amount of silicon found in the aluminium alloy has a direct correlation to the coolant required to machine the material. Higher silicon-containing alloys are more abrasive and brittle.

Castrol has extensive experience and knowledge in machining various aluminium alloy metallurgies. Castrol understands the unique characteristics that are required of soluble coolants to effectively machine each specific alloy and has formulated products with unique lubrication packages to prevent tool wear as well as provide corrosion/stain protection that is compatible with varying materials.

Our soluble coolants for aluminium machining are under the 'Alusol', 'CareCut', 'Clearedge', 'Cooledge' and 'Hysol' names.

Ferrous Alloy Machining

When choosing a soluble coolant for machining ferrous alloys, the following properties of the work piece material should be considered:

- Carbon content of the material – high carbon steel requires more lubrication to machine the material effectively
- Hardness of the material – typically hardened materials require more lubrication for similar machining processes
- Machining process – from light-duty grinding to tapping and heavy-duty broaching
- Type of material – stainless steel or nickel alloy steels

Castrol has worked at the forefront of advanced technology to develop a robust range of ferrous machining fluids to meet all the above requirements as well as maintain corrosion protection of the material.

Our soluble coolants for ferrous alloy machining are under the 'Almaredge', 'Alusol', 'CareCut', 'Clearedge', 'Cooledge', 'Hysol' and 'Superedge' names.

CASTROL'S SOLUBLE COOLANT EXPERIENCE & KNOWLEDGE HELP MAXIMISE YOUR PERFORMANCE

We deliver full support

From standard technical support and routine testing and monitoring, to complete system management, we can provide products and services to meet your unique requirements.

Parameters that should be measured routinely

- Concentration – A refractometer is a simple tool for checking the level of coolant and water mixture. Some soluble coolants may require acid splits or alkalinity measurements to maintain concentration. This ensures the correct level of lubrication and product constituent
- pH – Maintaining pH will reduce biological activity in the system, extend system life and maintain corrosion protection

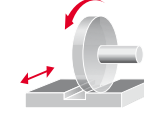
- Tramp oil – Excessive tramp oil can lead to biological concerns and weaken the emulsion stability of the soluble coolant
- Hardness – Is the measure of inorganic salts (calcium, magnesium) dissolved in water. Increased hardness can lead to emulsion stability issues and cause 'splitting' of the soluble oil emulsion. Castrol has a full range of soluble coolants to meet any water conditions
- Bacteria/fungus – Dip slide is a simple method of checking the bacteria and fungal conditions of the soluble coolant. Bacteria/fungus may cause corrosion, poor filterability, drop in pH-value and odour issues



GRINDING



CENTRELESS GRINDING

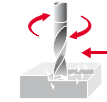


SURFACE GRINDING



CYLINDRICAL GRINDING

MILLING



END MILLING



FACE MILLING TOOL



SIDE & FACE MILLING TOOL

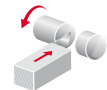


FORM MILLING TOOL



PLAIN/SLAB MILLING TOOL

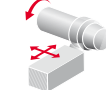
TURNING



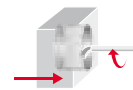
CUTTING OFF



GROOVING

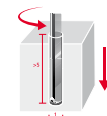


FORM TURNING



BORING

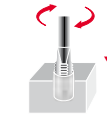
DRILLING & DEEP HOLE DRILLING



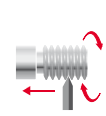
DEEP HOLE DRILLING



STANDARD DRILLING

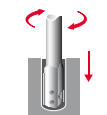


STANDARD TAPPING



SINGLE POINT THREADING

REAMING



ONE BLADE REAMER

BROACHING



EXTERNAL BROACHING



INTERNAL BROACHING

GLOBAL SUPPLY, TECHNOLOGY AND MACHINING CENTRES



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