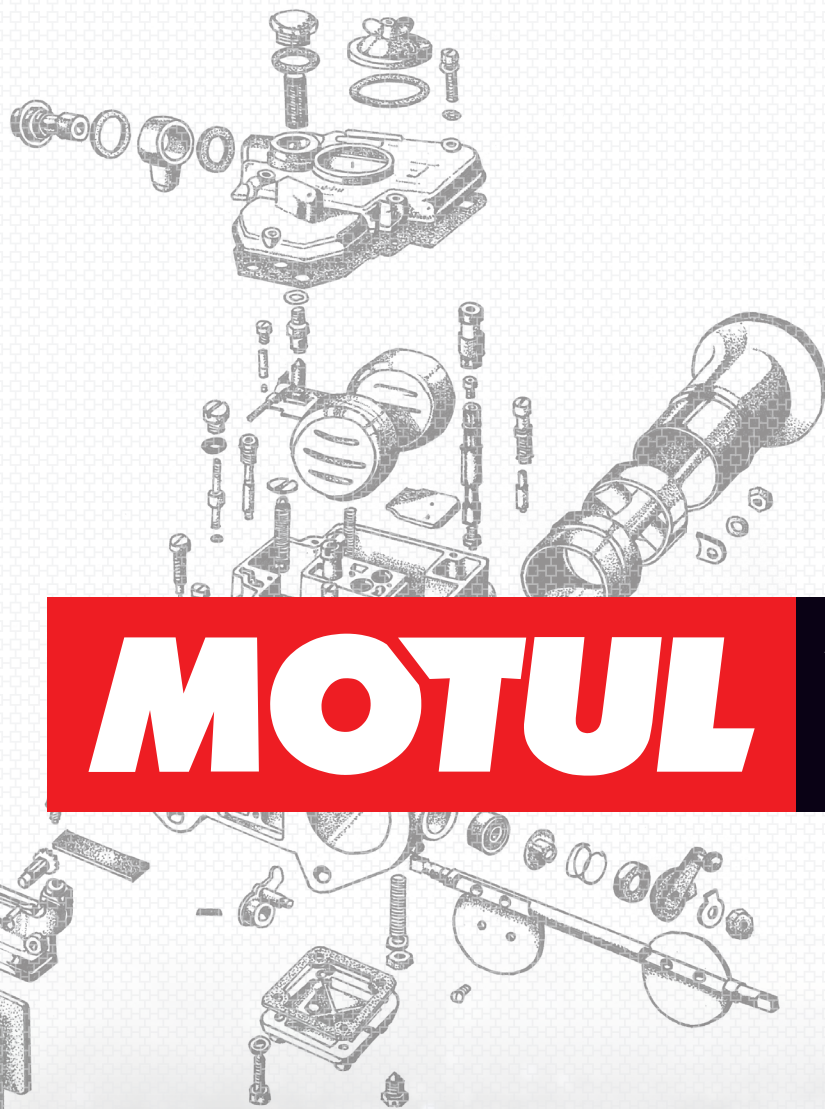


# HEAT TREATMENT



**MOTUL**

**TECH**

**THE MOTULTECH RANGE  
OF QUENCHING PRODUCTS**

# MOTUL TECH

MotulTech is a division of the Motul group, an international French industrial group, specialist for 150 years in high performance lubricants.

MotulTech develops, manufactures and markets industrial high technology lubricants for the machining and transformation of metals, as well as the high performance lubrication of industrial equipment.

MotulTech has presence in many countries all over the world through its products and services as well as production and R&D.

## HEAT TREATMENT

**Every heat application is unique, each of our customers has specific requirements.**

In the light of extensive expertise and being a crucial member of the A3TS, heat treatment association, MotulTech has a range, covering all applications from cold quenching with an aqueous quenching polymer to hot quenching at 250°C. This range is the result of a long collaboration with heat treatment specialists. Listening to your requirements, our experts develop products that reconcile the search for high performance and productivity with the respect for users and the environment. Experts that put at your service their knowledge of your applications and your area of activity. MotulTech thus offers you a set of complete solutions including products and services.



|     |             |              |         |              |          |                      |                             |                            |       |
|-----|-------------|--------------|---------|--------------|----------|----------------------|-----------------------------|----------------------------|-------|
| GAS | FUSED SALTS | VERY HOT OIL | HOT OIL | SEMI-HOT OIL | COLD OIL | ACCELERATED COLD OIL | HIGHLY ACCELERATED COLD OIL | WATER + QUENCHING SOFTENER | WATER |
|-----|-------------|--------------|---------|--------------|----------|----------------------|-----------------------------|----------------------------|-------|

|            |            |               |               |               |               |         |
|------------|------------|---------------|---------------|---------------|---------------|---------|
| Thermic    | Thermic    | Thermic       | Thermic       | Thermic       | Thermic       | Thermic |
| <b>100</b> | <b>30R</b> | <b>SPH 10</b> | <b>TO 10R</b> | <b>TO 25R</b> | <b>SH 615</b> |         |
| <b>150</b> |            |               | <b>TO 19R</b> | <b>TO 26R</b> | <b>SP</b>     |         |
|            |            |               |               | <b>TO 20R</b> | <b>FGP</b>    |         |

The generic name THERMIC precedes all our references

## HEAT TREATMENT PROCESS

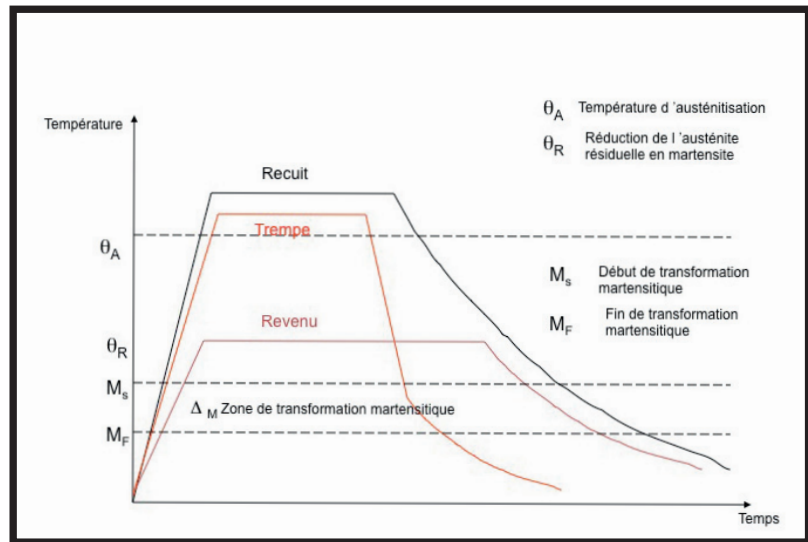
**MOTUL** TECH

Heat treatment consists in giving specific mechanical properties to metal alloys and to make them suitable for meeting the operating requirements.

Thermal cycles consist in heating at a given temperature greater than the transformation point or solution annealing point, followed by maintaining at this temperature and cooling in a specified fluid to obtain the required properties.

The main thermal cycles are:

- Quenching: process that provides hardness and brittleness. The quenched parts have specific metallurgical properties. The brittleness is partially eliminated by tempering.
- Tempering: continuous quenching process. The quenched parts are often too fragile (brittle). Tempering reduces the brittleness.
- Annealing: it eliminates the properties brought about by quenching and restores the initial properties of the metal.



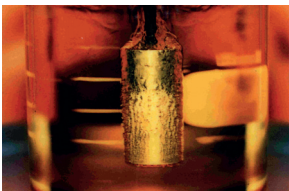
## QUENCHING

This is a heat treatment that consists in heating the metal to a temperature greater than the austenitizing point, maintaining it at this temperature for a sufficiently long time so that all carbides pass into solution without austenite grain coarsening and then cooling it quickly and continuously.

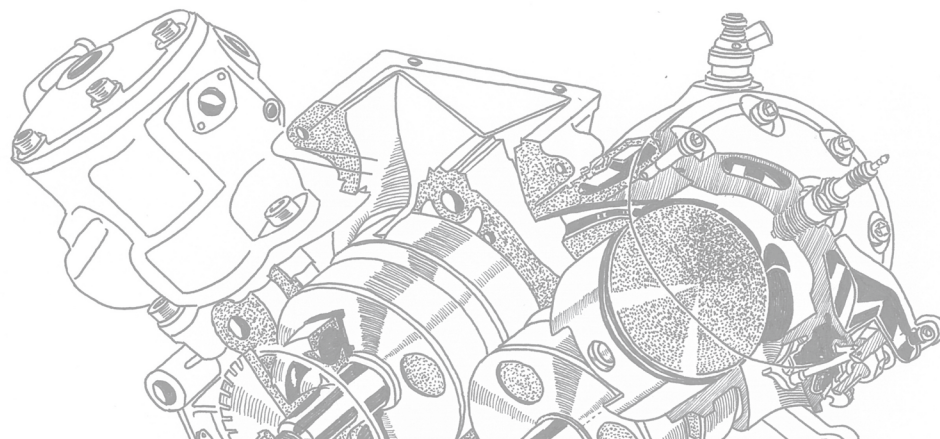
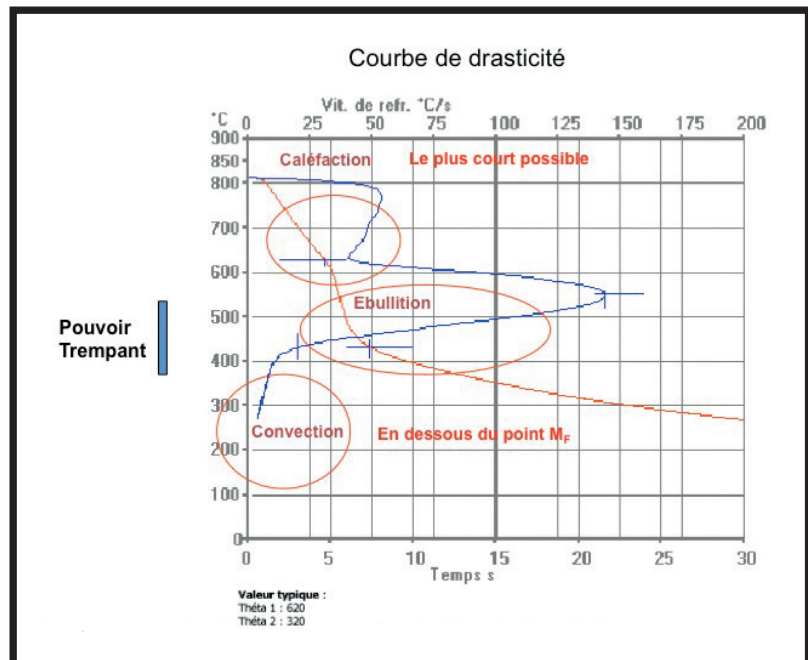
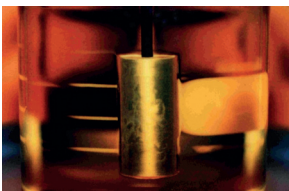
### CALEFACTION



### BOILING



### CONVECTION



# THE MOTULTECH RANGE OF NEAT QUENCHING OILS

The range of High Performance MotulTech heat treatment oils offers a large choice of effective, innovative and economical solutions for the most specialised industrial applications. Their formulation meets the strictest requirements of the current regulations. MotulTech also proposes a range of products and services to ensure the maintenance of fluids and guarantee a high performance level.

The THERMIC quenching oils are characterised by their high performance level and have numerous advantages:

- High thermal stability
- Excellent resistance to oxidation and cracking
- Good wetting power
- Constant quenching power
- Optimised fluidity minimising drag out
- High flash points limiting fire hazards
- Do not leave deposits on parts after treatment
- Can be used in all types of furnaces

The THERMIC quenching oils are classified according to their operating temperature and their cooling rate.

## COLD QUENCHING

Can be used up to 80°C for applications where deformation is not a problem during quenching.



### THERMIC TO 10

Heat treatment of parts made from steel with good hardenability, of **simple geometry** such as small mechanical parts, forged parts and bolts.

### THERMIC TO 10R

**Slightly accelerated** quenching oil, used for heat treatment of alloyed and moderately alloyed steel for mechanical construction such as hard and semi-hard carbon steel, low and moderately alloyed steel as well as martensitic stainless steel.

### THERMIC TO 19R

**Accelerated** quenching oil, used for heat treatment of alloyed and semi-alloyed steel parts of **complex geometry** and more specifically medium-hard carbon steel, medium and low alloy steel.

### THERMIC TO 25R

**Highly accelerated** quenching oil, used for heat treatment of mechanical engineering steel parts, such as medium-hard carbon steel and low alloy steel.

### THERMIC TO 26R

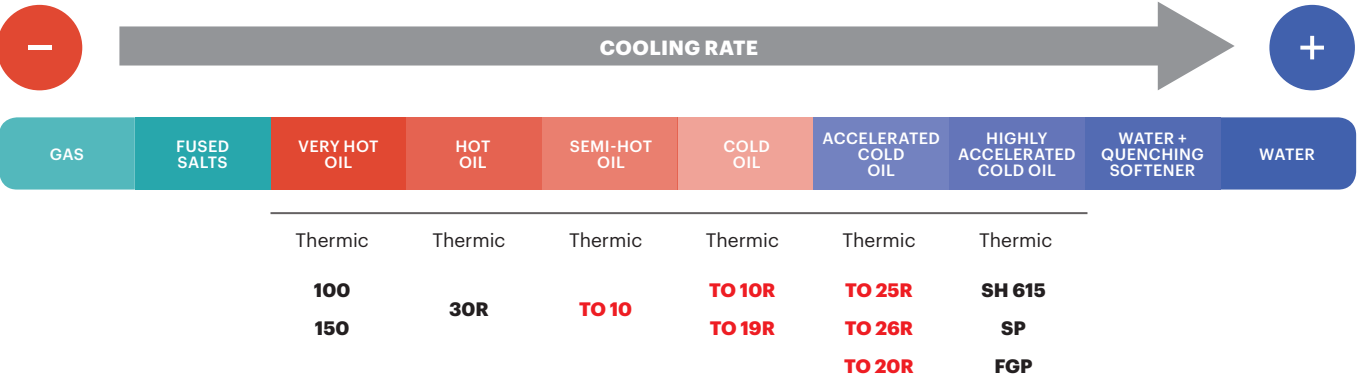
**Highly accelerated** quenching oil, used for heat treatment of alloyed or non-alloyed steel of poor hardenability, such as medium-hard carbon steel and low alloy steel parts of **complex geometry**.

## VACUUM QUENCHING

Used for heat treatment of steel in vacuum and thermochemical vacuum.

### THERMIC SV6

Bainitic and martensitic heat treatment of mechanical parts of complex geometry sensitive to deformation for specific applications in aeronautical, medical and automotive fields.



# THE MOTULTECH RANGE OF NEAT QUENCHING OILS

## SEMI-HOT QUENCHING

Use between 60 °C and 120°C for martensitic quenching of mechanical steel parts of complex geometry.

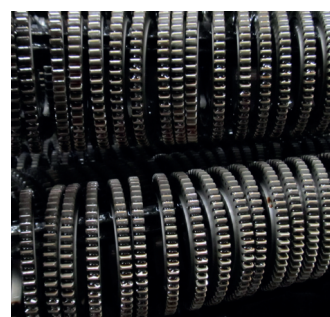


### THERMIC 15

Used for **martensitic quenching** of mechanical steel parts of **complex geometry** and more specifically hard and medium-hard steel as well as case-hardened steel parts:

### THERMIC 30R

**Very drastic** quenching oil designed only for **extremely poor hardenability steel** such as low alloy steel, steel of poor hardenability and case hardened parts over large depths.



## HOT QUENCHING

Used at a temperature greater than 180°C in order to be able to control the deformations during quenching. This process is also known as "marquenching".

### THERMIC 100

Designed for isothermal martensitic tiered heat treatment and hot quenching. Application: Low and medium alloy case hardened steel, low alloy nitrocarburizing steel. Continuous hot quenching of carbon steel.

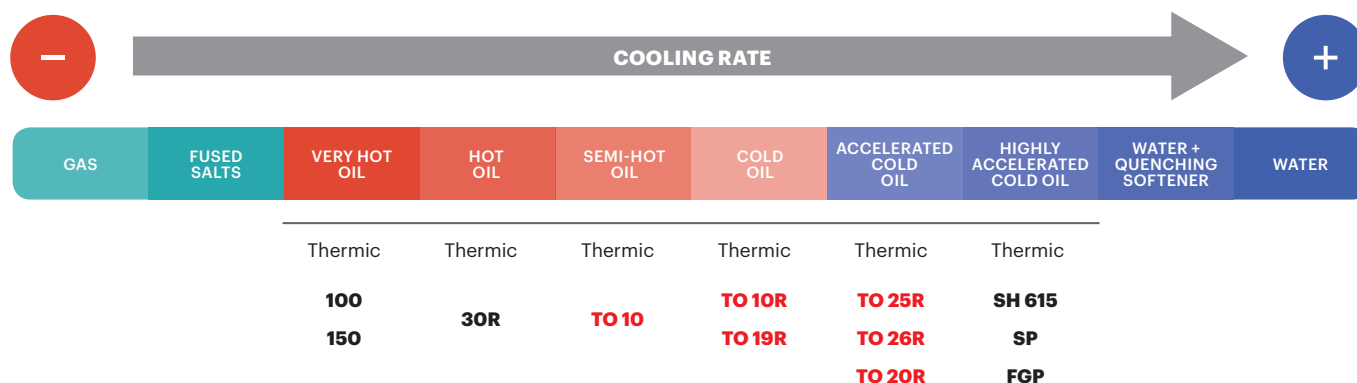
### THERMIC 150

Used for the same applications as Thermic 100, Thermic 150, it has a **reinforced resistance to oxidation** as well as a **higher cast hardening power**.

## SUPER HOT QUENCHING

### THERMIC SPH250

Designed for martensitic or bainitic tiered heat treatment of mechanical parts of complex geometry. Application: Same application as super hot quenching oils. Can replace the martensitic quenching in a nitrite-nitrate salt bath.



# THE MOTULTECH RANGE OF SOLUBLE QUENCHING FLUIDS

## INDUCTION HARDENING

**Soluble induction hardening** is a superficial heat treatment process that only affects the surface of the part to provide it with good hardness while retaining a good core resilience of the part. This process is used for the production of certain parts such as gears, transmission shafts or tools.

The surface of the steel part is quickly and locally heated, to avoid thermal diffusion at the centre of the part, up to the austenitizing temperature and then cooled rapidly.

The advantages are:

- Localised, quick and economical heating
- No deformation of the part
- Serial quenching, integrated into the production line, on the induction machine
- Concentration adapted to attain the desired cooling rate
- Corrosion inhibitor without boron and diethanolamine
- Good dermatological behaviour
- High resistance to micro-organisms (without formaldehyde and formaldehyde releasers)

### THERMIC SH615

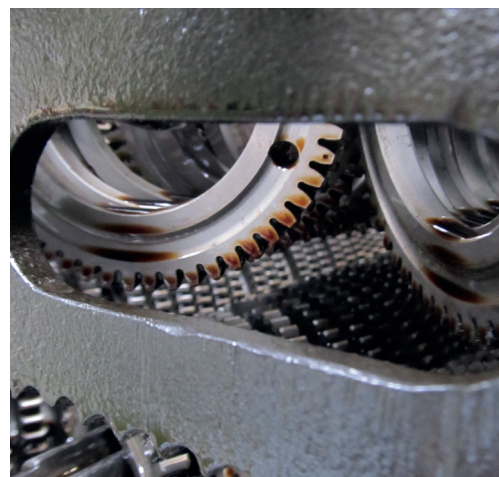
Soluble quenching polymer, enabling, according to the percentages, to obtain different cooling rates so as to cover a large operating range. The service concentration depends on the nature of steel to be treated and the desired hardening depth. Generally, it is between 6 and 15% (shower, immersion, etc.). The recommended temperature of the bath is between 30 and 50°C maximum.

THERMIC SH 615 can be used when tempering is stopped from 4%.

### THERMIC SP

Water soluble synthetic liquid, used diluted for surface hardening operations, ensuring a high protection against corrosion of the treated parts as well as the machine parts.

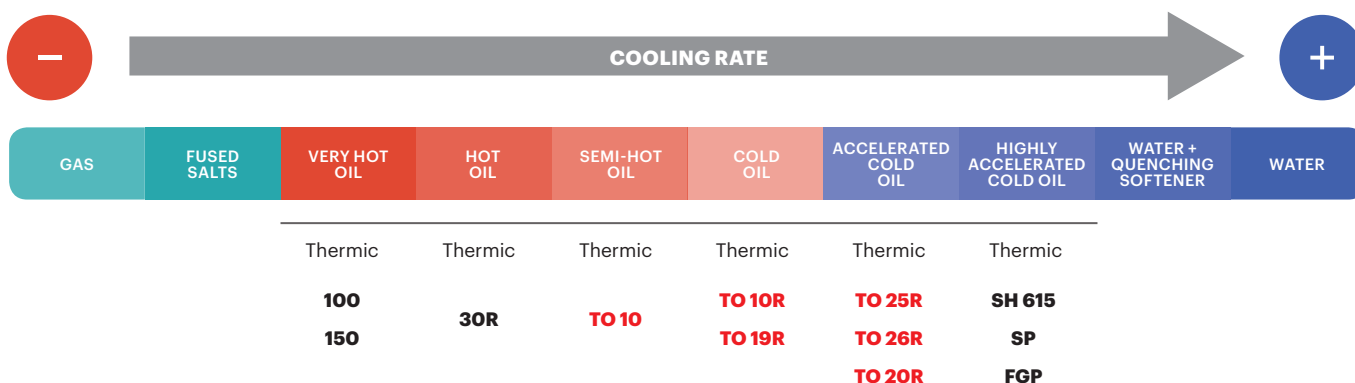
THERMIC SP can be used for tempering stop, when a middle term protection against corrosion is required, without additional rust preventative product.



## MASS QUENCHING

### THERMIC FGP

Water-soluble synthetic liquid used as a solution in water for mass quenching, without nitrite. Allows to get several cooling rates according to the ratio of concentrate diluted in water. THERMIC FGP, used generally after volume heating, can be diluted between 10% and 25%, depending on the steel grades to be treated. The recommended temperature of the bath is between 25°C and 45°C.



## THE SERVICE ASSOCIATED WITH THE MOTULTECH HEAT TREATMENT PRODUCTS

In order to guarantee easy implementation, optimum performance and extended service life for its heat treatment products, MotulTech proposes a set of additional services and equipment to its customers.

### The specific services relating to the quenching fluids:

The quenching fluid in use is highly sought in its lifetime, according to the number of cycles and temperature of the hardened metal. To limit and remedy the deterioration of the oil in use, monitoring of the parameters and therefore monitoring in operation by analysis must be ensured. The frequency of the analysis depends on the oil requirement: operating temperature, load/oil volume ratio, environment. The main parameters monitored are therefore:

- Oxidation
- Contamination
- Fire hazard
- State of the filtration system
- Cooling power
- Quenching power
- Drasticity

### MOTULTECH LABORATORY PHOTO



Drastimeter enabling to establish and check the characteristics of a quenching oil (drasticity).

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## OTHER MOTULTECH SERVICES



- The product recommendation: advice for finding the product most suited to your requirements
- On sitetechnical validation of the recommended product and implementation in the workshop with audits, analyses, equipment, methods.
- Monitoring of the product in service, including analyses, training, maintenance equipment (oil separators, etc.)

A complete catalogue of the MotulTech Service offer is available with your MotulTech sales representative.

### • Our partners in heat treatment

Vacuum quenching: ECM

Soluble quenching: SAET, GH

Complete quenching: SERTHEL, CFI, AICHELIN, SOLO, CIEFFE, BMI, IPSEN

### • Our customers in heat treatment:

AMIS, SIFCOR Group, PSA Group, STAR TRANSMISSION, AGRATI, NTN, JTEKT, FIAT, BODYCOTE

# THE MOTULTECH OFFER

**MotulTech is a global player in Industrial Lubricants. It brings to its customers high end products, skills and services.**  
MotulTech offers performance and quality through very complementary product ranges.

| APPLICATION                       | PRODUCT RANGE / PRODUCT |                          |                        |
|-----------------------------------|-------------------------|--------------------------|------------------------|
| HYDRAULIC FLUIDS                  | RUBRIC                  | RUBRIC CLEAN             | RUBRIC BIO             |
| SPINDLE OIL                       | SPEED                   |                          |                        |
| SLIDEWAY OIL                      | SLID FILM               | SUPRASLIDE               |                        |
| GEAR DRIVE LUBRICANTS             | SUPRACO MPL             | SUPRAGEAR SY             | SUPRAGEAR GL           |
| COMPRESSOR OILS                   | ALTERNA                 | VIS                      | BAR                    |
| CHAIN AND CONVEYOR LUBRICANTS     | CIMLUBE HE CL           |                          |                        |
| HIGH PERFORMANCE GREASES          | IRIX HP                 | CIMLUBE                  | TECH GREASE            |
| CUTTING/ SUPERFINISHING NEAT OILS | SUPRACO                 | PROFILINE                | SUPRACUT & SUPRACUT HC |
| NEAT FORMING/ COLD FORGING OILS   | CADREX                  | CENTER OIL               | UNIVERSELLE            |
| HEAT TREATMENT OIL                | THERMIC                 |                          |                        |
| SOLUBLE CUTTING FLUIDS            | STABILIS (EMULSION)     | SAFKOOL (SEMI-SYNTHETIC) | BIOCOOL (SYNTHETIC)    |
| CLEANING & PROTECTION             | MT PROTECT              | SAFCO KLEEN              |                        |

|                 |                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PEOPLE</b>   | Everywhere in the world, MotulTech professional teams of lubrication are servicing industrial customers.                                                     |
| <b>SERVICE</b>  | Advices, product monitoring, technical assistance for MotulTech customers.                                                                                   |
| <b>R&amp;D</b>  | Innovation drives MotulTech. With laboratories in the main industrial areas of the world, MotulTech finds new solutions for tomorrow's industry.             |
| <b>LOGISTIC</b> | As an industrial supplier, MotulTech has to offer a perfect logistic to its customers. This is our commitment.                                               |
| <b>QUALITY</b>  | The MotulTech commitment for quality is certified by ISO 9001 and ISO TS16949. It allows MotulTech to guarantee Premium quality products all over the world. |

# MOTUL

119, boulevard Félix Faure  
93300 Aubervilliers  
Tél.: +33.1.48.11.70.30  
Fax.: +33.1.48.11.70.38  
[www.motul.com](http://www.motul.com)

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