

Lubricant solutions for the medical technology 2024



MOVING YOUR WORLD



FUCHS LUBRICANTS GERMANY

We don't just develop lubricants. For highly complex challenges in a wide range of industries, we develop innovative lubricant solutions that enable the mobility of tomorrow. Our goal: to keep our customers' world in motion. Efficient, sustainable, reliable. Today and tomorrow.

What can we move for you?

FUCHS LUBRICANTS

Facts and figures

Company: FUCHS LUBRICANTS (UK) plc,
a company of the FUCHS Group

UK manufacturing site: Hanley Stoke-on-Trent,

Product range: A full range of more than 3,000 products
for all application areas

Certifications: ISO 9001, IATF 16949, EN 9100, ISO 14001,
ISO 50001 and ISO 45001

(detailed certifications at www.fuchs.com/uk)

Gate-to-Gate* CO₂-compensated

FUCHS LUBRICANTS (UK) plc is a subsidiary of FUCHS SE, the world's largest independent supplier of lubricant solutions.

The high level of technical consulting expertise combined with the largest, nationwide network of its own technical contacts makes FUCHS LUBRICANTS a reliable local partner. A comprehensive product range, supplemented by digital offerings and Smart Services, as well as many years of lubricant expertise and a high level of research competence are the foundations for the innovative FUCHS lubricant solutions. They reduce wear and energy requirements, extend the running times and service life of machines, and thus keep the world moving - from industrial motors and e-cars to wind turbines and washing machines. FUCHS LUBRICANTS is certified according to a wide range of standards and, as a technology leader and development partner, places the highest demands on quality management.

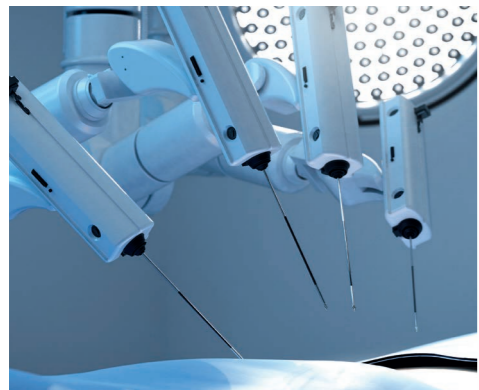
Customers in all industries benefit from this quality management: automotive suppliers and OEM, mechanical engineering, metal processing, mining and exploration, aerospace, energy, construction and transport, agriculture and forestry, as well as the paper, steel, metal, cement, forging and food industries, but also qualified lubricant dealers, car dealerships and workshops.

MOVING YOUR WORLD

*Gate-to-Gate Scope includes GHG-Protocol Scope 1, 2 and selected Scope 3 emissions (water, waste, business travel, commuting)

LUBRICANT SPECIALISTS FOR THE MEDICAL INDUSTRY

In the dynamic field of healthcare, where precision and reliability are critical, the need for specialty lubricants is particularly evident. Medical technology systems present complex challenges that make the use of specialty lubricants unavoidable. In addition, tested non-cytotoxic cooling lubricants also offer high biocompatibility. This ensures that the end products are absolutely safe and suitable for use in various medical applications. FUCHS develops solutions worldwide to meet these high requirements and ensure optimum functionality and patient safety.



Lubricants for use in medical devices

- NyeMed® product line
- Motion control & sealing
- Electrical connectors, contacts & switches
- Robotics & automation

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Lubricants used in the manufacturing of medical devices

- Approved non-cytotoxic lubricants for the tool machine
- High-performance metalworking fluids for machining in medical technology
- Magnesium processing
- Minimal quantity lubrication
- Cleaner for optimum process safety

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Our NYEMED® product line

Lubricants are critical design sub-components that add value to, or enable, breakthrough medical technology.

NYE is your partner in selecting and designing the right formulations that serve not only to lubricate, but also to seal, protect, and control motion.

Our products perform in a vast array of critical applications including:

- Medical devices
- Drug delivery devices
- Diagnostic equipment & instrumentation
- Robotic automation
- Assembly processes
- Powered surgical tools & equipment.

Spring-loaded mechanisms, bearings, gears, linear positioning devices, hand-held actuators, lead screws and O-ring seals represent only a few examples of the diverse range of components within medical devices that can benefit from our specialty gels and fluids.

Examples of performance benefits include:

- Extending operating life
- Broadening of operating temperature range
- Controlling or damping of energy release
- Eliminating undesirable noise
- Optimizing haptic feedback
- Sealing against dirt, debris or moisture in the environment
- Reducing force required during assembly or connection
- Mitigating the effect of tolerance stacking.

NYE adds value to breakthroughs in medical technology every day. We provide a high level of support, augmented with a robust quality management system, ISO 13485:2016 certification, and an appreciation of the need for innovation as well as risk reduction. Considerations When Selecting Gels & Fluids for Medical & Pharmaceutical Applications.

LUBRICANTS FOR USE IN MEDICAL DEVICES

Carefully selected lubricants do much more than reduce friction and wear-rate between surfaces in device and equipment mechanisms. They can broaden a product's operating temperature range, reduce unwanted noise, control motion, improve touch-sensitivity and user perception, reduce variability and limit design or production costs by reducing the need for extremely tight dimensional tolerances.



NYE LUBRICANTS

Nye Lubricants (certified according to ISO 13485:2016) has been part of the FUCHS Group since 2020 and complements the portfolio with synthetic lubricants for special applications and markets.

Medical applications



Motion control & sealing

In medical equipment, viscous damping greases or gels can smooth operation, eliminate noise, and reduce the impact of environmental factors, e.g. by sealing gaps and orifices. These products provide appropriate viscous drag on parts while moving. This stress resistance controls motion and minimizes free-motion problems, such as backlash, stick-slip, or coasting. Products with appropriate rheological characteristics can be selected, or formulations

can be tailored to the requirements of the application. NYEMED® damping products share important physical characteristics: carefully controlled flow properties; low oil separation, and good compatibility with plastics. These products serve as a starting point for custom-design of experimental formulations for specific customer applications.

Electrical connectors, contacts & switches

Microelectronics are proliferating in medical devices, requiring increasing numbers of connectors and contacts. The benefits of lubricating electrical connectors and switches in medical devices include:

- Providing protection against sterilizing conditions, dust, reagents, moisture, and corrosive substances
- Reducing friction and wear
- Lowering insertion force.

A special class of medical applications that utilize viscous damping gels involves the development of disposable and reusable devices such as: pumps, hand-held injectors or inhalers, for drug or implant delivery. These devices rely on our products to lubricate parts, absorb shock, control dose delivery rate, and ensure complete dose delivery while optimizing the feel and sound of the device. The result is enhancement of functionality, quality, and usability, thus leading to higher patient compliance, lower risk, and better treatment outcomes.

Robotics & automation

This application class encompasses a broad range of mechanisms. Some will benefit from the use of our NYEMED® product line, while others will meet design requirements with our standard NYE products that have a proven record of success in automated equipment utilized in the Aerospace, Semiconductor and In-Vacuum industries.

Bearings

Wide range of lubricants offered, from impregnating oils for sintered bearings to ultrafiltered greases for rolling element bearings. Greases can provide the elastohydrodynamic lubricating film needed to reduce friction and wear, while also serving as an effective seal to protect from contaminants and moisture.

Gear motors & gear boxes

Gear lubricants meet broad temperature requirements without oxidizing or evaporating. Lubricants minimize friction, inhibit wear and corrosion, dampen noise and control free motion.



Linear positioning devices & sliding parts

Mechanisms require lubricants that exhibit stay-in-place properties, while minimizing friction, inhibiting wear, rust, and corrosion, damping noise, and controlling free motion.

Lead screws & ball screws

Lubricants reduce torque, increase efficiency, and extend performance life.

NYEMED® product line

Brand name	Properties	Type
NYEMED® 7325	UV-dyed, high-viscosity gel or grease with a narrow viscosity specification.	Silicone
NYEMED® 7364	Extremely stiff, tacky, very high viscosity gel or grease.	Synthetic Hydrocarbon
NYEMED® 7560	UV-dyed, medium-viscosity, clear gel or grease. Applications range from mild damping to protection of electrical contacts and connectors.	Synthetic Hydrocarbon
NYEMED® 7492	UV-dyed, low-viscosity gel or grease with high affinity for metal surfaces. Typical applications might include high-speed bearings, switches, etc.	Ester
NYEMED® 7630	Medium viscosity gel or grease that excels at high-speed and high-temperature applications, providing corrosion and wear protection.	Synthetic Hydrocarbon
NYEMED® 7571	Medium viscosity gel or grease with high oxidative stability and lubricity, providing environmental protection for both plastic and metal substrates.	Perfluoropolyether
NYEMED® 7471	Inert fluid possessing a very wide temperature range (-70 to 250 °C), excellent oxidation resistance, high plastic/elastomer compatibility, and low solubility.	Perfluoropolyether
NYEMED® 7477	Medium viscosity inert gel or grease possessing a very wide temperature range (-70 to 250 °C), excellent oxidation resistance, high plastic/elastomer compatibility, and low solubility.	Perfluoropolyether

Full-line supplier in medical technology

FUCHS not only has a high-performance lubricant program, but also the necessary process expertise to meet the specific challenges and regulations.

As implants remain in the body for at least 15 years or even longer and are permanently subject to cyclic loads, very high demands such as excellent bio-compatibility are made on the quality of the materials used. Apart from the material itself, surface finish is a decisive factor in the functionality of an implant.

Stainless steels, cobalt-chrome alloys are growing in popularity as well as ceramics and the even more popular titanium alloys. These materials are characterized by high tensile strength, resistance to fatigue and thus by difficult and cost-intensive machining. For these reasons, cutting fluid selection plays an essential role in guaranteeing the highest medical standards while maintaining machining efficiency. For each processing step, FUCHS offers an optimum product, from **water-miscible metalworking fluids**, **neat oils** and for **minimum quantity lubrication applications** to **special universal oils** which display excellent properties for both machining operations and machine tool hydraulics.

Because hydrogen is created during chip-forming machining with emulsions, the use of magnesium as an absorbable implant material poses a special challenge which FUCHS has successfully overcome with special, newly-developed products. The advantage of magnesium, which is also present in the body, is its automatic degradation which eliminates the need for further surgery after the implant has been fitted. We are also fully conversant with the **latest cleaning processes** through our participation in the NMI research project into innovative cleaning procedures in medical technology as well as the enormously important certification process.

Reassure yourself about the effective and efficient application of the latest high-tech cutting fluids and comprehensive service offer from the initial consultation to routine subsequent checks from the number one lubricant specialist.



Source: BVMed

LUBRICANTS USED IN THE MANUFACTURING OF MEDICAL PRODUCTS

Lubricants for medical technology must be high-performance, economical, and free of environmentally and health-damaging ingredients, and additionally meet high requirements for qualification and validation.



Optimized lubricants for specific requirements in medical technology



Highest lubricant performance

Cutting and grinding fluids in the medical technology industry along with the manufacturing methods as well as the final cleaning of the components are an integral part of the component licensing. This means that every change must be examined for influence on the integrity or the sterility of the component.

Very high demands are thus made on the lubricants and the qualified cleaners.

Special demands

When developing innovative solutions, cooperation with the lubricant manufacturer starting at the development phase is crucial.

Firstly, to guarantee the economics of the process and to prolong tool life. Secondly, to perform the process with the maximum reliability.

One possible risk is the drag-in of contaminants which could cause problems during final cleaning.

Specialists for the machining of medical technology materials

The materials used in the medical sector pose great demands on a cutting fluid. Special demands are made on material compatibility, foaming, high-pressure stability and lubricity.

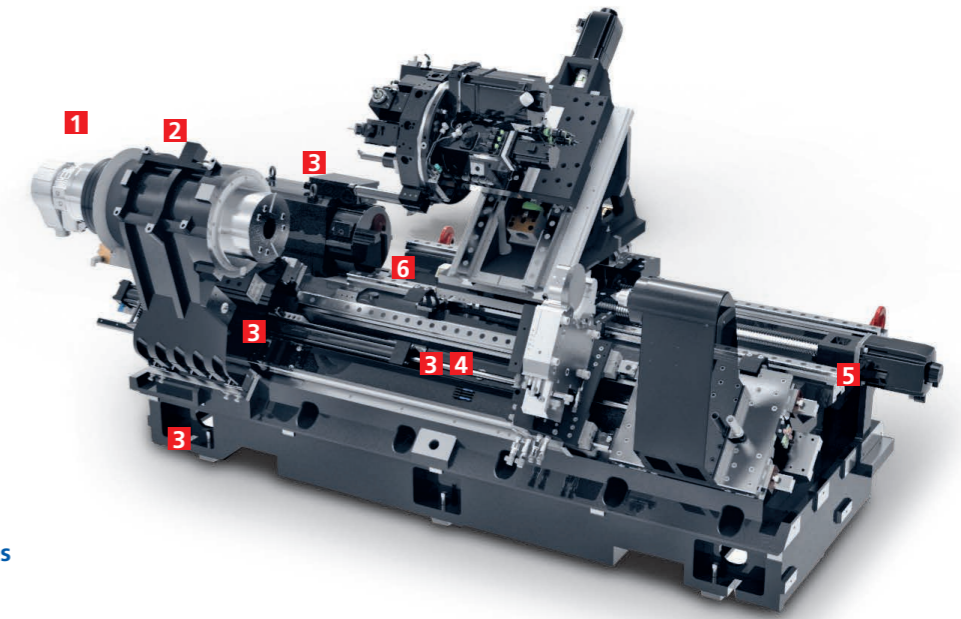
FUCHS has perfect lubricant solutions for every medical material.



Source: BVMed

Approved non-cytotoxic lubricants for machine tools and medical technology applications

- 1 Hydraulic oils**
RENOLIN ZAF B 46 HT
RENOLIN ZAF D 46 HT
UNIFLUID REIHE
- 2 Spindle oil**
RENOLIN FF 68
- 3 Greases**
RENOLIT SF7/041
RENOLIT GFW 00
RENOLIT HI-SPEED 2
RENOLIT CHUCK PASTE
- 4 Slideway oils**
RENEP CGLP 220
RENEP CGLP 68
- 5 Cleaner / Corrosion preventives**
- 6 Metalworking fluids**



Source: DMG MORI

High-performance metalworking fluids for the machining of: Titanium and cobalt alloys, stainless steels and chrome-nickel steels

Water-miscible metalworking fluid Emulsion	Neat oil	Minimum quantity lubrication (MQL)
ECOCOOL GLOBAL 1000	ECOCUT HS	ECOCUT MIKRO PLUS 20
ECOCOOL NI 1000	PLANTOCUT 10 SR	
ECOCOOL TN 2525 HP-BFH	UNIFLUID 10 und UNIFLUID 32	
	ECOCUT 7520 LE-M	
	ECOCUT FE	
	ECOCUT FT 11 MED	
	ECOCUT HFN 15 GB1	

ECOCUT FT – Products on request.

ECOCUT FT stands for qualitative high-quality grinding and cutting oils, based on base oils produced by the GTL (Fischer-Tropsch synthesis) process.

Manufacturing process of medical products

The only way to guarantee consistently high quality of medical products is to understand the entire process and the matched auxiliary materials used during machining and to employ reliable quality control.

Irrespective of this, each new process or process change must pass the necessary tests (for example cytotoxicity test, etc.) and be both checked and validated in its entirety.



Raw material

Metalworking
ECOCOOL/ECOCUT

- turning
- milling
- drilling
- thread cutting
- grinding
- polishing

Corundom
blasting

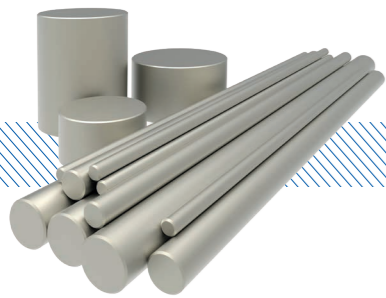
Coating

Laser printing

Every product gets its own serial number. This ensures full traceability if necessary.

Passivation

Finished part



Cleaning
RENOCLEAN

FUCHS offers special cleaners for optimum intermediate and final cleaning of medical implants and instruments. These have been designed specifically for use following processing with FUCHS machining cleaners.

Source: BVMed

Cleaners for optimum process safety



The manufacture of instruments and implants is subject to very strict requirements. The cleaners used for intermediate cleaning must reliably and thoroughly remove machining materials such as oil, wax, cooling lubricants, lapping and polishing pastes, etc. In the sense of "high purity" the final cleaning process always requires the highest cleanliness levels here.

Cleaning of implants and surgical instruments not only has a key part to play at the end of the manufacturing process. Even impurities or soiling in the ppm range can lead to serious complications with implants, for example. A stable process is therefore a top priority for compliance with the high quality standards that medical devices must meet.

However, there is no patent solution for optimum coordination of the cleaning process or system & process engineering. Instead, this results from assessment of the entire production environment. Key criteria in this regard are the materials to be cleaned, the size and geometry of the components, the type and quantity of soiling, the throughput, the necessary flexibility and obviously the specifications in terms of film-based and particulate cleanliness. When using aqueous cleaners, it is a good idea to clarify material compatibility and the results that can be achieved in advance by performing cleaning tests.

Shipping/freight containers, tools and tool holding fixtures, as well as the production rooms must also be properly sanitized using suitable cleaning products.

Brand name	pH/FP	Intermediate cleaning	Final cleaning	Description
RENOCLEAN FDC 4001	12.1	++	+	High-alkaline, phosphate-based cleaner for cleaning medical components in dipping and ultrasonic systems.
RENOCLEAN MTA 2001	7.7	++	++	Neutral, phosphate-based builder, free of surfactants, silicates and borates; suitable for dipping, ultrasonic and spray cleaning systems when used in connection with corresponding surfactant.
RENOCLEAN MTA 4001	10.2	++	++	Medium-alkaline, phosphate-based builder, free of surfactants, silicates and borates; suitable for dipping, ultrasonic and spray cleaning systems when used in connection with corresponding surfactant.
RENOCLEAN FTA 4001	12.9	++	++	High-alkaline, phosphate-free builder, suitable for steel, cast materials, titanium; suitable for dipping, ultrasonic and spray cleaning systems when used in connection with corresponding surfactant.
RENOCLEAN TENSID 161	8.6	++	++	Surfactant combination with demulsifying properties for pressure-flooding, dipping, ultrasonic and, in some cases, also spraying applications.
RENOCLEAN MTT 2003	7.2	++	++	Surfactant combination with demulsifying properties for spray, dipping, ultrasonic and spraying applications.
RENOCLEAN MTS 7001	≥ 61 °C	+	++	Modified alcohol, predominantly for final/fine cleaning.
RENOCLEAN SPEZIAL 2000	10.9	--	--	Cleaners for cleaning metal and plastic surfaces, as well as hall and workshop floors.

++ suitable + suitable after test – not recommended -- other application

Innovative lubricants need experienced application engineers

Every lubricant change should be preceded by expert consultation on the application in question. Only then can the best lubricant system be selected. Experienced FUCHS engineers will be happy to advise on products for the application in question and also on our full range of lubricants.

Contact:



FUCHS LUBRICANTS (UK) plc,
New Century Street, Hanley,
Stoke on Trent, ST1 5HU
Phone: +44 (0) 1782 203700
E-Mail: contact-uk@fuchs.com
www.fuchs.com/uk

 [/fuchslubricantsuk](https://www.facebook.com/fuchslubricantsuk)

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