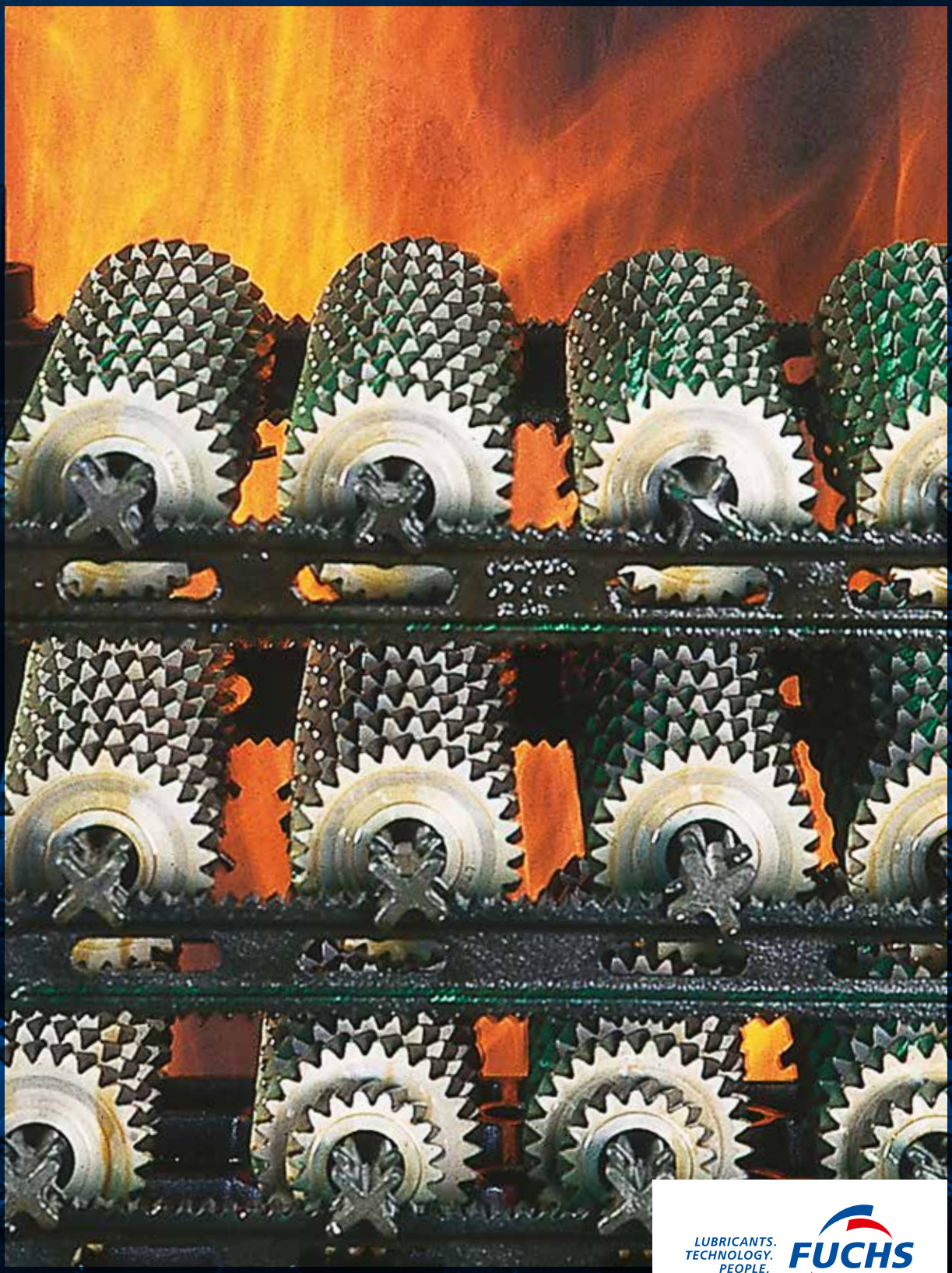
Quenching Oils and Polymer Quenchants



LUBRICANTS.
TECHNOLOGY.
PEOPLE.

FUCHS

LUBRICANTS. TECHNOLOGY. PEOPLE.

We focus consistently on high-quality lubricants and related specialties.

We develop innovative and holistic solutions for a wide variety of applications.

We value the high level of commitment of our employees and their trusting interaction with one another.

Facts and figures

Holding company: FUCHS PETROLUB SE Headquaters in Mannheim, Germany
Established 3 generations ago as a family-owned business
References: The world´s largest independant lubricant manufacturer with more than 100,000 customers
Companies worldwide: 58
Employees: Approx. 5,000 employees, over 400 of these in the department research and development
Product program: A full range of over 10,000 lubricants and related specialties
FUCHS SCHMIERSTOFFE GMBH: A company of the FUCHS Group
Headquarters: Mannheim
Other plants in Wedel, Kiel
Mitarbeiter: more than 800 employees
Certifications: IATF 16949, ISO 14001, BS OHSAS 18001, ISO 50001
References: One of the leading lubricants OEM for the German automotive industry

FUCHS has developed, produced and sold high-quality lubricants and related specialties for more than 85 years – for virtually all areas of application and sectors. With over 100,000 customers and 58 companies worldwide, the FUCHS Group is the leading independent supplier of lubricants.

A team of more than 800 specialists across Germany works to guarantee the satisfaction of our customers. Whatever their requirements, we have the ideal lubricant for their specific applications and processes. In our technology center we link interdisciplinary expertise in a quick and efficient way – and work on innovative lubricant solutions to meet the demands of today and tomorrow every single day.

FUCHS lubricants stand for performance and sustainability, for safety and reliability, for efficiency and cost savings. They represent a promise: technology that pays off.

THERMISOL GIVES COMPONENTS THE NECESSARY STRENGTH

Fluids play an important role in the area of heat treatment. Only by selecting the right quenching medium, can the required microstructural composition be achieved along with the resulting material hardness.

The quenching characteristics of a medium have a direct effect on the future properties of the material and thus its subsequent use.

Pivotal to an optimum quenching process, apart from the selection of the best quenching medium, is the exact control of all accompanying process parameters.

Only the optimum matching of all heat treatment parameters can guarantee constant and almost warp-free heat treatment results.

Place your trust in a partner who fully understands all heat treatment processes, who is glad to share its comprehensive knowledge and who can offer you carefully matched system solutions – all to your ultimate benefit.

FUCHS is also your expert partner for all prior and subsequent manufacturing processes ranging from forming and machining to cleaning and corrosion protection. Make use of our know-how to optimize your entire manufacturing operations.

Precision even at the highest temperatures

THERMISOL QB
Neat quenching oils offer lower quenching intensity and are usually used for the quenching of alloyed tool steels with simple geometries.

THERMISOL QH
These high-performance, high-additive quenching oils contain special wetting-improvers for more intense quenching. High performance quenching oils are widely used because their optimized wetting behaviour makes them particularly suitable for warp-prone components.

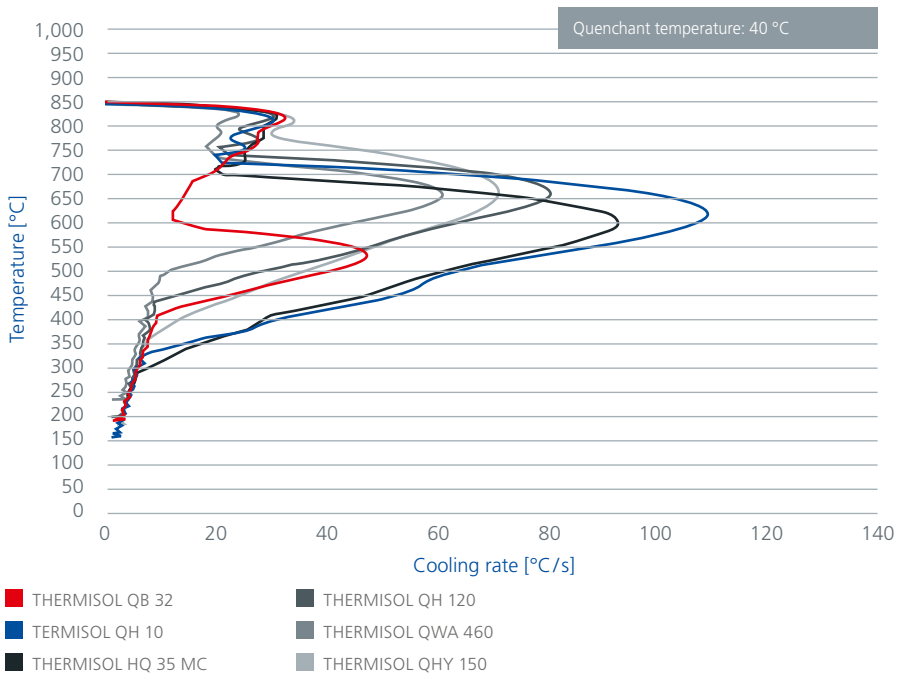
THERMISOL QH MC series
High-performance, high-additive quenchants based on hydrocracked oils. In addition to their optimum wetting characteristics and high quenching intensity, these products are extremely low-evaporation and thermally stable.

THERMISOL QWA
Mineral oil-based heat treatment and annealing oils whose high viscosity allows high oil bath temperatures to be used.

THERMISOL QHY series
These synthetic high-performance quenching and tempering oils are characterized by a high flashpoint and low drag-out losses. After treatment, these oils leave surfaces as bright and residue-free as they were originally.

THERMISOL QZS
Water-miscible, polymer quenchants for use after induction heating or for submersion tempering operations. High-alloy materials through to tool steels can be quenched by selecting particularly mild polymer solutions.

IVF-Quenchotest according to FLV-A-18 (FUCHS SCHMIERSTOFFE GMBH test method) and based on ISO 9950



Mineral oil-based and synthetic quenchants – selection and application areas

When selecting the most suitable high-performance quenching oil for a particular application, an initial rough differentiation can be made between high-viscosity and low-viscosity quenching oils.

Specifying an absolute threshold viscosity is not possible because of the different quenching oil grades.

Low-viscosity, high-performance quenching oils:

- Application temperature range <100 °C (Please always read the respective Product Information Sheet!)
- Quenching of alloyed and unalloyed quenched and tempered steels or case-hardening steels
- Good hardening penetration and depth
- Hardening of mass-produced parts and small components
- Hardening of gearbox components

High viscosity, high-performance quenching oils:

- Quenching bath oils for applications >100 °C
- Tool steels
- Hardening of particularly warp-prone components with large diameters
- Warp-prone gearbox components, large gears, sprockets
- Low-warp hardening of sheet steel
- Bainite and grey cast iron hardening at high temperatures

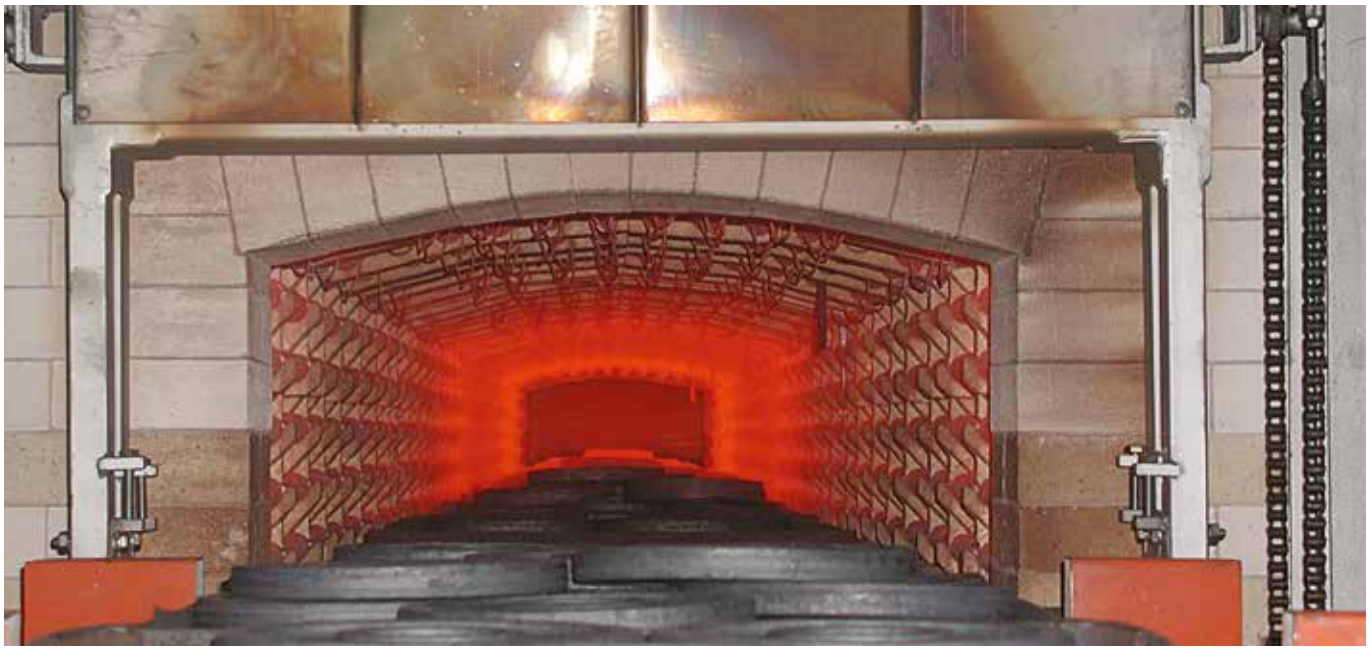
THERMISOL QB- / QH- / QH-MC and QWA series – mineral oil-based quenchant program

Conventional mineral oil-based quenching oils continue to offer good ageing stability, low evaporation losses and minimum maintenance.

With corresponding additives, they display a relatively high evaporation stability and a high flashpoint which means that they can be used for a large number of applications.

Product name	Kin. viscosity at 40 °C [mm²/ s]	Application temperature [°C]	Description
THERMISOL QB series: Neat quenching oils			
THERMISOL QB 32	31	50 – 90	Neat quenching oils are low evaporation and ageing stable normal speed quenching oils with moderate quenching intensity. Quenching behaviour is principally governed by the viscosity of the oil. Neat quenching oils are mostly used for the hardening of tool steels and warp-prone components. Suitable for use in open and closed quenching lines.
THERMISOL QB 46	46	50 – 100	
THERMISOL QH series			
THERMISOL QH 10	12	50 – 80	Accelerated, mineral oil-based quenchants whose special additives offer a very short vapour phase and very intensive cooling. THERMISOL QH series products offer improved protection against warping and less risk of cracking. Suitable for use in all open and closed quenching lines.
THERMISOL QH 15 LE	16	50 – 80	
THERMISOL QH 25	21	50 – 100	
THERMISOL QH 40	45	50 – 110	
THERMISOL QH 80	78	50 – 160	
THERMISOL QH 120	119	50 – 170	
THERMISOL QH MC series			
THERMISOL QH 10 MC	11	50 – 80	Low-evaporation, mineral oil-based, high-performance quenching oils. The THERMISOL QH MC series is recommended for continuous quenching lines. Both products are suitable for open and closed lines. In addition, THERMISOL QH 30 MC can also be used in vacuum ovens.
THERMISOL QH 30 MC	26	50 – 100 (max. 150)	
THERMISOL QH 35 MC	37	40 – 80 (max. 150)	High-performance quenching oil for a broad range of applications. THERMISOL QH 30 MC is recommended for continuous quenching lines and for varying batch sizes. Is suitable for open and closed lines as well as vacuum ovens.
THERMISOL QWA: Annealing and tempering oils			
THERMISOL QWA 460	503	100 – 180 (max. 275)	Particularly oxidation-stable, mineral oil-based annealing and tempering oils for higher oil bath temperatures.

THERMISOL QHY series – synthetic, high-performance quenching oils



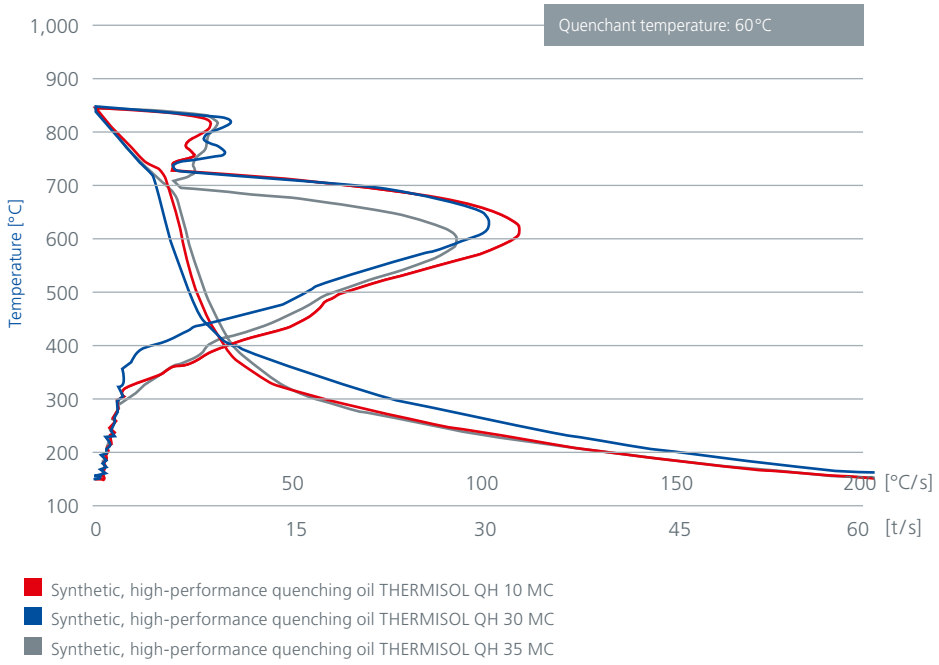
The synthetic, high-performance THERMISOL QHY series of oils display the benefits of mineral oil-based quenchants such as ageing stability and low maintenance. However, these products offer a significantly higher flashpoint and are even more low evaporation than mineral oil products with the same quenching performance.

Further positive features at a glance:

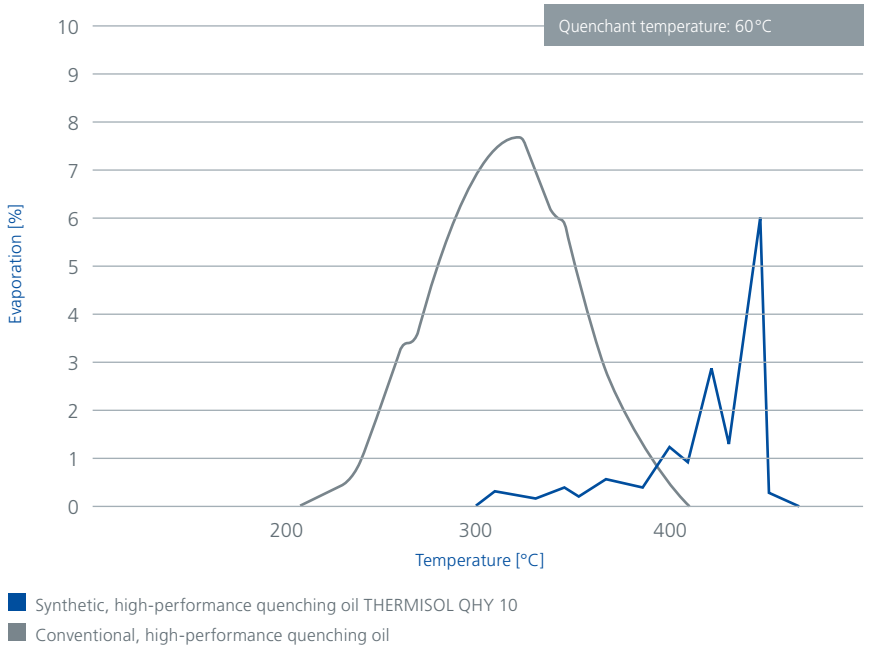
- Extremely short vapour phase allows almost instant wetting of the whole component surface and thus especially warp-free quenching
- Reduces warping during quenching to an absolute minimum
- Due to its narrow boiling range and good thermal stability, Thermisol QHY produces consistent quenching results even in extremely difficult conditions
- Universally applicable for nearly all applications
- Particularly broad temperature spectrum
- Suitable for open and closed quenching lines
- Rapidly biodegradable

Product name	Kin. viscosity at 40 °C [mm²/s]	Application temperature [°C]
THERMISOL QHY 10	11	50 – 130
THERMISOL QHY 35	37	60 – 200
THERMISOL QHY 150	145	60 – 260

IVF-Quenchotest
Inconel 600 test slug, Dimensions:
12.5 mm ø x 60 mm
Temperature / time and temperature / cooling speed.



Evaporation acc. to DIN 51581-T02
depending on temperature at the same viscosity.



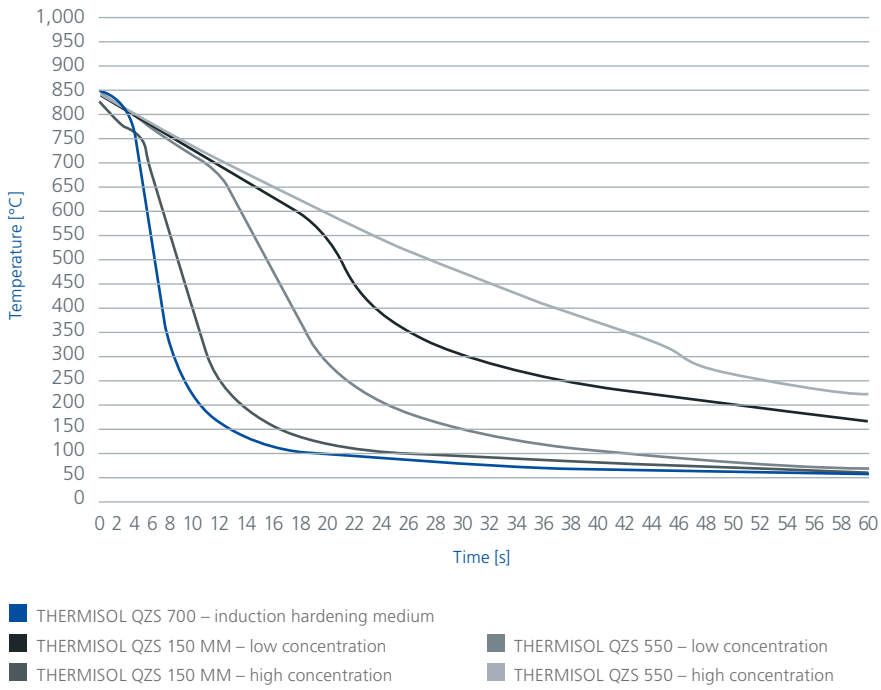
THERMISOL QZS – water-miscible polymer quenching concentrates

Apart from conventional quenchants whose advantages lie in their ageing stability and low maintenance requirement, water-miscible, polymer-based products are increasingly being used to treat low- and high-alloy steels. These products minimize fire risks and the creation of oil mists. In addition, water-miscible products are gaining favour because of their significantly lower mixture costs and drag-out losses. By varying the polymer concentration, the demands of different microstructures can be met without the need to completely change the content of the bath. Although the use of polymer quenchants in the past was limited to induction hardening and the hardening of low-alloy materials because of the abrupt cooling they offered, the new generation of polymer quenchants satisfy a broad range of quenching applications.

Intensive research by FUCHS led to the development of a series of polymer quenchants which satisfy every application, ranging from induction hardening to the quenching of low-and high-alloy steels. By adjusting the concentration and bath flow, homogeneous microstructures and more even through-hardening of components can be achieved. Depending on the material, very soft structures through to Bainite can be treated because of the particularly long vapour phase. Polymer quenchants are also perfectly suitable for open quenching baths and constantly changing component geometries.

Would you like to find out more? Then just give us a call. We would be glad to offer you personal advice.

Quenching THERMISOL QZS series



THERMISOL QZS – water-miscible polymer quenching concentrate

Application:

- Polymer quenchants are used to reduce the quenching intensity of water alone
- The quenching effect is influenced by the circulation, temperature and concentration of the polymer solution which is normally between 5 and 30 %

Benefits at a glance:

- No fire hazards and no oil misting
- Low preparation costs
- Reduced consumption
- Homogeneous microstructural composition and improved through-hardening by adjusting the concentration, temperature and circulation of the polymer solution
- Depending on the material, soft to Bainitic structures are possible

Recommended applications

THERMISOL QZS 700

- Induction and flame hardening
- Especially when good corrosion protection is required

THERMISOL QZS 400

- Induction and flame hardening
- Especially suitable for crack-prone components
- Dip quenching of low- and non-alloyed steels

THERMISOL QZS 300 ALU

- Quenching of aluminium (Aerospace industry)
- Universally-applicable for induction and flame hardening
- For the quenching of low- and non-alloyed materials

THERMISOL QZS 150 MM

- Tempering of forged parts
- Induction hardening of particularly crack-prone components

THERMISOL QZS 550

- Tempering of forged parts
- Hardening of low-alloy materials through to tool steels
- To achieve particularly mild quenching

Complete solutions for all your manufacturing operations

With system solutions from FUCHS, the world's largest independent manufacturer of lubricants with the most extensive program of metalworking fluids, you have chosen an absolute specialist. And thus, benefit from all the know-how, years of application engineering experience and customized solutions.

Example: Gearbox manufacturing.

ECOCOOL

MACHINING: WM*

- High performance
- Economical
- Outstanding lubricity

ECOCUT

MACHINING: NEAT**

- Increased reliability
- Economical
- Low misting and low evaporation

THERMISOL

QUENCHING

- Low distortion
- Low consumption
- Good compatibility

RENOCLEAN

CLEANING

- Highly effective
- Unproblematic processes
- Outstanding emulsification and demulsification

RENOLIT

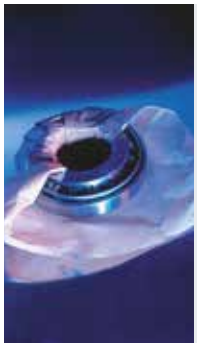
LUBRICATION: GREASES

- Compatible
- Long-term and life-long lubrication
- Optimum compatibility with sealing materials

RENOLIN

LUBRICATION: OILS

- Compatible
- Excellent corrosion protection
- Optimum wear protection



ANTICORIT

PROTECTION

- Optimum protection
- Clean application

CPM

FLUID MANAGEMENT

- For all fluids
- Auditable documentation
- Better performance
- Higher process reliability
- Cost reductions

*WM = water-miscible, **NEAT = not water-miscible

Notes

Hinweis
The information contained in this technical information is based on the experience and know-how of FUCHS SCHMIERSTOFFE GMBH in the development and manufacturing of lubricants and represents the current state-of-the-art. The performance of our products can be influenced by a series of factors, especially the specific use, the method of application, the operational environment, component pre-treatment, possible external contamination, etc. For this reason, universally-valid statements about the function of our products are not possible. Our products must not be used in aircraft/spacecraft or their components, unless such products are removed before the components are assembled into the aircraft/spacecraft. The information given in this technical information represents general, non-binding guidelines. No warranty expressed or implied is given concerning the properties of the product or its suitability for any given application.

We therefore recommend that you consult a FUCHS SCHMIERSTOFFE GMBH application engineer to discuss application conditions and the performance criteria of the products before the product is used. It is the responsibility of the user to test the functional suitability of the product and to use it with the corresponding care.

Our products undergo continuous improvement. We therefore retain the right to change our product program, the products, and their manufacturing processes as well as all details in this technical information at any time and without warning, unless otherwise provided in customer-specific agreements. With the publication of this brochure, all previous editions cease to be valid.

Any form of reproduction requires express prior written permission from FUCHS SCHMIERSTOFFE GMBH.

© FUCHS SCHMIERSTOFFE GMBH. All rights reserved.

FUCHS lubricants

Innovative lubricants need experienced application engineers

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

Contact:

FUCHS SCHMIERSTOFFE GMBH
Friesenheimer Straße 19
68169 Mannheim / Germany
Phone: 0621 3701-0
Fax: 0621 3701-7000
E-mail: zentrale@fuchs-schmierstoffe.de
www.fuchs.com/de

Export Division
Friesenheimer Straße 19
68169 Mannheim / Germany
Phone: +49 621 3701-1713
Fax: +49 621 3701-7713
E-mail: export@fuchs-schmierstoffe.de
www.fuchs.com/de/en

930139245 09 / 2018