

Precision - Even at the Highest Temperatures



Quenching Oils and Polymer Quenchants

LUBRICANTS.
TECHNOLOGY.
PEOPLE.



OUR LUBRICANTS KEEP THE WORLD MOVING

For over 80 years now, we have been concentrating all our activities and all of our research expertise on the development of innovative lubricants. This specialization has resulted in our company growing continuously, not only geographically but also technically and in terms of the application areas we serve.

Today, the German company FUCHS is synonymous with high performance lubricants and related specialties in nearly all fields of application and industries.





What sets our products apart.

We develop application-specific lubricants specially for our partner's processes. Together with our customers, we strive to create perfect lubricants. This cooperation is unique in terms of style, scope and intensity. We call this development partnership. This competence is based on an essential feature: As a German company based in Mannheim, we are the largest independent lubricant specialist. And this independence makes the difference. We are open to new approaches, open to new visions – the prerequisites for innovation. And innovations are a hallmark of FUCHS.

Together, we can achieve more.

THERMISOL

For tough and durable components.



Engineering today is characterized by ever increasing demands on performance, precision and economy. At the same time, changing conditions at the workplace and increasing environmental awareness have set new standards. And we know the issues facing our customers. In close cooperation with our customers, we develop solutions which satisfy or even surpass what the market needs today and in the future.

Particularly in the field of heat treatment, fluids play a central role. Only if the optimum quenchant is selected, can the required microstructure and strength be achieved.

Any change to the quenching rate has an effect on the microstructure, on the properties of the material and thus on its later use.

Apart from the selection of the right quenchant, precise control over the corresponding process parameters is crucial for optimum heat treatment results.

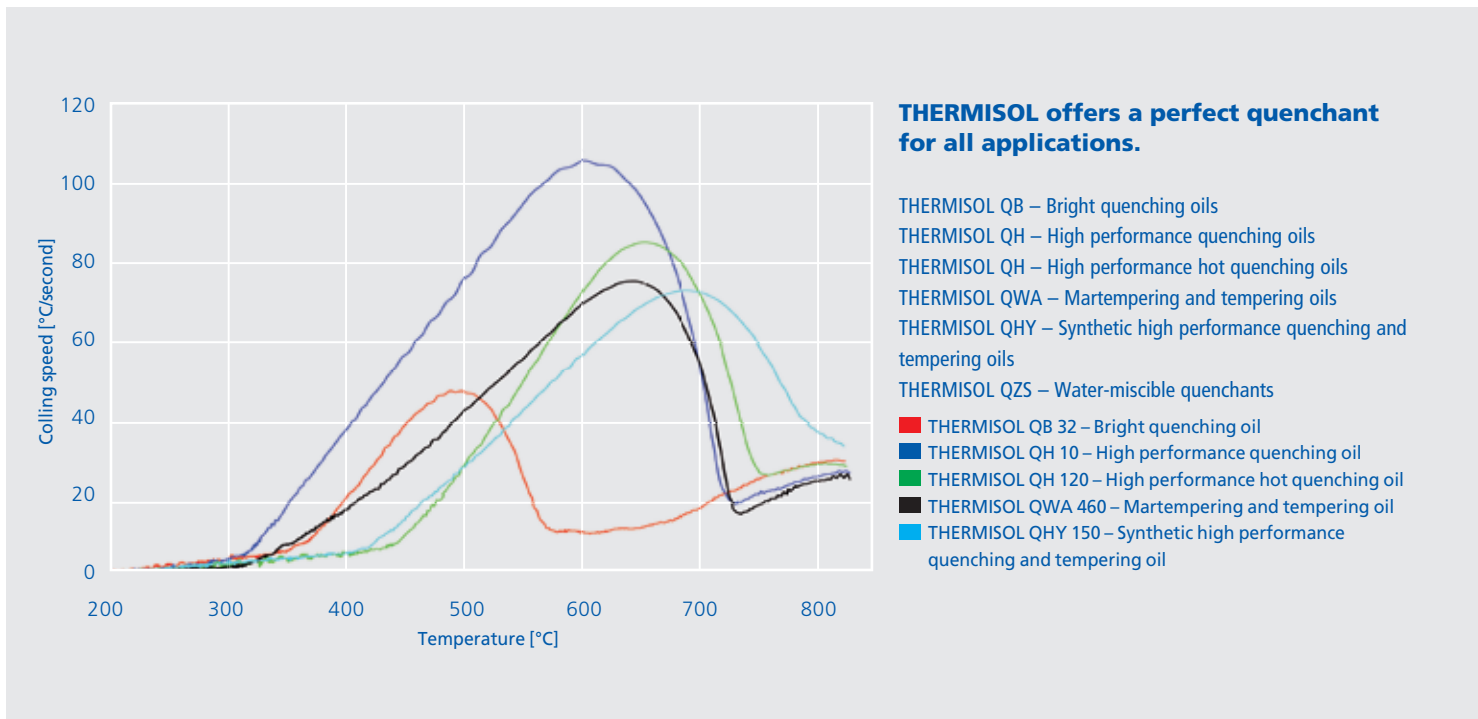
Only the perfect matching of all the hardening process parameters can guarantee consistent and warp-free heat treatment results.

Trust a partner who understands all the facets of heat treatment, who is glad to advise you and who can offer you the very best system solutions for perfect results.



THERMISOL Quenching Oils and Polymer Quenchants

Brand name	Description
THERMISOL QB: Bright quenching oils	Bright quenching oils offer moderate quenching rates and are normally used to quench alloyed materials with simple geometries.
THERMISOL QH: High performance quenching oils	High performance quenching oils are high-additive quenchants which 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 Series:	High performance quenching oils with enhanced wetting properties.
THERMISOL QH MC Series:	Particularly low evaporation, mineral oil-based high performance quenching oils.
THERMISOL QHY Series:	Synthetic high performance quenching oils.
THERMISOL QWA: Annealing and tempering oils	Mineral oil-based, high temperature heat treatment and annealing oils.



THERMISOL QZS: Water-miscible polymer quenchants	Water-miscible polymer quenchant for cooling after induction heating or for immersion tempering processes. High-alloy materials through to tool steels can be quenched by selecting particularly mild polymer solutions.
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Quenchant Selection and Application Areas



When selecting the most suitable high performance quenchant 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 qualities.

Low-Viscosity, High-Performance Quenching Oils:

- Application temperature range < 100 °C (Please always read the respective Product Information Sheet!)
- Quenching of alloyed and unalloyed tempered and 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:

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

These days, conventional mineral oil-based quenching oils also offer relatively good evaporation stability which means they can be used for a large number of applications. When selecting the best hardening oils, quenching

line peripherals should always be taken into consideration. Particularly in the area of vacuum hardening in closed lines, the evaporation resistance of the product is a major selection criterion.

THERMISOL QB / QH / QH MC and QWA Series: Mineral Oil-Based Quenching Oil Program

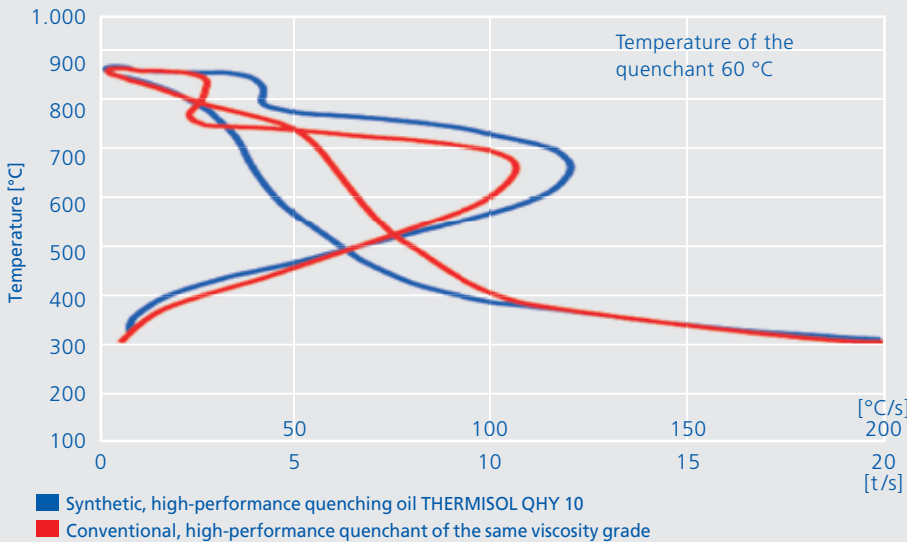
Brand name	Kin. viscosity at 40°C (mm ² /s)	Application temperature	Description
THERMISOL QB Series: Bright quenching oils			
THERMISOL QB 32	31	50-90°C	Bright quenching oils are low-evaporation and ageing stable. Normal speed quenching oils with relatively low cooling speed. Quenching behaviour is principally governed by the viscosity of the quenching oil. Bright quenching oils are mostly used for the hardening of tool steels and warp-prone components. Suitable for use in both open and closed quenching lines.
THERMISOL QB 46	41	50-100°C	
THERMISOL QH Series			
THERMISOL QH 10	11	50-80°C	Accelerated, mineral oil-based quenchants whose special additives offer a very short vapour phase and very intensive cooling.
THERMISOL QH 15 LE	16	50-80°C (max. 120°C) (H304 No classification necessary even after 06/014)	
THERMISOL QH 25	21	50-100°C	Improved warp-resistance and less risk of hairline cracking.
THERMISOL QH 40	42	50-110°C (max. 150°C)	Recommended for both open and closed quenching lines.
THERMISOL QH 80	78	60-160°C (max. 190°C)	
THERMISOL QH 120	123	60-170°C (max. 200°C)	
THERMISOL QH MC Series			
THERMISOL QH 10 MC	11	50-80°C	Extremely low evaporation, mineral oil-based high-performance quenching oils.
THERMISOL QH 30 MC	26	50-100°C (max. 150°C)	
THERMISOL QH 40 MC	41	50-110°C (max. 170°C)	Especially recommended for closed lines as well as for vacuum ovens (viscosity dependent).
THERMISOL QWA: Annealing and tempering oils			
THERMISOL QWA 460	503	150-200°C (max. 275°C)	Particularly oxidation-stable, mineral oil-based annealing and tempering oils.

THERMISOL QHY Series: Synthetic High-Performance Quenching Oils

Brand name	Kinematic viscosity at 40°C (mm ² /s)	Application temperature
THERMISOL QHY 10	11	50-130°C
THERMISOL QHY 35	35	60-200°C
THERMISOL QHY 150	148	60-260°C

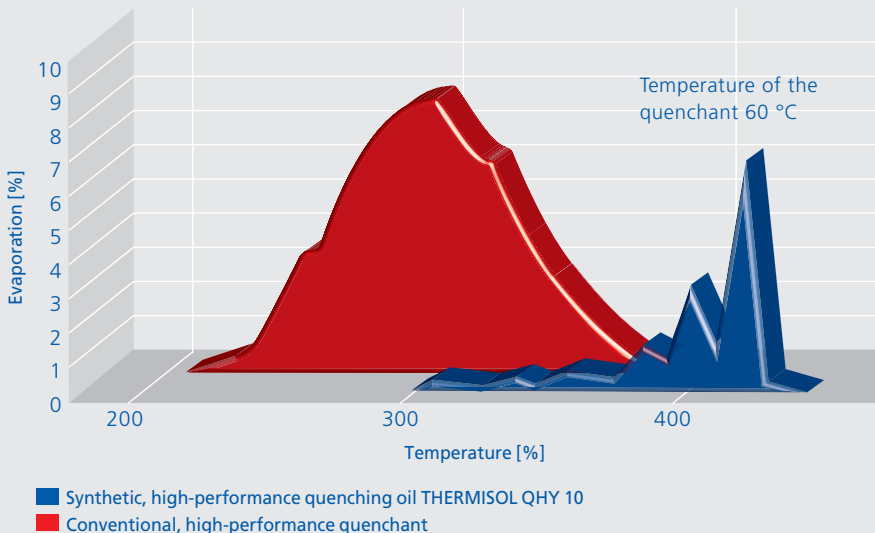
IVF Quenchttest

Test slug, Material Inconel 600, 12.5 mm diameter, 60 mm long.
Temperature-time and temperature-quenching speed curves.



Evaporation according to DIN 51 581-Part 02

Depending on temperature at the same viscosity



Description:

- Synthetic, high-performance quenching oils with extremely short vapour phase
- Extremely short vapour phase allows the almost instant wetting of the whole component surface and thus especially warp-free quenching
- Much lower evaporation than equally viscous, mineral oil-based hardening oils
- Reduces the warping resulting from quenching to an absolute minimum
- Increase in the total hardness compared to mineral oil-based, high performance quenchant
- Due to its narrow boiling range and good thermal stability, Thermisol QHY produces consistent quenching results even in extremely difficult conditions
- Applicable for nearly all applications
- Particularly broad temperature spectrum
- Suitable for open and closed quenching lines
- Rapidly biodegradable

THERMISOL QZS: Water-miscible, polymer quenching concentrates

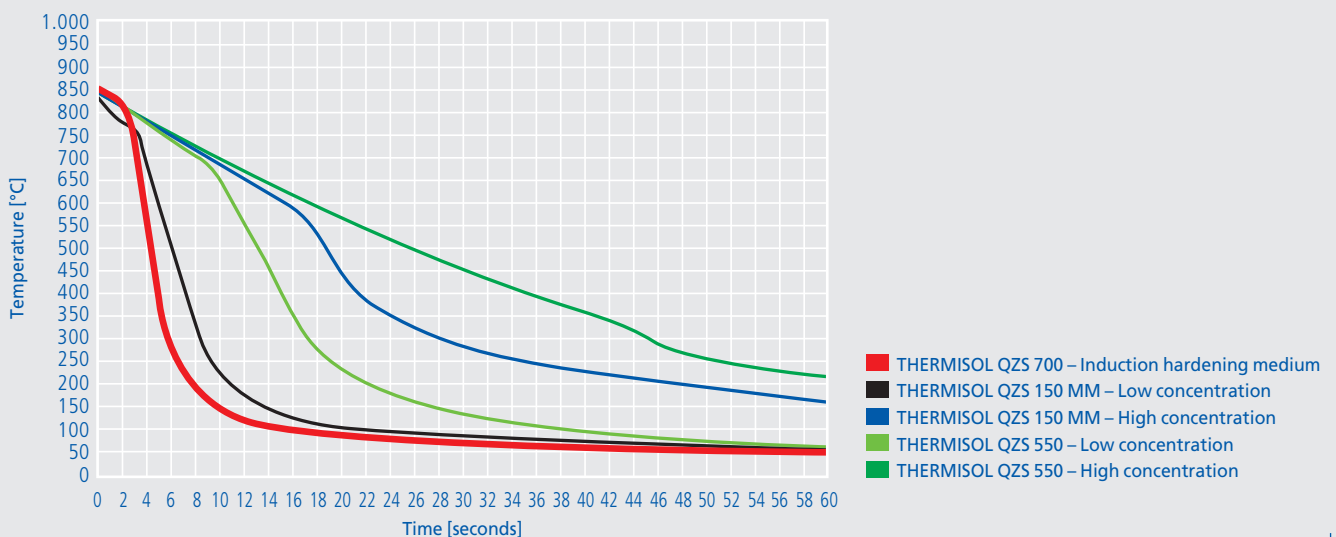


Apart from conventional quenchants whose advantages lie in their ageing stability and low maintenance requirement, water-miscible polymer-based products are increasingly being used to heat treat low- and high-alloy steels. These products minimize fire risks and the creation of oil mists. In addition, 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 a 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, homogenous microstructures and more even 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? Just give us a call. We would be glad to offer you personal advice.

Quenching: THERMISOL QZS Series



THERMISOL QZS: Water-miscible, polymer quenching concentrates

Applications:

- Polymer quenchants are designed to make the cooling effect of water less abrupt.
- The quenching speed is dependent on the flow, temperature and concentration of the polymer solution which is normally between 5 and 30 %.

Advantages at a glance:

- No fire hazards and no oil misting.
- Low tank-fill costs.
- Reduced consumption.
- Homogeneous microstructures and a better through hardening of components can be achieved by adjusting the concentration, temperature and bath flow.
- Depending on the material, very soft structures through to Bainite can be treated.

Recommended applications:

THERMISOL QZS 700

- Induction and flame hardening.
- Particularly if good corrosion protection is required.



THERMISOL QZS 400

- Induction and flame hardening.
- Particularly suitable for components prone to cracking.
- Immersion-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 steels.



THERMISOL QZS 150 MM

- Tempering of forged parts.
- Induction hardening of components prone to cracking.



THERMISOL QZS 550

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



Compatible Solutions for All Your Manufacturing Processes

The right quenchants guarantee optimum hardness and excellent surface finishes.

But performance can also be influenced by compatibility with the other lubricants used. The smooth running of all production processes is the prerequisite for optimum operating results. Perfectly matched and compatible lubricants make an invaluable contribution to this.

Trust system solutions from the specialist FUCHS, the world's largest independent manufacturer of lubricants with an extensive line of products. And also the knowhow and experience in application engineering and on tailor-made solutions.

<p>Example: Gearbox manufacturing</p> 	<p>>> MACHINING: NWM**</p>  <ul style="list-style-type: none"> ■ Increased safety ■ Economical ■ Low misting and low evaporation <p>ECOCUT</p>	<p>>> MACHINING: WM*</p>  <ul style="list-style-type: none"> ■ High performance ■ Economical ■ Outstanding lubricity <p>ECOCOOL</p>
<p>>> QUENCHING</p>  <ul style="list-style-type: none"> ■ Minimal warping ■ Low consumption ■ Excellent compatibility <p>THERMISOL</p>	<p>>> FORMING</p>  <ul style="list-style-type: none"> ■ Compatible ■ Adhesive compatible ■ Unproblematic welding <p>RENOFORM</p>	<p>>> CLEANING</p>  <ul style="list-style-type: none"> ■ Excellent cleansing ■ Process compatible ■ Excellent emulsification and demulsification <p>RENOCLEAN</p>
<p>>> LUBRICATING GREASES</p>  <ul style="list-style-type: none"> ■ Compatible ■ Long-term and greased-for-life applications ■ Optimum sealing material compatibility <p>RENOLIT</p>	<p>>> LUBRICATING OILS</p>  <ul style="list-style-type: none"> ■ Compatible ■ Good corrosion protection ■ Optimum wear protection <p>RENOLIN</p>	<p>>> CORROSION PROTECTION</p>  <ul style="list-style-type: none"> ■ Optimum protection ■ Clean application ■ Environmentally compatible, residue-free <p>ANTICORIT</p>

*WM = Water miscible , **NWM = Not water miscible

The information contained in this product 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. The information given in this product 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 of our product information sheets at any time and without warning, unless otherwise provided in customer-specific agreements. With the publication of this product information, all previous editions cease to be valid.

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FUCHS Industrial Lubricants

Innovative Lubricants Require 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 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: +49 621 3701-0
Fax: +49 621 3701-570
E-Mail: zentrale@fuchs-schmierstoffe.de
www.fuchs-schmierstoffe.de

Export Division
Friesenheimer Straße 19
68169 Mannheim / Germany
Phone: +49 621 3701-1703
Fax: +49 621 3701-7719