IDEMITSU QUENCHANT OILS FOR HEAT TREATERS

THE RIGHT PRODUCT AND SERVICE TO INCREASE YOUR BOTTOM LINE.

Quenchant Oils that Deliver Better Quality Parts and Lower Operational Costs

idemitsu

Idemitsu Quench Oils – The Quality Approach to Quenching

Whether your operation requires cold, semi-hot or hot quench oil, or you prefer the unique safety and environmental characteristics of a water-based polymer, the complete line of Idemitsu Quench Oils offers the specific quench oil to meet your application requirements.

Developed to maximize production output, Idemitsu Quench Oils are formulated to provide excellent quench rates, thermal stability, optimal viscosity and low volatility.

The bottom line for customer heat treat operations: produce uniform, well-hardened parts while holding distortion and cracking to a minimum, all while helping manage quench data and bath maintenance procedures like no other quench oil provider can.

Quality, performance, customer service and price, plus the unique I-LAS Online Support Program, makes Idemitsu's Quench Oils the right choice for your operation. There's a reason why Idemitsu is one of the largest quench oil suppliers in the world. Let us show you why.

Idemitsu Cold, Semi-Hot & Hot Quench Oils

Idemitsu Quench Oils are highly refined index oils thermally stable across large temperature ranges. In fact, with proper maintenance care and additions of neat oil, there's no need for tank side additives such as oxidation inhibitors, quench speed and viscosity improvers.

Ideal for heat treatment of carbon and alloy steel by flame, induction, induction heating, as well as in batch and continuous furnace operations, Idemitsu Quench Oils are perfect for items such as large and small gears, shafts, transmission gears, camshafts and pieces involving complex geometry and metallurgy, including bolts, bearings and carbon steel parts.

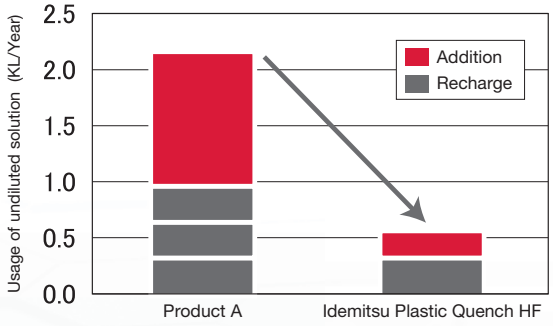
Idemitsu has a complete line of quench oils, covering several different requirements of heat treating processes.

As one of the market leaders, with global presence, our technical sales team is ready to find solutions and process improvements to your specific needs.

Idemitsu Water-Soluble Quench Polymers

Idemitsu Water-Soluble Quench Polymers feature superior safety and environmental characteristics. Designed for both low and high hardened steel applications, quenching characteristics can be varied between those of water and normal cold quenching oil by simply adjusting the concentration of the solution.

Benefits include the reduction or elimination of typical sticky build-up on machine, parts, fixtures, gauges and more. Its lower viscosity polymer solubilizes in water more easily than typical polymers, causing less drag-out (minimal surface deposits) which results in lower product consumption (excellent economy). With the elimination of a tacky residue, sump life is lengthened. When polymer use is reduced, production efficiency is improved and maintenance costs are lowered. In addition, with proper care and regular additions of concentrate, the nitrite-free formulation of Idemitsu Water-Soluble Quench Polymers requires no additives to adjust pH, biocides and rust inhibition.



Using Idemitsu Water-Soluble Quench Polymers, actual quench oil usage has been reduced by up to 75%.

The Key Points of Idemitsu Quench Oils

Idemitsu has developed its quench oils to meet the exacting needs of its customers.

Quench Oil Required Characteristics	Idemitsu Performace Features	Key Formulation Differentiators
Cooling Ability	Longer Boiling Stage	▸ Narrow Boiling Point Range Base Oil ▸ High-Performance Cooling Improver
Minimized Distortion	Shorter Vapor Blanket Stage	▸ High-Performance Cooling Technology
	Oxidation Stability	▸ Highly Refined Base Oil ▸ High-Performance Antioxidant
Brightness	Long Lasting Brightness Stability	▸ High-Performance Brightness Improver

Quench Oil Required Characteristics	Idemitsu Performace Features	Key Formulation Differentiators
Cleanliness	High Oxidation Resistance	▸ Highly Refined Base Oil ▸ High-Performance Antioxidant
	Anti-Emulsification	▸ Highly Refined Base Oil ▸ Special Selected Additives
Long Life	Oxidation Stability	▸ Highly Refined Base Oil ▸ High-Performance Antioxidant
High Flash Point	High Safety Standards	▸ Narrow Boiling Point Range Base Oil

Idemitsu Quench Oil Series

COLD QUENCH OILS

Product Name	Features	Typical Use	Application Temp °C (°F)	Viscosity @40°C (mm2/sec)	Cooling Power H Value 80°C	Flash Point °C (°F)	CHARACTERISTICS: Cooling Performance	CHARACTERISTICS: Brightness After Quenching
Idemitsu Quench US-U	This oil is used when the highest possible hardness is required. Particularly when sufficient hardness in carbon steels, and low Mn steels, or thick wall tool steels cannot be obtained by using conventional quenching oils.	Large Gear Large Shaft Large Bolt	30-80 (86-176)	14.3	0.17	196 (385)	Excellent	Good
Idemitsu Master Quench A-U	A short vapor blanket cooling stage, and high cooling power in the vapor transport cooling stage provides excellent quenching performance for many types of low alloy operations.	Bolt Bearing Gear Turbine Shaft Washer	30-90 (86-194)	17.2	0.14	198 (388)	Very good	Good
Idemitsu Quench N-U	Similar in terms of additives and base oil to Masterquench A-U however with better distortion characteristics.	Needle Bearing Ball Joint Bolt	50-100 (122-212)	27.0	0.13	236 (457)	Good	Good
Idemitsu Bright Quench U	This oil has an excellent brightness ability and long brightness life.	Bearing Race Drive Shaft	50-100 (122-212)	28.4	0.13	226 (439)	Good	Excellent
Idemitsu Bright Quench M-U	This oil has an excellent brightness ability, long brightness life and high cooling speed.	Bearing Race Fasteners	35-90 (95-194)	19.0	0.14	196 (385)	Very Good	Excellent

SEMI-HOT QUENCH OILS

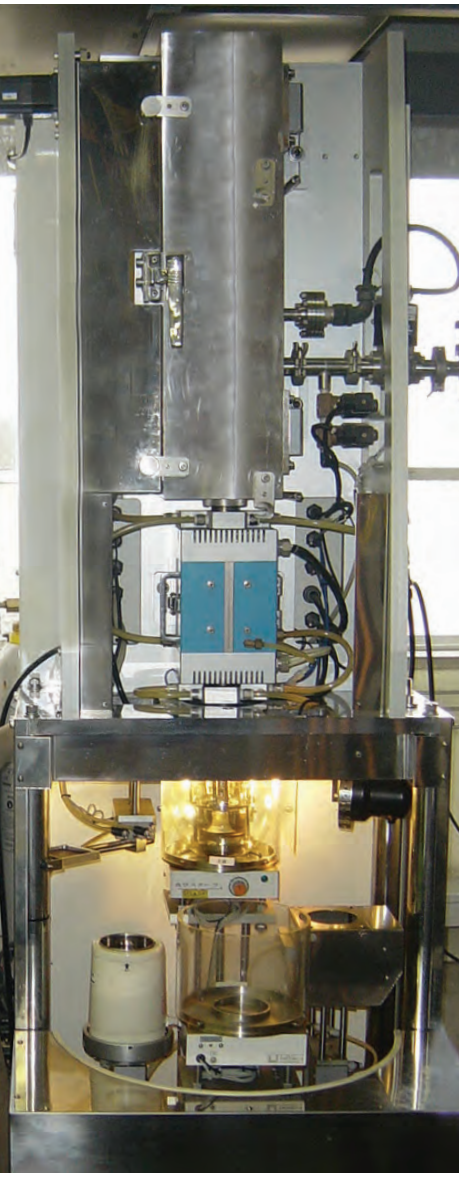
Product Name	Features	Application	Application Temp °C (°F)	Viscosity @100°C (mm2/sec)	Cooling Power H Value @120°C	Flash Point °C (°F)	Cooling Performance	Brightness After Quenching	Distortion Performance
Idemitsu Hi Temp Oil X-U	Excellent cooling performance. Suitable for batch furnaces and continuous carburizing.	Large Gear Large Shaft	80-140 (176-284)	12.5	0.14	270 (518)	Excellent	Very good	Good
Idemitsu Hi Temp Oil L-U	Economical general semi-hot oil. A shorter vapor blanket stage, promotes less distortion.	Large Gear Large Shaft	70-120 (158-248)	7.5	0.11 @80°C	226 (439)	Very good	Good	Good
Idemitsu Hi Temp Oil SM-U	Excellent oxidation resistance and thermal stability. Provides long-lasting brightness when used at open quench tanks.	Bearing Race Transmission Gear	85-130 (185-266)	13.1	0.12	286 (547)	Very good	Excellent	Very good

HOT QUENCH OILS

Product Name	Features	Application	Application Temp °C (°F)	Viscosity @100°C (mm2/sec)	Cooling Power H Value @120°C	Flash Point °C (°F)	Cooling Performance	Brightness After Quenching	Distortion Performance
Idemitsu Hi Temp Oil A-U	Typical hot quench oil that has good oxidation stability and ensures longer brightness life in batch furnace conditions.	Transmission Gear Bearing	95-160 (203-320)	18.2	0.103	298 (568)	Good	Very good	Very good
Idemitsu Hi Temp Oil AM-U	Provides long-lasting brightness when used at open quench tanks. Minimizes distortion.	Thin Bearing Race Transmission Gear	95-160 (203-320)	17.5	0.099	288 (550)	Good	Excellent	Excellent
Idemitsu Hi Temp Oil B-U	This oil is the typical marquenching oil designed for preventing distortion and has good oxidation stability.	Clutch Plate Ring Gear	110-180 (230-356)	30.2	0.080	304 (579)	Good	Very Good	Excellent

POLYMER QUENCHANTS

Product Name	Features	Application	Application Temp °C (°F)	Viscosity @40°C (mm2/sec)	PH	Anti-Cracking	Anti-Decay	Stickness
Idemitsu Plastic Quench HF	Synthetic glycol-based quenchant for induction heat treating. Offers significantly less residue than conventional polymers. Low consumption, long life.	Gear Shafts CV Joint	30-40 (86-104)	28.3	10.2	Very good	Excellent	Excellent



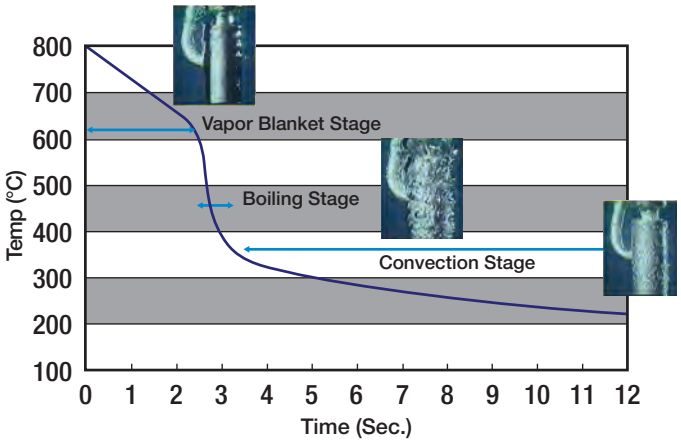
“H” Value Silver Probe Cooling Analysis

In the past, the severity of the quench has been measured using the GM Quenchometer Nickel Ball method. This standard measures the cooling time of the nickel ball between two temperatures. However, it does not fully explain the three-phase cooling process. For this reason, the Silver Probe* cooling analysis test was developed.

The Silver Probe test method determines the heat transfer coefficient (H-Value) of a particular oil, an indicator of the quench oil’s ability to harden steel. This value is directly related to the heat transfer coefficient (the higher the H-Value, the higher the quench severity and the faster the quench).

Idemitsu only uses the most up-to-date JIS Silver Probe test method to effectively measure the dynamic cooling curve of the quench oil. This Silver Probe method replaces the previous standard, the GM Quenchometer Nickel Ball method, which is ineffective in measuring the cooling pathway required in determining a quench oil’s ability to harden steel.

*Silver has one of the highest heat conduction coefficients, giving very precise and consistent measurements.



JIS Cooling Curve

When a hot component comes into contact with a quenching oil, there are normally three stages as it cools, namely:

1. Vapor blanket stage
2. Boiling stage
3. Convection stage

The JIS cooling curve records the time and temperature at each of these three distinct stages. Generally, the faster the above three stages are achieved (i.e., steeper curve), the better the quality of the quenching oil.

Brightness Testing

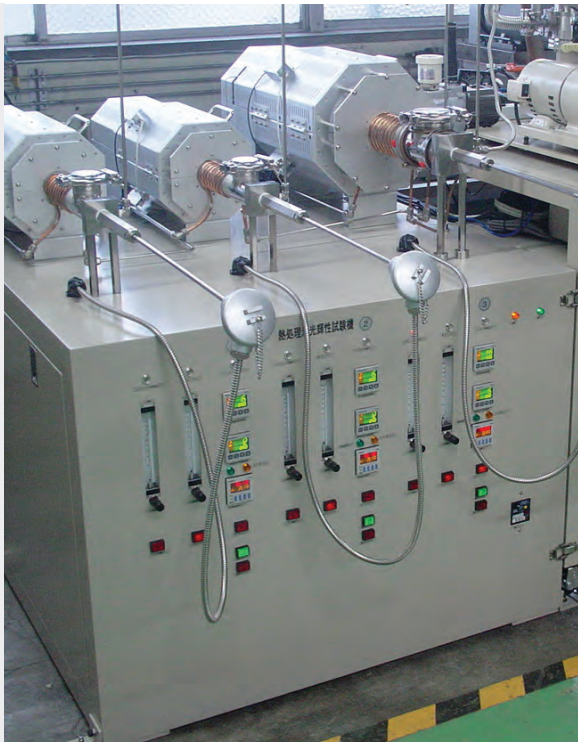
Part treated by Idemitsu’s Quench Oil – showing desired bright finish.

Identical part treated using competitive quench oil – showing oxidation and excessive discoloration.

Idemitsu is committed to providing quench oils that deliver the desired level of brightness to suit customer specifications and maintain strength, quality and durability standards. There are multiple factors within the production process that may influence brightness such as part properties, furnace atmospherics, internal conditions or intervention (i.e., oil temp, or agitation), other contaminants (i.e., water, cutting oil, etc.) and quench oil quality.

When quench oil contains water, it can cause the surface of the part to appear blue (tempered coloring). Furthermore, if oxidation does occur, it will stain the part and diminish brightness.

Idemitsu thoroughly tests all parts to check if the oil is the cause of any change in brightness and takes the necessary measures to achieve and maintain your desired specifications.



I-LAS

An Online Support Program That Helps Keep Quality Up & Production On Schedule

To assure optimal quench process control, it's necessary to monitor quality variations throughout the life of an oil to minimize the formation of undesirable thermal and transformational gradients (sludge and varnish) that can lead to increased distortion and cracking. This is accomplished by establishing uncompromising quench bath maintenance procedures supported by the Idemitsu Lubricants Analysis System (I-LAS).

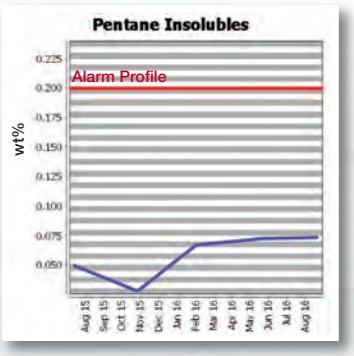
Idemitsu's state-of-the-art lab offers superior testing services that support all of your quench, lubrication and coolant test needs. Trained engineers help determine which tests best fit your goals, helping you increase efficiency and save on quench costs. Idemitsu's convenient, data driven analysis system helps you manage and maintain optimal fluid health.

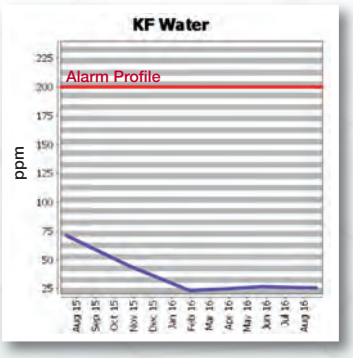
Exclusively developed for Idemitsu customers, the I-LAS Online Support Program includes:

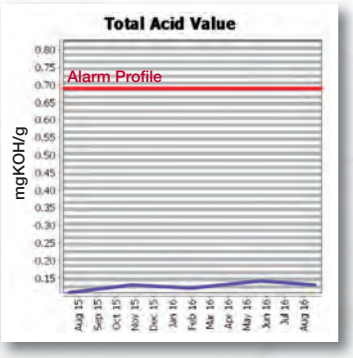
With trending data available online and the convenience of email notifications, you never have to worry about meeting requirements of the various quality systems, including CQI9 and NADCAP.

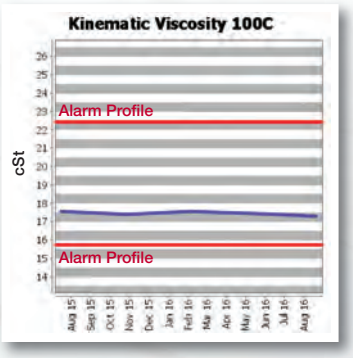
Idemitsu's I-LAS Program – just another example of Idemitsu's commitment to servicing your manufacturing requirements and maximizing your production quality.

I-LAS offers round-the-clock analytics at the click of a button such as kenetic viscosity, PH and brightness values, to name a few.









Idemitsu Lubricants America Production Facility | Jeffersonville, Indiana

Idemitsu Lubricants America Corporation

Idemitsu Lubricants America (ILA) is a premier lubricants manufacturer committed to providing quality, innovation and service to customers around the world. ILA offers unmatched production quality, ensuring peak operating performance from a full range of lubricants for the automotive and industrial sectors. Whatever the application, Idemitsu can provide environmentally friendly, cost-effective lubricant and quench solutions that help maximize production efficiencies and minimize cost.

A leading supplier to the industrial sector, Idemitsu today serves more than 50% of the Japanese quench oil market. Idemitsu maintains a wide range of customers across the U.S. in every industry sector, who depend on its Idemitsu range for more consistent and superior quench characteristics.

The entire Idemitsu product line is continuously evolving around customer needs, and leads the market in prolonging oil life and reduced distortion during quenching, ensuring consistency that results in high production quality.

All information and data contained within this document is accurate at time of printing. Claims and data included herein may be revised at any time. See your Idemitsu representative for current product information.

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