MAK THERMOL

Superior heat treatment oils for outstanding performance

MAK Thermol range is a superior quality quenching oil formulated exclusively from highly refined base stock and special additive. The antioxidant additive provides excellent resistance to oxidation and break down of the oil and ensures longer operating life. These oils have very high flash points and low volatility. The range covers all quenching processes. The quenching oils allow uniform hardening of parts with improved grain structure and with minimum distortion. It provides consistent and repeatable mechanical and metallurgical properties.

Grades: MAK Thermol range is available in the following ISO VG grades – **22**, **32** and **68**

Applications:
MAK Thermol range is available in different qualities (Accelerated, Conventional and Hot oils) to allow the selection of the most suitable quenching capability. MAK Thermol 22 is an additised quenching oil and is suitable for applications where fast quenching is required. MAK Thermol 32 is a slow speed quenching oil. MAK Thermol 68 is suitable for hot quenching applications and is recommended for parts subject to strong distortion. MAK Thermol range of oils are suitable for applications like open tanks, continuous furnaces, batch furnaces and vacuum furnaces. They are recommended for hardening of ferrous metals like carbon steel, grey iron and high-alloy steel. These oils are generally used in quenching of crank shafts, gear parts, automotive leaf springs, high-speed tools, nut, bolts bright bars and industrial components.

Operating Parameters	MAK Thermol 22	MAK Thermol 32	MAK Thermol 68
Type	Accelerated Oil (Cold Quenching)	Conventional Oil (Cold Quenching)	Accelerated Oil (Hot Quenching)
Quenching Speed	Fast Cooling	Slow Cooling	Fast Cooling
Working Bath Temperature	~45^{O}C	~45^{O}C	~100^{O}C

Performance/ Benefits:
Excellent Oxidation Resistance – Outstanding resistance to sludge and deposit formation. Keeps the work piece clean. Longer operating life and lower operating cost.

Excellent Thermal Stability – provides resistance to break down and deposit formation for optimum life and performance.

High Flash Point – limits the risk of fire and offers safe working environment.

Low Volatility – reduces fume generation, decomposition of product and oil consumption. Provides conducive working environment.

Good Rust Protection – Offers superior protection for work pieces.

Excellent Thermal Conductivity – wettability additive improves the rate of heat transfer. Proper rate of heat transfer maintains quenching speed and allow uniform hardening.

Consistent Performance – offers uniform hardening with minimum distortion that allows consistent mechanical and metallurgical properties

Non-Corrosive – no corrosion of the work pieces, maintains metallurgy and dimensional uniformity.

Non-Toxic – Provides safe working environment to the operators.

Specification:
- IS 2664:1980 (Reaffirmed 2014) for the respective viscosity grades

Storage & Handling:
The product should be stored inside. Keep it properly sealed to avoid contamination. Avoid freezing. Shelf life is 3 yrs. under protected storage conditions.

Health & Safety:
They are unlikely to be hazardous when properly used in recommended applications. Contamination of the oil from other oils, greases, chemicals, dirty water etc. can occur during the use. It should be avoided. Regular monitoring of the in-use product is recommended.

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Typical Physico-Chemical Data: MAK Thermol

Characteristics	Method	22	32	68
Colour	Visual	Light Brown	Light Brown	Light Brown
Appearance	Visual	Clear	Clear	Clear
Density, g/cc @15^{O}C	ASTM D1298	0.8791	0.8819	0.890
Copper Corrosion, 100^{O}C, 3 hrs.	ASTM D130	1b	1b	1b
Flash Point, COC, ^{O}C	ASTM D92	192	196	230
Kinematic Viscosity @40^{O}C, cSt	ASTM D445	22.2	32.5	65.6
Kinematic Viscosity @100^{O}C, cSt	ASTM D445	4.32	5.42	8.58
Viscosity Index	ASTM D 102	100	100	101
GM Quench Speed, Sec	ASTM D 3520	16	27	18
Maximum Cooling Rate, ^{O}C/S		75-80	60-65	85-90

Values for cooling rate is typical for new oil. It will vary for used oil due to oxidation and contamination.

** Check with the supplier for additional details about quenching performance

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