

TECHNI/TIPS

A Publication of the Lubrication Engineers Technical Department

LEADERS IN LUBRICANTS

NUMBER 115

ROCK DRILL OIL APPLICATIONS

Typically, pneumatic rock drills consist of two major components -- the pneumatic hammer and the drill bit. The rock drill requires a compressed air source of suitable pressure and capacity with an oiler to introduce lubricant into the air stream. The quantity of oil is not as important as how it arrives at the tool. The oiler should atomize the oil so that it is entrained in the air stream and not collecting in the air delivery hoses and fittings. The oiling rate is correct if the bit shank is wet with oil, but the oil is not running onto the bit itself. Excess oil flow contaminates the material being drilled, may affect the outcome of assays, and pollutes the environment.

Rock drill lubricants are subjected to one of the most difficult environments (dust, dirt, moisture) and severe operations encountered in any other lubricant application. Factors include heavy loading, high speeds, high temperature, acidic water, dirt and other solid impurities, close tolerances, an often hostile, enclosed working environment and even abusive operation by the machine operator.

Friction Reduction

A rock drill's hammer piston and cylinder are the most vulnerable parts of the system. Lack of sufficient lubrication or use of poor quality or incorrect type oil can result in catastrophic destructive failure within a short period of time. Relatively low wear rates can soon effect physical tolerances between mating surfaces while high wear rates will elevate metal temperatures to the point where plastic deformation occurs. Severe scoring, followed by welding of the surfaces, will ultimately occur if even very small voids of lubricant are allowed to exist.

Lack of lubrication or use of a lubricant with inadequate film strength will quickly have catastrophic results associated with piston hammer splines. Total fracture of the hammer is not an infrequent result in this type of failure mechanism.

LE's MONOLEC® Rock Drill Oils combat heat and friction through the use of proprietary friction reducing and EP additives, combined with superior base oils to extend hammer life substantially over that achieved through the use of commercial grade oils.

Corrosion Protection

Rock drill hammers are made from steel and are therefore vulnerable to corrosive elements encountered in this application. The rock drill oil is required to eliminate the corrosive and oxidative effects within the hammer cylinder. It must protect against the attack of moisture and chemicals present in the drilling air stream. An effective oil film on all metal surfaces of the hammer will prevent pitting of mating parts thereby maintaining the integrity and strength of the hammer and associated components. Lack of, or poor quality lubrication will result in weakening of the metal through corrosive attack, progressively increasing the vulnerability to stress failure.

MONOLEC Rock Drill Oils contain an additive to enhance adhesion to metal parts as well as an emulsifying agent to enhance its performance where moisture is present. An inherently high oxidation resistance pre-vents the formation of corrosively destructive by-products.

Sealing Characteristics

The rock drill lubricant must also seal the clearances between the hammer's moving parts. Without an adequate seal, reduced drilling efficiency would result. A rock drill lubricant must sealing the clearances

without increasing the sliding resistance of mating parts or in itself affecting the tolerances it is meant to seal. MONOLEC Rock Drill Oils are high in both lubricity and adhesiveness allowing them to create an effective and efficient seal of metal surface clearances.

Dieseling

Dieseling (spontaneous ignition of the rock drill oil in the hammer cylinder) is a destructive phenomenon caused by over-lubrication or defective oilers which are not properly introducing the lubricant into the air stream. i.e. Improper oil droplet size in an oil atomizing system. Dieseling is destructive in that it can cause instantaneous lack of lubrication. Frequent inspection and preventive maintenance procedures can help to avoid malfunctions such as dieseling and improper lubrication.

Maintenance Precautions

Proper rock drill oil selection is the most important maintenance factor in achieving trouble-free drill operation. Higher productivity, less repair expense and improved driller safety are all benefits of selecting a high quality lubricant. A minimum oil viscosity of ISO 100 (SAE Grade 30) should be used for any rock drill application. Larger, heavily loaded rock drills operating at elevated temperatures should use oil with a viscosity of ISO 220 (SAE grade 50).

The oil must be specified for use in rock drill applications and must contain an extreme pressure additive. Adequate inventory should be maintained to avoid running out of the selected rock drill lubricant and the temptation to use an inferior, incorrect lubricant until additional rock drill lubricant can be procured.

Frequent inspection and adjustment of the oiler cannot be over emphasized. Periodic inspection and cleaning of all air and oil lines is also recommended at regular intervals or when indicated by signs of excess or insufficient lubrication.

LE's MONOLEC Rock Drill Oils are designed and specified for use in the most rigorous and extreme rock drill applications. LE's 6303 (ISO 100) or LE's 6305 (ISO 220) can be used with peace of mind in achieving optimum rock drill performance with a minimum of wear.

Drills with hydraulic hammers should use LE's MONOLEC Hydraulic Oils or LE'S MULTILEC® Industrial Oils in the hydraulic actuators. Do Not Use a rock drill oil in a hydraulic hammer application.

System air compressors must be of adequate pressure and capacity to assure optimum operation of rock drills. Attempting to operate a drill with insufficient air capacity could cause severe damage to the hammer and risk of injury to the driller. LE's MONOLEC Air Compressor Oils or LE's MULTILEC Industrial Oils of the recommended viscosity should be used in all air compressors. These products will help the air compressor efficiently supply air at a lower outlet temperature, thus reducing stress and wear of the air operated tools.

When a diesel engine drives the air compressor, more system efficiencies and further reduced temperatures can be realized through the use of LE's 8800 MONOLEC ULTRA® Engine Oil (SAE 15W-40). Less radiation and convection of heat to the adjacent air compressor will contribute to further lowering the air outlet temperature.

A complete package of LE lubricants in the total rock drill system-drill, compressor, engine-can offer substantially improved fuel efficiency with dramatically reduced operating air temperature with accompanying reduction in hammer stress and wear.



LUBRICATION ENGINEERS, Inc.®

300 Bailey Ave, Fort Worth, TX 76107 | 817-834-6321 | 800-537-7683
fax 817-834-2341 | <http://www.le-inc.com>