



Oil Fog Health & Safety

Liquid Shield Polar rock drill oils / air tool lubricant
Powerful, economical protection for miners and equipment

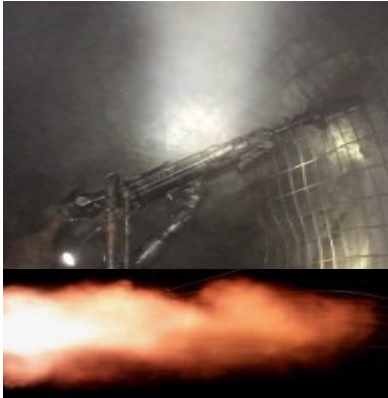


The hazards of airborne oil particulate (Oil Fog) are well documented

Typical rock drill oils are composed of mineral oils that tend to lose their lubricity as temperatures within percussive tools are worked hard, resulting in increased heat generation.

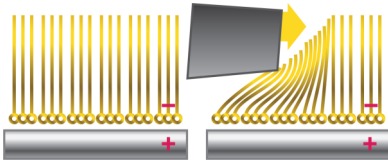
As heat rises, the lubricity of a standard rock drill oil decreases, and at temperatures in excess of 390°F, (199°C) RDOs begin to coke (form hard carbonaceous particles), and instead of lubricating the tool, they accelerate wear. As lubricity decreases, increased friction causes temperatures to rise rapidly, resulting in backfires, and often, exhaust flames and smoke.

Oil fog poses well documented health hazards, but once it turns to smoke, health hazards increase significantly. LS polar rock drill oils reduce the risks.



What is a polar rock drill oil?

Liquid Shield polar rock drill oils are formulated with negatively charged esters that adhere to steel surfaces, which are positively charged. This causes the lubricant to coat all components of the tool, ensuring consistent lubrication, and aids in heat reduction in hard drilling. This polar attraction also helps to minimize the tendency of oils to form oil fog caused by turbulent compressed air.



Liquid Shield High performance heat tolerant esters

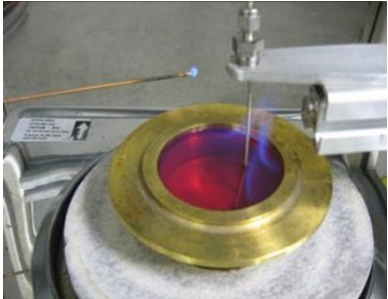
The engineered esters used in Liquid Shield polar rock drill oils are designed to withstand temperatures in excess of 600°F (315°C), which is about 200°F (93°C) higher than standard RDOs, The impact on rock drills is twofold:

- 1) They maintain lubricity long after standard RDOs have failed. This ensures a cooler running tool, and reduces back-firing and smoke generation. It also reduces tool wear and potentially extends service intervals.
- 2) Polar RDO molecules adhere to tool surfaces and to each other, reducing oil fog generation.

Flash points are not a good indicator of how a rock drill oil will behave in a percussive tool

Flash points are measured in a lab apparatus which involves heating the subject oil in a bath over which a flame is present at a predetermined level over the oil. Temperatures are raised until the vapor above the oil bath ignites.

Lubrication within a percussive tool is accomplished by injecting rock drill oil into the compressed air stream, at approximately 2 ppm. This creates a very thin lubricant film over tool surfaces. A thin film is more volatile than a large quantity of oil, and therefore manufacturers' stated flash points are not useful to determine the ability of a rock drill oil to withstand temperatures developed during hard drilling.



Flash point test apparatus



The photos below demonstrate the ultimate fate of various lubricants at high temperatures

The lubricants in the photos were brushed on to a metal surface and heated to 425°F (218°C) for a period of 5 minutes. The results clearly illustrate the impact of heat on various RDOs.



Liquid Shield Ester



Mineral Oil - 425°F

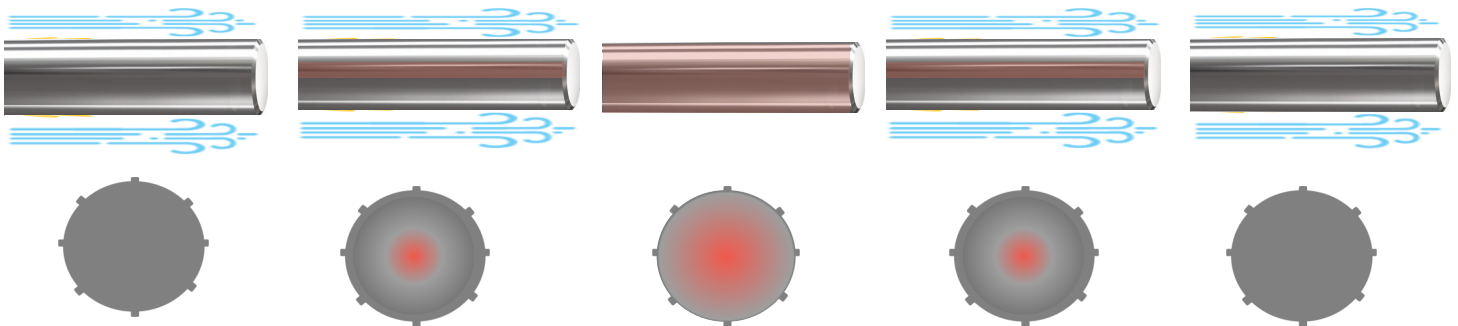


Rock drill grease - 425°F



Vegetable oil - 425°F

During drilling, the cold compressed air rushing past tool surfaces keeps everything cool. However, drilling is never constant (without pauses), and when the tool is paused, heat stored up in the core of the tool radiates to component surfaces, and cooks the lubricant, as you can see in the photos above. The illustration below indicates how the tool starts out cool, builds heat during drilling, and the heat radiates to the surface during pauses (centre illustration) and cools down when drilling resumes.



All polar lubricants are not equal when it comes to heat

Vegetable oils are polar, but their performance in sustained heat conditions is inadequate. They can form varnishes which negatively impact lubricity. The proof of this is evidenced by the use of cooking oils to season cast iron frying pans. A thin film of oil is applied to the pan, which is then heated up until the oil forms a varnish which prevents the pan from rusting. This is great for the kitchen, but not for percussive tool lubrication in high heat conditions. Vegetable oil drill lubes are OK for small diameter DTH drilling, but are not suitable for high load conditions. Liquid Shield engineered esters retain lubricity and tool protection in more severe drilling conditions.

Inhalation of airborne particles is to be avoided. Carbonaceous particles such as smoke from burnt rock drill oil, as well as diesel fumes pose a serious threat. Liquid Shield polar ester formulas reduce exposure to raw and burnt oil particles, and are an inexpensive way to reduce air pollution in drilling operations.

Our products are labelled as non hazardous, and very low odour. Because they limit oil fog generation, they also help to maintain cleaner working conditions.

Choose Liquid Shield polar RDOs to protect your team.



WHMIS & TDG



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