

Alternatives to mineral-based hydraulic fluids in steel production:

**MANAGE YOUR FIRE RISK WITHOUT JEOPARDIZING YOUR PRODUCTIVITY.**

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**The Fire Risks of Hydraulic Fluids.** A fire is one of the events that, once experienced, leaves a huge impression on the people involved. In addition to the risk of personnel injuries, there is a likelihood of loss in both capital and production. These losses not only include damage to the building and equipment, but also encompass interruptions in production that can idle production lines for days or even months.

One cause of fire in a steel production plant is the ignition of mineral oil hydraulic fluids. While mineral oil has the definite advantage of a good cost performance ratio, it is a distillate from crude oil, and not always the safest choice due to its tendency to catch fire easily. Fortunately, there are alternatives available to manage this risk and reduce the chance of an ignition without jeopardizing the performance or productivity.

**Understanding the Term “Fire-resistant.”** The term “fire resistant” is often mistakenly understood to be the same as “fire-retardant”—or the ability to suppress a flame. Fluids can be tested to determine their fire resistance. The most common and generally accepted tests are those used by Factory Mutual (FM Global), the testing and approval arm of a major industrial insurance underwriter ([www.fm-global.com](http://www.fm-global.com)). By using an FM Global approved hydraulic fluid, manufacturers can often reduce their insurance premium. Additionally, beyond FM Global, many other organizations and companies have developed fire resistance tests, usually to simulate a certain type of real-world accident.

**A Comparison of Mineral Oil and QUINTOLUBRIC® when poured on a 900°C panel.**

Figure 1

The frame shots in Figure 1 show the comparison between ignition of mineral oils and HFD-U fluids. These still frames demonstrate the problem that typically occurs when mineral oil comes into contact with a hot surface. The mineral oil evaporates easily, and therefore tends to build a vapor of oil droplets. Once ignition takes place, the oil droplets can catch fire and result in an explosion or fire ball. These two effects make the fire with a mineral oil dangerous and hard to control, as the fire ball can go to the roof or to cables and can ignite that area.

With the polyol ester based HFD-U fluids, this evaporation does not take place and thus no explosion or fire ball will be generated. The HFD-U fluid might burn as well, but there is no vapor or explosion and it is limited to the place it comes in contact with, so the situation remains under control.

The heat of combustion of a mineral oil based hydraulic fluid is typically about 43-44 kJ/g, whereas an HFD-U, polyol ester fire-resistant hydraulic fluid has a heat of combustion of about 38 kJ/g. So chemically an HFD-U fluid generates 10-15% less heat during combustion.

Classic mineral oil based hydraulic fluids introduce a big risk into a steel production plant. Using a waterfree, polyol ester based fire-resistant hydraulic fluids instead can improve the safety in your plant significantly, without jeopardizing the productivity and performance of your production line.

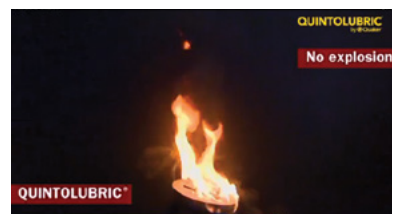
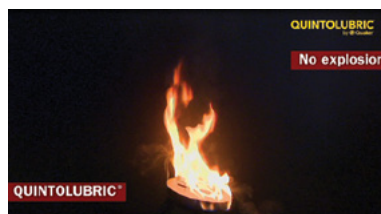
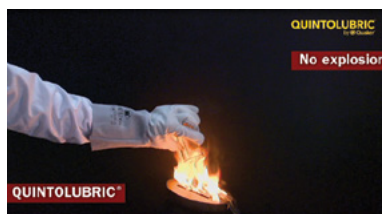
**20 ML OF MINERAL OIL (HLP-46) POURED ON A 900°C PANEL**

Mineral oil forms vapours which results in explosive ignition



**20 ML OF QUINTOLUBRIC® 888 (HLP-46) POURED ON A 900°C PANEL**

QUINTOLUBRIC® 888 produces controlled ignition, no explosion, and ultimate control of the situation



QUINTOLUBRIC® 888 is Quaker’s best-in-class, ester-based, synthetic, water-free, fire-resistant hydraulic fluid (HFD-U). QUINTOLUBRIC® 888 is endorsed by multiple major hydraulic component OEMs.

# DON'T BURN OUT.

## KEEP SAFETY AND EFFICIENCY FROM GOING UP IN SMOKE WITH QUINTOLUBRIC® FIRE-RESISTANT HYDRAULIC FLUIDS.

Mineral oils are highly flammable and are a serious source of fire hazard in high temperature environments and applications close to open flames or red-hot metal parts. The risk is further increased by the rapid and aggressive ignition rate of mineral oils which can cause disruption in production, plant shutdown, increased insurance premiums, and threats to worker safety.

For those who won't compromise on efficiency or safety, there's the QUINTOLUBRIC® line of fire-resistant hydraulic fluids. Our solutions keep your machines working at optimal performance with fewer interruptions and a longer life span for a lower total cost of ownership, increased safety and reduced risk.

Our experts work with you to improve operations, process and efficiency, so you'll keep going strong and keep your workers safe.

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