

Industrial machinery relies heavily on hydraulic fluids; however, these fluids are known for their flammability, which poses a significant safety concern, especially in environments with high temperatures and potential ignition sources. This is particularly problematic in industries such as aluminum extrusion plants. Ronald Knecht, Global Strategic Product Line Manager – Hydraulics & Lubricants and Guillermo Díaz del Pino, Business Development Manager – Operating Solutions from Quaker Houghton, explore the best fire resistant hydraulic fluid options to mitigate risk in manufacturing plants. **Pic 1.**

Although petroleum-based hydraulic fluids have a flash point that is generally above 400°F (200°C), they still carry a risk of combustion. These fluids have been responsible for numerous large fires that caused extensive damage to buildings and equipment and prolonged disruption of operations. Industries face added complexity in meeting safety and environmental regulations, as traditional hydraulic fluids can hinder compliance. More and more industries are considering fire resistant hydraulic fluids as a viable



Pic 1. View of aluminum extrusion plant

# The crucial role of fire resistant hydraulic fluids

alternative to address this issue. These fluids reduce the risk of flammability and enhance the performance of hydraulic systems, leading to a safer work environment and better regulatory adherence.

## Minimizing the risk of fire

It is important to note that mineral oil-based hydraulic fluids can be highly flammable. Two main factors can cause the ignition of these fluids. Firstly, if the fluids spill or leak onto a hot surface, and secondly, if sparks or hot liquid metal encounter a pool of the fluid. The issue with mineral oil-based fluids is that they evaporate quickly, creating a vapor of oil droplets. In ignition, these droplets can catch fire, leading to an explosion or fireball. In the quest for alternatives to mineral oil-based hydraulic fluids, it's essential to prioritize fire resistance, a critical consideration in industrial settings. The distinction between "fire resistant" and "fire retardant" is clarified,

emphasizing that the former doesn't guarantee immunity to burning under specific conditions.

The decision between a solely fire resistant lubricant and one fully retardant involves a nuanced evaluation, considering the fluid's price and its potential impact on existing equipment, including component life and operational reliability. Businesses are advised to assess the total cost of ownership, comparing upfront and ongoing costs against the long-term value derived from reduced fire risk.

Striking the right balance requires navigating conflicting demands to ensure both productivity and profitability while managing an acceptable level of risk. Exploring well-established tests for fire resistance, such as those by factory mutual, provides a reliable framework. Opting for an FM Global-approved hydraulic fluid enhances safety and can reduce insurance premiums, aligning risk management with financial considerations. In industrial environments, hydraulic fluids need to

possess fire resistant properties. Fire resistant lubricant provides a solution that can mitigate the risk of ignition and combustion, ensuring a safer working environment.

## Compliance with safety and environmental regulations

To ensure the responsible and sustainable operation of aluminum extrusion plants and industrial facilities, it is important to prioritize a variety of regulations. These include protecting water quality, controlling noise and vibration, adhering to land use, and zoning requirements, and conducting environmental impact assessments. It is also crucial to maintain compliance with occupational health and safety regulations, which involve addressing concerns related to hazardous substances and prioritizing the well-being of workers. By adhering to these regulations, industrial activities can be balanced with economic viability and environmental stewardship.

Aluminum extrusion plants and industrial facilities should operate within stringent safety and environmental regulations to safeguard workers, preserve the environment, and ensure public safety. These regulations encompass a comprehensive range of aspects, including protocols for worker safety, guidelines for chemical management to control the handling and disposal of hazardous substances, and standards for air quality, limiting emissions of pollutants. However, most extrusion units continue to operate using conventional mineral oil-based hydraulic fluids, leading to an unsafe working environment and jeopardizing process continuity.

Fire resistant hydraulic fluids are essential to responsible industrial practices as they help minimize fire hazards, promote worker safety, and ensure compliance with safety and environmental regulations. These fluids have higher flash points, which significantly reduce the risk of ignition in case of leaks or equipment failure. By adhering to industry-specific standards, these fluids promote worker well-being, minimize environmental impact through biodegradability and lower toxicity, and protect equipment, thereby contributing

to longer lifespans. Adopting these fluids demonstrates a solid commitment to safety, environmental stewardship, and responsible industrial practices, which reinforces emergency response planning and minimizes liability in the event of accidents.

## Sustainable advantages of fire resistant hydraulic fluids

The environmental impact of fire resistant hydraulic fluids is reduced by their biodegradability, which minimizes ecological damage in case of leaks or spills. Secondly, their enhanced safety features contribute to a secure working environment, preventing fires and

water. Typically, HFD fluids are based on synthetic base stocks or esters that combine reasonable to good fire resistant properties with excellent lubrication performance. These fluids are designed to operate in oil hydraulic equipment and have been approved by Factory Mutual Global as a less hazardous hydraulic fluid.

Quaker Houghton's laboratories thoroughly tested all the components used in QUINTOLUBRIC® 888 for compatibility and performance. Adopting fire resistant HFDU hydraulic oils can potentially lead to a reduction in insurance premiums. QUINTOLUBRIC® 888 offers superior performance characteristics, positively impacting productivity and



Pic 2. Quaker Houghton has global footprint of 35 R&D centers

accidents, thereby safeguarding both human lives and industrial equipment. Moreover, these fluids contribute to sustainability by extending equipment lifespan through their excellent lubricating properties and thermal stability. This reduces the frequency of replacements, lowering resource consumption and waste generation. Compliance with stringent environmental regulations is another aspect, as using fire resistant fluids aligns industries with responsible practices.

## QUINTOLUBRIC® 888 polyol ester HFD-U

Quaker Houghton's QUINTOLUBRIC® 888 polyol ester HFD-U fluids are hydraulic fluids that are readily biodegradable<sup>1</sup>, fire resistant and do not contain

significantly saving maintenance, repairs, and equipment replacement costs. **Pic 2.**

The QUINTOLUBRIC® 888 series is included within Quaker Houghton's See Beyond™<sup>1</sup> sustainability portfolio. This product series stands out due to its readily biodegradable nature<sup>2</sup> and WEC grade one, the lowest possible grade. It also has other benefits, such as being FM-approved, having a lower carbon footprint, and owning a true global formulation.

Explore a comprehensive range of innovative hydraulic fluid solutions by visiting Quaker Houghton's website at [www.fire-resistantfluids.com](http://www.fire-resistantfluids.com) for detailed insights and product information tailored to enhance your manufacturing operations. ■

(1) Discover our See Beyond™ sustainability approach - <https://home.quakerhoughton.com/sustainability/>  
(2) QUINTOLUBRIC 888 is tested as readily biodegradable to OECD 301-C