



# LUBRICANTS

## Webinar Executive Summary

Webinar Title: Hydraulic Selection and Sales

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Blaise Pascal is considered to be the father of hydraulics. Pascal's law states that a pressure change at any point in a confined incompressible fluid is transmitted throughout the fluid such that the change occurs everywhere. A simple hydraulic circuit consists of a fluid reservoir, a filter, the system pump, a directional control valve, and a hydraulic cylinder.

The products lines that will be discussed are CITGO HyDurance AW hydraulic Oils, Mystik JT-9 LeakShield AW Fluids, Clarion Environmental Hydraulic fluids, and Clarion Food grade hydraulic fluids. CITGO HyDurance AW Synthetic Fluids are PAO based. The fluids are ashless and have excellent thermal and oxidative stability. They are high viscosity index and great to use in wide temperature range performance. CITGO HyDurance AW Synthetic Fluids are available in ISO grade 46 and ISO grade 68. CITGO HyDurance AW Fluids are mineral based fluids, blended with API group II base oils. They are formulated with a zinc based anti-wear package and provide excellent rust and corrosion protection. They have excellent thermal and oxidative stability and good demulsibility. CITGO HyDurance AW fluids are available in ISO grades 22, 32, 46, 68, 100, and 150.

CITGO HyDurance AW All Temp are mineral oil based fluids. These fluids are blended with API group II base oils and have excellent zinc based anti-wear protections. The fluids possess excellent rust and corrosion protection and demulsibility. These are high viscosity index fluids and they are available in ISO grades 32, 46, and 68.

CITGO HyDurance AW CP Fluid has a dielectric strength of 35 kV. It has multi-grade performance and the viscosity is around 26 cSt at 40C. There are many applications of use for this fluid, including tree trimming, fruit picking mobile equipment, firefighting lift trucks, and buckets.

There are three CITGO product families that are made up of non-zinc containing fluids. These fluids all contain ashless zinc free anti-wear additive packages. They are inherently biodegradable and have low acute aquatic toxicity. CITGO HyDurance AW NZ Fluids and CITGO HyDurance AW All Temp NZ Fluids are available in ISO grades 32, 46, and 68. CITGO HyDurance AW Super NZ Fluids are available at viscosities 32 cSt and 53 cSt.

There are two fire resistance hydraulic fluids available in the CITGO product line. CITGO FR WG-40XD hydraulic Fluid and CITGO Glycol FR-5046HP are both water-glycol fluids. CITGO FR WG-40XD Hydraulic fluid can be used in systems with pressures up to 3000 psi. CITGO Glycol FR-5046 HP can be used in high pressure systems up to 5000 psi.

Mystik JT-9 LeakShield Hydraulic Fluids are blended with API group II base oils. The fluids have excellent properties including, demulsibility, anti-foaming performance, thermal and oxidative stability, and zinc based anti-wear protection. Mystik JT-9 LeakShield fluids are available in ISO grades 22, 32, 46, and 68. There are also two high viscosity index grades available. HVI-32 and HVI-68 are great to use in applications with a wide temperature range and both contain high dielectric strength properties.

Clarion Food Grade Hydraulic Fluids are formulated with white mineral base oils and NSF NX-1 additives. They are NSF H1 for incidental food contact and available in ISO grades 32, 46, 68, and 100.

Clarion CompressorGard products can be used where a synthetic food grade hydraulic fluid is needed. The fluids are available in ISO grades 32, 46, and 68. Clarion Food Grade FR Fluid is NSF H1 for incidental food contact and is for high-temperature hydraulic applications where there is risk of fire. It contains dipropylene glycol and has excellent heat transfer properties.



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Clarion Green Hydraulic Fluids are white mineral oil based and are inherently biodegradable. Clarion Green Hydraulic Fluids are available in ISO grades 32, 46, and 68. Clarion Green Synthetic Fluids are synthetic ester based, readily biodegradable, and meet EPA 2013 VGP requirements. The fluids are available in ISO 22, 32, 46, and 68 grades. Clarion Green Bio Fluids are naturally ester based fluids and readily biodegradable. The fluids meet EPA 2013 VGP requirements and are available in ISO 32, 46, and 68 grades.

There are several hydraulic power applications. Advantages of hydraulic power include power and precision to move heavy loads with fine control, reliability, and compact, economical systems. Hydraulic systems are found in all industrial sectors including, manufacturing, mobile equipment, mining, and rescue equipment. When selection hydraulic fluids the application should be considered. The starting point is the machine or component OEM recommendation. Next, the next consideration is determining if the equipment is under warranty or not and inventory consolidation should be taken. Additional considerations for selecting the proper hydraulic fluid include determining the operating or ambient temperature range. A HVI product may be a good choice in certain applications. The current product in use should be reviewed to determine if it is providing acceptable performance. Compatibility is also important in applications. Zinc and non-zinc fluid are not compatible, but depending on the environmental conditions, one may be a better choice than the other.

There can be several overlapping “correct” recommendations when trying to determine the right choice versus the best choice. However, getting to the “best” choice is the most prudent recommendation. The CITGO and Mystik product lines both have hydraulic fluids with high viscosity index characteristics. As the temperature range increases, the need for a higher VI product also increases. Viscosity-temperature operating window should also be considered. Viscosity is the most important property of a hydraulic fluid. For optimum performance, the viscosity should be between 10 and 1000 cSt at the operating temperature. Zinc based hydraulic fluids contain zinc dialkydithiophosphate (ZDDP). There are applications or situations where a zinc based hydraulic fluid is not suitable. Non-zinc hydraulic fluids should be considered in environmentally sensitive applications, such as elevators, construction equipment over or near water, and amusement park rides.

Compatibility is also an important determining factor when selecting a hydraulic fluid. Zinc and non-zinc chemistries should not be mixed. Elastomer compatibility should be considered. Mineral oil and PAO fluids work well with traditional elastomers. Ester-based fluids have unique compatibility concerns and elastomers used should have excellent resistance.

The CITGO Hydraulic Fluids-Properties and Specifications Chart provides an overview of CITGO HyDurance, Mystik, and Clarion hydraulic fluids.