



# LUBRICANTS

## Webinar Executive Summary

### Off-Road Products

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There are many types of equipment used in the construction and mining industries. Many different original equipment manufacturers (OEMs) make equipment for these industries. Caterpillar may be the largest OEM in this area, but others, such as Terex, Komatsu, Hitachi, John Deere, Volvo, Case, and Bobcat are important players. Dump trucks are used on many construction sites, to haul materials such as soil, sand, rock, gravel, rubble, and waste. Concrete mixers are found in the construction of highways and home foundations. Bulldozers are found on virtually every construction site, used to move materials such as soil, sand, and rubble within the site. Bulldozers can be tracked or wheeled types, and come in a large range of sizes. Scraper and motor graders are used to produce flat surfaces, mainly in highway construction. Excavators are used for digging – holes, ditches, etc. Other attachments, such as drills, mowers, claws, saws, and snowplows are found on excavators. Backhoes and loaders are used for moving materials on a construction site. This type of machine includes skid-steer loaders and backhoe loaders. They are typically smaller than bulldozers and excavators, and are often preferred on smaller construction sites, such as home construction. Milling machines are used to remove old pavement from roads, often in preparation for new pavement to be applied. Pavers are used to lay new asphalt or concrete pavement. In the mining industry, haul trucks are used to move large volumes of materials within the mine site. This may be overburden or the object of the mining operation. Drag Lines are some of the largest mining equipment. They are used to move very massive amounts of material in each motion. Mining shovels are typically used to remove the material being mined from the ground and transfer it to a haul truck. Typically, one or two shovel bucketfuls will fill the haul truck. Excavators are similar to shovels, but with the bucket facing toward the machine. They are used in a similar way as shovels. Rock drills are used to drill holes in the overburden. The holes are filled with explosives, then detonated in a pattern that loosens the material to make it easier to remove. Crushers are used to reduce the size of materials.

Many pieces of construction equipment and most mine haul trucks are diesel powered. CITGO has several tiers of diesel engine oils, starting with the CITGARD 600 Monogrades, which meet the obsolete CF and CF-2 categories (available viscosity grades SAE 10W, 30, 40 and 50). CITGARD 600 10W-30 and 15W-40 are conventional engine oils that meet API CK-4 and the major HD OEM's. CITGARD 700 Synthetic Blend 10W-30 and 15W-40 meet API CK-4 and the major OEM's and have a shear stable viscosity modifier and balanced additive package. CITGARD CNG/LNG 10W-30 and 15W-40 can be used with CNG/LNG, diesel, and gasoline engines for multi-fuel fleets. CITGARD SynDurance Plus 5W-30 and 5W-40 have synthetic formulas that are designed for temperature extremes. Mystik JT-8 Monogrades are synthetic blends. JT-8 10W-30, 10W-40 and 15W-40 are synthetic blends that meet API CK-4 and the major HD OEMs (10W-30 and 15W-40). Mystik JT-8 Synthetic 5W-40 also meets API CK-4 and the OEMs. Mystik JT-8 15W-50 provides excellent protection for older engines.

CITGO Gear Oils highest tier is the SynDurance Synthetic Gear Lubricants (75W-90, 80W-140 and SAE 50) that meet API GL-5/MT-1, SAE J2360 and OEM specs. The CITGEAR HD Synthetic Gear Lubricants (75W-90, 75W-140, 80W-140 and SAE 50) meet API GL-5/MT-1 and are suitable for several OEM specs. The CITGO Premium Gear Oils (MP) (80W-90 and 85W-140) and Premium (LS) 80W-90 meet API GL-5/MT-1.



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CITGO Has several HD Transmission Fluids. The SynDurance 668 ATF meets Allison TES 668, which is backwards compatible with the older TES 295. The SynDurance Synthetic MTF meets the Eaton PS-386 spec. The Quatrasyn Synthetic Transmission Fluid is suitable for use in Allison TES 295. The SynDurance Synthetic All Seasons HD Transmission fluid meets CAT TO-4 and TO-4M, Allison C-4 and Komatsu Micro-Clutch. The TRANSGARD HD transmission fluids (SAE 10W, 30, 50 and 60 )meet CAT TO-4, Allison C-4 (10W/30) and Komatsu Micro-clutch. The CITGO Final Drive Oil meets CAT FD-1 and is a SAE 60.

Mystik SX-7000 Synthetic Gear Lubricants (SAE 75W-90, 80W-140 and SAE 50) meet API GL-5/MT-1, SAE J2360 and several OEM specs. Mystik JT-7 Extended Range Full Synthetic Gear Lubricants (75W-90 and 75W-140) meet API GL-5/MT-1 and can be used for Limited Slip fill. JT-7 Multi-Purpose Gear Lubricants (80W-90 and 85W-140) also meet API GL-5/MT-1 and can be used for Limited Slip fill.

CITGO has several Hydraulic fluid tiers. The zinc-containing fluids are the HyDurance AW (ISO 22 – 150), HyDurance AW All Temp (high VI and ISO grades 32/46/68). CITGO AW Hydraulic Oil Super MV (202 VI), and HyDurance AW CP Fluid (high dielectric strength for manlifts). The non-zinc containing fluids are the HyDurance AW NZ (ISO 32/46/68), HyDurance AW All Temp NZ (high VI and ISO 32/46/68), HyDurance AW Super NZ Fluid (177 VI), and HyDurance AW Synthetic Fluids (ISO 46/68). The Mystik JT-9 LeakShield Hydraulic Oils are dyed green, have an anti-leak additive and come in ISO grades 32/46/68/100. Clarion Green AW oils (ISO 32/46/68) are non-zinc and inherently biodegradable, Clarion Green BIO (ISO 32/46/68) are natural ester based and readily biodegradable and Clarion Green Synthetic (ISO 22/32/46/68) are synthetic ester based and readily biodegradable.

Industrial gear oils are also used in construction and mining equipment. CITGO has the EP Compound line (ISO 68 – 680), CITGEAR Synthetic EP Gear Lubricants (ISO 100 – 680) and CITGEAR Synthetic PAG Lubricants (ISO 100 – 460). Clarion Gear oils are the Clarion Green Gear Lubes (ISO 220/320), which are non-zinc and inherently biodegradable, and the Clarion Green Synthetic Gear Fluids (ISO 150/220/320), which are non-zinc and readily biodegradable.

Greases are essential in the lubrication of construction and mining equipment. CITGO offers multiple grease for those applications. The Lithoplex CM and HM products contain 3% and 5%, respectively, of molybdenum disulfide. They are available in NLGI 1 and 2 grades. Mystik JT-6 Hi-Temp Grease with Moly is based on Mystik JT-6 Hi-Temp Grease 2, with 3% of molybdenum disulfide. Mystik JT-6 Hi-Temp greases are excellent general purpose greases, available in NLGI 1 and 2 grades. They are NLGI GC/LB certified. Mystik JT-6 Super Heavy Duty 460 Grease contains a synthetic blend base oil and a lithium complex thickener. It has exceptional load-carrying capacity, excellent water resistance, and protects against corrosion in sea water environments.