



Off-Road Products

The webinar will begin in less than 10 minutes.

David Turner, CLS, OMA-I, CLGS

Steven Bowles, CLS, OMA-I



Off-Road Products

The webinar will begin in less than 5 minutes.

David Turner, CLS, OMA-I, CLGS

Steven Bowles, CLS, OMA-I



Off-Road Products

David Turner, CLS, OMA-I, CLGS
Steven Bowles, CLS, OMA-I

David Turner

- CITGO Sr. Technical Services Representative
- BS, Chemical Engineering
- 39+ Years Experience in Lubricants
- STLE Certified
 - Certified Lubrication Specialist
 - Oil Monitoring Analyst I
- NLGI Certified
 - Certified Lubricating Grease Specialist
- Active in STLE, NLGI, and ASTM



Steven Bowles

- CITGO Sr. Product Specialist
- BS, Zoology
- MS, Environmental Science
- 17 Years Experience in Lubricants
- 16 Years Experience in Laboratory Supervision/Analytical Chemistry
- STLE Certified
 - Certified Lubrication Specialist
 - Oil Monitoring Analyst I



Agenda

- Types of Construction Equipment
- Types of Mining Equipment
- CITGO, Mystik, and Clarion
Products for Off-Road Construction
and Mining Applications



Off-Road Products

Types of Construction Equipment

Types of Construction Equipment

- Dump Trucks
- Concrete Mixers
- Bulldozers
- Scrapers and Motor Graders
- Excavators
- Backhoes/Loaders
- Milling Machines
- Pavers



TOP US Construction Equipment Manufacturers

CATERPILLAR[®]

 **JOHN DEERE**

KOMATSU

 **TEREX**
CORPORATION



Parker

CASE
CONSTRUCTION

 **Bobcat.**

HITACHI

JCB

Dump Trucks

- Dump trucks are used to haul all types of construction materials



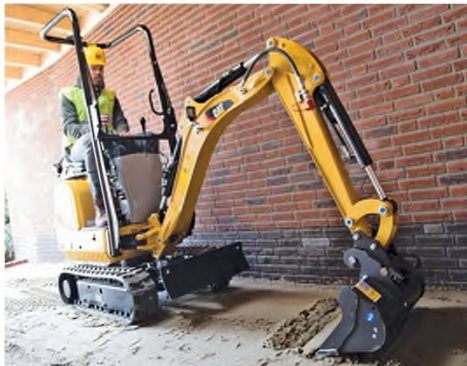
Concrete Mixers

- Used to deliver concrete to construction sites



Bulldozers

- Bulldozers are used on virtually all construction sites
- They are used to move materials such as soil, sand, and rubble
- Most are tracked, but some have wheels
- Bulldozers come in a large range of sizes



Scrapers and Motor Graders

- Scrapers are used to perform rough grading
- Motor graders are used to produce a flat or canted surface



Excavators

- Boom, dipper, and bucket
- Used for digging (trenches, holes)
- Many attachments – drill, mower, claw, saw, snowplow



Backhoes/Loaders

- Skid-steer Loaders
- Backhoe Loaders
- Used for moving materials
- Typically smaller than bulldozers and excavators
- Used on many construction sites, such as home construction



Milling Machines

- Used to remove part or all of asphalt pavement, often to prepare for new pavement to be applied



Pavers

- Used to lay asphalt or concrete pavement



Off-Road Products

Types of Mining Equipment

Types of Mining Equipment

- Haul Trucks
- Draglines
- Shovels
- Excavators
- Bulldozers
- Rock Drills
- Crushers



Haul Trucks

- Used to move overburden or the product of a mine
- Sized to move one or two shovel loads



Drag Lines

- Used to move massive amounts of materials



Mining Shovels

Typically used to remove the product of the mine (coal, phosphate, etc.) and place it into haul trucks for transportation



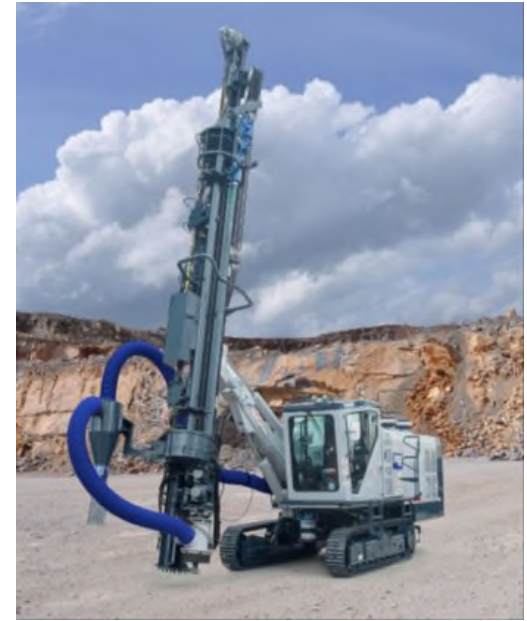
Excavators

- Similar to shovels, but the bucket faces backward instead of forward
- Can fill a haul truck in one or two loads



Rock Drills

Used to drill holes that are filled with explosives



Crushers

- Multiple designs: jaw, hammer, cone, gyratory, double row tooth
- One function: size reduction



Off-Road Products

CITGO and Mystik Lubricants for Construction and Mining

CITGARD Diesel Engine Oils

- Many pieces of construction equipment and most mine haul trucks are diesel powered.
- CITGARD 600 Monogrades
 - Obsolete API Categories CF, CF-2
 - SAE 10W, 30, 40 and 50
- CITGARD 600 10W-30/15W-40
 - Licensed API CK-4
 - Approved for major HD OEM's
- CITGARD 700 Synthetic Blend 10W-30/15W-40
 - Balanced additive package
 - Shear stable VM



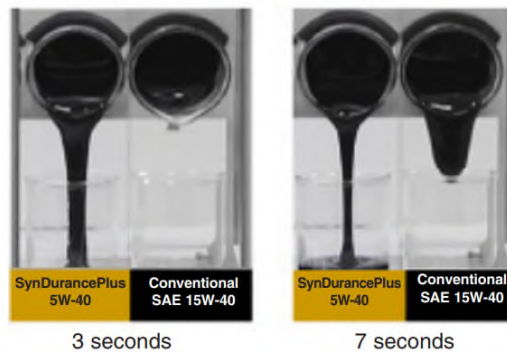
CITGARD Diesel Engine Oils

- CITGARD CNG/LNG 10W-30/15W-40
 - For multi-fuel fleets
 - CNG/LNG, Diesel, Gasoline
- CITGARD SynDurance Plus 5W-30/5W-40
 - Synthetic Formula for temperature extremes



Low Temperature Pumpability Comparison

How much wear occurs waiting on 15W-40?



Cold box testing at -22°F (-30°C) of used oil demonstrates the superior flow characteristics of SynDurance Plus Synthetic 5W-40



Mystik JT-8 Super Heavy Duty Diesel Engine Oils

- Mystik JT-8 Synthetic Blend SHD Monograde Engine Oils
 - SAE 10W, 30, 40 and 50
- Mystik JT-8 Synthetic Engine Oil 5W-40 and JT-8 Synthetic Blend SHD Engine Oils 10W-30, 10W-40 and 15W-40 meet API CK-4. 10W-30 and 15W-40 meet multiple diesel engine OEM specifications.
- Mystik JT-8 Synthetic Blend Super Heavy Duty Engine Oil 15W-50 is formulated to provide excellent protection for equipment operating in severe conditions. The SAE 15W-50 product is designed for use in older engines with higher miles or operating hours.



CITGO Gear Lubricants

- CITGO SynDurance Synthetic Gear Lubricants
 - SAE 75W-90, 80W-140, and 50
 - Meet API GL-5/MT-1, SAE J2360, OEM Specs
- CITGO CITGEAR HD Synthetic Gear Lubricants
 - SAE 75W-90, 75W-140, 80W-140, SAE 50
 - Meet API GL-5/MT-1, GL-4/MT-1 (SAE 50)
- CITGO Premium Gear Oils (MP)
 - API GL-5/MT-1
- CITGO Premium (LS) Gear Oil
 - API GL-5/MT-1, for use in Limited Slip Differentials



CITGO Transmission Lubricants

- CITGO SynDurance 668 ATF
 - Synthetic HD ATF approved for Allison TES 668
 - Backwards compatible with TES 295
- CITGO SynDurance Synthetic MTF
 - Approved for Eaton PS-386
 - Supersedes PS-164 Rev. 7
 - 75W-90 (SAE 40)
- CITGO QuatraSyn Synthetic Transmission Fluid
 - Suitable for Allison TES 295
 - MAN, MB, Voith and ZF approvals



CITGO Transmission Lubricants

- CITGO SynDurance Synthetic All Seasons HD Transmission Fluid
 - Meets performance requirements of CAT TO-4, Allison C-4 and Komatsu Micro-Clutch
- CITGO TRANSGARD HD Transmission Fluids
 - SAE 10W, 30, 50, 60
 - Meets performance requirements of CAT TO-4, Allison C-4 (10W and 30) Komatsu Micro-Clutch
- CITGO Final Drive Oil
 - meets performance requirements of CAT FD-1
 - SAE 60



Mystik Gear Lubricants

- Mystik SX-7000 Synthetic Gear Lubricants
 - SAE 75W-90, 80W-140, 50
 - Meet API GL-5/MT-1, SAE J2360, OEM Specs
- Mystik JT-7 Extended Range Full Synthetic Gear Lubricants
 - API GL-5/MT-1 and SAE J2360
 - SAE 75W-90 and 75W-140 (LS)
- JT-7 Multi-Purpose Gear Lubricants
 - API GL-5/MT-1 and SAE J2360
 - SAE 80W-90 and 85W-140 (LS)



CITGO Hydraulic Fluids (Zinc)

- HyDurance AW
 - Industry standard zinc-based hydraulic fluids
 - ISO 22, 32, 46, 68, 100, and 150
- HyDurance AW All Temp
 - High VI hydraulic fluids – ISO 32, 46, and 68
- CITGO A/W Hydraulic Oil Super MV
 - Very high VI - 36 cSt @ 40°C, 202 VI
- HyDurance AW CP Fluid
 - High dielectric strength hydraulic fluid for use in applications near power lines – 25 cSt @ 40°C



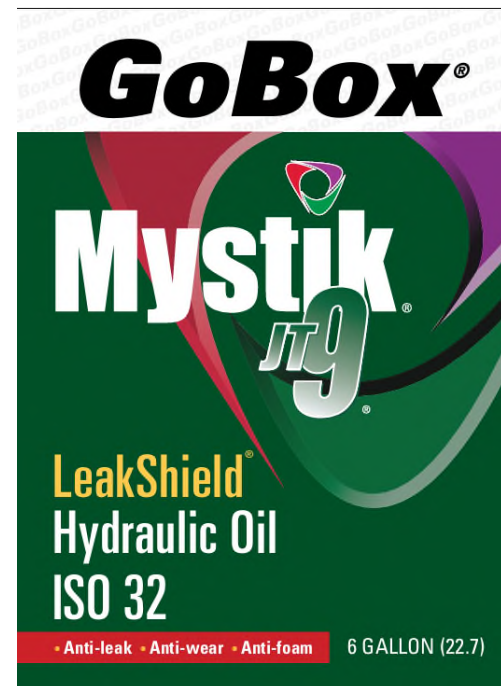
CITGO Hydraulic Fluids (Non-Zinc)

- HyDurance AW NZ
 - ISO 32, 46, 68
 - Non-toxic in acute aquatic toxicity test (OECD TG 203)
- HyDurance AW All Temp NZ
 - Higher viscosity index hydraulic fluid
 - – ISO 32, 46, 68
- HyDurance AW Super NZ Fluid
 - Very high VI – 53 cSt @ 40°C (177 VI)
- HyDurance AW Synthetic Fluids
 - ISO 46, 68



Mystik JT-9 LeakShield Hydraulic Oils

- Available in ISO grades 32, 46, 68 and 100
- Consolidation of the Mystik AW and AW/AL hydraulic oil lines
- Available in the following packages
 - 2 gallon bottle: ISO 32/46/68
 - 6 gallon GoBox: ISO 32/46/68
 - Pails: ISO 32/46/68/100
 - Drums: ISO 32/46/68/100
 - Totes: ISO 32/46/68/100
 - Bulk: ISO 32



Clarion Hydraulic Fluids

- For use in environmentally sensitive areas and applications
- Clarion Green Bio and Synthetic meet the 2013 EPA VGP requirements, readily biodegradable, non-toxic
- Clarion Green A/W Oils pass the US Coast Guard static sheen test, inherently biodegradable
- Clarion Green A/W Oils – Non-zinc, white mineral oil based – ISO 32, 46, 68
- Clarion Green Bio – Non-zinc, natural ester based – ISO 32, 46, 68
- Clarion Green Synthetic – Non-zinc, synthetic ester based – ISO 22, 32, 46, 68



CITGO Industrial Gear Oils

- Many types of construction and mining equipment contain industrial gearboxes
- Many haul trucks are driven by electric garmotors that require PAG-based lubricants
- EP Compound – Industry standard mineral oil based gear oils – ISO 68 – 680
- CITGEAR Synthetic EP Gear Lubricant – PAO-based gear lubricants – ISO 100 – 680
- CITGEAR Synthetic PAG Gear Lubricant – PAG-based gear lubricants – ISO 100 - 460



Clarion Industrial Gear Lubricants

- For use in environmentally sensitive areas and applications
- Clarion Green Synthetic Gear Lubes meet the 2013 EPA VGP requirements, readily biodegradable, non-toxic
- Clarion Green Gear Lubes pass the US Coast Guard static sheen test, inherently biodegradable
- Clarion Green Gear Lube – Non-zinc, white mineral oil based – ISO 220, 320
- Clarion Green Synthetic Gear Fluid – Non-zinc, synthetic ester based – ISO 150, 220, 320



CITGO Lithoplex CM and HM Greases

- Lithium complex greases with molybdenum disulfide (MoS_2)
- Designed for use on construction and mining equipment
- Polymer fortified for excellent water resistance and adhesion

Product	CM1	CM2	HM1	HM2
NLGI Grade	1	2	1	2
Base Oil Viscosity cSt @ 40°C	285	375	375	375
MoS_2 Content, %	3	3	5	5



Mystik JT-6 Hi-Temp with Moly

- High performance construction and mining grease
- Based on Mystik JT-6 Hi-Temp Grease 2
- Lithium complex thickener
- Excellent resistance to oxidation and corrosion
- Superior antiwear and extreme pressure performance
- Excellent water resistance
- Contains 3% molybdenum disulfide
- NLGI 2 grade
- Meets the NLGI GC-LB specification for automotive service



Mystik JT-6 Hi-Temp Greases

- NLGI 2 and 1 grades
- Formulated with high performance lithium complex thickener and high performance base oils.
 - Compatible with most greases on the market
 - High temperature performance
 - NLGI GC-LB Certified Automotive Wheel Bearing and Chassis Lubricant
- Proprietary Additive System with Excellent Load-Carrying Properties
 - 80 lb. Timken OK Load
 - 315 kgf Four-Ball EP Weld Point
 - 0.45 mm Four-Ball Wear Scar
- Polymer Fortified
 - Provides Excellent Adhesion
 - Improved Water Resistance



Mystik JT-6 Super Heavy Duty 460 Grease

- Lithium complex thickener provides high temperature performance
- Unique EP additive system provides extra high load carrying capability
800 kgf Four-Ball Weld
- 5% Synthetic Sea Water Corrosion Pass
- High viscosity synthetic blend base oils provide excellent pumpability and water resistance
Water Spray-Off <10%





Questions

- Please post your questions using the Q&A function.
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How to Contact Us

- Lubes Answer Line

800-248-4684

8:00 AM - 12:00 PM, 1:00 PM – 5:00 PM CT
Monday through Thursday

8:00 AM - 12:00 PM, 1:00 PM – 4:30 PM CT
Friday

lubeshelp@citgo.com



Future Webinars

June 11, 2021	Lubricant Additives for the Non-Chemist
June 25, 2021	Clarion Lubricants for the Food and Beverage Industry
July 9, 2021	Lubricants for the Steel Industry
July 23, 2021	Wear Modes and Failure Analysis
