



CITGO® CITGARD® CNG/LNG Engine Oils

OVERVIEW



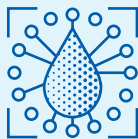
- Specially formulated for natural gas (CNG/LNG), diesel, and gasoline fueled engines. Available in SAE 15W-40 and 10W-30 viscosity grades.
- Use CONVERGE Engine Oil Advantage to provide multi-fuel fleet with optimum performance capability without compromising overall performance.

FEATURES & BENEFITS



- Meet Cummins CES 20092.
- Excellent for fleets wanting one oil to reduce inventory in a mixed fleet with a variety of applications.
- Additive technology delivers superior oxidation and nitration protection combined with a shear-stable VI improver to maintain viscosity, ensuring wear protection in severe applications.
- This unique formulation provides superior engine deposit control, reducing the tendency for valve guttering due to higher combustion temperatures in CNG engines and oil oxidation in the higher operating temperatures of modern diesel engines.
- Field-tested at 30,000 miles and 500 hours with 'headroom' results that demonstrate protection against deposits, corrosion, and liner and tappet wear.
- Maintain TAN and TBN reserve for optimum protection when longer oil service life is needed.
- CONVERGE additive technology provides excellent cold-weather pumpability, foam protection, exceptional oxidation and nitration control, overall engine cleanliness, and reduced oil consumption.
- The SAE 10W-30 grade is designed to improve fuel economy and is licensed API SN service category. Gasoline-powered pickup trucks and similar vehicles can take advantage of this technology where this grade is recommended by the OEM.

APPLICATIONS



CITGARD with CONVERGE Advantage delivers:

- C** – Clean engine and corrosion protection tested to 500 hours/30,000 miles. ODI - extra TBN/TAN reserve to neutralize acids
- O** – Oxidation – 100% better than test limit extended to over 700 hours
- N** – Nitration – low nitration with extended 500 hr. ODI
- V** – Viscosity shear stability
- E** – Extendable ODI to standardize diesel/CNG service
- R** – Reduce pressure drop in DPF and regeneration event frequency while also reducing engine wear and maintaining low iron wear out to 740-hour ODI
- G** – Guaranteed results or money back
- E** – Eliminates the need for three different engine oils for a multi-fuel type fleet

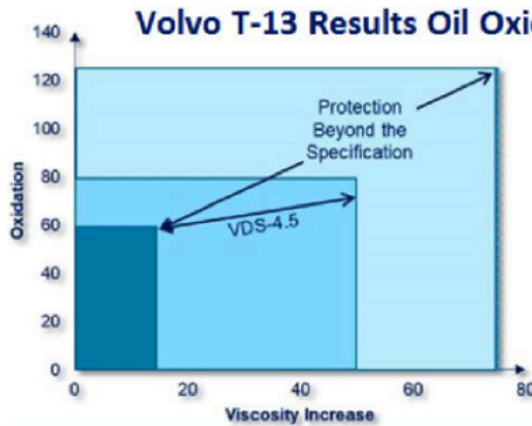
APPLICATIONS



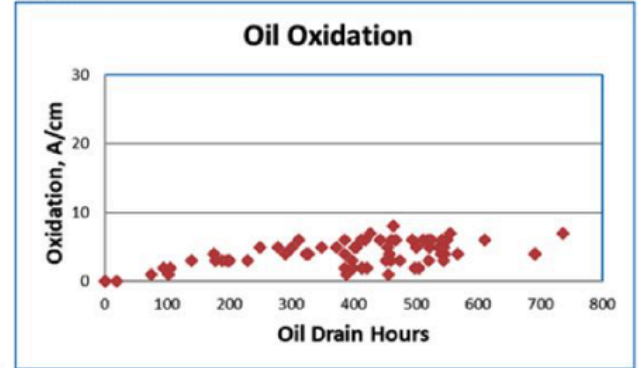
Approved for:

Cummins CES 20092
 Cummins CES 20086
 Caterpillar ECF-3

Detroit Diesel DFS 93K222
 Volvo/Mack/Renault - VDS-4.5/EOS-4.5/RLD-3
 API CK-4/SN



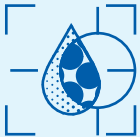
Field Test Results
 Cummins ISL G
 8.9L/320 HP



100% Better oxidation protection than specification 20% below Volvo VDS-4.5 limit

CITGARD CNG/LNG with Converge Technology. Field-tested to 700 hours with superior oxidation stability

PROPERTIES



Typical Properties for CITGO CITGARD CNG/LNG Engine Oils:

SAE Grade	10W-30	15W-40
Material Code	632019	632020
Gravity, ASTM D4052, °API at 60°F	31.5	30.0
Pounds/Gallon at 60°F	7.3	7.3
Viscosity ASTM D445		
cSt at 40°C	86	124
cSt at 100°C	12.2	15.7
Viscosity Index	137	134
CCS Viscosity, cP, @ Temperature	6550 @ -25°C	5470 @ -20°C
MRV Viscosity, cP, @ Temperature	22500 @ -30°C	20000 @ -25°C
MRV Yield Stress, Pa, @ Temperature	<35 @ -30°C	<35 @ -25°C
Pour Point, °F (°C)	-42 (-44)	-39 (-38)
Flash Point, COC, °F (°C)	207 (405)	210 (410)
Noack Volatility, ASTM D5800, % Loss	11	10
Color, ASTM D1500	L4.0	L4.0
Total Base Number, ASTM D2896	10	10
Sulfated Ash, ASTM D874, % wt	0.9	0.9

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