Fleets are under constant cost pressures – Fuel and labor is the largest percentage cost impact that they are working to manage and reduce.

Any products that can help achieve longer drain intervals or reduce fuel consumption are important for fleets to review.

**Average Trucking Fleet – Cost Analysis**

- **Fuel costs**, 40%
- **Depreciation**, 15%
- **Repair and maintenance**, 5%
- **Tires**, 2%
- **Tolls, licensing and permits**, 2%
- **Labor Costs**, 35%

*Source: America Transportation Research Institute (2008) Survey*
EPA and NHTSA announced a first-ever program to regulate GHG emissions and Fuel Economy for Model Year 2014-2018 MD and HD vehicles

Only on-road HD vehicles rated at a GVW ≥8,500 lbs are included in this proposal

Proposed emission standards for CO2 and fuel consumption standards are tailored to each of three main categories:

- Combination tractor & trailers
- HD Pickup trucks and vans
- Vocational service vehicles

As the majority of these vehicles carry payloads of goods in addition to passengers, two types of standard metrics are proposed:

- Pickups/Vans: g/mile (or gal/100 mile)
- Vocational vehicles/Combination tractors: g/ton-mile (gal/1000 ton-mile)
Fleet & awareness of the rising cost of fuel and overall sustainability concerns is creating demand for a new generation of fuel efficient HD oils.

Major OEMs such as Daimler (Detroit), Volvo, PACCAR, Navistar and Cummins are currently factory filling with SAE 10W-30 engine oils and starting to recommend its use with fleets.

As fleet customers look to achieve better fuel economy performance – they can focus on a number of key factors that can help achieve fuel economy savings (reference slide 7).

These factors are addressed by both OEMs and fleet operating procedures to help maximize fuel economy.
Chevron Delo® 400 XLE Synblend SAE 10W-30 with ISOSYN® Technology is a top-tier synthetic blend HD engine oil formulated to provide excellent on-road fleet customer performance:

**Fuel Economy & Emissions:**
- Excellent fuel economy performance in Class 8 & 6 vehicles – helps minimize operating costs
- Helps lower carbon (CO₂) emissions

**Engine Durability & Extended Drain Capability:**
- Comparable level of wear protection as leading API CJ-4 SAE15W-40 heavy duty engine oils.
- Extended oil drain capability demonstrated in fleet field tests while controlling wear rates

**Cold Weather Capable:**
- Better cold weather flow versus SAE 15W-40 engine oils – similar performance to full synthetic SAE 5W-40 engine oils
- Improved flow performance provides better lubrication at start up for diesel parts protection.
API and Original Engine Manufacturers (OEM) Specifications

- API CJ-4 / API SM
- ACEA E9
- Cummins CES 20081
- Caterpillar ECF-3, ECF-2
- DDC 93K218 (P)
- Mack EO-O Premium Plus (P)
- Volvo VDS-4 (P)
- Renault RLD-3 (P)
- Mercedes Benz MB 228.31 (P)
- Deutz DQC-III-10LA (P)
- MAN M3575 (P)
- MTU Category 2.1 (P)

(P) = Approval Pending
Overall Truck Fuel Economy Contribution

Key Contributors to Achieve World Class Fuel Economy Performance

Maximum Fuel Economy Impact

- Operator/Environment
- Vehicle

Major Fuel Economy Impact Drivers
OEMs and Fleets focus on these areas with hardware/ECU management

These areas help further improve Fuel Economy as long as truck durability and reliability is maintained

Chevron Delo® 400 XLE Synblend SAE 10W-30
Fuel Economy Test Stand Performance – Volvo D12D test – Class 8 trucks

SAE 10W-30 Fuel Efficiency Savings
0.7 to 1.03% based on driving conditions

W. van Dam et al. Esslingen 2012 – data compared to 15W-40 HDEO

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Chevron Delo® 400 XLE Synblend SAE 10W-30
Fuel Economy Results in SAE J1321 Track Testing
(Reference Slide 27 in Appendix)

- SAE J1321 testing shows field economy savings at up to 3.6% for Class 6 trucks and up to 1.03% for class 8 trucks versus SAE 15W-40 engine oils

- Truck Class / Engine size / Duty Cycle are factors that influence fuel economy % savings performance vs. baseline SAE 15W-40 use

- Percent savings with Delo 400 XLE Synblend SAE 10W-30 are very good for fleets

*Testing conducted by an independent research lab following SAE J1321 test standards and measurement protocols*
Chevron Delo® 400 XLE Synblend SAE 10W-30
Minimizes Operating Costs - Fuel Savings can Offset the Oil Price Differential
(Reference Slide 28 in Appendix)

Impact of small fuel savings % across fleet fuel costs

Incremental Net Savings of $752/truck/year
($75,200 per year for 100 truck fleet)

Assumes an average diesel fuel cost of $4.00/G and 120,000 miles per year
– Full RbL Savings details in the Appendix – Slide 28
Chevron Delo® 400 XLE Synblend SAE 10W-30
Reduced Carbon Footprint Emissions Performance
(Reference Slide 29 in Appendix)

Impact of fuel savings % across fleet CO₂ Emissions Reductions

Incremental Net CO₂ Reduction 4,396lbs/truck/year
(439,600 lbs reduction per year for 100 truck fleet)

Full Carbon Emission reduction details in the Appendix and is based on 120,000 miles per year of driving – reference slide 29
Chevron Delo 400 XLE Synblend SAE 10W-30

*Engine Durability Performance*

*Fleet Field Test Performance in Volvo 13L Diesel Engines*
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Kinematic Viscosity

Drain Interval Achieved with Delo 400 XLE Synblend 10W-30

Higher Viscosity Limit – 12.5cST @100C
Lower Viscosity Limit – 9.3cST @100C

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Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Iron Wear

Maximum of 150 ppm for Iron wear

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.

Drain Interval
Achieved with Delo 400 XLE Synblend 10W-30
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Iron Wear

Maximum of 150 ppm for Iron wear

Consistent Drain Interval Achieved with Delo 400 XLE Synblend 10W-30 with Low Iron Wear rates

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Iron Wear

Maximum of 40 ppm for Aluminum wear

Drain Interval Achieved with Delo 400 XLE Synblend 10W-30

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Aluminum Wear

Maximum of 40 ppm for Aluminum wear

Consistent Drain Interval Achieved with Delo 400 XLE Synblend 10W-30 with Low Aluminum Wear rates

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Copper Wear

Drain Interval Achieved with Delo 400 XLE Synblend 10W-30

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.

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Consistent Drain Interval Achieved with Delo 400 XLE Synblend 10W-30 with Low Copper Wear rates – High Copper points due to oil cooler passivation process

Maximum of 30 ppm for Aluminum wear

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Lead Wear

Drain Interval Achieved with Delo 400 XLE Synblend 10W-30

Maximum of 30 ppm for Lead wear

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.

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Delo® 400 XLE Synblend SAE 10W-30
Field Test Results – Used Oil Analysis Lead Wear

Consistent Drain Interval Achieved with Delo 400 XLE Synblend 10W-30 with Low Lead Wear rates

Maximum of 30 ppm for Lead wear

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.

© 2013 Chevron
Drain Interval Achieved with Delo 400 XLE Synblend 10W-30

Minimum TBN of 1.5 TBN using ASTM D 4739

Always follow OEM recommendations and utilize used oil analysis when extending drain intervals.
Delo 400 XLE Synblend 10W-30

Cold Flow Performance
Cold Storage Box Test compares the pumpability of oils by subjecting them to sub-zero temperatures for 24 hours and then testing both products flow rates and times for a fixed volume of oil to be pumped to an alternate vessel.

- Easy test to measure real world pumpability and cold flow that an engine oil would face in harsh winter conditions going from the oil pan to the crankcase.

- Chevron’s Delo 400 XLE Synblend SAE10W-30 performs extremely well down to –31F (-35C).

- Shows how Delo 400 XLE Synblend 10W-30 provides faster lubrication protection versus SAE 15W-40 in cold weather conditions and similar performance to full synthetic SAE 5W-40 engine oil.
Delivers real world fuel economy - gains of up to 2.3% for mixed fleet operations (medium and heavy-duty) based on EPA SmartWay® protocols

Minimizes operating costs - potential fuel savings can more than offset the price differential versus conventional SAE 15W-40 heavy duty engine oils and still provide total per truck savings

Lowers carbon emissions - capable of reducing CO₂ emissions by up to 4,300+ lbs per Class 8 truck per year compared to a SAE 15W-40

Enhanced engine durability – provides low wear performance and ultimate protection of engine parts – even in extended drain applications to help long vehicle performance

Superior cold weather performance - allows for faster pumpability than SAE 15W-40 oils and similar pumpability to SAE 5W-40 synthetic oils for improved lubrication

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Delo 400 XLE Synblend SAE 10W-30

APPENDIX – Additional Materials
Delo® 400 XLE Synblend SAE 10W-30

HD Fuel Economy Truck Track Test – SAE J1321 Protocol/SmartWay® Program
(Slide 10 Details on SAE J1321 Testing)

- Independent validity was conducted by SWRI using SmartWay® Protocols
  - SmartWay® program was started in 2004 by EPA as a way to assess vehicle designs and equipment, that taken together can reduce fuel consumption
  - It is a close proxy to validate the real world fuel economy performance of light viscosity engine oils
- Modified SAE J1321 Type II testing procedure
  - One control truck and three test trucks – The track used for the test work was Pecos Research Testing Center
  - Fuel weight differentials determined using removable fuel tanks
  - Class 6 trucks were ballasted with concrete blocks to a gross vehicle weight (GVW) of 25,700 lbs; Class 8 weight at 68,000 lbs.
  - The same drivers operated their assigned trucks throughout the test program.
  - Fuel consumption was measured over a distance of 20 miles.
  - One driving cycle consisted of 2.2 laps (20 miles) around the main track for Class 6 trucks. Class 8 truck was driven 4+ laps (41.2 miles) around main track.
  - Class 8 work cycle is considered over the road – Class 6 work cycle is considered “stop & go” – these methods were utilized per SmartWay and SAEJ1321 guidelines.
- For Class 6 truck testing – “Stop & Go” duty cycles utilized from SAE J1376 report selected to match truck purpose
  - SAE J1376 duty cycles developed to be consistently replicated by human drivers. By limiting driver variability and using multiple trucks, we have higher confidence in data generated

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### Class 8 Truck RbL Savings Example

<table>
<thead>
<tr>
<th></th>
<th>Fleet Information</th>
<th>15W-40 Baseline Information</th>
<th>10W-30 Savings Based on Volvo D12D (flat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Economy Improvement, %</td>
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<td>0</td>
<td>1.0%</td>
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<tr>
<td>Avg Fleet Economy, mpg</td>
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<tr>
<td>Diesel cost, $/gal</td>
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<tr>
<td>Annualized mileage, miles</td>
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<tr>
<td>Fuel consumption, gal/truck</td>
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<td>Fuel cost, $/truck</td>
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<td>Fuel saving, gal/truck (per year)</td>
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<td>Fuel saving, $/truck (per year)</td>
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<td>Avg Drain Interval, miles</td>
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<td>HDEO Cost (API CJ-4), $/gal (estimate)</td>
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<td>Number of oil drain (per year)</td>
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<td>Incremental cost of Oil Change, $/truck</td>
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<td>Net savings, $/truck</td>
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<tr>
<td>Number of trucks</td>
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<td><strong>Annual Savings (whole fleet)</strong></td>
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<td><strong>$0</strong></td>
<td><strong>$75,200</strong></td>
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</table>
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<td>1.0%</td>
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<tr>
<td><strong>Avg Fleet Economy, mpg</strong></td>
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<tr>
<td><strong>Number of Trucks in Fleet</strong></td>
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<td><strong>Annualized mileage, miles</strong></td>
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<tr>
<td><strong>Fuel consumption, gal/truck</strong></td>
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<td>19,802</td>
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<td><strong>CO2 Reduction total fleet, lb (per year)</strong></td>
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</tbody>
</table>

*EPA estimates CO2 emissions for diesel fuel at 22.2lb/gal
Reference EPA 420-F-05-001- Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel dated February 2005