Using the Right Oil for the Right Vehicles to Protect Engines, Reduce Fuel Costs and Cut Emissions

PCFV Lubricants Work Group

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Lubricant Work Group Members

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Introduction to the Lubricant Work Group

- **Objective:**
  - To provide education and guidance to key stakeholders on the importance of using the most effective lubricants and oils, and on the potential benefits from switching to higher-performing lubricants (e.g., lower viscosity, more advanced industry specifications).

- **Audiences:**
  - Key stakeholders in countries that are moving towards Euro 6/VI standards, as well as stakeholders in countries that are at Euro 2-4/II-IV levels. These stakeholders include:
    - Policymakers and regulators
    - Industry associations that represent OEMs, car dealers, fuels distributors, etc.
    - Fleets, consumers, and other end users
WHY LUBRICANTS MATTER

Matching the Right Lubricants to the Right Vehicles Will Lead to Lower Emissions, Better Fuel Economy, and Better Performance
Lubricants and additives provide improved performance in a variety of ways.
Higher Performance Lubricants Reduce Heavy Duty Vehicle CO$_2$ Emissions + Fuel Consumption

• Engine + driveline lubricants already help reduce fuel consumption + CO$_2$ emissions
  – *Protect systems that help reduce emissions*
  – *Direct delivery of fuel savings and CO$_2$*

• New generation of lubricants are entering the market to help meet new emissions standards
  – *Even greater fuel savings + CO$_2$, without compromising engine performance + durability*

Next Step: Find ways to encourage higher performing lubricant use throughout the life the vehicle
Independent Studies Have Shown the Benefits of Fuel Efficient Lubricants in the HD Sector

Modern HD Diesel Engines are Certified with 10W-30 HPLs due to their Fuel Economy benefits as compared to older 15W-40 lubricants.

Class 8 over-the-road fleets can realistically expect fuel savings in the range of 0.5% to 1.5% by switching from 15W-40 to 5W/10W-30 CK-4 engine oil.

The savings from switching to the fuel-efficient FA-4 variant, available after December 2016, can be expected to add a further 0.4–0.7% of increased fuel efficiency.

Source: Trucking Efficiency Confidence Report: Low-Viscosity Lubricants

Using Higher Viscosity Lubricants Causes Higher Fuel Consumption and Increased CO₂
Higher Performing Lubricants Ensure Original Engine Performance over Extended Lifetime

Critical engine parts with over 800,000 km usage.

HPLs can provide protection throughout multiple vehicle owners

TEST MILEAGE: 823,720 km
Frequent Oil/Filter Changes Create Many Opportunities to Maximize Fuel Savings and GHG Reductions

Heavy Duty Diesel Example

- **Engine Overhaul**: 1,000,000 - 1,500,000 miles
- **Gear Oil Replaced**: 500,000 miles
- **Tires Replaced / DPF Cleaning**: 100,000 – 300,000 miles
- **Oil and Filter Replaced**: 20,000 – 30,000 miles
- **DEF Tank Filled**: 3,000 – 6,000 miles

Point-of-sale transactions create frequent opportunities to encourage consumers and fleets to use the right oil for the right vehicle.
THE RISKS OF LUBRICANT MISAPPLICATION
Lower Quality Lubricants in Modern Engines Leads to Lower Efficiency and Higher Emissions (1)

End of test engine components from a TGDI passenger car field trial conducted in China

Using older specification lubricants in a modern engine can result in excessive sludge and deposit formation, which can lead to lower efficiency and hence higher emissions.
Lower Quality Lubricants in Modern Engines Leads to Lower Efficiency and Higher Emissions (2)

Low Speed Pre-Ignition (LSPI)
Catastrophic Piston Damage

Cylinder Liner Scuffing from improper lubricant selection decreases engine efficiency

DPF Fouling/Plugging decreases DPF effectiveness and also leads to severe engine damage from increased exhaust back pressure.
INITIAL CASE STUDY FOR THE PCFV:
TAKING STEPS TO ENSURE THE LATEST LUBRICANT TECHNOLOGIES ARE USED IN AFRICA
Why HPLs Are Increasingly Necessary for Africa

- As powertrains, engines, and emission control systems become increasingly complex to meet advanced vehicle emission and efficiency standards, HPLs become increasingly important.
- Steps to ensure that vehicle owners use “the right oil for the right vehicle” will help protect engines, increase efficiency, and reduce emissions.
  - Imported Euro 4/IV and 5/V vehicles currently in Africa should use HPLs to operate efficiently and cleanly already.
  - The introduction of Euro 6/VI vehicles will further increase demand for HPLs in Africa.
- In some markets, there will be a demand for lower-viscosity oils that deliver even greater fuel economy and emissions benefits.
Lubricants meeting the latest specifications are backward compatible

Sub Sahara Africa – Commercial Vehicle Parc Age Profile - 2018

Lubricants meeting older specifications are not suitable for newer vehicles

*API CJ-4 / CK-4 lubricants are required for vehicles equipped with diesel particulate filters, enabling the vehicle to meet the latest emissions regulations

Source: OICA
Lubricants meeting the latest specifications are backward compatible.

Passenger Vehicle Parc Age Profile - 2018

Euro I: 153,000 vehicles
Euro II: 300,000 vehicles
Euro III: 1,234,000 vehicles
Euro IV: 1,154,000 vehicles
Euro V: 2,282,000 vehicles
Euro VI: 2,414,000 vehicles

API SM
API SJ
API SL
API SH
API SN / SN Plus*

Lubricants meeting older specifications are not suitable for newer vehicles.

*API SN / SN Plus lubricants are designed for vehicles equipped with exhaust after treatment devices, enabling the vehicle to meet the recent emissions regulations.

Source: OICA
Summary

• Higher Performing Lubricants (HPLs) enable advanced emission controls to work properly – and deliver their own direct emissions and fuel economy benefits

• HPLs are a cost-effective way to reduce emissions, increase efficiency, and protect advanced engines and other hardware throughout their useful life

• Because vehicles must have their oil changed regularly, strategies to encourage HPLs at every oil change will pay dividends for the life of the vehicle

• As Africa imports used—yet increasingly advanced—vehicles from Europe and Asia, (e.g., Euro 5/V, Euro 6/VI), the need to use “the right oils for the right vehicles” will become more important every year

• Establishing minimum performance standards for lubricants will help ensure that vehicle owners use the right oils for their vehicles