

July 2016

# LUBES'N'GREASES

EUROPE  
MIDDLE EAST  
AFRICA

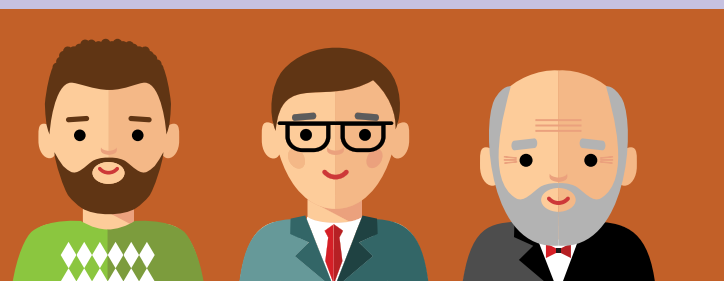
Number 85



2030



2010



2000

## Adapting to the Global Demographic Shift

## India's Lubricant Market

# Start-Stop Engines Challenge Lube Formulators

**A**utomotive start-stop engines have increased their market share in the passenger car segment. In recent years, the trend has started to extend into the heavy-duty vehicle category as well.

Driven by stringent emissions reduction targets set by government regulators, lubricant producers and original equipment manufacturers are looking for ways to increase fuel economy as never before. As a result, the industry has seen an increasing penetration of start-stop gasoline and diesel engines in passenger cars since 2010.

Hybrid-drive equipped cars also feature start-stop technology. For example, Toyota introduced hybrids with start-stop engines in the late 1990s, most notably its popular Prius model.

Today, around 60 percent of the cars driven in the European Union feature start-stop engines, according to IHS Automotive. Thanks to cheaper fuel and a different approach to emis-

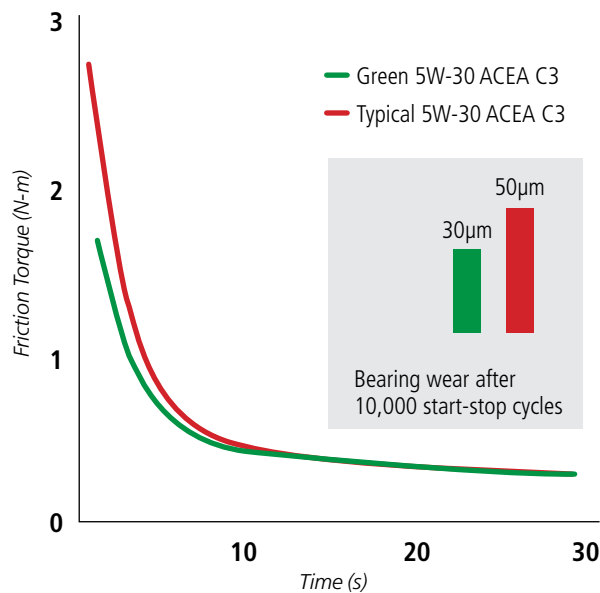
sions, this number is much lower in the United States. But it has increased steadily each year to 8 percent in 2015. Automaker Ford reported that 70 percent of its overall fleet will have start-stop technology installed by 2017.

How does this technology work and what implications does it have for lubricants? In start-stop operation, the car electronics simply shut off the engine when the vehicle stops for few

seconds; for example, at a traffic light when the engine is idling. As soon as the driver releases the brake pedal, the engine restarts in milliseconds. The car does not shut off completely when the engine stops – all other functions, such as air conditioning, lights and wipers continue running.


Estimates of fuel savings with start-stop operation vary, depending on weather conditions, engine power and

*Continued on page 12*



**Start-up friction torque at 2,000 Newton bearing load and 90 degrees C oil temperature.**





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## TRANSPORTATION TRENDS

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the driving regime – urban or highway, air conditioning on or off. The industry consensus is that start-stop technology saves around 10 percent of fuel on average in city driving.

An average passenger car engine is designed to withstand 20,000 to 40,000 starts, Boris Zhmud of the German lubricant manufacturer Bizon, told *Lubes'n'Greases* in a recent interview. "With start-stop technology, the number of engine starts increases tenfold on average, the highest being in city traffic. While starting corresponds to only an infinite fraction of engine service life, it accounts for up to 75 percent of engine wear and wear-related failures," said Zhmud, head of Research & Development in Bizon's Berlin office.

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the use of ultralow viscosity motor oils, which often compromise wear protection for the sake of fuel economy, he said. "The most intense wear occurs at camshaft bearings, although balancing shaft bearings, main bearings and connecting rod/gudgeon pin systems are affected as well."

Both oil manufacturers and automotive OEMs are working hard to resolve these problems, according to Bizon. "They are inherited from the pre-start-stop engine design. One modern solution to alleviate the

detrimental impact of start-stop on bearings is the use of roller bearings for both camshafts and balancing shafts as seen in Jaguar Ingenium engines," Zhmud observed. He added that the use of electric gear oil pumps helps maintain hydraulic oil pressure in the subsystems after the engine has switched off.

At the moment, all major oil companies are working intensely on updating their formulations for new engines, as a part of preparation for the forthcoming updated Dexos 1,

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ILSAC GF-6 and PC-11 specifications, according to Bizol. A few competitive products are already on the market that address these challenges and claim improved performance when used in start-stop engines.

Bizol is preparing to promote its new line of start-stop engine oils in the Chinese market in the next few months. The company uses surface-gel-forming super lubricity additives in its product formulations. "It is an innovative technology we dubbed COMB LubriBoost, and it provides a two-fold increase in lubricant film strength and prevents lubricant film collapse even if there is no relative motion between the mating surfaces," Zhmud said.

Castrol, a United Kingdom lube manufacturer, recently launched a start-stop engine oil aimed at the Middle East market. Many other lube marketers are expected to follow suit in the near future. □

### Savings & Benefits of Start-Stop Technology

According to Resource Canada's website, idle stop-start technology can reduce fuel consumption and emissions in city driving by 4 to 10 percent or more, compared to a vehicle using conventional technology. Over 10 years, this corresponds to carbon dioxide reductions of 610 to 3,540 kilograms.

Fuel Consumption (L/100km)			CO <sub>2</sub> Reduction (kg)	
Average	4% Reduction	10% Reduction	Annual	10 years
14.0	13.44	12.6	142-354	1,420-3,540
12.0	11.52	10.8	121-304	1,210-3,040
10.0	9.60	9.0	101-253	1,010-2,530
8.0	7.68	7.2	81-202	810-2,020
6.0	5.76	5.4	61-152	610-1,520

**Savings based on an annual city driving distance of 11,000 km and CO<sub>2</sub> emissions factor of 2.3 kg/L of gasoline.**

Source: Resource Canada



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