# QUALITY ENDURES.

**ORGANIC FRICTION MODIFIER**

Motion.Mastered.

**Additin® RC 3502**

**QUALITY WORKS.**

LANXESS
Energizing Chemistry

**LANXESS HAS DEVELOPED A TRULY UNIQUE ORGANIC FRICTION MODIFIER LUBRICANT ADDITIVE WHICH CONTRIBUTES UP TO A 5%[1)] IMPROVEMENT IN FUEL ECONOMY FOR THE PASSENGER CAR MOTOR OIL MARKET.**

[1)] fuel economy benefit calculated from sequence VIE engine test FEI sum over SAE20W-30 baseline


 This document contains important information and must be read in its entirety.

# IMPROVED FUEL EFFICIENCY & ENHANCED PERFORMANCE RETENTION

Effective lubrication plays a critical role in fuel efficiency. The automotive industry's increased attention to greater fuel economy and lower emissions, creates the need for lower viscosity engine oils and non metallic lubricant additives.

LANXESS's new patented organic friction modifier lubricant additive Additin® RC 3502 delivers significantly enhanced friction reduction, performance retention and anti-wear protection.

Our new technology provides formulators the option to increase fuel economy while reducing the levels of metallic friction modifiers, without compromising fuel efficiency performance. Fully compatible with all synthetic engine oils and non corrosive, our additive delivers outstanding performance when needed the most.

**' MAKE YOUR MOVE TOWARDS TRUE MOTION TODAY. '**

## PRODUCT FEATURES

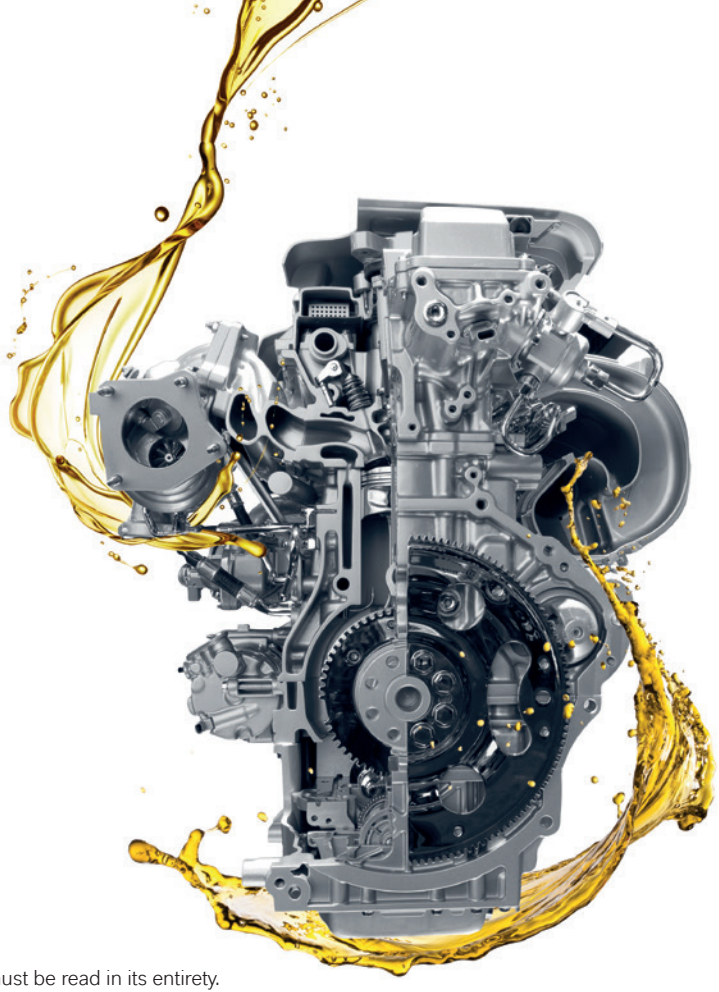
- Organic with zero sulfated ash, phosphorus and sulfur
- Non-corrosive, stable
- Clear, light amber liquid - compatible in a range of Group I – V formulations

## BENEFITS

- Friction reduction performance is far greater than current organic friction modifiers
- Enhanced performance retention (GMO, molybdenum friction modifiers lacking in durability)
- Optimize molybdenum friction modifier concentrations without compromising friction reduction performance
- Fully compatible and safe with all oil and additive types
- Greater friction reduction with Mg sulfonate detergents (including Hybase® M-401)

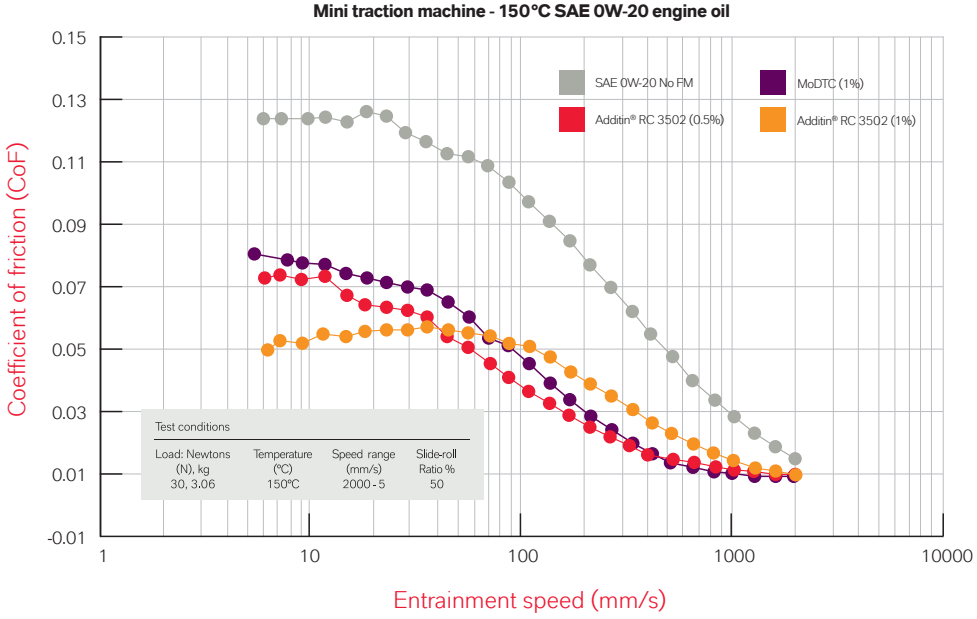
## KEY MARKETS & APPLICATIONS

- Passenger car engine oil
- High performance racing oil
- Heavy duty diesel oil
- Railroad oil



# TRIBOLOGY DATA FRICTION REDUCTION WITH SPEED - STRIBECK CURVE

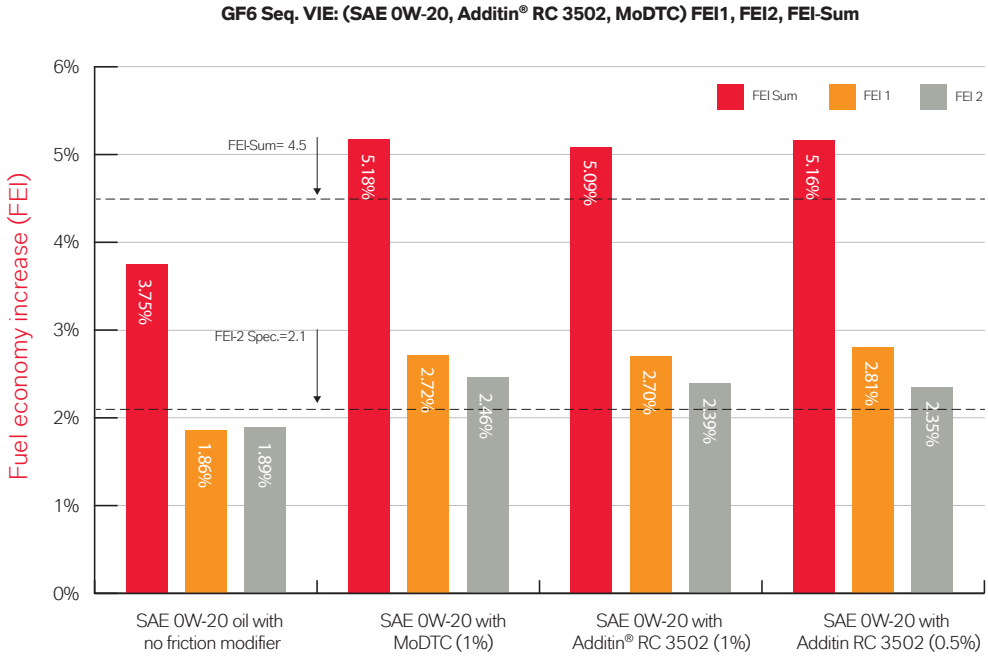
## PASSENGER CAR MOTOR OIL




- **Boundary lubrication at lower speeds** - responds
- Lower viscosity oils have **higher CoF at boundary**
- **Organic friction modifier (Additin® RC 3502)** does not need time to activate

# ENGINE DATA (SEQUENCE VIE) FUEL ECONOMY
## INCREASE PASSENGER CAR MOTOR OIL

- 5% FEI-Sum over SAE 20W-30 baseline ~1.2x proposed specifications for GF6
- FEI retention values 84% - 90%
- **MoDTC, Additin® RC 3502** similar performance
- Strong performance of **Additin® RC 3502** even at 0.5%

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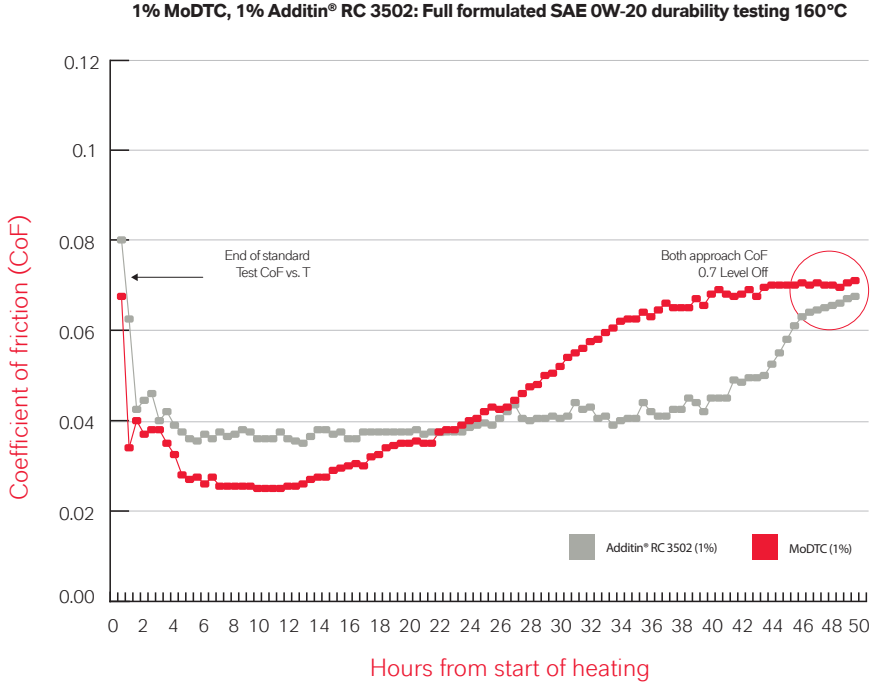
# TE-77 FRICTION MODIFIER PERFORMANCE RETENTION
## EXTENDED HOLD STUDY




- Isothermal (160°C) study of friction change over time
- Initially **MoDTC** has better friction performance than **Additin® RC 3502** up to 12hrs
- After 12hrs there is a steady loss in friction performance up to 32hrs which is not observed in **Additin® RC 3502**
- **Additin® RC 3502** remains constant up to 46hrs after which time **MoDTC** and **Additin® RC 3502** are equivalent in friction reduction performance

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