

# meeting API and ACEA requirements

Interchangeable and linked group II base oils

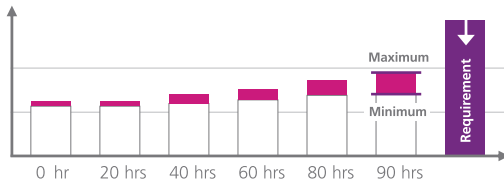
In accordance with API and ACEA protocols, Saudi Aramco has successfully completed test programs that demonstrated the interchangeability and linkage between Group II base oils from our global manufacturing sites. The extensive testing programs covered API SN/GF-5, API CJ-4 and

ACEA A3/B4 automotive engine oils together with demonstration in industrial and gear oils applications. Engine tests to meet ACEA E7 and E9 are currently underway with completion expected Q1 2019.

## Automotive Engine Tests

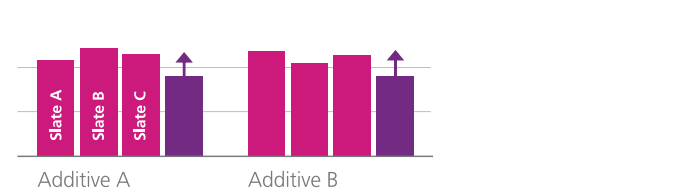
### Sequence IIHH Engine Test (API SN/GF-5)

Viscosity increase (cSt@40°C)



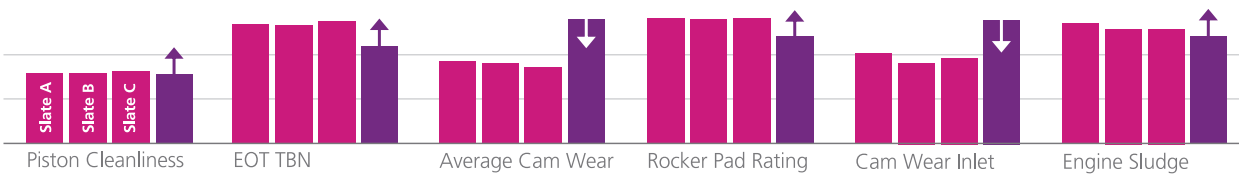
### Sequence IIHH Engine Test (API CJ-4)

Weighted Piston Deposit (merit rating)



\*) Scales of each data adjusted for visualization

### European Engine Test (ACEA A3/B4)

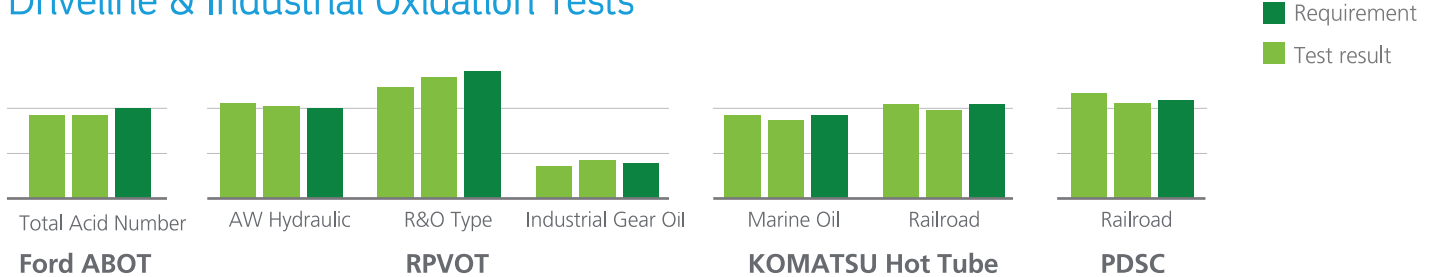


**Volkswagen TDI (CEC L-78-T-99)**  
4 cyl., 1.9L, turbocharged,  
direct injection

**Peugeot TU3M (CEC L-38-A-94)**  
OHC, 4 cyl., gasoline, 1,360cc

**Mercedes Benz OM646LA (CEC L-099-08)**  
4 cyl., 2.2L, VTG turbocharged,  
direct injection

## Driveline & Industrial Oxidation Tests



The Group II base oils show satisfactory performance in various API and ACEA engine tests across a number of metrics including oxidation, anti-wear, piston cleanliness, and sludge formation resistance using suitable additive technologies.

