

# Premium Blue® Engine Oil

## Commercial & Industrial

### Overview:

Valvoline's Premium Blue engine oil is exclusively recommended and endorsed by Cummins Inc. Premium Blue is designed to provide advanced lubricant performance in modern, low emissions diesel engines, including those with cooled Exhaust Gas Recirculation (EGR). It is a higher Total Base Number (TBN) product designed for the latest diesel engine specification from API, ACEA, and OEMs (including Cummins) that allow for higher sulfated ash products. The advanced product technology offers a long-life, extended drain capability, balanced formulation that helps maximize engine durability.

### Use:

- Recommended for use in EGR, SCR (Selective Catalyst Reduction), and Euro 4 engines, but not for DPF (Diesel Particulate Filter) equipped engines.
- Extensively tested in Cummins', as well as other OEM engine's.

### Benefits/ Advantages:

Unique Valvoline Exclusive Booster provides enhanced protection and performance, such as

- Outstanding soot control
- Exceptional acid Neutralization capability to protect against corrosive wears.
- Provides ultimate wear protection for maximum engine life
- Improves engine life through enhanced deposit control.
- Proven field performance worldwide in a variety of engine types, operating conditions and fuel quality.

### How it Works:

Premium Blue contains advanced technology — a proprietary combination of additives designed with dedication to meet the needs of advanced diesel engines and perform at a level only achieved through the joint development of Cummins & Valvoline.



## Soot Control

### Advanced Dispersant Technology provides outstanding soot control

Standard dispersant technology may not effectively disperse the soot, causing steep increase in viscosity. An increase in the viscosity of an oil can lead to increased flow resistance, preventing the lubricant from reaching critical engine parts. This can result in excessive wear of components and/or engine failure.

As you can see in this graph, the advanced dispersant technology used in Premium Blue oil prevents viscosity increase significantly better than oils using the standard dispersant technology.

Premium Blue's Advanced Technology is a patented blend of additives that reduce soot related viscosity increase and prevent engine wear. Our advanced technology forms a stronger bond with soot particles to keep them well dispersed in the oil and prevent viscosity increase due to soot agglomeration.

The Benefit? **Premium Blue's Technology maintain the oil's viscosity, prevent soot-related wear, and extend engine life, and allowing for increased drain intervals.**

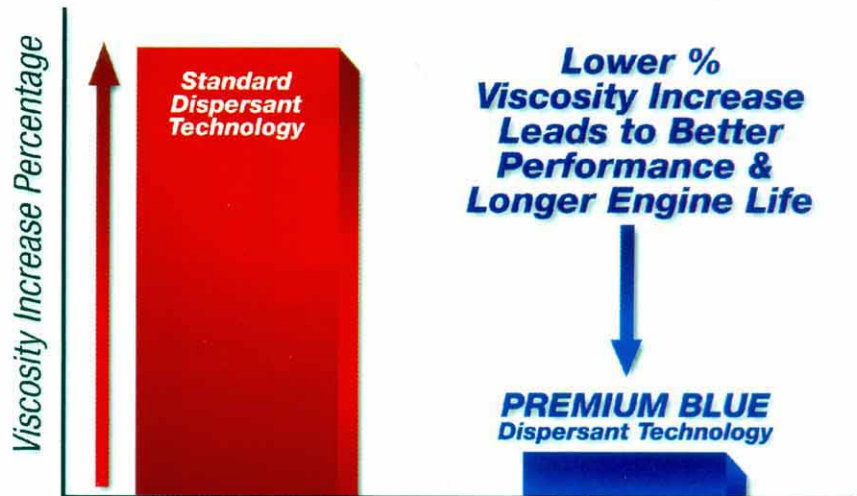
## Acid Neutralization

### Offers exceptional acid neutralization capability to protect against corrosive wear

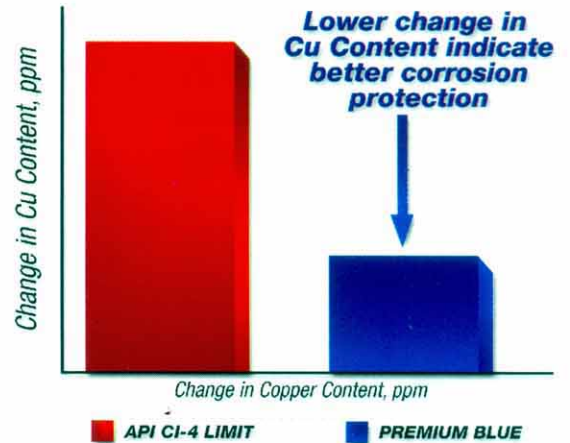
The combustion process and thermal oxidative breakdown generates significant quantities of acids inside the engine. Proper acid neutralization is essential to prevent corrosive wear of cylinders, rings, and bearings. It is also the key enabler for extending oil drain intervals.

Premium Blue CI-4 offers a fresh oil **TBN (Total Base Number) of 11.5**. This is among the highest of the API CI-4 oils available in the market today. The high TBN is delivered by a powerful multi-detergent additive technology. This unique detergent technology provides a large TBN reserve needed to neutralize the acids that are created during the combustion process and also keeps the engine parts clean.

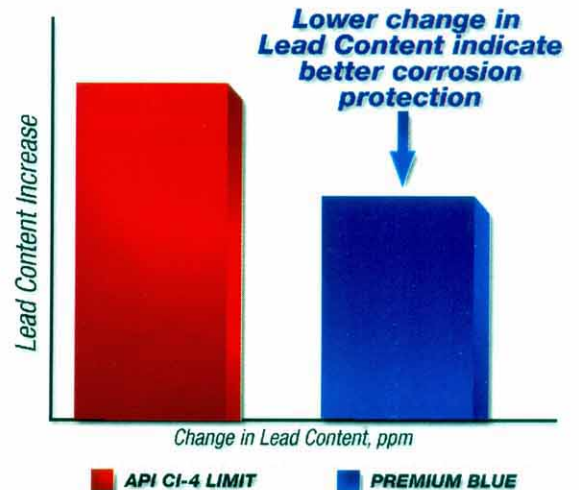
HTCBT test (**High-Temperature Corrosion Bench Test**) is used to evaluate the lubricant's ability to prevent corrosion of copper & lead components used in engine bearings. As can be seen from the graphs, powerful detergent additives in **Premium Blue provide exceptional protection against both copper/lead corrosion & enable Longer life Engine Oil components.**



### Protection against Copper Corrosion Cummins HTCBT Test Results

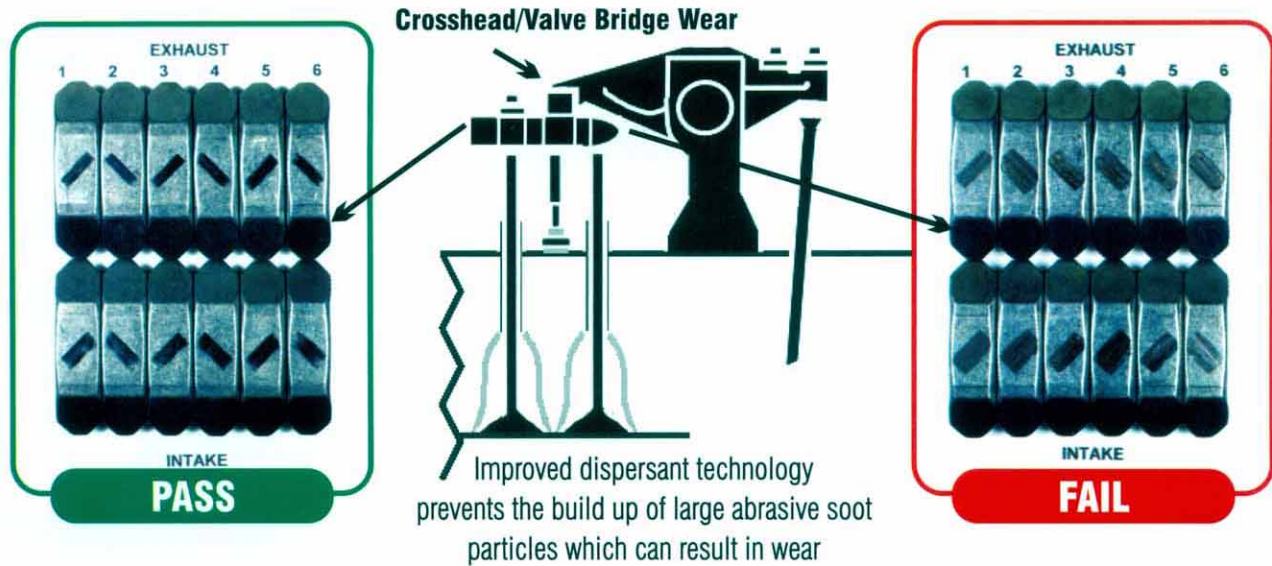


### Protection against Lead Corrosion Cummins HTCBT Test Results



## Wear Protection

Provides ultimate wear protection for maximum engine life



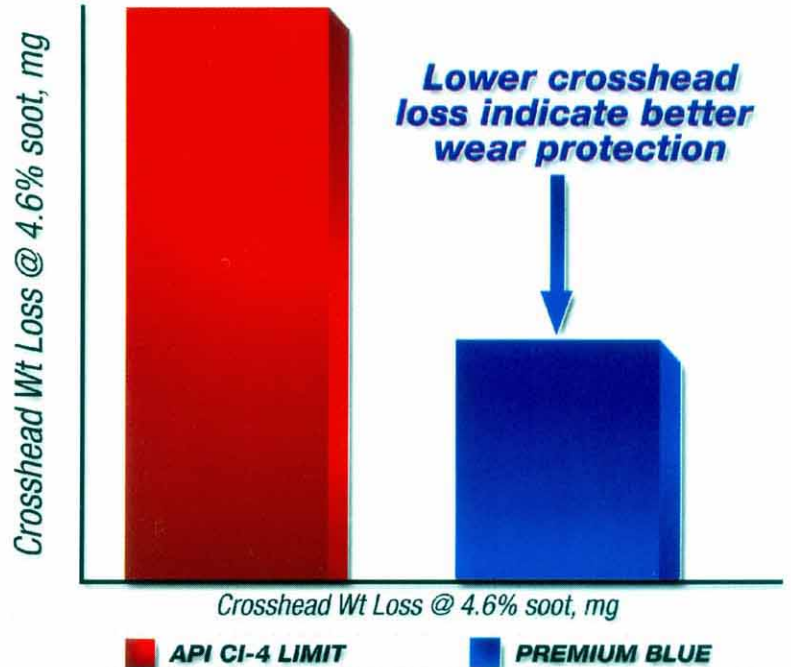
Engine wear can manifest itself in different ways. Premium Blue has been engineered to provide outstanding protection against abrasive wear from soot, boundary wear from metal-metal contact, and corrosive wear from acids. Examples of soot related wear can be seen from the picture above.

Premium Blue's advanced dispersant technology prevents even the toughest soot particles from agglomerating. Soot agglomerates can often be larger than the protective film created by the oil. As these hard agglomerates are pumped through the engine they can pierce through the oil film causing abrasive wear.

As demonstrated in graph below, in the harsh lubrication regions where the oil film breaks down.

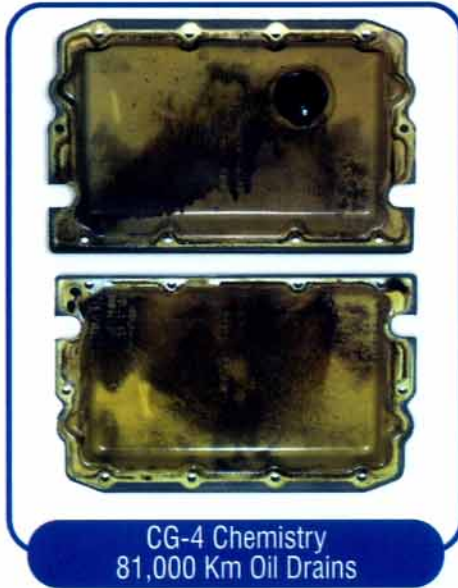
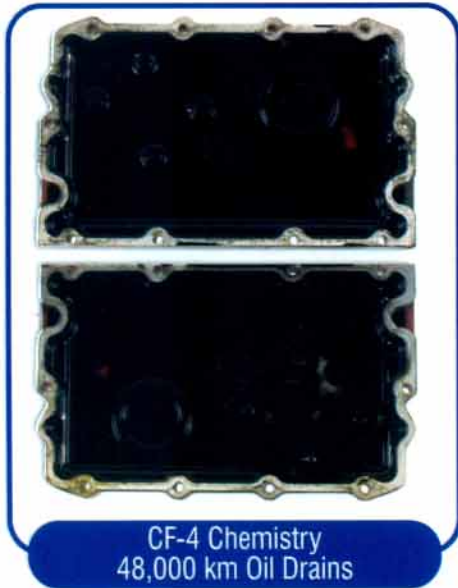
### Protection Excellent Wear Protection Cummins M11 EGR Engine Test Results

“ Premium Blue has unique anti-wear additives that create a protective solid film which minimizes metal-metal wear under boundary/extreme-pressure conditions. ”



# Enhanced Deposit Control

## Cummins N14 Field Test Performance Advanced in Dispersant Technology



### Improves engine life through enhanced deposit control

Premium Blue is designed to provide advanced lubricant performance in diesel engines operating under a variety of service conditions. The advanced technology can also help optimize service intervals. Premium Blue is not just tested in the laboratory, but out on the road, demonstrating real world performance.

Example of excellent deposit control offered by Premium Blue can be seen from the photographs above of engine components from Cummins N14 field evaluation.

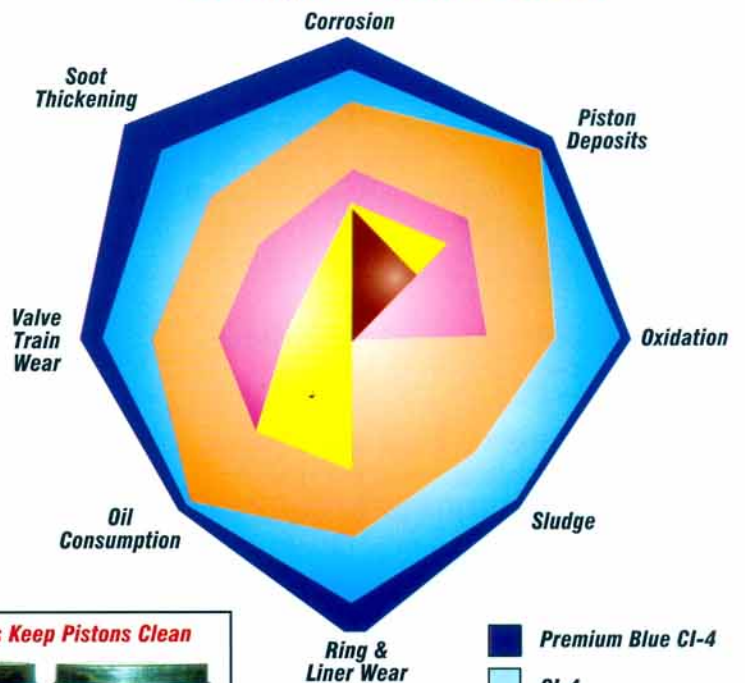
### Proven field performance worldwide in a wide variety of engine types, operating conditions and fuel quality

Do you worry about what diesel fuel you are getting at the pump?

The technology in Premium Blue has been designed to work with wide range of fuel sulfur levels.

Premium Blue technology has been tested extensively in field in a wide variety of engine types, operating conditions and fuel quality around the globe. Premium Blue delivered robust performance despite the broad challenges presented by today's diesel fuels across the globe. More than 5.2 trillion miles of proven field performance available on this technology in over 100 countries.

### Premium Blue Offers Unsurpassed Protection



- Premium Blue CI-4
- CI-4
- CH-4
- CF-4
- CG-4
- CF



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