

PC-10 New Category Evaluation Team

Status Report

Meetings

- Organizational Meeting - 07/29/2002
- EMA Request for Category - 09/25/2002
- WEB Conference - 10/14/2002

Members

- API
 - W.A. Runkle, Valvoline - Chair
 - R. Cherrillo, Shell Global Solutions
- EMA
 - D.E. Tharp, Caterpillar
 - W.A. Totten, Cummins
- ACC
 - M.P. Shah, Lubrizol
 - R.M. Klein, Oronite

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September 24, 2002

VIA ELECTRONIC MAIL

API/EMA Diesel Engine Oil Advisory Panel
c/o Steven Kennedy, Co-Chair
ExxonMobil Research & Engineering
Paulsboro Technical Center
P.O. Box 480
Paulsboro, New Jersey 08066-0480

Re: Request for New Category

Dear Steve:

In accordance with the procedures established in API 1509 Appendix D, the Engine Manufacturers Association requests that the API/EMA Diesel Engine Oil Advisory Panel (DEOAP) proceed with the development of a new heavy-duty diesel engine oil category (referred to as "PC-10").

As you are aware, the U.S. Environmental Protection Agency (EPA) has adopted regulations which will mandate an additional 90% reduction in nitrogen oxide (NOx) and particulate matter (PM) emissions from heavy-duty on-highway diesel engines and vehicles, beginning in 2007 (the "2007 Rule"). The 2007 Rule also mandates a phase-in of cleaner, ultra-low sulfur diesel fuel. Significant oil performance changes are critical if engine manufacturers are to have the ability to introduce the advanced aftertreatment devices and use the ultra-low sulfur fuel needed to achieve EPA's emission goals.

A table outlining proposed performance requirements for PC-10 is attached as Exhibit A. Please note that the proposal calls for PC-10 oils to include the performance properties of the earlier diesel engine oil service categories when used with either 500 ppm or 15 ppm sulfur fuel. As the category development process proceeds, EMA expects to provide information regarding the performance tests that may be available to evaluate the performance needs requested.

We look forward to working together again with API as we undertake this very important project.

Very truly yours,

Greg Shank

Greg Shank
Engine Lubricants Committee Chair

cc: EMA Engine Lubricants Committee
Richard C. Clark, API

PC-10 Proposed Performance Requirements

Characteristic	Carryover from PC-9	New for PC-10
Piston Deposits, Fe Oil Consumption	X	
Piston Deposits, Al Oil Consumption	X	
Ring and Liner Wear (Corrosive), Bearing Corrosion	X	
Soot Valvetrain Wear (Abrasive and Rolling)	X	
Soot Valvetrain Wear (Sliding Wear)		X
Soot / EGR Valvetrain Wear Valve Stem / Guide Wear (Abrasive and Corrosive)	X	
Thermal Stability (Oxidation)	X	
Oil Aeration	X	
Turbo Coking Deposits		X
Closed Crankcase Deposit Control		X
Soot/Viscosity	X	
Soot/Viscosity in EGR Engines		X
Elastomer Compatibility	X	
Used Oil Viscometrics (Low Temp)	X	
Catalyst Aftertreatment Compatibility		X
High Temperature Corrosion Bench Test	X	
High Temperature/High Shear Limit (for New Oil)	X	
High Temperature/High Shear Limit (for Used Oil)		X
Shear Stability	X	
Shear Stability (Improved)		X
Volatility	X	
Foaming	X	
Ash Limit		X
Phosphorus Limit		X
Sulfur Limit		X
Backward Compatability with 15 ppm and 500 ppm Sulfur Fuels in pre-2007 Engines		X

Iron Piston Deposits, Oil Consumption

- CI-4 Requirement
- New Test
- New Engine - Caterpillar C-9
- Length - ~ 500 hours
- Matrix Required

Aluminum Piston Deposits, Oil Consumption

- CI-4 Requirement
- Caterpillar 1K or 1N
- Required for backward compatibility
- Matrix not required
- May be dropped, if industry shows no harm

Ring & Liner Wear (Corrosive), Bearing Corrosion

- CI-4 Mack T-10?
- T-10 With New Hardware?
- T-10 With ULS Fuel?
- Length - ~ 300 hours
- Matrix Probable

Soot Related Valvetrain Wear (Abrasive & Rolling)

- RFWT
- CI-4 Level
- Matrix Not Required

Soot Related Valvetrain Wear (Sliding Follower)

- New Test
- CUMMINS ISB?
- 100 Hour Aftertreatment Compatibility?
- Length - 250 to 300 Hours?
- Matrix Required

EGR Soot Related Valvetrain Wear (Abrasive & Corrosive)

- CUMMINS M-11 EGR @ Lower Soot
- 5% to 6% Soot
- ~ 200 Hours Length
- Fuel Sulfur Level?
- New Test
- Matrix Required

Thermal Stability (Oxidation)

- Sequence IIIF/IIIG
- Viscosity Increase Only
- PCEO Procedure
- Matrix Not Required

Turbo Coking Deposits

- European Bench Test?
- Added Test Parameter for Engine Test?
- Matrix?

Closed Crankcase Deposit Control

- European Bench Test?
- Added Parameter for Engine Test?
- Matrix?

Soot Related Viscosity Increase

- Mack T-8E
- CI-4 Level
- Matrix Not Required

EGR Soot Related Viscosity Increase

- New Test
- CUMMINS 200 Hour M-11 EGR?
- Matrix?

Elastomer Compatibility

- Carryover from CI-4
- EMA to Review Elastomers Used

Used Oil Viscometrics (Low Temperature)

- Mack T-10A
- Carryover from CI-4
- May Be Redundant, With Soot/Viscosity

Catalyst Aftertreatment Compatibility

- Caterpillar C-9?
- CUMMINS ISB?
- Other New Test?
- Multiple Catalyst Test?
- Additional Matrix?

High Temperature Corrosion Bench Test

- CI-4 Carryover
- Needed?

HT/HS Limit for New Oil

- CI-4 Carryover

HT/HS Limit for Used Oil

- New Requirement
- TBS?
- Ravenfield?
- Other Test?

Shear Stability (Improved)

- CI-4 Test Method?
- Correlate to New Engines
- EMA to Provide Correlation Data

Volatility

- NOACK
- 13% Maximum

Foaming

- CI-4 Carryover
- Same Test
- Same Limits

Chemical Property Limits

- Sulfated Ash Limit
- Phosphorus Limit
- Sulfur Limit
- Limits Required, if Aftertreatment Test Not Developed and Accepted

Backward Compatibility

- Pre-2007 Engines
- 15 PPM Sulfur Fuel
- 500 PPM Sulfur Fuel
- Catalyst Compatible May Preclude

API Lubricants Committee Support

- Continue Evaluation
- Need Established
- Propose User Language
- Propose Feasible Tests
- Report Proposed Funding Mechanism
- NCDT Request ~ Spring 2003