

# **PC-10 Engine Test Matrix Funding, Design, and Oils**

**ASTM HDEOCP Meeting  
January 13, 2005  
San Antonio, TX**

# PC-10 Engine Test Matrix

## *Funding*

- **Plan to fund the PC-10 matrix established**
  - ❖ ACC & API each contribute \$1MM in cash
  - ❖ EMA to provide \$350M in cash and >\$650M in-kind
- **Trade association funding (\$2.35MM) plus stand calibration testing allows acceptable designs**
  - ❖ Overall cost (minus EMA in-kind)      \$4.2MM to \$4.5MM
  - ❖ Stand calibration tests                      \$1.89MM to \$2.14MM
  - ❖ Industry funded tests                         \$2.33MM
- **Draft MOA sent to potential matrix participants**

# PC-10 Engine Test Matrix

## Matrix Design

- Preliminary designs approved MDTF:

		Cat C13	Cummis ISB	Mack T-12
Matrix Outputs	Precision	Yes	Yes	Yes
	BOI	Yes	No	No
Number of Tests		26	14 to 16	14 to 16
Calibration		12	6 to 8	6 to 8
Funded		14	8	8
Number of Oils		6	2 or 3	2 or 3
Number of Stands		7	4	4
Number of Labs		5	2 to 4	2 to 4
Runs / Stand	First Stands	4	4	4
	Second Stands	3	3	3

- Final matrix selection to be based on additional criteria
  - ❖ Readiness / willingness of individual labs and stands
  - ❖ Agreed distribution across labs and test costs to industry
- PC-10 MDTF to remain in case additional input is needed

# PC-10 Engine Test Matrix

## Oil Selection

- API LC endorsed the following on Dec 1:
  - ❖ Use base stocks offered to blend 6 “15W-40” matrix oils
  - ❖ PC-10B & PC-10E (“Base Oil 2”) as featured oils for all new tests
  - ❖ Guidelines for blending Technologies with “Base Oil 3”
    - Target the same base oil viscosity (KV100 +/- 0.2 cSt) used to blend with “Base Oils 1 and 2”
    - Maintain nominal SAE 40 finished oil KV100 achieved with “Base Oils 1 and 2”

- **Matrix Oil Key**

	Base Oil 1	Base Oil 2	Base Oil 3
Technology A	PC-10A	PC-10B	PC-10C
	C13	C13, ISB, T12	C13
Technology B	PC-10D	PC-10E	PC-10F
	C13	C13, ISB, T12	C13

- Notes: (1) Cat C13 to use PC-10B & PC-10E as the featured oils  
(2) Both PC-10B and PC-10E to be available for ISB & T-12, but only one may be used

# PC-10 Engine Test Matrix

## Oil Selection

- Matrix Oil Assignments

Test	No.	Codes
Caterpillar C13	6	PC-10A thru PC-10F <b>PC-10B &amp; PC-10E featured</b>
Cummins ISB	2 or 3	TMC 830 (M11-EGR) PC-10B and/or PC-10E
Mack T-12	2 or 3	TMC 820 (T-10 & T-11) PC-10B and/or PC-10E

- Options to accommodate required use of current TMC ref oils in precision-only matrices being considered
  - ❖ 820 in T-12 / 830 in ISB
  - ❖ MDTF statistical group developed designs to use 3 matrix oils
  - ❖ Use of non-matrix calibration tests could help

# PC-10 Engine Test Matrix

## *Next Steps*

- **Draft MOA being circulated for comments**
  - ❖ **Single document to cover all 3 new tests**
  - ❖ **Each test matrix will start when declared ready**
  - ❖ **Includes stipulation that BOI for ISB & T-12 is finalized before precision testing can begin**
- **Selection of specific matrix designs**
  - ❖ **Will be impacted by the number of labs and stands**
  - ❖ **Labs asked to provide estimate of stand availability**
  - ❖ **Final oil selection and criteria for participation in precision only matrices to be determined**
- **Complete blending of matrix oils**