

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

**ASTM HDEOCP Meeting  
December 7, 2004  
Tampa, FL**

# PC-10 Engine Test Matrix

## *Funding*

- Preliminary plan to fund the PC-10 matrix established at an October 20 meeting
  - ❖ 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 \$4.2MM to \$4.5MM
  - ❖ Stand calibration tests \$1.89MM to \$2.14MM
  - ❖ Industry funded tests \$2.33MM
- Trade associations have confirmed support for the funding plan; draft MOA to be available before the end of the year

# PC-10 Engine Test Matrix

## Matrix Design

- Preliminary designs approved Task Force:

		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 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 will remain in place to see if additional input is needed

# PC-10 Engine Test Matrix

## Oil Selection

- EMA selected PC-10 prototype two technologies for use in the matrix oils
- Base oils complying with BOI-VGRA TF recommendation have been volunteered

Recommended			
Base Oils & Blends	1	2	3
<b>Targets</b>			
Saturates	MIN	~99%	~99%
Sulfur	0.1 MAX	~0	~0
Viscosity Index	95 - 105	95 - 105	~125
<b>Information</b>			
Finished Oil Vis Grade	15W-40	15W-40	~15W-40
Base Oil Blend KV@100C	5.5 - 7	5.5 - 7	~7
Offered			
<b>Base Oil Slates</b>			
Saturates	84 - 88%	> 99%	~99%
Sulfur	0.11%	< 10 ppm	< 10 ppm
Viscosity Index	~95	~100	125 min

# 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

## *Next Steps*

- **Draft MOA being prepared by API**
  - ❖ **Single document to cover all 3 new tests**
  - ❖ **Each test matrix will start when declared ready**
  - ❖ **Will include 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 to be used**
  - ❖ **Criteria for participation in precision only matrices will need to be determined**
- **Complete blending of matrix oils**