



10 Engine Tests and 6 Bench Tests

Performance Criteria	Fuel Sulfur, Wt %/ppm	Test	PC-10 2006
Engine Tests			
Aluminum Piston Deposits, Oil Consumption	0.05	Caterpillar 1N ASTM D 6750	1
Forged Steel Piston Oil Consumption / Deposits	0.05	Caterpillar 1P ASTM D 6681	2
Oil Consumption and Piston Deposit	15 ppm	Caterpillar C-13	3
Viscosity Increase Due to Soot at 6.0%*	0.05	Mack T-11 ASTM D 7156	4
Ring, Liner Bearing Wear & Oil Consumption	15 ppm	MackT-12	5
Valve Train Wear, Filter Δ P and Sludge	.05	Cummins ISM	6
Valve Train Wear	15 ppm	Cummins ISB	7
Roller-Follower Valve Train Wear	0.05	GM 6.5-L RFWT ASTM D 5966	8
Aeration	0.05	Navistar EOAT ASTM D 6894	9
Oil Oxidation	0.10	See III G (SM) or IIIF-CI-4(D 6984)	10
Bench Tests			
Foam Sequence I, II, III	–	ASTM D 892 (non opt. A)	1
Volatility	–	Noack D 5800	2
Elastomer Compatibility		EOEC (DXXXX) plus Vamac	3
High Temperature/High Shear		Viscosity After Shear D 4683	4
Corrosion		HTCBT 135°C D 6594	5
Shear Stability – 90 Cycles	–	Bosch Injector ASTM D 7109	6
Total Number of Engine and Bench Tests			16

T12 Proposal PC 10 Exit Ballot

Criterion	EOT Delta Pb	250-300 Hour Delta PB	Cylinder Liner Wear	Top Ring Weight Loss	Oil Consumption
Weight	200	200	250	200	150
Maximum	35	15	24	105	85
Anchor	25	10	20	70	65
Minimum	10	0	12	35	50

1000

Mack Merit 1000 min



NO FTIR Parameter

Estimated MTAC Limits

- **Tappet wear limit**
 - Target limit **100 mg weight loss.**
 - **MTAC limits are: 100 / 108 / 112 mg for 1/2/3 tests**
- **Cam wear limit**
 - Target limit **55 μm wear by Mitutoyo snap gauge.**
 - **MTAC limits are: 55 / 59 / 61 μm for 1/2/3 tests**
- **Statisticians need to verify MTAC Limits.**

ISM Merit System for PC-10

- **Motion: Accept the ISM Merit System as summarized here.**

Criterion	Crosshead Weight Loss	Top Ring Weight Loss	Oil Filter Delta P	Adjusting Screw Weight Loss	Sludge	Total Merits
Weight	350	0	150	350	150	1000
Maximum	7.1	100	19	45	8.7	
Anchor	5.7		13	27	9.0	
Minimum	4.3		7	16	9.3	
Average	5.3	58.9	11.3	24.6	9.0	
St Dev	1.42	15.64	5.93	11.03	0.15	

Final Proposed Merit System

- **Following merit system currently planned for presentation to class panel for exit ballot...**

Parameter	Limit	Cap	Max Merit	Weight
Delta OC	25	31	10	300
TLC	30	35	15	300
TGC	46	53	30	300
2RTC	22	33	5	100

T11 Proposal for PC10 (CJ-4)

Visc 12 cSt Inc.
TGA Soot 6.0 min
Std .25 COV 4.2

Visc 15 cSt Inc.
TGA Soot 6.7 min
Std .26 COV 4.3

Visc 4 cSt Inc.
TGA Soot 3.5 min.
Std .27 COV 4.3