HEAVY-DUTY ENGINE OIL CLASSIFICATION PANEL

OF

ASTM D02.B0.02

June 17, 2008

Hyatt Regency Vancouver – Vancouver, British Columbia

ACTION ITEMS

1. Form Bio Compatibility Bench Test and Oil Analysis Test Task Forces **Joe Franklin**

MINUTES

1.0 Call to order

1.1 The Heavy Duty Engine Oil Classification Panel (HDEOCP) was called to order by Chairman Jim McGeehan at 10:30 a.m. on Tuesday, June 17, 2008, in the Plaza B Room of the Hyatt Regency Vancouver, Vancouver, British Columbia.

1.2 There were 14 members present and 53 guests present. The attendance list is shown as Attachment **2.**

2.0 Agenda

2.1 The agenda was reviewed. A status report for the 6V92TA test was added to the agenda. (included as Attachment **1**)

3.0 Minutes

3.1 The minutes from December 4, 2007 were approved as written.

4.0 Membership

4.1 There were 2 membership changes: Brad Carter replaces Bill Kleiser at Oronite. Dave Duncan replaced Lew Williams for Lubrizol. See Attachment **3**.

5.0 Bio Diesel Testing Report

5.1 Dave Stehouwer presented the results of the B20 tests that the EMA and the NBB sponsored. See Attachment **4**. The tests conducted were: Mack T-12, Caterpillar C13, and Cummins ISB.

5.2 The C13 had 2 cold stuck second rings. That may not be ordinary and will need to be monitored.

5.3 The T12 test had the Stage 2 fuel flow setpoint raised to keep the engine load and resulting cylinder pressure equivalent to PC-10 fueled tests. The EOT Lead and 250 – 300 hour lead were severe outside of the reference acceptance bands.

5.4 In all 3 tests, the TAN increase was higher for the B20 runs than historical, but the TBN stayed about the same. The wear data were all within acceptable limits. The T12 had higher oxidation and lead corrosion. Non-rated sludge parts appeared clean and free of sludge. High fuel dilution conditions were not represented in this testing.

5.5 The T-12 upper rod bearing weight loss data was not included. It will be made available. The GC fuel dilution measurement was less than 0.10%; effectively zero. There are no standardized, diesel lubricant tests that yield fuel dilution. There are driving cycles that would yield fuel dilution. Other non-standard testing has been performed where fuel has been added to the crankcase.

5.6 The NBB and the EMA will meet to discuss options for further testing. Additional testing will be prioritized.

6.0 EMA Summary of the Bio Tests

6.1 Greg Shank presented EMA's thoughts on the bio tests. See Attachment **5a**. The T-12 result correlates very well with field data on other manufacturer's engines. The lead in the oil may suggest a drain interval reduction. At B100, piston deposits are higher. The higher TAN is indicative of something changing chemically. Post injection testing or bio spiking of the engine oil are areas for further investigation.

6.2 The EMA recommendations are: Form a Bio Compatibility Bench Test Task Force to look at Oxidation, TAN, Corrosion, Fuel Dilution and an Oil Analysis Test Development Task Force Methods – Bio – Used Oil Analysis. Greg's recommendation is for Joe Franklin to chair both task forces. Joe prefers to send an email to solicit members. A bench test is the quickest way to verify the effects. A modified engine test would be considered a new engine test.

7.0 EMA Report

7.1 Greg continued with the EMA report. See Attachment **5b**. No CJ-4 field data has been submitted to the EMA. Currently, the chemical limits are OK, even for 2010. Additional Performance Requirements Considered: Oxidation is still a concern. The EMA would like to see CJ-4 oils runs in the ROBO. Sump temps are rising. TBN depletion slope is different. Shear stability is unacceptable at lower soot or in today's engines. Aeration control: the test may not discriminate as well as it had in the past. Turbo deposits: Experience with CCV is increasing. Still looking at Turbo Deposit test development in Europe. Fuel Economy is a big issue, not willing to reduce HTHS below 3.5. Suggest forming a task group and bring data to the group. The shear stability shows that the oils fall out of grade, but no wear issues to date. The EMA will still review test redundancy for the next category. When it was first investigated, there were too many new variables.

7.2 ACEA E9 will include the T-11 in place of the T-8.

7.3 Turbo Deposit Test will not be available for the ACEA E9 category.

8.0 HDMO oil category

8.1 Steve Kennedy reviewed API action on older categories. See Attachment **6**. CF-4 expires in July 2008. A ballot will be issued to terminate licensing CG-4 and promote CH-4. The long term viability of CF is being considered. EMA recommends terminating CF licenses. No consensus in API LC; DEOAP to evaluate options. CF is tied to some other products. EMA supports CF-2, but test availability may drive action. The Surveillance Panel has targeted to have a long term plan by December ASTM. One possibility is to separate CF-2 from the MIL spec.

9.0 6V92 availability

9.1 Patrick Lai discussed the status of the 6V92TA 2 cycle diesel engine test. See attachment **7**. There has only been one test stand at one test laboratory with very little activity. A business decision has been made to remove that stand. If an announcement of another stand becoming available, then the category could be in a "provisional" status. Confirmed long term unavailability would make CF-2 obsolete. This test is needed for the MIL spec.

Additionally, there is a corporate test sponsor change from DDC to MTU. Some laboratories are considering establishment of a test stand, but this will take a few months.

9.2 Currently, the 6V92TA is temporarily unavailable. There are no physical constraints to conduct the test procedure. The API stated that if there is no resolution by December, the API will have to ask for a letter from ASTM to cease licensing.

10.0 Next meetings

10.1 The next meeting will be at the call of the chairman.

11.0 The meeting was adjourned at 11:45 am.

Tentative Agenda
ASTMSECTION D.02.BO.02
HEAVY-DUTY ENGINE OIL CLASSIFICATION PANELS

Hyatt Regency Vancouver
June 17th 2008
10:00 am--12:00 noon

Chairman/ Secretary: **Jim Mc Geehan/Jim Moritz**
Purpose: **Support API HDMO categories**

Desired Outcomes: **Preparing for 2010-2012 Oil Categories**

TOPIC	PROCESS	WHO	TIME
Agenda Review	• Desired Outcomes & Agenda	Group	10:00-10:05
Minutes Approval	• December 4, 2007	Group	10:05-10:10
Membership	• Changes: Additions	Jim Mc Geehan	10:10-10:15
EMA Report	• Biodiesel test results: Mack T-12; Caterpillar C13 and Cummins ISB • Fuel Economy Oils • Turbo-Deposit Test • ACEA E9: Mack T-11 or T-8 • Excepted impact of SCR system on lubricants and implications for future • Discussion	David Stehouwer Greg Shank	10:15:-11:15
API report	• HDMO oil category up-date	Steve Kennedy	11:15-11:45
API CF-2	• Status of 6V92 test	Patrick Lai	11:45-12:00
New or Old business		Group	12:00-12:15

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3	Dan Arcy - Shell	Mesfin Belay - Detroit Diesel
4	Steve Goodier - Castrol	Hind Abi-Akar - Caterpillar Inc.
5	Vic Kersey - Ashland	Heather DeBaun - International
6	Scott Harold - CIBA	Ken Chao - John Deere
7	Steven Herzog - RohMax	Bob Olree - GM Powertrain
8	Cathy Devlin - Afton	
9	Brad Carter - Oronite	
10	Dave Duncan - Lubrizol	
11	Pat Fetterman - Infineum U.S.A.	
12	David Taber,-ConocoPhillips	
13		
14		

Engine Tests for B20 Effects on Lube Performance

D M Stehouwer

for

ASTM HDEOCP

Review

June 2008

Engine Lube Tests with B-20

- **Objective: To determine if there are any effects on lubricant performance from the use of B-20 fuel**
- **Plan: Run standard engine tests with B-20 using reference oils to compare lube performance with # 2 diesel**
  - **Does NOT cover high fuel dilution conditions**
- **Fuel: B-20 blended from PC-10 fuel and B-100 meeting D 6751**

Engine Tests for B-20 Evaluation

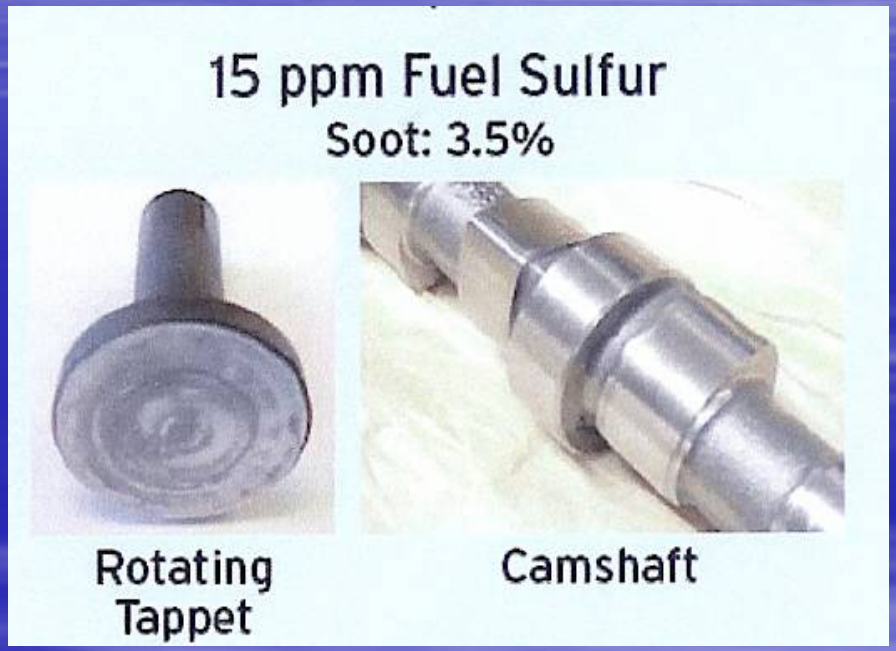
- ISB, C13, T-12 cover critical lube performance measures
- None of the standard tests cover high fuel dilution conditions

API CJ-4 Engine Test and Performance Criteria									
Performance	Cummins ISM	Cummins ISB	GM 6.5L	Cat C13	Cat 1N	Mack T-12	Mack T-11(A)	Gasoline IIIG / IIIF	Navistar 7.3L
Valve Train Wear	X	X	X						
Liner Wear						X			
Ring Wear	X					X			
Bearing Corrosion						X			
Oxidation						X		X	
Oil Consumption				X	X	X			
Iron Piston Deposits				X					
Aluminum Piston Deposits					X				
Soot Viscosity Increase							X		
Sludge	X								
Filter Plugging	X								
Aeration									X
Low Temp Pump @ 5.2% Soot							X		
Performance areas covered in B-20 testing									

"API CJ-4: Diesel Oil Category for Both Legacy Engines and Low Emission Engines Using Diesel Particulate Filters" James A McGeehan, et.al. **SAE 2006-01-3439** SAE 2006 Transactions Journal of Fuels and Lubricants.

Engine Tests for B20 Effects Cummins ISB

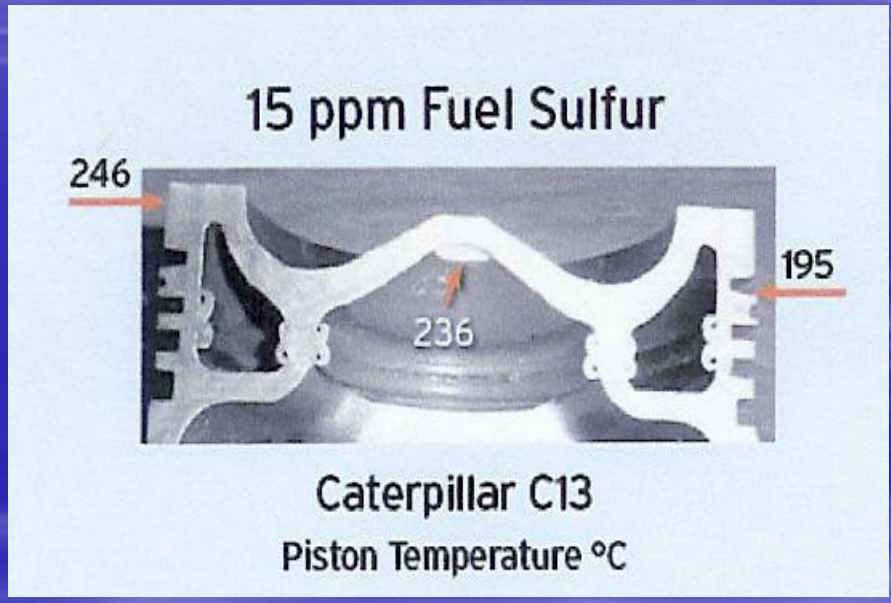
- **Engine**
  - Cummins '04 ISB 5.9L, EGR with VG Turbo, 300 bhp @ 2600 rpm
- **Test Cycle**
  - 100 hr retarded timing
  - 3.0 – 3.5% soot window
  - 250 hr cycle from low idle to rated to peak torque
- **Wear Parameters**
  - Rotating Tappet Wt Loss, mg
  - Cam Nose Wear, um



"API CJ-4: The Most Robust Diesel Engine Oil Category for All Engines" J. A. McGeehan, Lubrication Magazine, http://www.lubricantsuniversity.com/images/stories/LubricationMagazine_March2008_LoRes.pdf

Engine Tests for B20 Effects
Cat C13

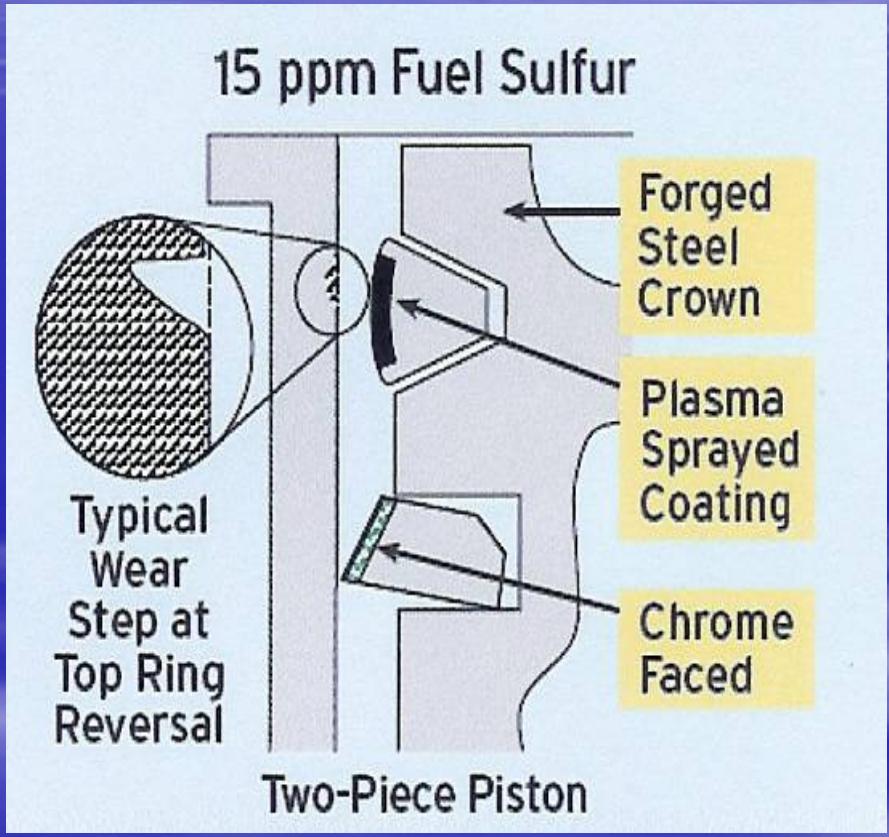
- Engine
  - Cat C-13, 12.5L ACERT, Twin Turbo '04, 430 bhp @ 1800 rpm
- Test Cycle
  - Constant 1800 rpm@ 430 bhp for 500 hr
  - Fuel rate: 159 lb/hr
  - Oil temp: 98 °C
  - Low Soot: ~ 2%
- Control Parameters
  - Oil Consumption Increase
  - Top Land Carbon
  - Top Grove Carbon
  - 2nd Ring Top Face Carbon



"API CJ-4: The Most Robust Diesel Engine Oil Category for All Engines" J. A. McGeehan, Lubrication Magazine, http://www.lubricantsuniversity.com/images/stories/LubricationMagazine_March2008_LoRes.pdf

Engine Tests for B20 Effects
Mack T-12

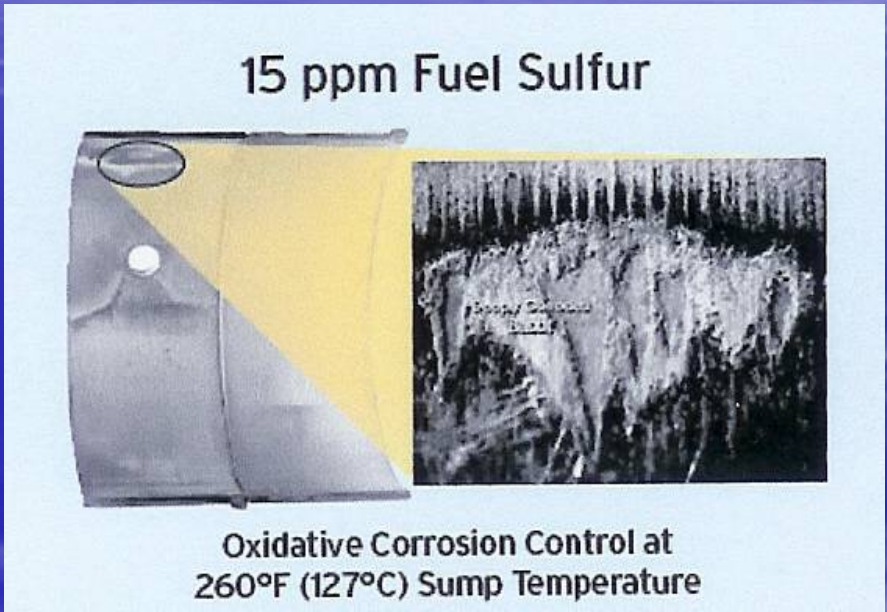
- Engine
  - E-Tech V, 12L, Cooled EGR, VG Turbo
- Test Cycle
  - 100 hr retarded timing
  - 35% cooled EGR@ 1800 rpm
  - Soot target 4.3%
  - 200 hr @ peak torque, 1200rpm
  - 15% EGR
  - Oil temp: 116 ^{o}C gallery 127 ^{o}C sump
  - EOT Soot 6%
- Control Parameters
  - Ring wt loss, mg
  - Liner step wear, um
  - EOT Lead and Delta Lead



"API CJ-4: The Most Robust Diesel Engine Oil Category for All Engines" J. A. McGeehan, Lubrication Magazine, http://www.lubricantsuniversity.com/images/stories/LubricationMagazine_March2008_LoRes.pdf

Engine Tests for B20 Effects
Mack T-12

- Mack T-12 Parts (Cont'd)
- Control Parameters
  - Ring wt loss, mg
  - Liner step wear, um
  - EOT Lead and Delta Lead
- Bearing Corrosion
  - Bearings not rated
  - Oxidative corrosion
  - Measured by used oil lead
  - Sensitive to acids, oil temperature and oxidation



Oxidative Corrosion Control at 260°F (127°C) Sump Temperature

"API CJ-4: The Most Robust Diesel Engine Oil Category for All Engines" J. A. McGeehan, Lubrication Magazine, http://www.lubricantsuniversity.com/images/stories/LubricationMagazine_March2008_LoRes.pdf

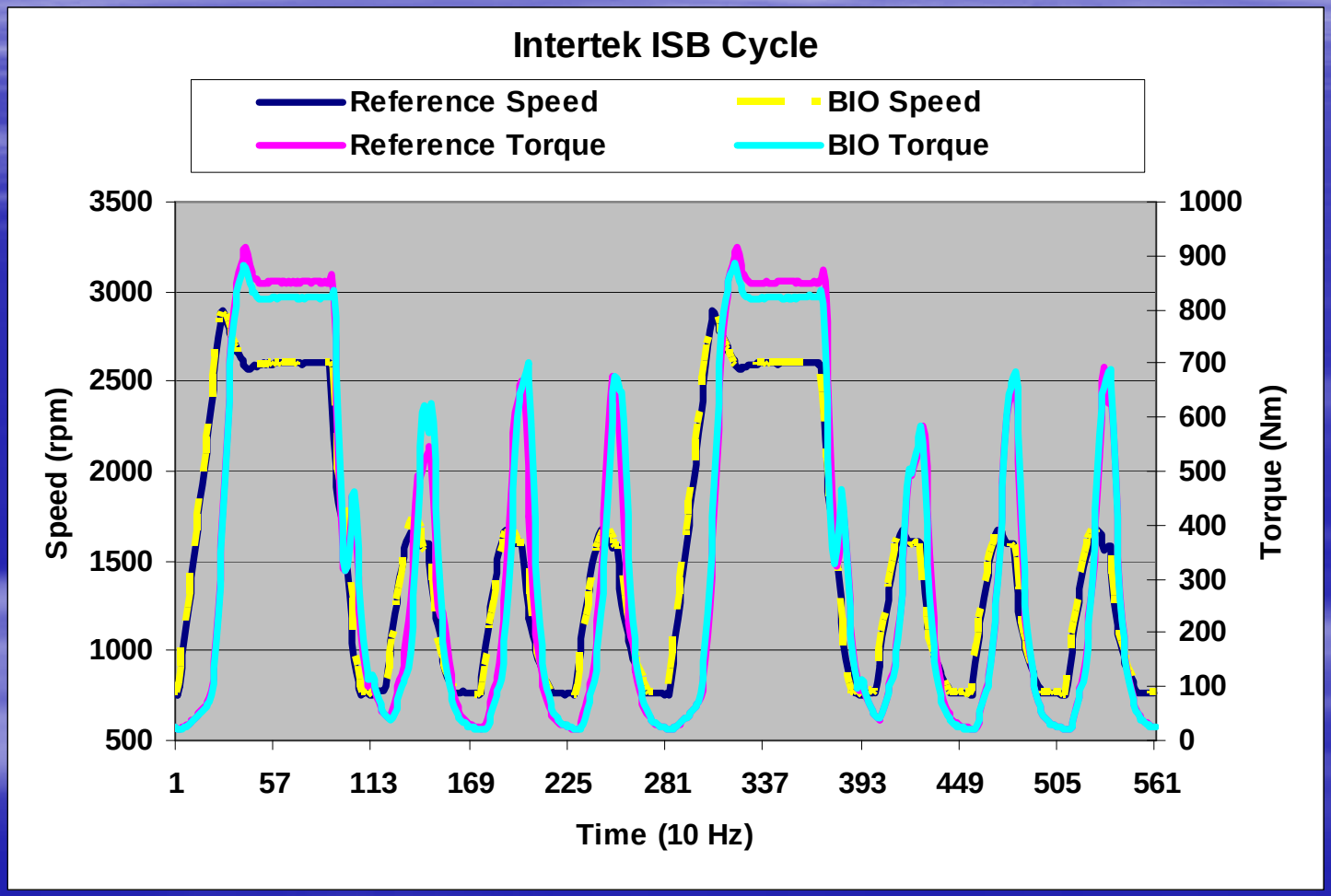
B-20 Blend Meets EMA Fuel Spec.

Item	Performance Characteristics	Requirements		B-20
		D1 Blends	D2 Blends	Blend
1	Flash Point, °C, min.	38	52	**69**
2	Water and sediment, vol %, max.	0.05	0.05	**0**
3	Physical Distillation, T90, °C, max.	343	343	**333**
4	Kinematic Viscosity, cSt@40C	1.3~ 4.1	1.9~4.1	**2.56**
5	Ash, mass%, max.	0.01	0.01	**0**
6	Sulfur, wt%, max.	Per regulation	Per regulation	**9**
7	Copper strip corrosion rating, max.	No. 3	No. 3	**1A**
8	Cetane Number, min.	43	43	**47**
9	Cloud point [1]	Per footnote	Per footnote	**-14**
10	Ramsbottom carbon residue on 10% distillation residue, wt%, max.	0.15	0.35	**0.09**
11	Lubricity, HFRR@60C, micron, max.	460	460	**190**
12	Acid number, mg KOH/g, max.	0.3	0.3	**0.17**
13	Phosphorus, wt%, max.	0.001	0.001	**0.0001**
14	Total Glycerin	------	-----	
15	Alkali metals (Na+K),ppm, max.	Nd	Nd	**0**
16	Alkaline metals (Mg+Ca), ppm max.	Nd	Nd	**0**
17	Blend fraction, vol. % [2]	+/- 2%	+/- 2%	**19**
18	Thermo-oxidative Stability, insolubles, mg/100 mL, max.	10	10	
19	Oxidation Stability, Induction time, hours, minimum	6	6	**10.3**
	Specfic Gravity		**0.842**	**0.857**

ISB Operational Data

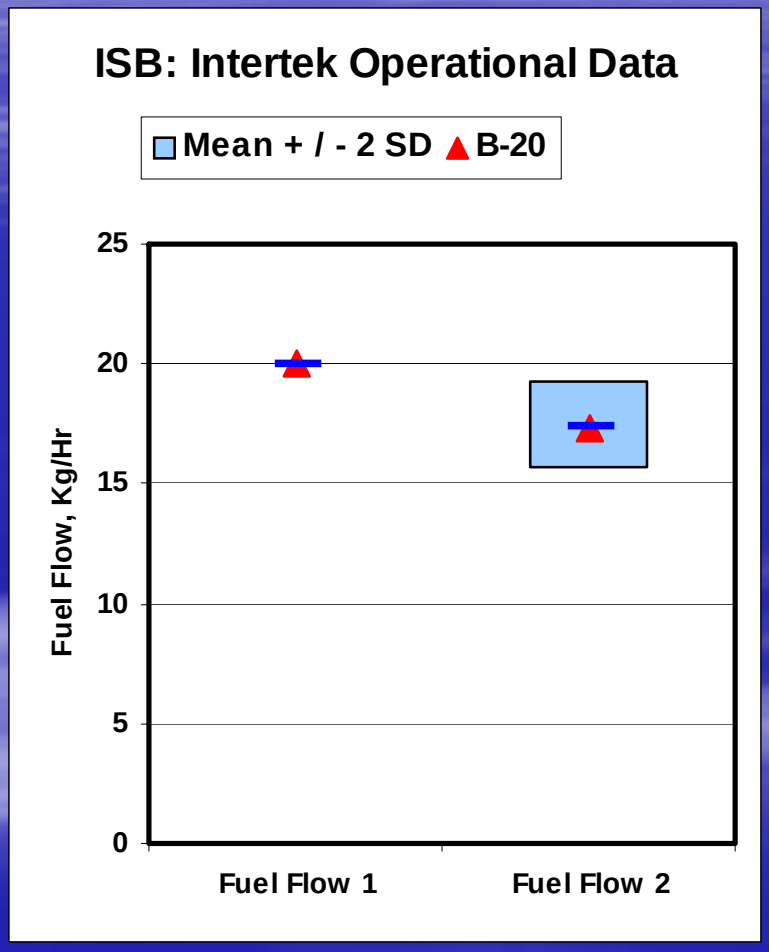
- Stage 1: Control to hit soot window
  - "More retard in timing than PC-10 fuel"
    - Statistically insignificant anecdotal comment
- Stage 2: Control to throttle position to match cycle
  - Load is within observed band

ISB Test Cycle

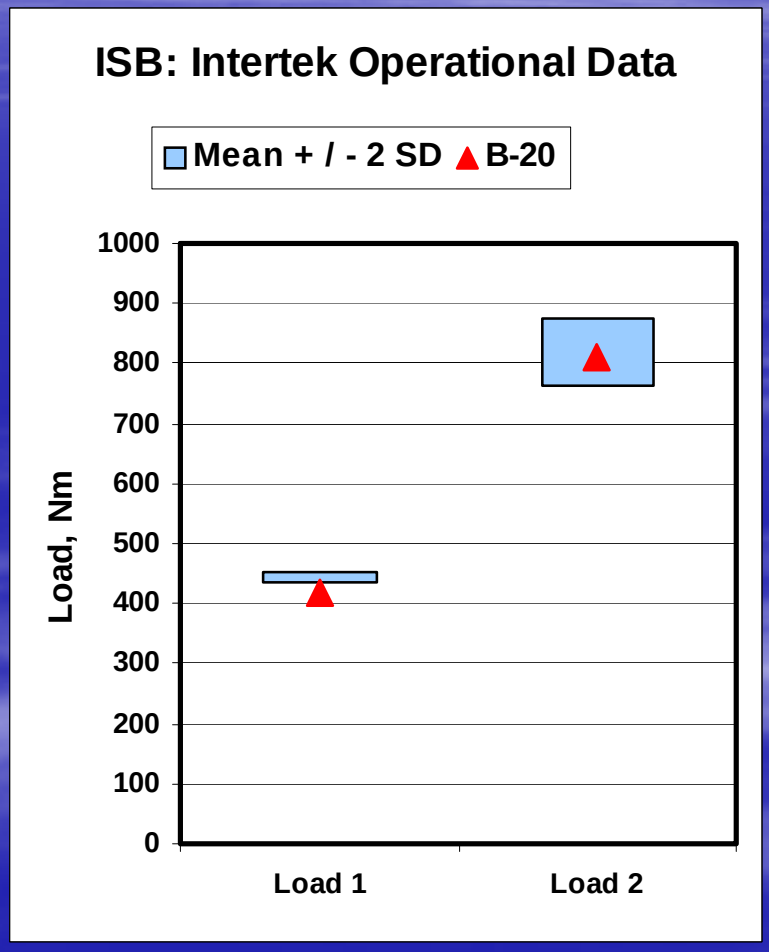


ISB Operational Data

Fuel Flow



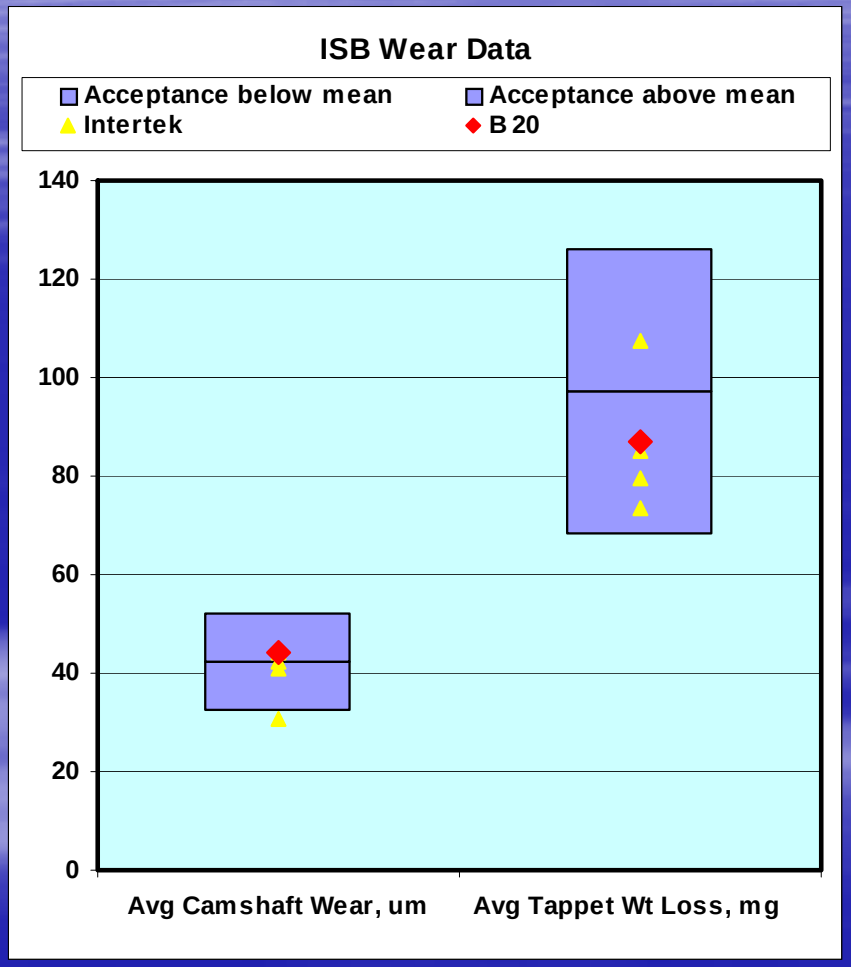
Load

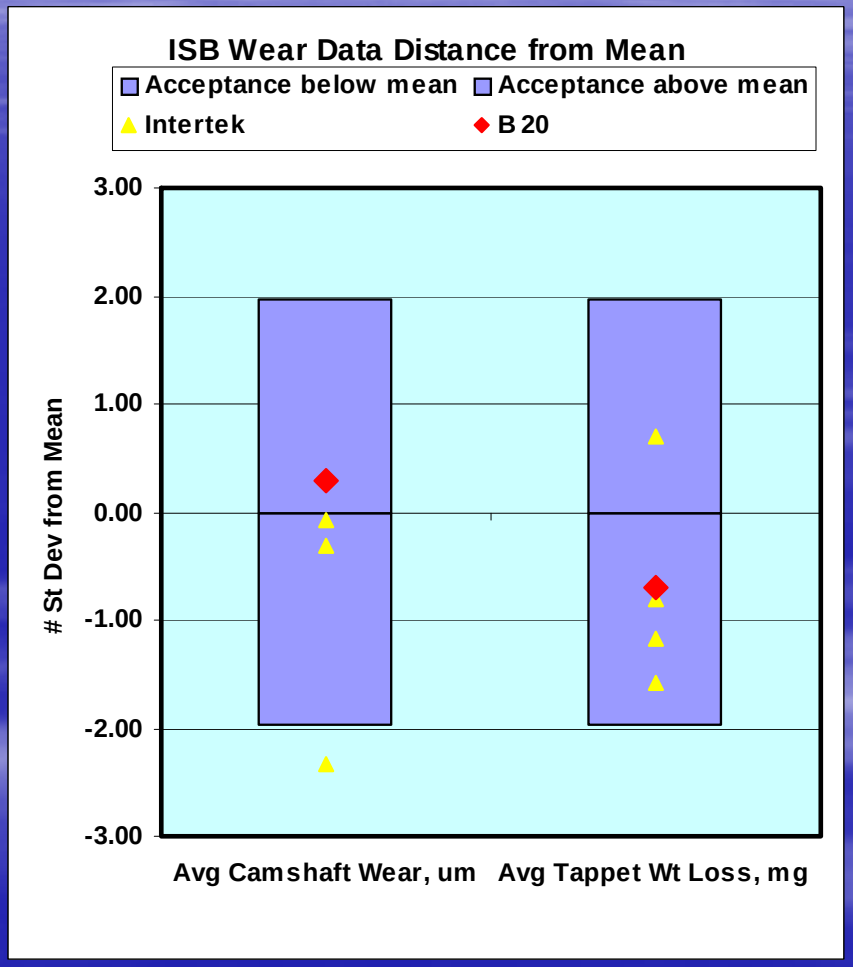


Test Results Presentation

- For each test there are two plots
- Actual test results of control parameters
  - Blue bars show TMC Acceptance Levels
  - Yellow triangles show Intertek reference runs
  - Red diamond is the B20 run
- Normalized data shown as a range expressed as # of Standard Deviations from the mean
  - Blue bars show TMC Acceptance Levels
  - Yellow triangles show Intertek reference runs
  - Red diamond is the B20 run

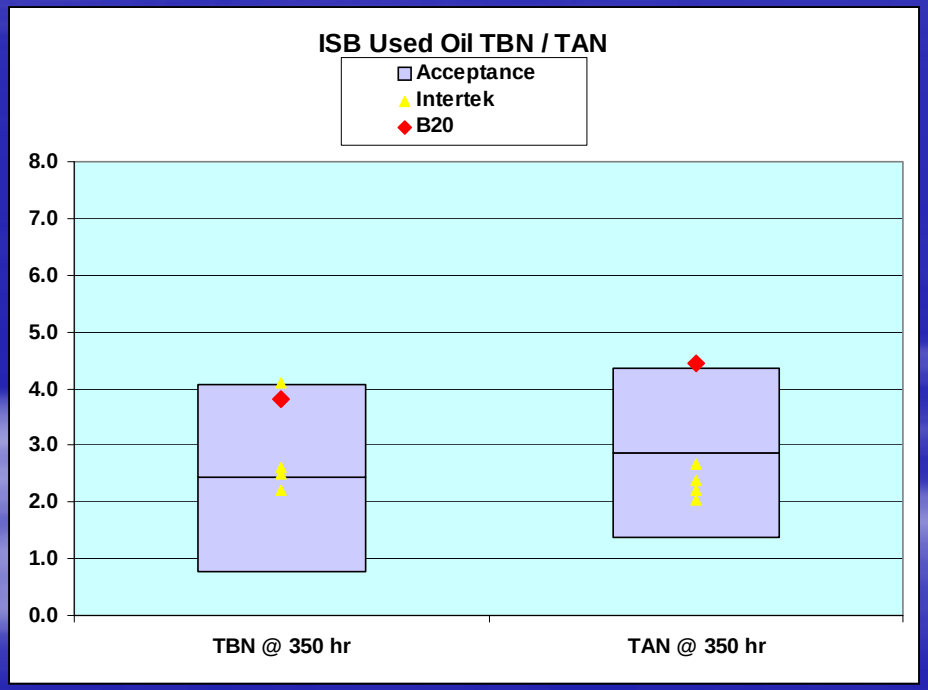
ISB Engine Data with B 20

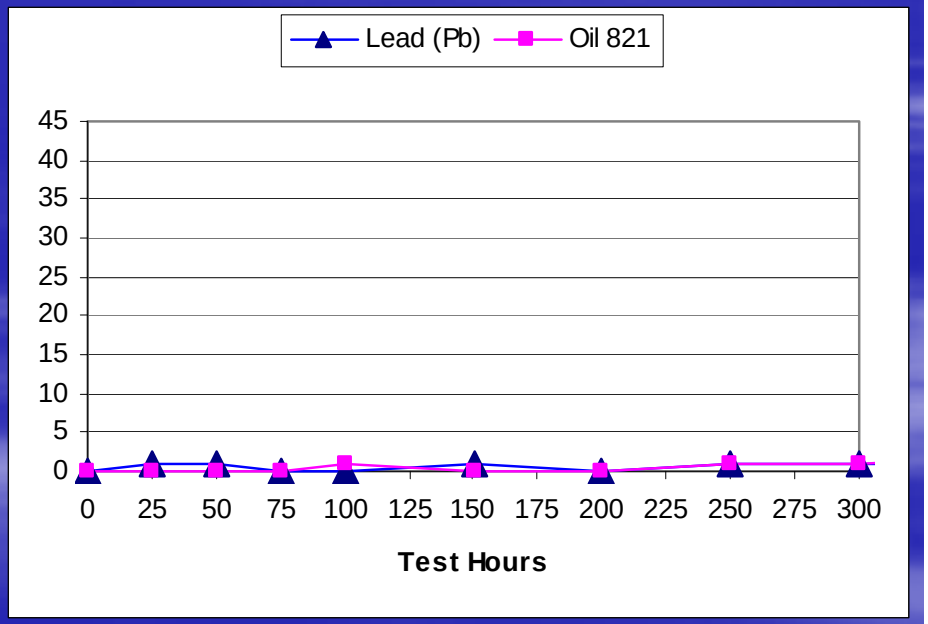




ISB Used Oil Analysis

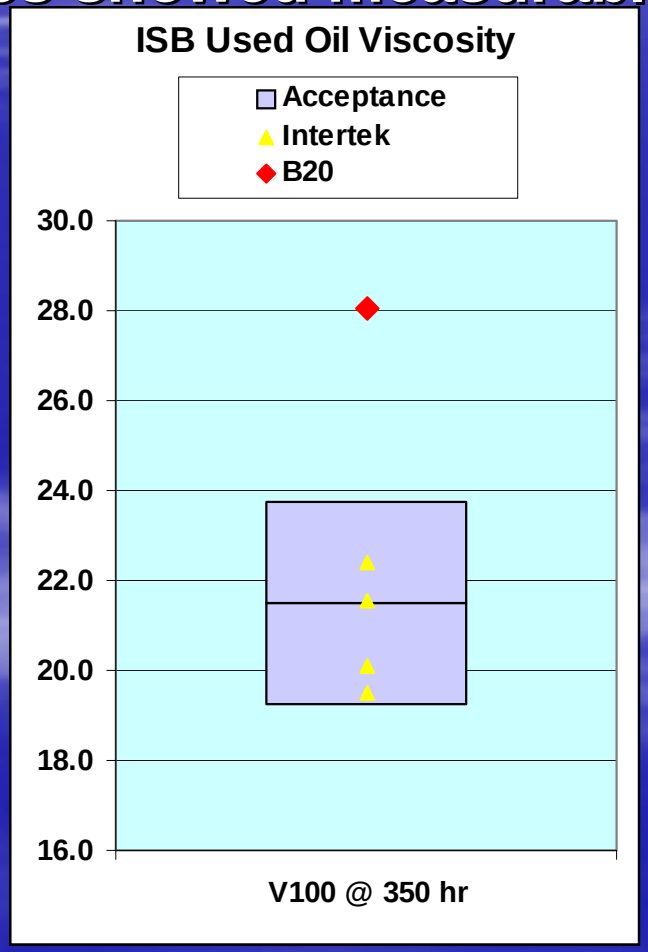
- B-20 test vs. recent 831 reference data
  - TBN Loss within range
  - TAN Increase just above range
  - PB Corrosion is not an issue in this test





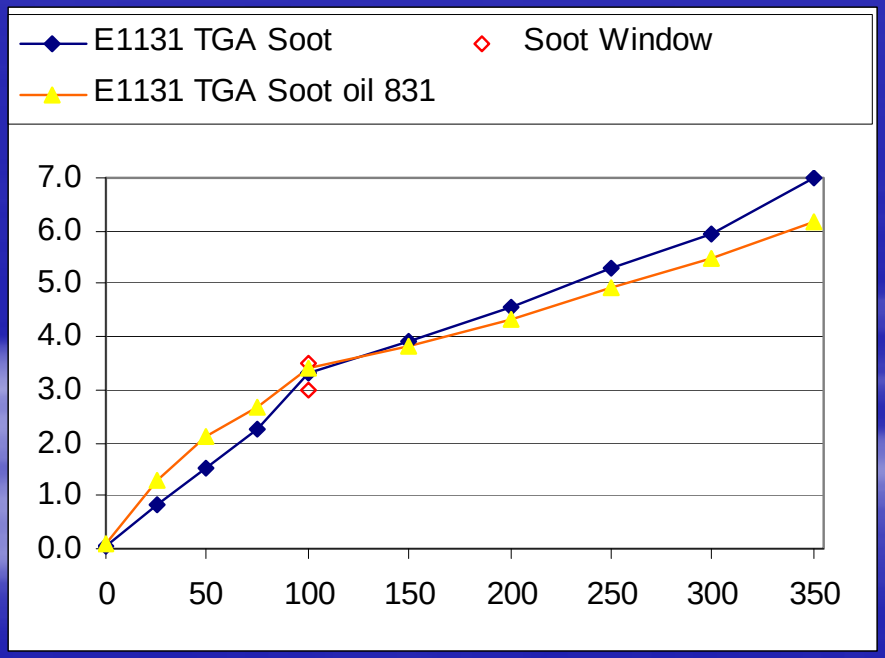
ISB Used Oil Analysis

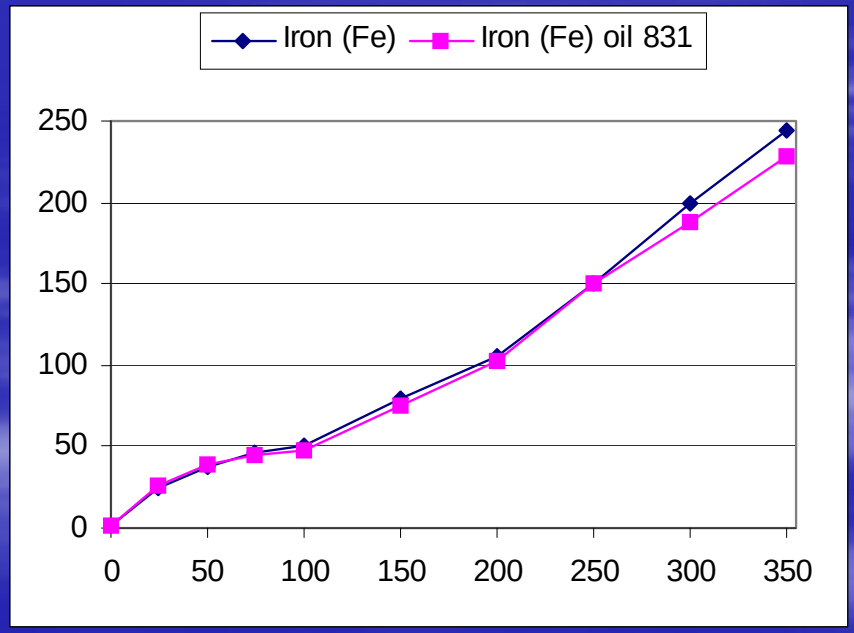
- B-20 test vs. recent 831 reference
  - Viscosity @ 100 C higher @ EOT
  - No samples showed measurable fuel dilution by GC



ISB Used Oil Analysis

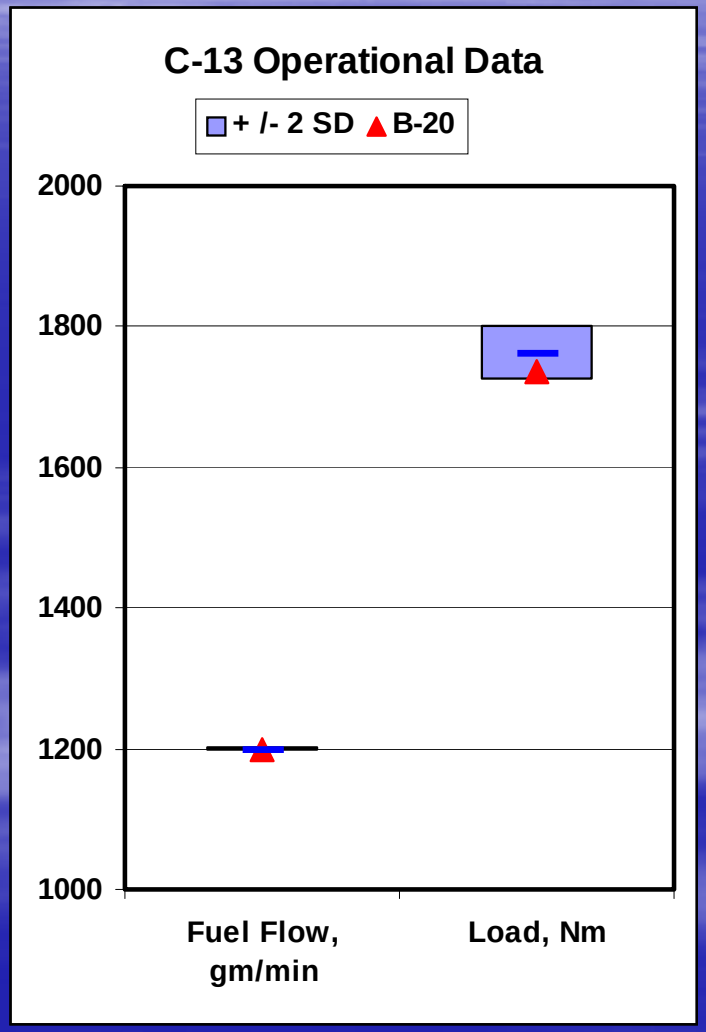
- **B-20 test vs recent 831 reference**
  - **Timing adjusted to hit soot window**
  - **Fe wear is comparable**



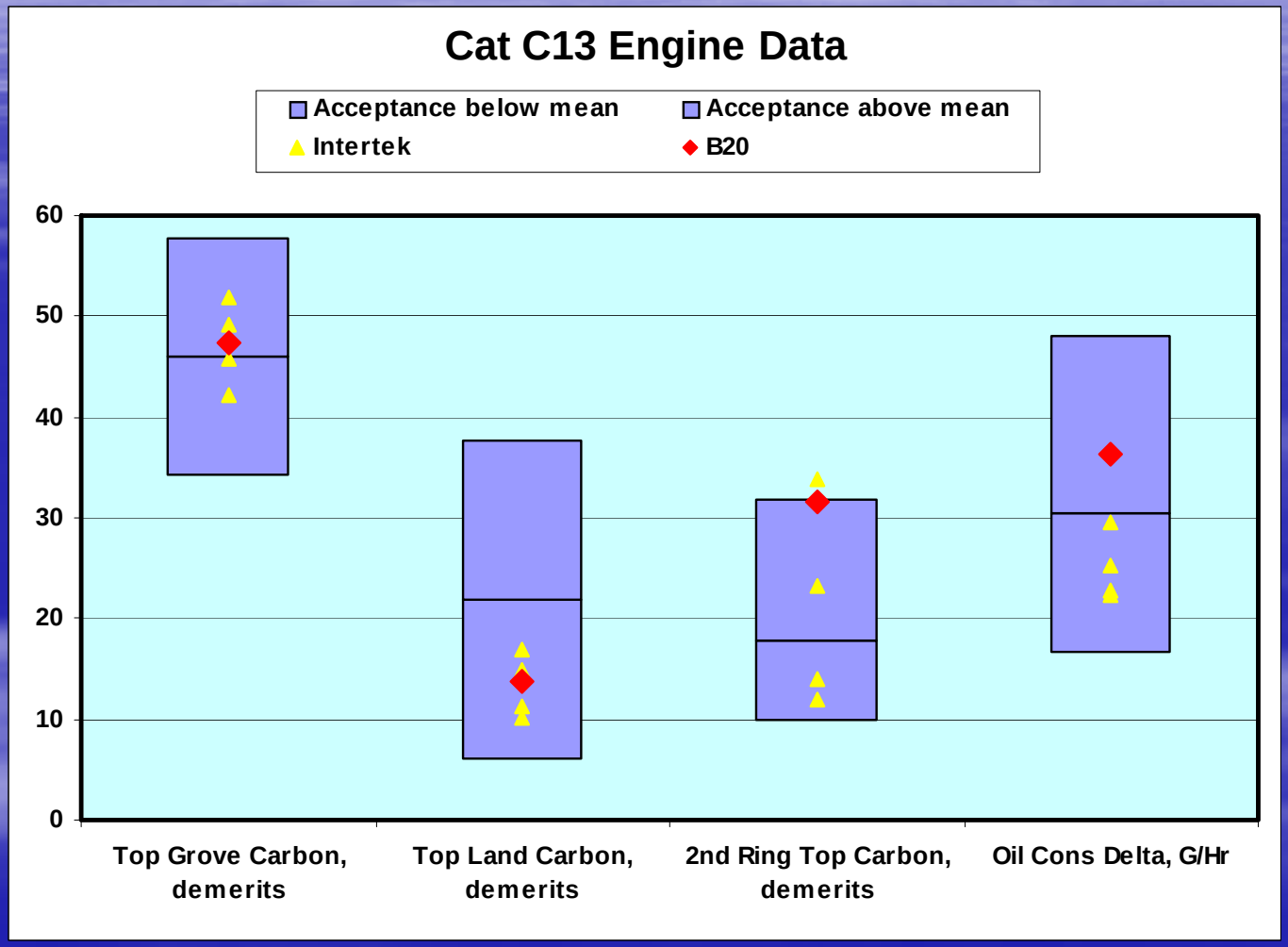


C-13 Operational Data

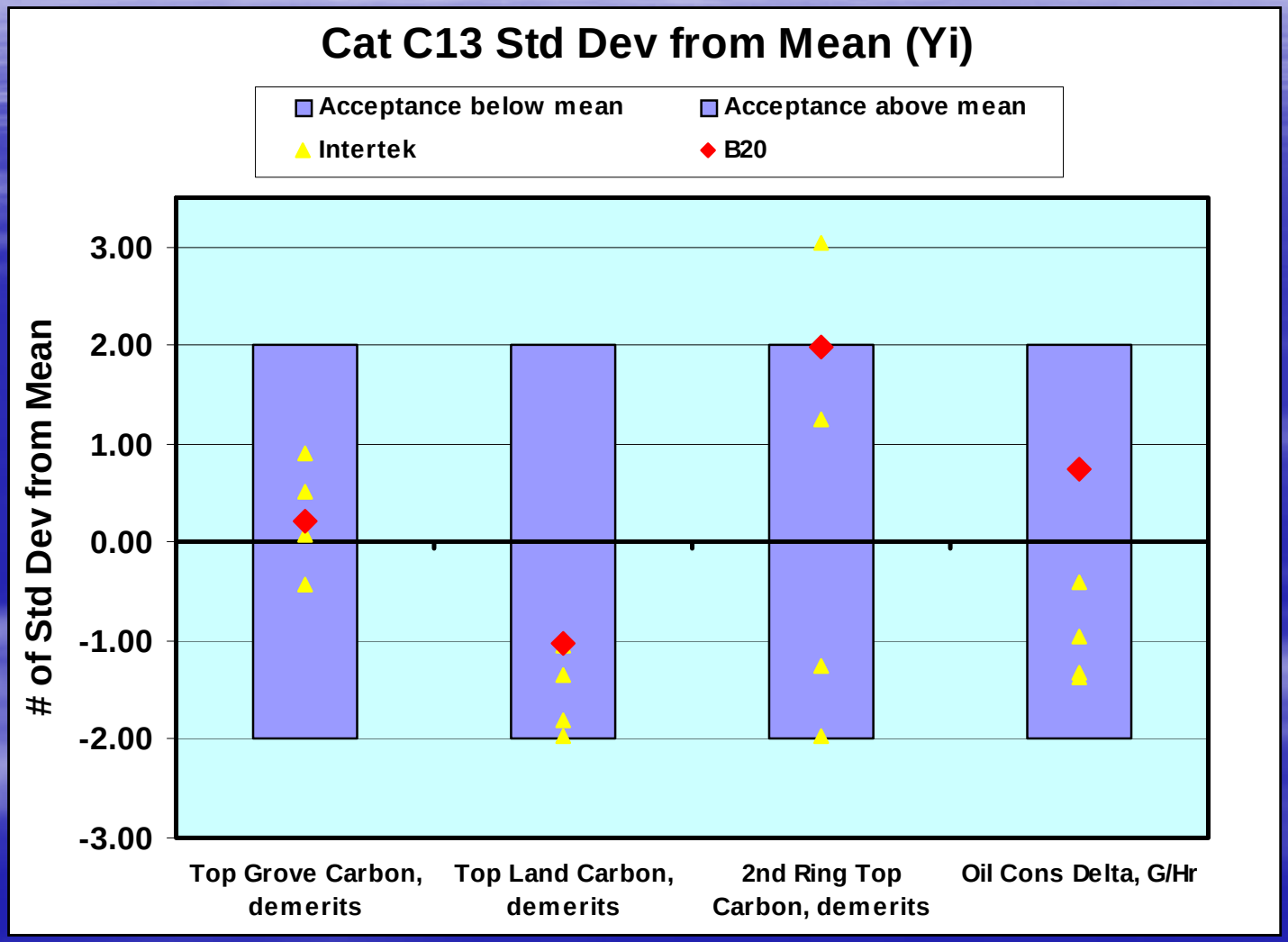
- **Fuel flow set @ 1200 gm / min**
- **Load falls within the band for all tests**



C13 Engine Data with B-20



C13 Statistical Data with B-20

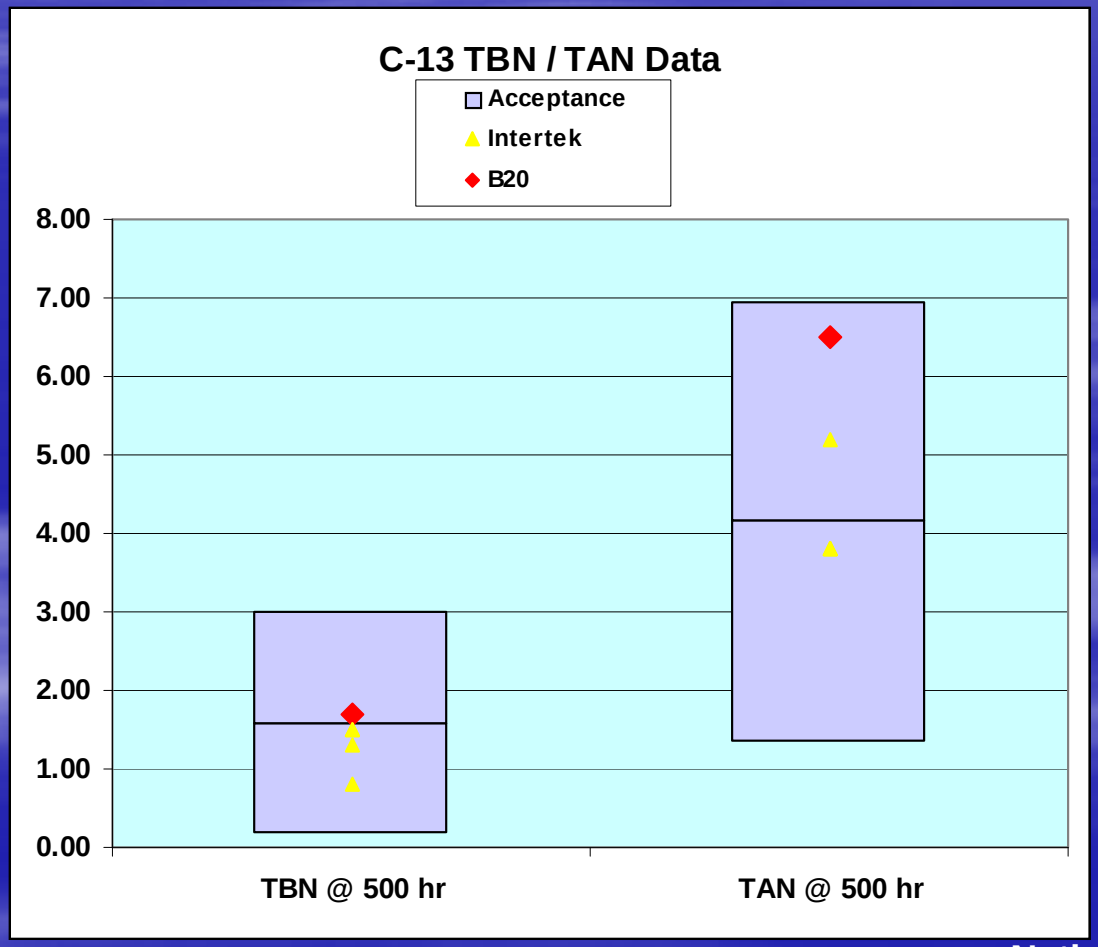


C-13 Rate & Report Factors

- 2 “Cold Stuck” rings were observed
- Lab reported a “cold stuck” ring on 2 other occasions with TMC 831
  - Tendency is there with high 2RTC
  - But the highest carbon ring was not the one stuck.
- This is an item to watch but it is not associated with high oil consumption in this test.

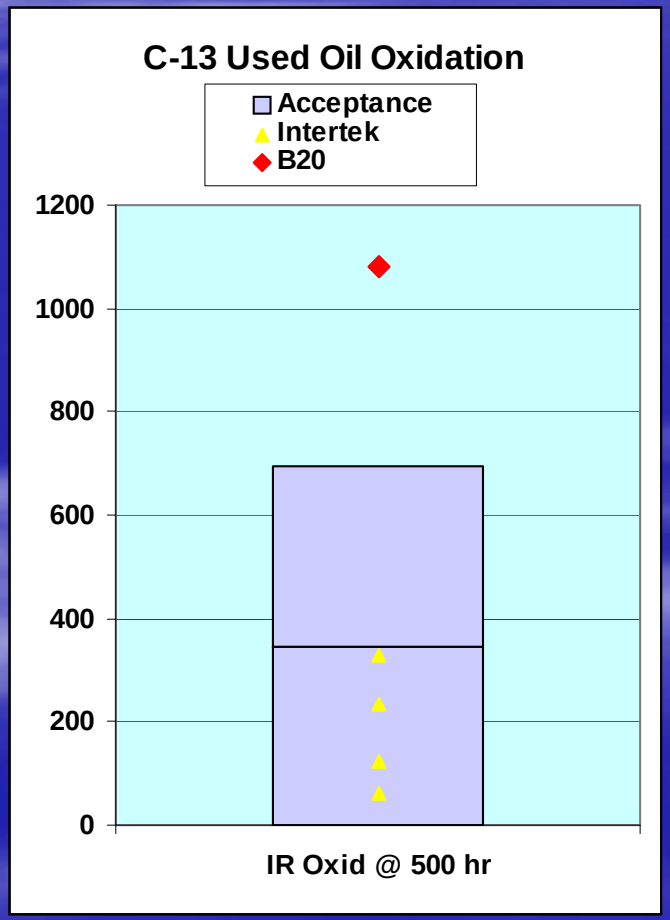
Cat C-13 Used Oil Analysis

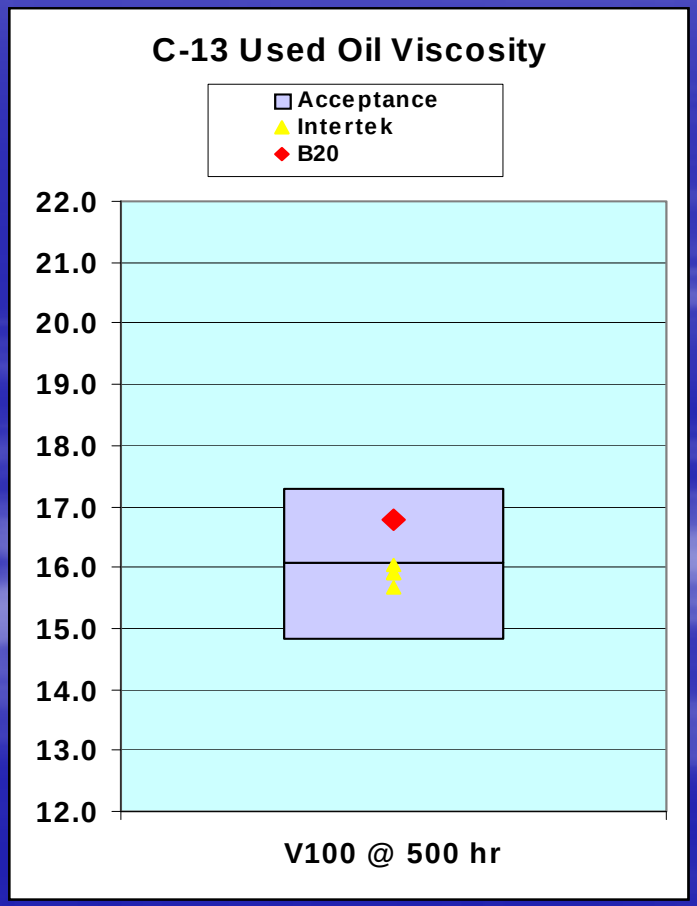
- B-20 test vs. 831 reference data
- 500 Hr TAN is near top of range of reference data
- 500 Hr TBN loss is at mean of reference data



Cat C-13 Used Oil Analysis

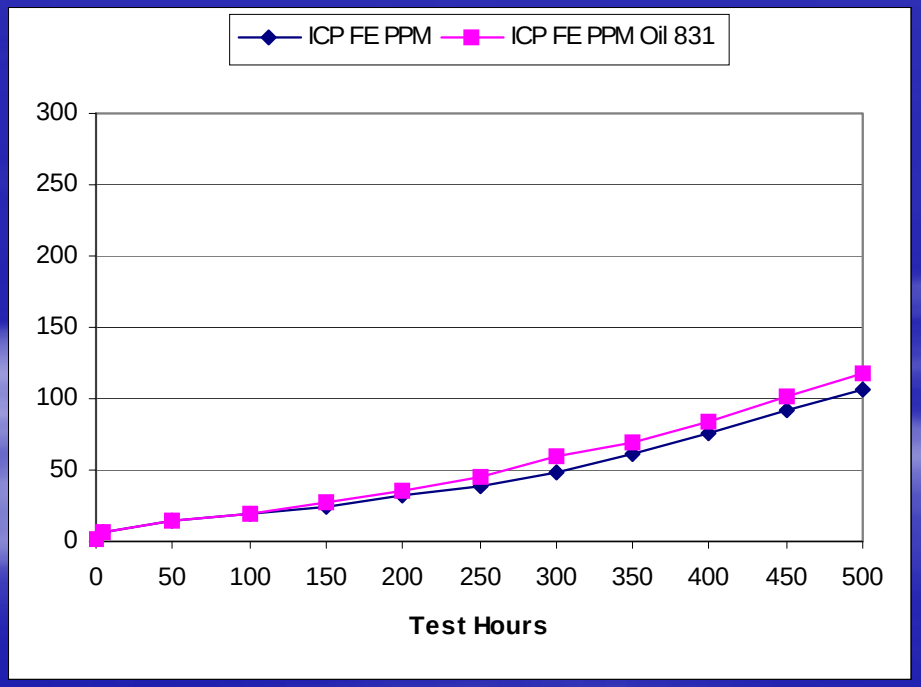
- Oxidation (DIR) appears higher; IR shows some ester
  - No samples showed fuel dilution by GC
- Viscosity increase is within range

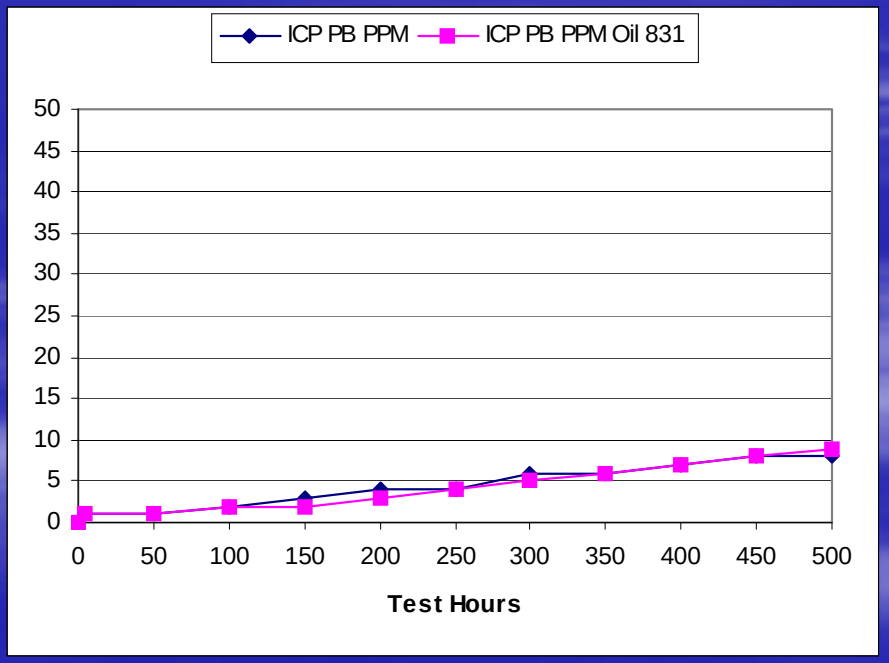




Cat C-13 Used Oil Analysis

- **B-20 test vs recent 831 reference**
  - **No issues with Fe, Pb or other wear metals**





Cat C-13 Parts Cleanliness

C13 / SME B20 / MCD5-029
ROCKER COVER

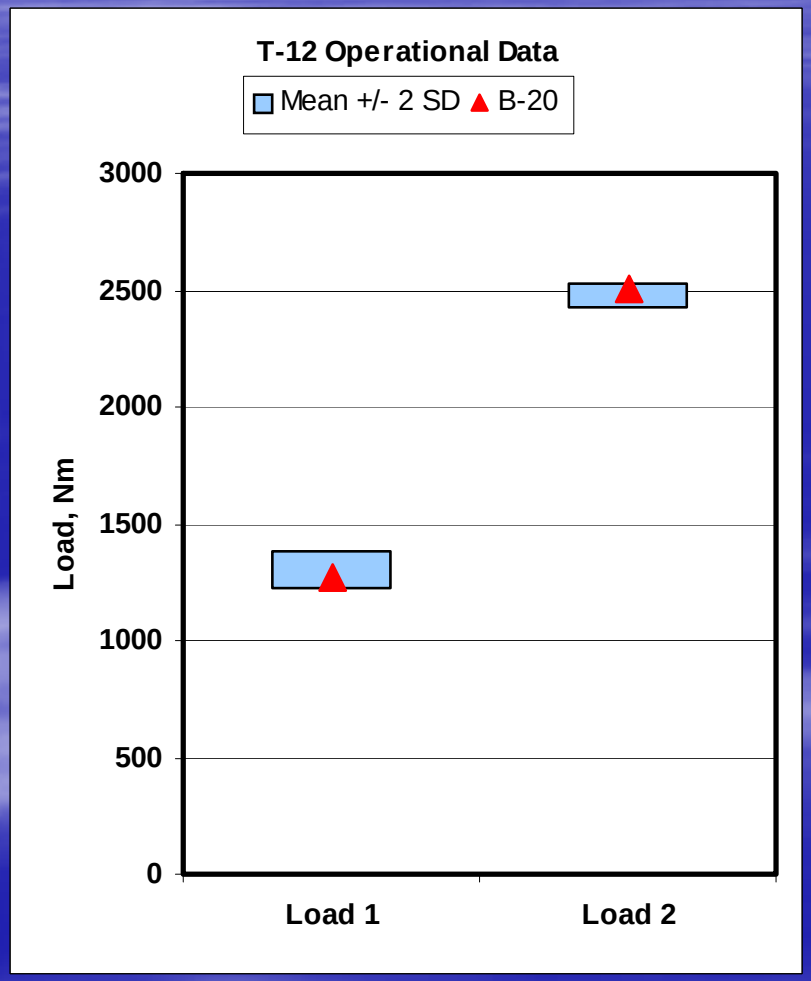
C13 / SME B20 / MCD5-029
OIL PAN

T12 Operational Data

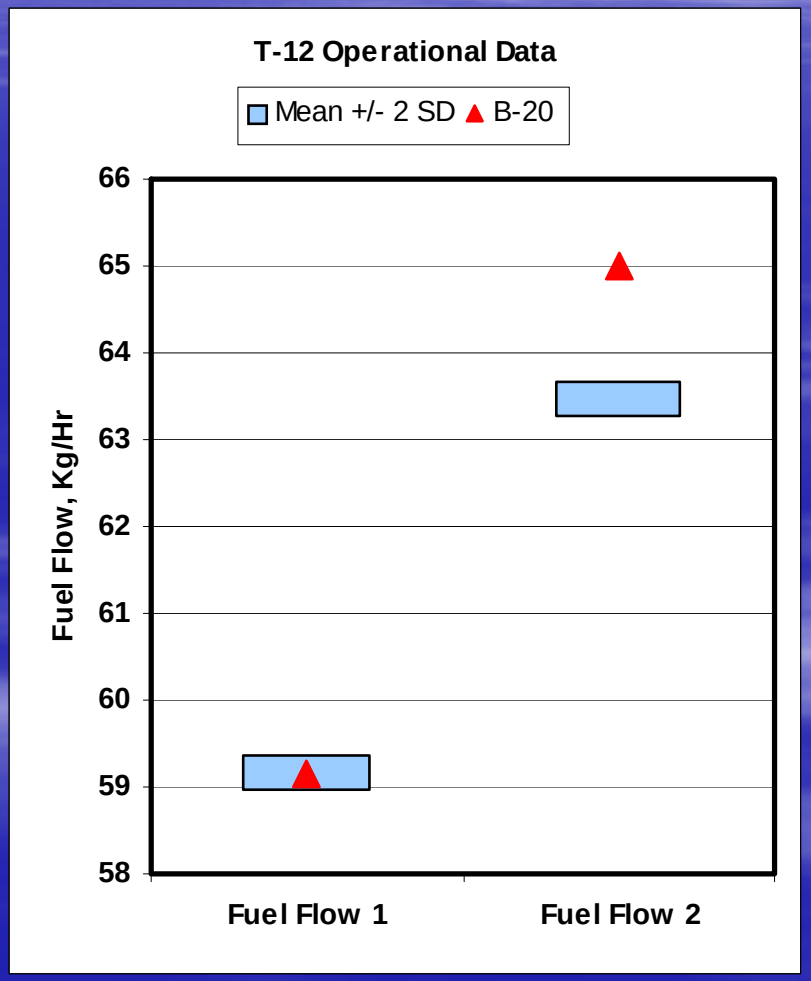
- **Stage 1: Ran to meet Soot Window**
  - **"More retard in timing than PC-10 fuel"**
    - **Statistically insignificant anecdotal comment**
- **Stage 2: Load critical**
  - **Adjust fuel flow to meet "typical load"**
  - **Set point raised from 63.5 to 65.0 Kg / Hr.**

T12 Operational Data

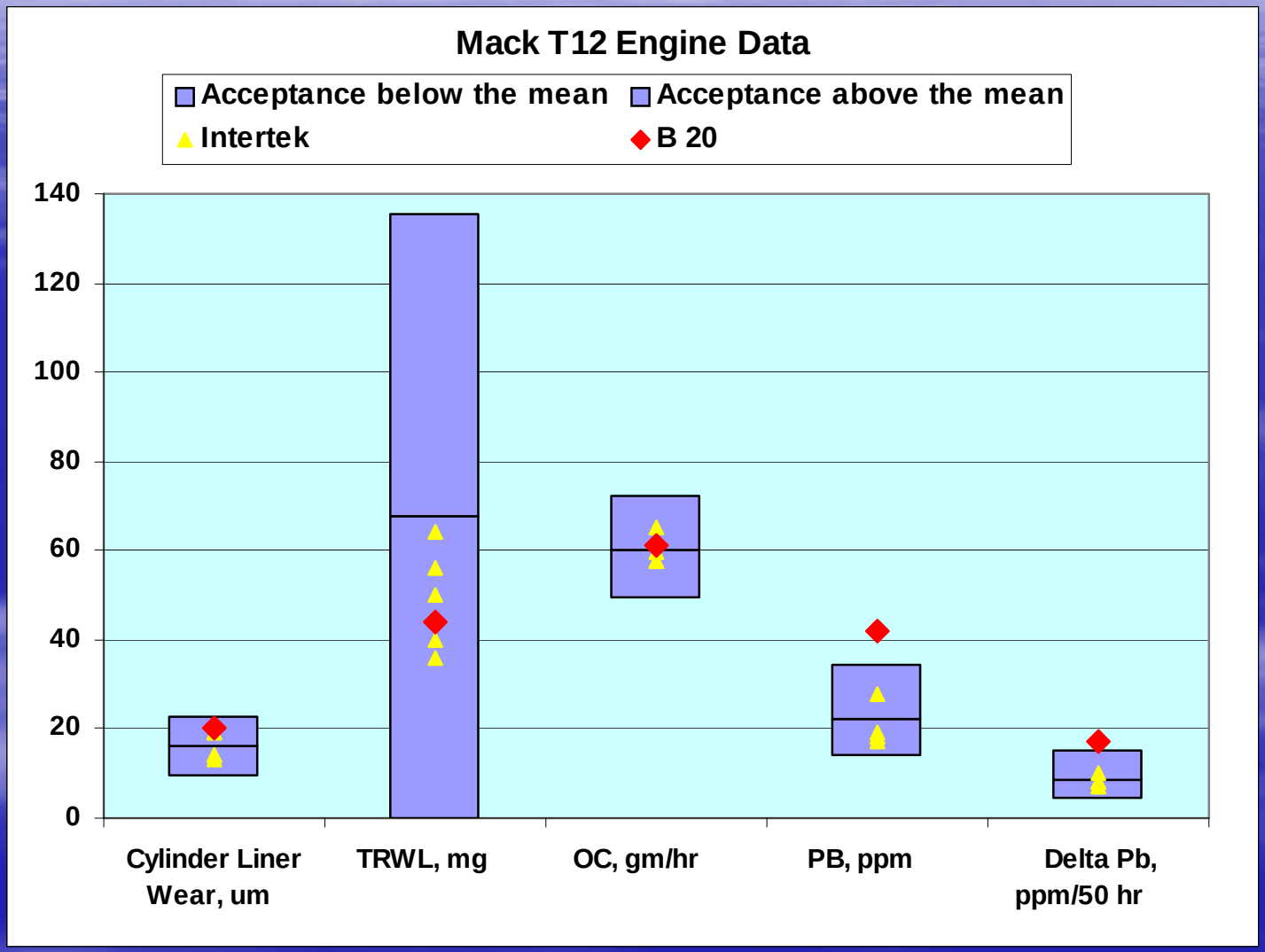
Load



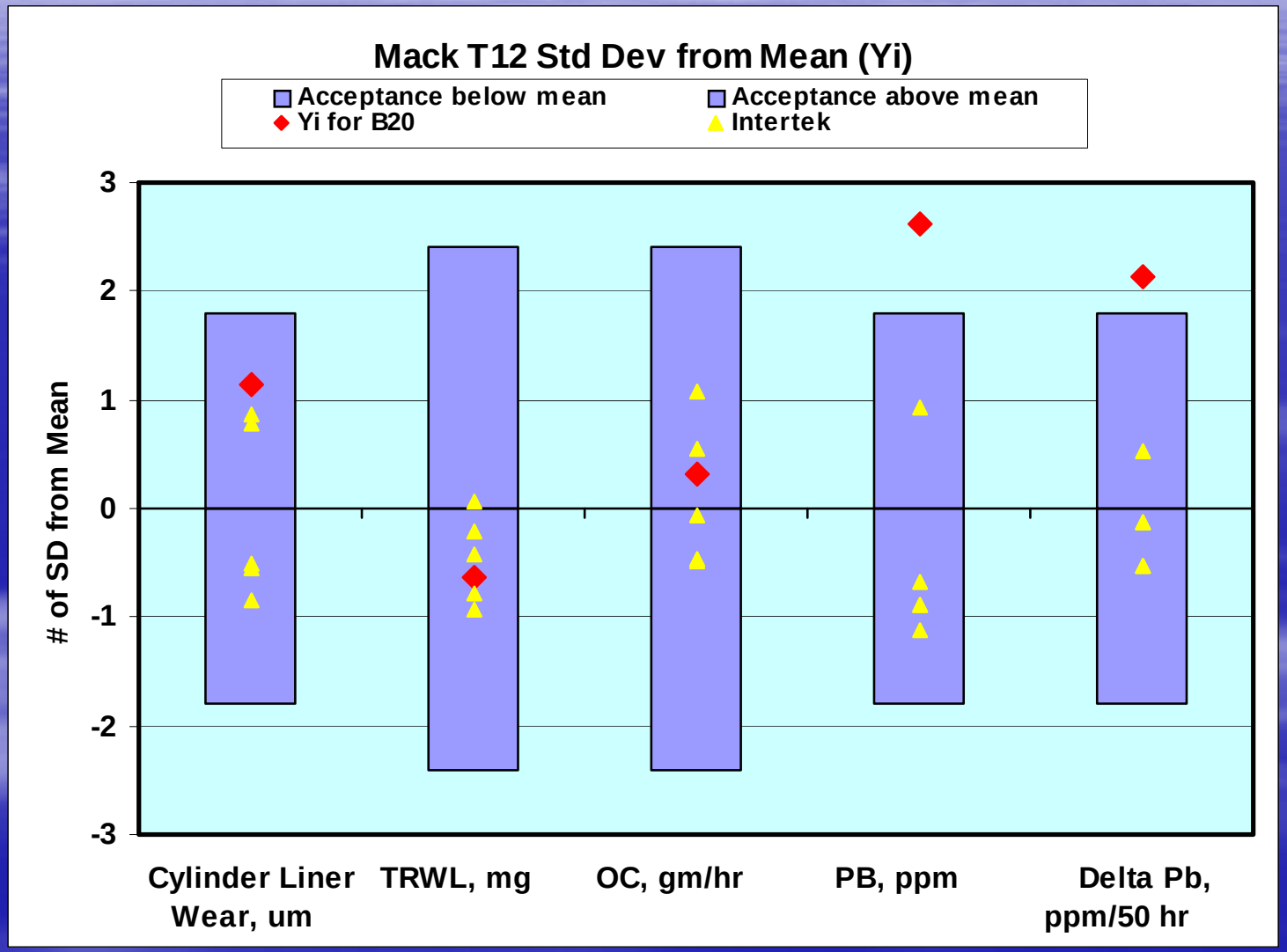
Fuel Flow



T12 Engine Data with B-20

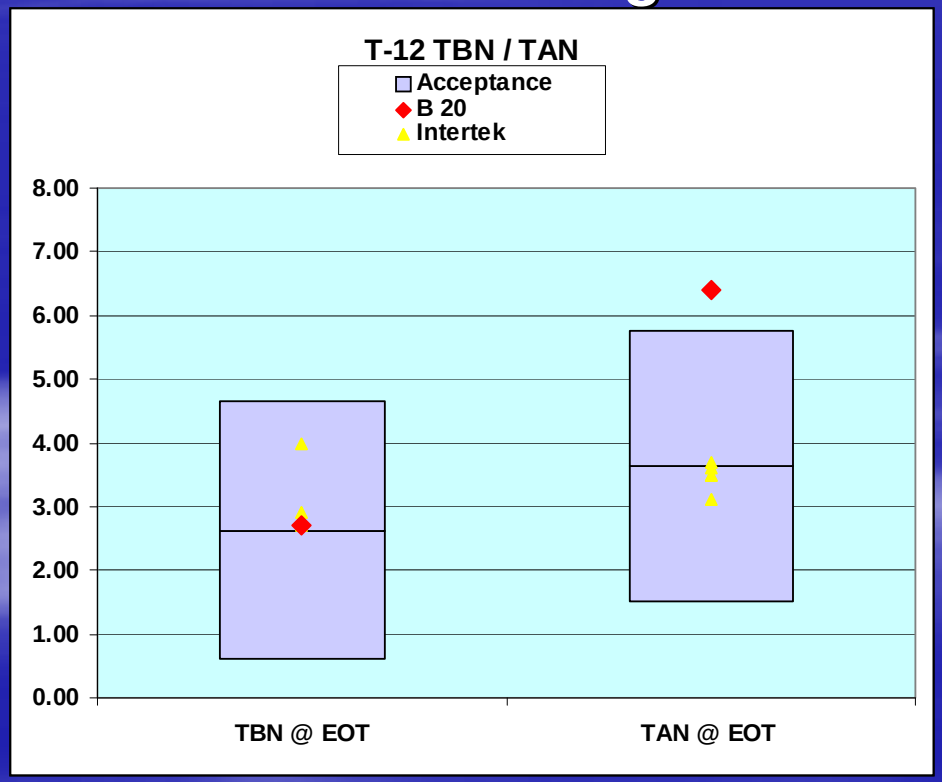


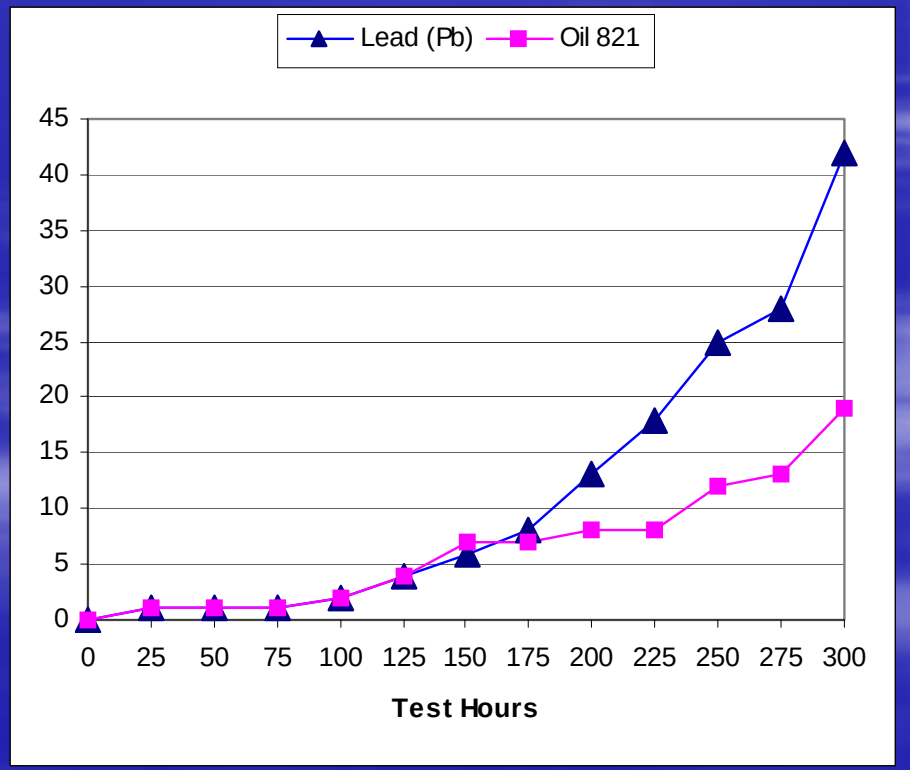
T12 Statistical Data with B-20



Mack T-12 Used Oil Analysis

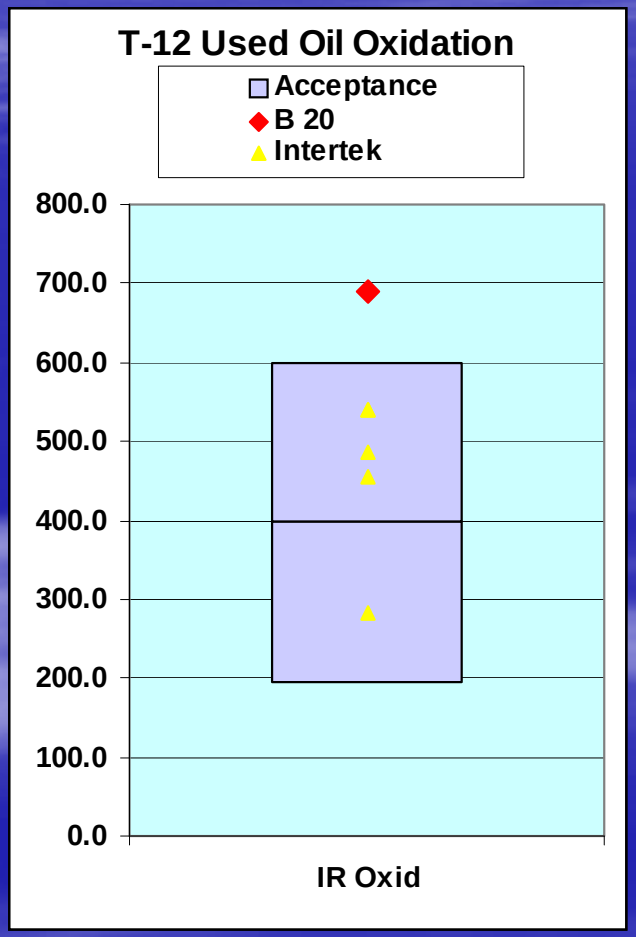
- B-20 test vs 821 reference data
  - TAN higher at EOT
  - TBN loss similar to mean reference data
  - Pb increase significant for last 100 hrs

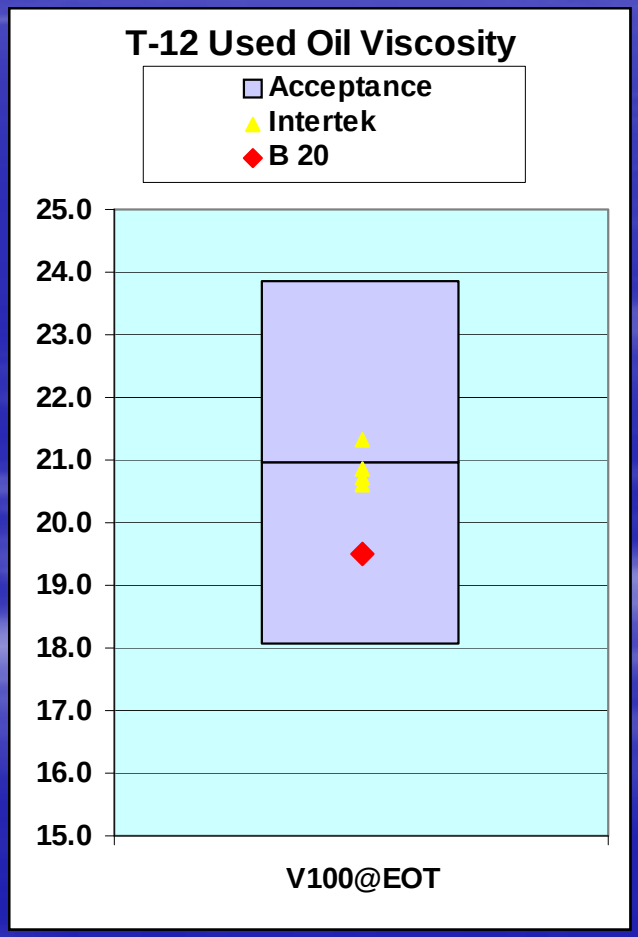




Mack T-12 Used Oil Data

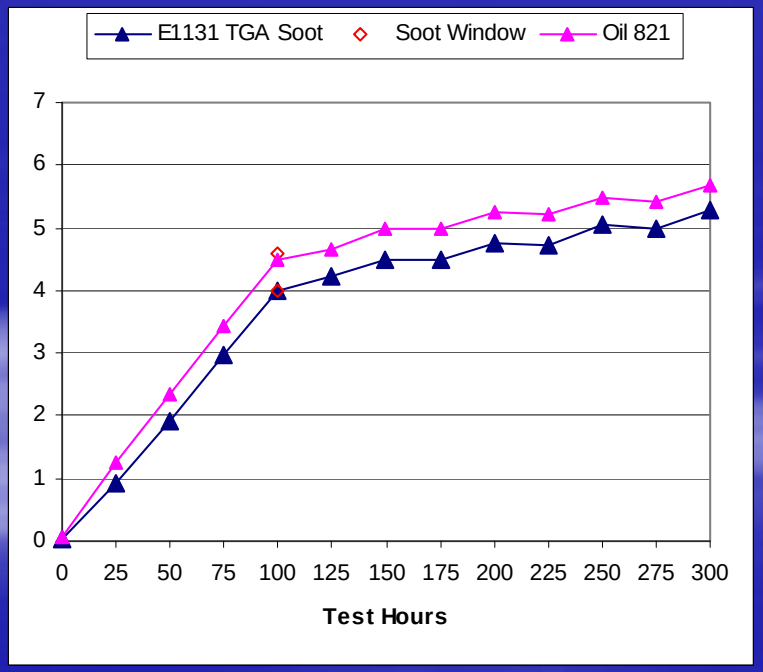
- Oxidation is significantly higher, but Viscosity is not affected
- No samples showed fuel dilution by GC but IR showed some ester

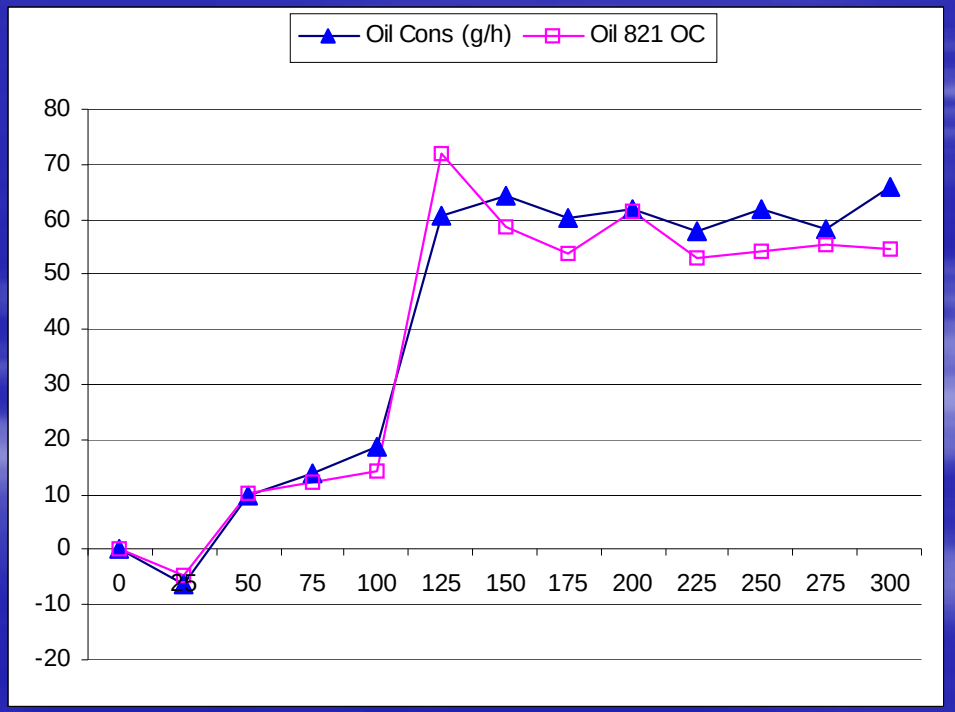




Mack T-12 Used Oil Analysis

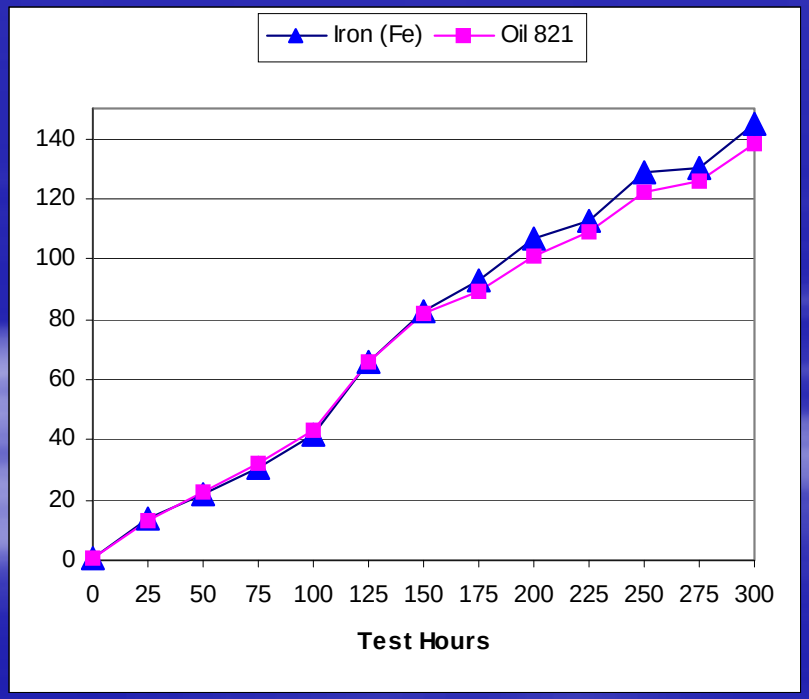
- **B-20 test vs recent 821 reference**
  - **No issues with Soot or Oil Cons**

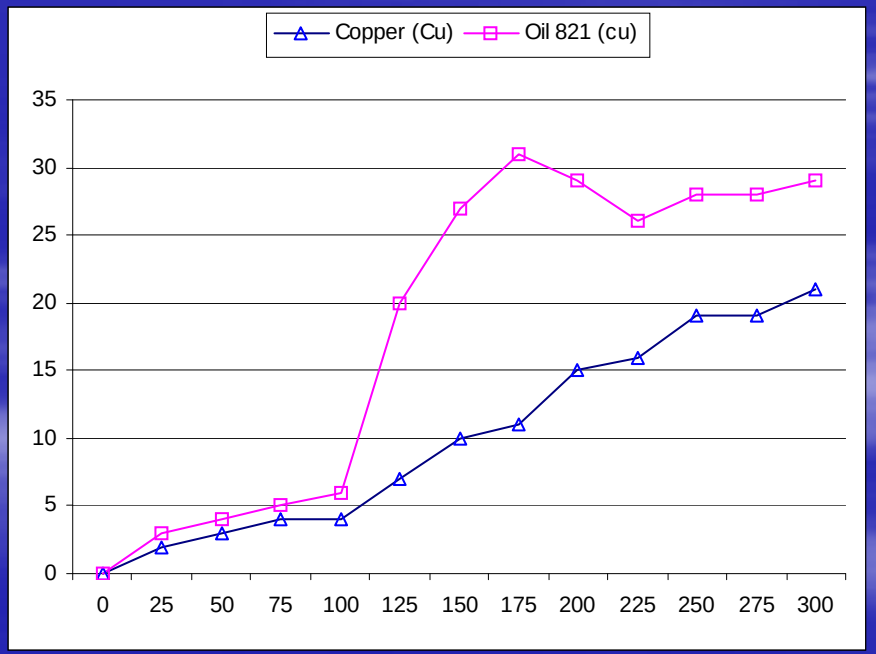




Mack T-12 Used Oil Analysis

- **B-20 test vs recent 821 reference**
  - **Fe and Cu: no issues**





Mack T-12 Used Oil Analysis

- Low temperature viscosity @ 100 hr
  - Previous stand reference MRV @ -20 C 11,500 cP
  - B-20 used oil MRV @ -20 C 11,100 cP
- No evidence that a unique soot was formed from the B-20 fuel
  - Low temp viscometrics
  - Wear data from T12, ISB

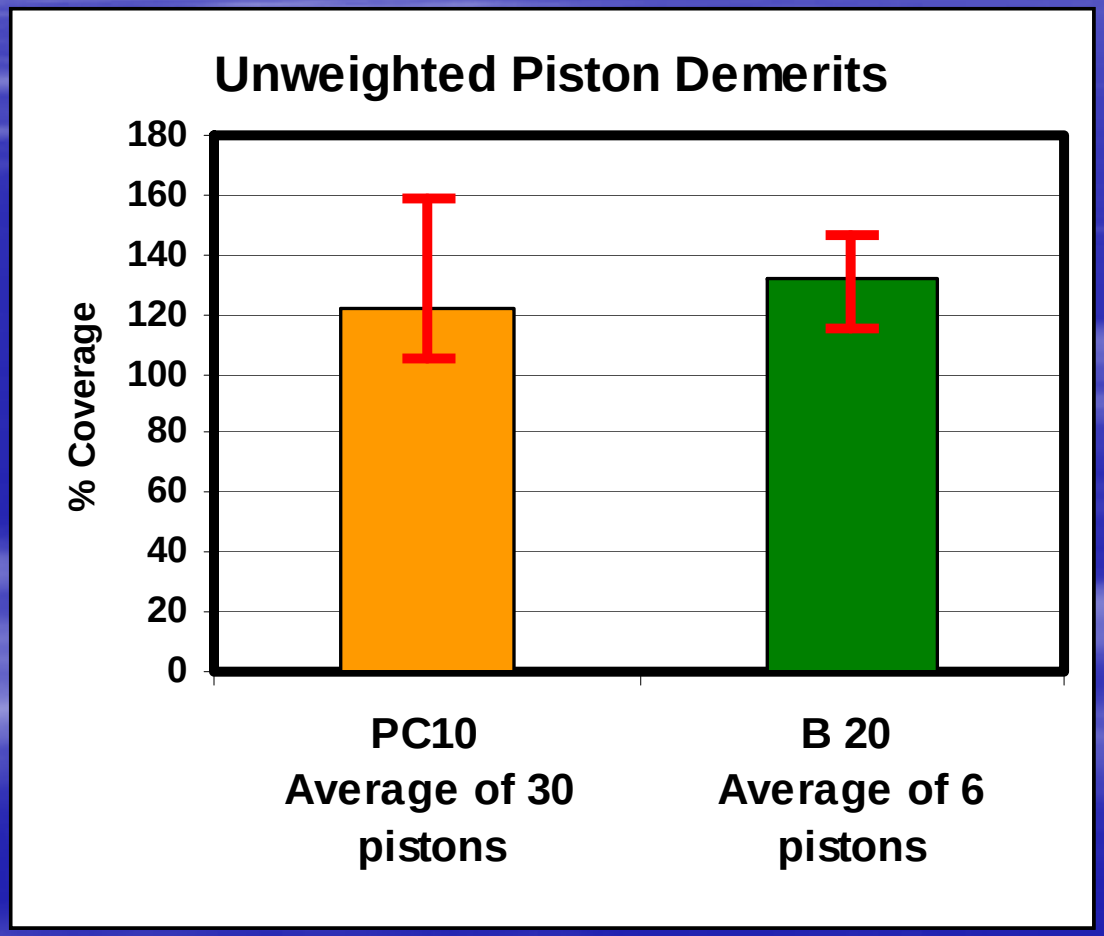
Used Oil Low Temp Viscosity

- Data from Rhomax
- Very good vis properties for sooted oils

Oil ID	Oil ID	YS	MRV TP-1 @ -15°C	YS	MRV TP-1 @ -20°C	YS	MRV TP-1 @ -25°C
65293	Cummins ISB 350	0	11,470	0	20,239	0	45,360
66302	Caterpillar C13 500	0	7910	0	15,270	0	30,720
62996	Can -1 Mack T12 300	0	9490	0	20,407	0	38,700
62996	Can - 2 T12 300	0	9500	0	18,750	0	38,200

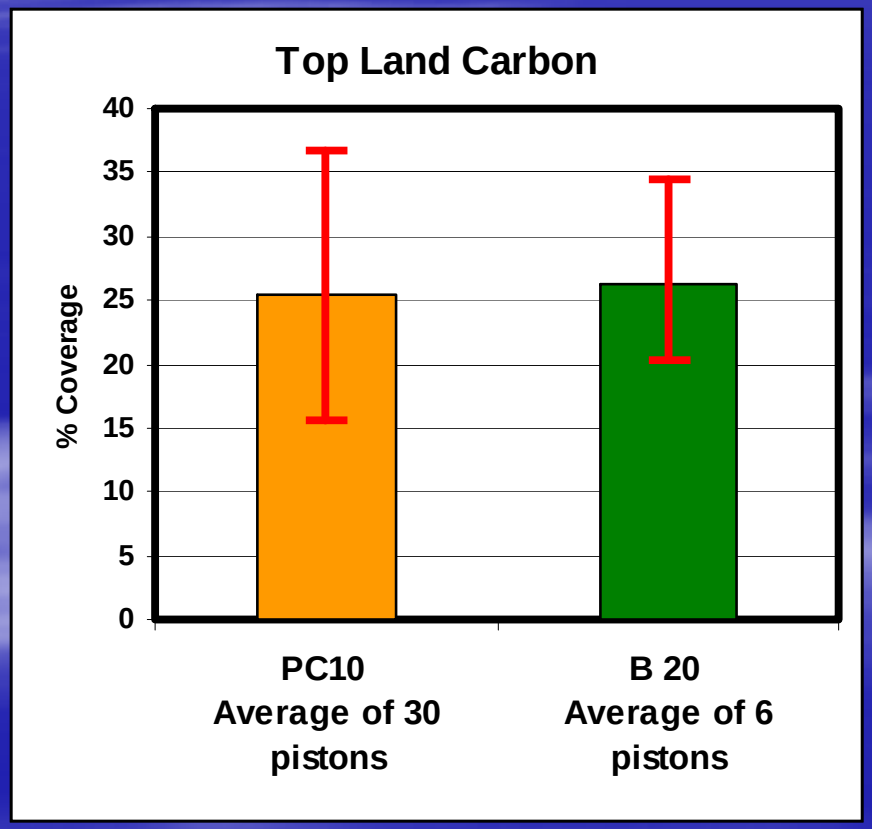
Mack T-12 Piston Deposits

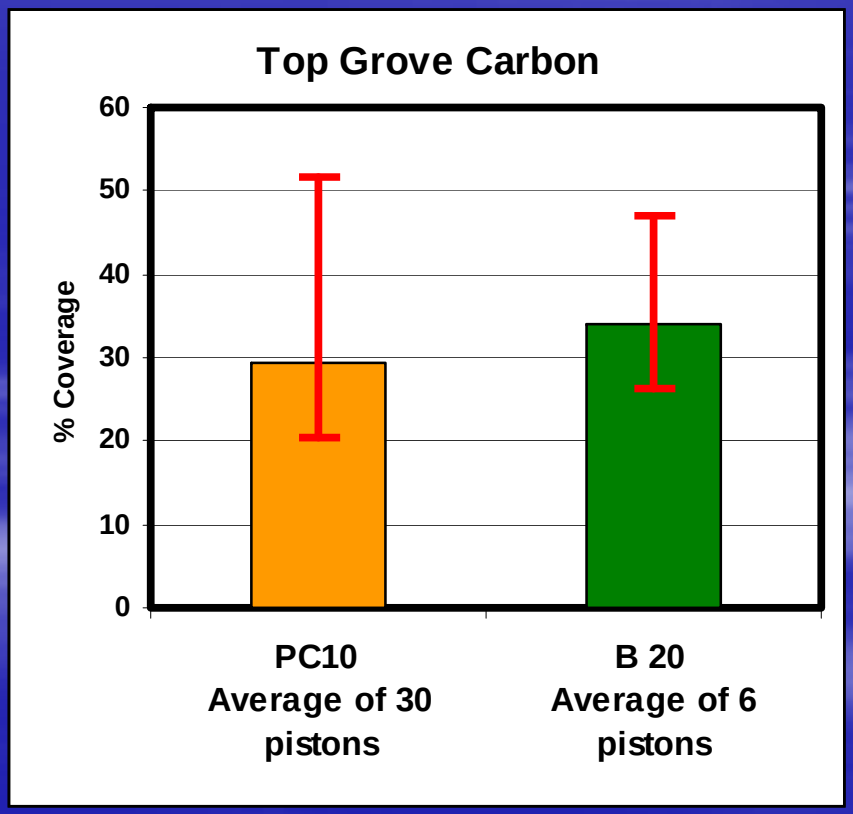
- **Un-weighted Piston Demerits**



Mack T-12 Piston Deposits

- Top Land Carbon
- Top Grove Carbon

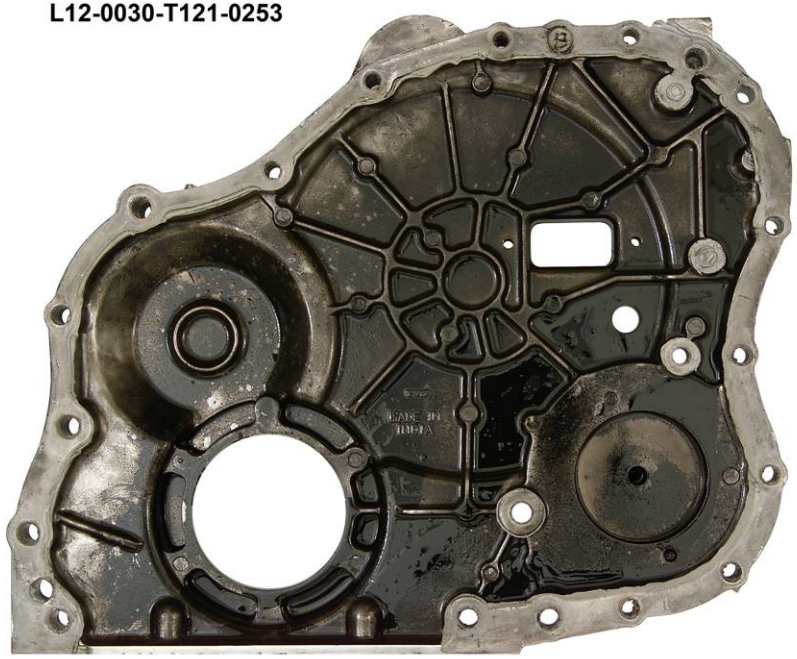




Mack T-12 Parts Cleanliness

T12
SME B20
L12-0030-T121-0253

FRONT COVER



T12 / SME B20 / L12-0030-T121-0253
OIL PAN

Mack T-12 Parts Cleanliness

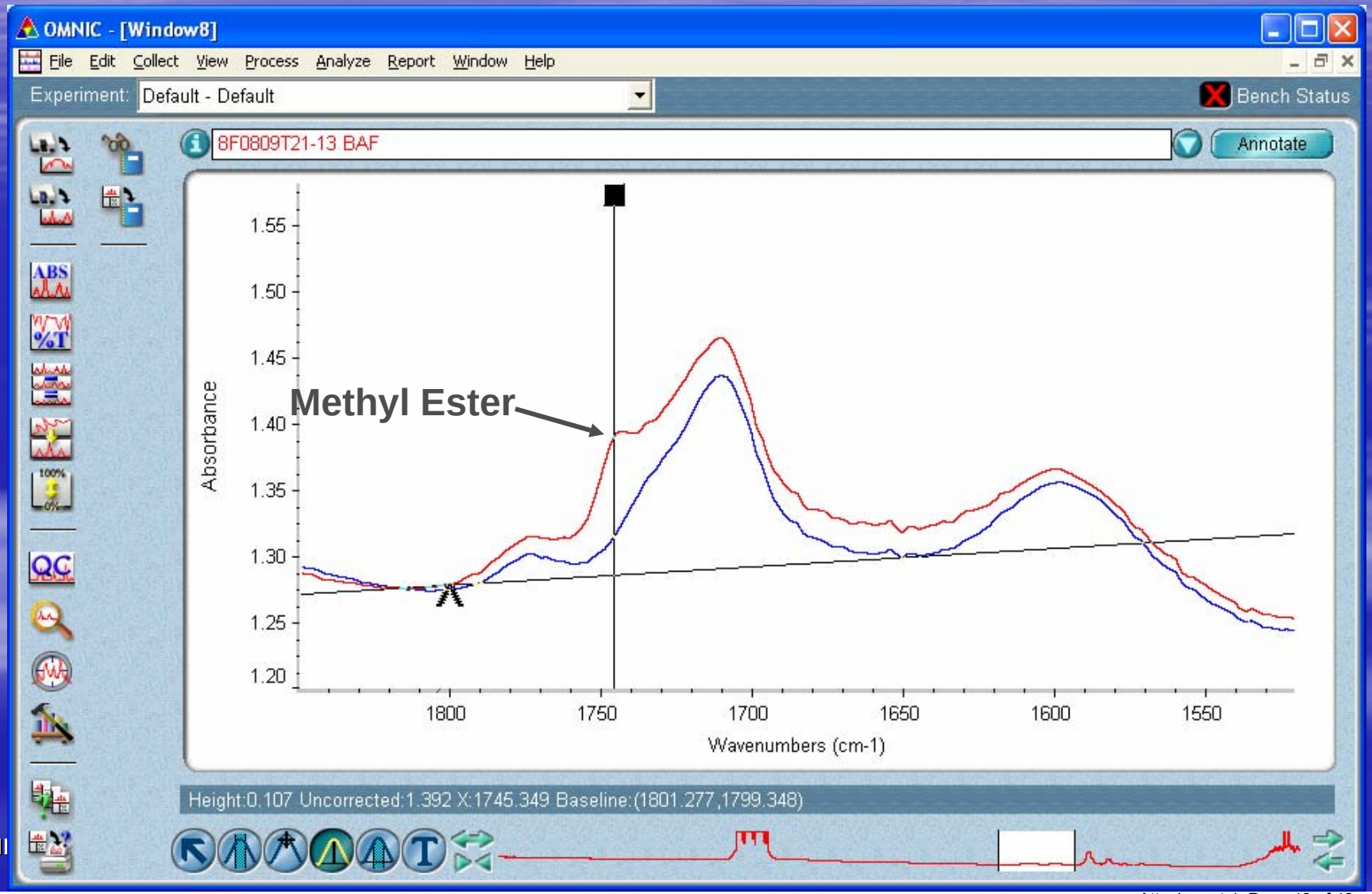
T12 / SME B20
Test No. L12-0030-T121-0253
ROCKER COVERS

Used Oil Data Summary

- **ISB**
  - TBN Loss: Upper Range (More TBN) ^
  - TAN Increase: Higher than Range ^^
  - Viscosity: Significantly Higher ^^^
  - Oxidation: No comparison
- **C-13**
  - TBN Loss: Near Mean -
  - TAN Increase: Upper part of Range ^
  - Viscosity: Upper part of Range ^
  - Oxidation: Significantly Higher ^^^
- **T-12**
  - TBN Loss: Near Mean -
  - TAN Increase: Significantly Higher ^^^
  - Viscosity: Lower part of range ↓
  - Oxidation: Significantly Higher ^^^

T-12 Used Oil

FTIR of B20 vs. PC10 EOT Oil



Summary

- Examination of the control parameters for these engine tests:
  - All wear data within acceptance limits
    - No evidence of unique, higher wear type of soot
  - All controlled piston / ring deposits within acceptance limits
  - Low temperature viscometrics not an issue
  - Only Pb Corrosion and T 12 oxidation are worse than acceptance limits

Summary (cont'd)

- Non rated engine parts appeared clean and free of sludge
- General trend toward higher TAN
  - Without corresponding loss of TBN
- IR shows more oxidation and esters
  - "Oxidation" not clearly associated with viscosity increase

Summary (cont'd)

- Mack T-12 issues
  - Sensitive to oxidation and TAN / TBN
  - Oxidation and Pb corrosion are an issue
    - Also reported by Infineum & Oronite papers
  - Piston deposits (not normally rated) show similar range of TLC, Demerits for B20 vs. PC-10 fuel
- May indicate that an oil could demonstrate some level of "Biodiesel Performance" by passing a Mack T-12 using B-20 blended with PC-10 fuel.
- High fuel dilution not represented in this testing

EMA – Biodiesel Status

- B20 Effects on Engine Oil
- Performance Concerns

  Oxidation
  Deposits
  Corrosion
  TAN >
  Fuel Dilution
  Oil Drain Interval Reduction
  Post Injection Test ?
  Bio Spike of Engine Oil ?
  After Treatment?

- Recommendations

  Bio Compatibility Bench Test Task Force
  Oxidation, TAN, Corrosion, Fuel Dilution

  Oil Analysis Test Development Task Force
  Methods – Bio - Used Oil Analysis

Engine Manufacturers Association

EMA CJ-4 / 2010 Status

- **CJ-4 Oil Field Performance?**

  Request Industry Data to be Submitted to EMA March 1 2008 - NO Data

- **Chemical Limits – OK – No Issues Today**

- **Additional Performance Requirements**
  - **Oxidation – IIIF-IIIG SL-SM Robo?**
  - **TBN Depletion?**
  - **Shear Stability (Correlation?)**
  - **Aeration (EOAT Discrimination Concern) – Surv Panel**
  - **Turbo Deposits**
  - **Fuel Economy (3.5 HTHS) Task Group?**
  - **Other?**

- **Review Test Redundancy**

Engine Manufacturers Association

Turbo Deposit Test

- The CEC Management Board has advised Klaus Daniel of APL to stop any further test method development work until the development process has been reviewed with the Board
- The turbocharger test is not expected to become available for ACEA Oct 2008. ATC/ATIEL have requested to issue ACEA Oct 2008 without the turbocharger deposit test requirement.

Engine Manufacturers Association

Status of Older API C Categories

ASTM HDEOCP Meeting

June 17, 2008

Status of Older API C Categories

- **CF-4 – no licenses granted as of July 2007, all expire by July 2008**
  - **API decision based on unavailability of Mack T-6 test**
- **CG-4 – ballot to discontinue licensing to be issued**
  - **Response to EMA recommendation to discontinue licensing and promote CH-4 as the minimum quality level for replacement**
  - **Based on a lack of a Ring/Liner Wear test**
- **CF – long-term viability/licensing being considered**
  - **EMA requested to discontinue based on applicability**
  - **No consensus within API LC; DEOAP to evaluate options**
- **CF-2 – 6V-92TA test availability may drive action to discontinue**
  - **EMA support continuation of licensing and 2-cycle test availability**
  - **Critical test currently not available; test labs considering options**
  - **Target to have a long-term plan in place by December ASTM**
  - **Solution could involve decoupling of CF-2 and MIL Spec**

2-Cycle Diesel Surveillance Panel Report

June, 2008

Patrick Lai

Chair, Surveillance Panel

6V92TA test availability status

- 6V92TA (ASTM D 5862) test adopted in 1990
- At one time, four laboratories ran reference test stands
- Only one referenced test laboratory in the last nine years
- Low demand on test in recent years
- Test stand last referenced in December, 2006
- The only referenced test laboratory stopped testing due to internal work re-alignment
  - Termination not due to lack of test parts or technical capability

Industry consultation process

- Surveillance panel tele-conference taken place (2008-06-11)
- Stake-holders outside of surveillance panel participated
  - API
  - EMA
  - US Military
  - ACC members
  - OEM test sponsor
  - TMC
  - DEOAP
  - Test laboratories

Implication on API CF-2 category

- Confirmed long term unavailability of 6V92TA test would make CF-2 obsolete
- Category and current licenses will remain on API website for one year
- If replacement test stand forthcoming, category can be in ‘provisional’ status
- ASTM to inform API on confirmation of permanent loss of 6V92TA test capability

Implication on Military 2104H specification

- US army operates large number of 2-cycle diesel powered equipment
- Oil performance specifications still critical for operations
- Substitution of loss of ASTM D 5862 could be
  - Non-referenced 6V92TA test stand
  - Physical/chemical property specifications
  - Field tests

Test sponsor OEM (MTU / DDC) position

- No new oil approval without test on referenced engine
- Field tests proposed as substitution of engine test

Feasible options under consideration

- Laboratories considering establishment of test stand
  - Either full referenced or non-referenced
- Decision process could take one to two months
  - Must be given reasonable time for decision
- API needs to see plan and signs of progress to continue category

Report summary to ASTM

- 6V92TA test temporally not available
- No physical constrains to conduct test procedure
- Laboratories have to be given time to consider establishment of test stand
- Decision and plan need to be timely, to report to ASTM within six months (by next December meetings