



Address 100 Barr Harbor Drive
PO BOX C700
W. Conshohocken, PA
19428-2959 | USA

Phone 610.832.9500
Fax 610.832.9555
e-mail service@astm.org
Web www.astm.org

Unapproved minutes of the ASTM Cummins ISB Test Development Task Force Held on September 5th, 2003 at Ethyl Corporation in Richmond, VA.

.....
This document is in the process of development and is for ASTM Committee use only. It shall not be reproduced, circulated, or quoted, in whole or in part, outside of ASTM Committee activities except with approval of the Committee with jurisdiction and or the president of the society.
.....

Call to Order: The meeting was called to order at 10:45 AM

Review of Agenda: *Attachment 1* shows a copy of the meeting agenda. The change was the "(7) Review Phase I installation at Ethyl" and was conducted before the Call To Order.

Nomination of Secretary: Chairman Mark Sarlo nominated Joseph Huang as Secretary, and was approved by general consensus.

Review of Scope and Objectives: The chairman proposed a scope and objective for the task force, and was approved by general consensus. See *Attachment 2*.

Review of Membership: This was the first meeting of the ISB Test Development Task Force, the membership was not finalized prior to the meeting. Based on a sign-up sheet distributed during the meeting, see *Attachment 3*, the official membership of the ISB Test Development Task Force is as follows:

NAME	COMPANY
Mark K Sarlo – Chairman	Southwest Research Institute
Joseph Huang – Secretary	Valvoline
Riccardo Conti	ExxonMobil
Jim Matasic	Lubrizol
Jeff Clark	TMC
Greg Shank	Mack/Volvo
Jim Moritz	PerkinElmer
Bob Campbell	Ethyl
Ron Buck	TEI

Other company representatives requested to be placed on the task force mailing list for the purpose of receiving routine updates. There were 24 people in attendance for this meeting.

Overview of ISB Test Operation and Hardware:

Cummins representative Warren Totten presented an overview of the proposed ISB test operation and hardware. See *Attachment 4* for the complete presentation. Some of the key points that were made in the presentation are:

- The ISB test consists of two separate running states. First, a 100 hour steady state condition at 1600 rpm and 325 ft-lbs with variable injecting timing retard between 14-16 degrees in order to achieve a 3.5% soot. Second, a 250 hour engine wear cycle.
- The engine used will be a 2004 EPA Compliant ISB rated at 300 HP and 600 ft-lbs. Cummins will furnish all engines and test parts for matrix testing.
- Primary rated parameters will be 1) Tappet wear and 2) Cam lobe wear. Secondary rated parameter is Overhead wear.
- The ISB test will run on 15ppm sulfur fuel.
- Preliminary photos of sliding tappets from a prior test were presented. Cummins will supply more data and photos later to the Committee.
- The effects of oil on aftertreatment devices will not be considered.
- The ISB Cam Wear Test will have to be finalized and available to the industry by 3Q 2005.

Following Warren's presentation, there were several specific questions asked about the ISB test operation and hardware. Some of the questions and responses are noted below:

Q: Will there be any special ECM used or modifications necessary?

A: No, the standard ECM will be used.

Q: How will oil adjustments be performed?

A: There will be no oil adjustments performed during the test.

Q: How is oil sump temperature controlled?

A: It is done with an external cooler. However, Warren will check and confirm the exact process.

Q: How is cam lobe wear profiled and measured?

A: Warren will provide a procedure used at Cummins to the Task Force.

Q: What soot generation rates are achievable during the 100 hour stage?

A: Between 0.027% - 0.055% soot/hour.

Establish Lab Timing:

Valvoline and SwRI have both received their engine, and the other engines are already shipped. Any other labs interested in participating in the matrix testing should contact Warren Totten at 812.377.3429 or warren.a.totten@cummins.com. A reference oil, 830-2, was brought to the attention of the Task Force for consideration.

Adjournment: The meeting was adjourned at approximately 11:45 AM.

For comments or questions regarding the minutes, please feel free to contact:

Joseph Huang
The Valvoline Company
22nd & Front St
Ashland, KY 41101
Phone: 606.329.1960 x5294
Email: jhuang@ashland.com

Proposed Agenda

- 1. Call to order M. Sarlo
- 2. Review of membership M. Sarlo
- 3. Overview of ISB test operations W. Totten
- 4. Review of hardware for ISB W. Totten
- 5. Formalize Scope and Objectives Task Force
- 6. Establish lab timing Task Force
- 7. Review Phase I installation at Ethyl Task Force
- 8. New Business Task Force

Scope and Objectives

- Valvetrain protection under cyclic conditions
- Duplicate field conditions
- Consider affects of oil on aftertreatment device

ATTACHMENT 3

Page 1 of 3

ISB Surveillance Panel

Meeting held 20030905

Name		Company	Address	email address	Phone & fax	Mem or Vis
Last	First MI					
Ritchie	Andrew	Infinium	1900 E. Linden Ave. E City Linden State NJ Zip 07928		Phone (908) 424-2097 Fax () Cell () Other ()	Vis
CASSIM	ABDUL H	CATERALLAR	BUILDING H2000 OLD CALDWAY ROAD City ROSA MOSSVILLE State IL Zip 61552	cassim_abdul_h@cat.com	Phone (309) 578 9096 Fax () " " 3563 Cell () Other ()	Vis
CONTI	RICCARDO	EXXON MOBIL	600 BILLINGSPOET RD. City PAULSBORO State NJ Zip 08066	riceardo.couti@exxonmobil.com	Phone (856) 224-2681 Fax (856) 224-3904 Cell (856) 305-7709 Other ()	MEM
Jim	Matasic	Lubrizol	29400 Lakeland Blvd. City Wickliffe State OH Zip 44092	jmat@lubrizol.com	Phone (440) 347-2487 Fax () Cell () Other ()	MEM
Bill	Larch	Lubrizol	29400 Lakeland Blvd. City Wickliffe State OH Zip 44092	lwr@lubrizol.com	Phone (440) 347-2086 Fax (440) 347-4096 Cell () Other ()	
JEFF	CLARK	TMC	6555 Penn Ave. City Pittsburgh State PA Zip 15206	jace@astmtmc.cmu.edu	Phone (412) 365-1032 Fax () Cell () Other ()	MEM
FRANK	FARBEE	TMC	6555 PENN AVE City PITTSBURGH State PA Zip 15206	fmf@astmtmc.cmu.edu	Phone (412) 365-1030 Fax () Cell () Other ()	Vis MEM
Scott	Richards	SWRI	SOTX City State Zip	SRichards@SWRI.org	Phone (212) 522-3567 Fax () Cell () Other ()	Vis

Richmond, VA

Last	Name First	MI	Company	Address	email address	Phone & fax	Mem or Vis
Totten	Warren	A	Cummins Inc	1900 McKinley Ave City Columbus State IN Zip 47201	Warren.a.totten@ cummins.com	Phone (812) 372-3429 Fax (812) 372-7226 Cell () Other ()	
WRUNKLE	WILLIAM A.		THE VALVOLINE CO	P.O. Box 14100 City Lexington State KY Zip 40512-4000	WRUNKLE@ASHLAND.COM	Phone (859) 357-7186 Fax (859) 357-7610 Cell () Other ()	✓
CAUDILL	Timothy		Valvoline	22nd & Front Sts. City Ashland State KY Zip 41101	TLCAUDILL@Ashland, com	Phone (606) 329-1960 x5708 Fax (606) 329-2204 Cell () Other ()	✓
Huang	Joseph		Valvoline	22nd & Front St City Ashland State KY Zip 41101	jhuang@ashland.com	Phone (606) 329-1960 x5294 Fax (606) 329-2204 Cell (304) 638-5106 Other ()	M
Pridemore	DAN		Ethyl	2000 Town Center Dr # 1750 City Southfield State MI Zip 48075	Dan.Pridemore@Ethyl.com	Phone (248) 350-0640 Fax () Cell () Other ()	✓
PASSUT	Charles		Ethyl	500 Spring St. City Richmond State VA Zip 23218	charlie-passut@ethyl.com	Phone (804) 788-6372 Fax (804) 788-6388 Cell () Other ()	✓
Shank	GREG		Mack/Volvo Powertech	City HAGERSTOWN State MD Zip 21795	greg.shank@macktrucks .com	Phone (301) 790-5817 Fax (301) 790-5815 Cell () Other ()	MM ↓ ADD
Kennedy	Steve		ETTON Mobil	600 Billingsport Rd City Pwalsboro, NJ State Zip 08066	steven.kennedy@ettonmbl.com	Phone (856) 224-2432 Fax (") " -3613 Cell () Other ()	✓

ATTACHMENT 3

Page 3 of 3

ISB Surveillance Panel

Meeting held 20030905

Last	Name First MI	Company	Address	email address	Phone & fax	Mem or Vis
SARLO	MARK K	SOUTHWEST RESEARCH INSTITUTE	6220 CULLEBA RD T-51 City SAN ANTONIO State TX Zip 78235-5161	msarlo@swri.org	Phone (210) 522-3754 Fax (210) 523-6919 Cell (210) 415-7202 Other ()	M
MORITZ	JIM ✓	PERKINELMER AUTOMOTIVE RESEARCH	5404 BANDERA ROAD City SAN ANTONIO State TX Zip 78238	JIM.MORITZ@ PERKINELMER.COM	Phone (210) 523-4601 Fax (210) 523-4607 Cell () Other ()	M
FRANKLIN	THOMAS M	PERKINELMER	3404 BANDERA RD City SAN ANTONIO State TX Zip 78238	Tom.franklin@ PERKINELMER.COM	Phone (210) 647-9446 Fax (210) 523-4607 Cell () Other ()	Vis
Franklin	Joe	Perkin Elmer	5404 Bandera Rd. City San Antonio State TX Zip 78238	joe.franklin@ perkinelmer.com	Phone (210) 523-4671 Fax (210) 681-8300 Cell () Other ()	Vis
Campbell	Bob ✓	ETHYL	500 Spring St City Richmond State VA Zip 23218	bob-campbell@ ethyl.com	Phone (804) 788 5340 Fax () 6358 Cell () Other ()	M
Scinto	Phil	LZ	29400 Lakeside Blvd. Drip #152A City W.cliffe State OH Zip 416092	PRS@LUBRIZOL.COM	Phone (419) 347-2161 Fax () Cell () Other ()	Vis
Jim Rutherford		Oronite	100 Chevron Way City Richmond State CA Zip 94802	JARU@NEURONTEXTACO.COM	Phone (510) 242-3490 Fax () Cell () Other ()	V
Pon Buck		TEI	12718 Cimarron PATH City SAN ANTONIO State TX Zip 78249	rbuck@tei-net.com	Phone (210) 877-0221 Fax (210) 690-1959 Cell (210) 274-4380 Other ()	M

Richmond, VA

ISB Task Force



September 5, 2003

Cummins Fuels and Lubricants

Warren Totten

B Product Evolution

1997
↓

2002
↓

Common Rail Fuel System
Rear Gear Train
Cooled EGR Emissions Control

4 Valve Head with Centered Injection
Full Authority Electronic Fuel System
No Adjust Overhead

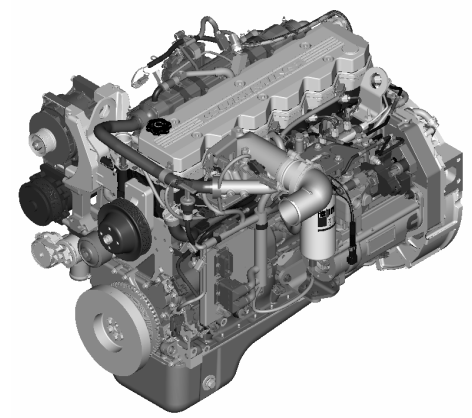
Established Product
Over 2 Million put in Service
Great Reliability & Durability



B Mechanical
September 5, 2003



ISB
Cummins Fuels and Lubricants



ISB '02
Warren Totten

Bosch High Pressure Common Rail Fuel System

- **Pilot, split main and post injection capability**
- **1600 bar rail pressure - pressure independent of speed**

ISB Lubricant Quality Test

- **Objective: To verify that the ISB engine hardware and procedure will have repeatable oil quality discrimination.**
- **Cummins will have ISB hardware available to the labs in October.**
- **Cummins will supply all test parts needed for matrix testing**

Test Development

- **The test method is derived from proven tests at Cummins and will have the same repeatability and discrimination**
- **Labs will receive 1 engine for shakedown and matrix testing**
- **The testing matrix design needs to begin soon**
- **This test will need to have completed matrix testing and be available to the industry by 3Q 2005**

ISB Operating Conditions

- **2004 EPA Compliant ISB engine rated at 300 HP and 600 ft-lbs torque**
 - ✓ **100 hours at 1600 RPM and 325 ft-lbs torque.
14 – 16 deg retarded timing.**
 - **Soot target 3.5% at 100 hours**
 - ✓ **250 hours engine wear cycle**

ISB Operating Conditions

- | | | |
|-----|---|---------|
| 1. | Run at low idle | 1.0 sec |
| 2. | Ramp up to rated speed (2600 RPM) and full load (600 ft-lbs) within | 2.5 sec |
| 3. | Run at rated speed and full load | 6.0 sec |
| 4. | Lug the engine to low idle within | 2.0 sec |
| 5. | Low idle | 1.0 sec |
| 6. | Ramp up to torque peak speed (1600 RPM) and 75% rated torque within | 2.5 sec |
| 7. | Lug the engine to low idle within | 2.0 sec |
| 8. | Ramp up to torque peak speed (1600 RPM) and 75% rated torque within | 2.5 sec |
| 9. | Lug the engine to low idle within | 2.0 sec |
| 10. | Ramp up to torque peak speed (1600 RPM) and 75% rated torque within | 2.5 sec |
| 11. | Lug the engine to low idle within | 2.0 sec |
| 12. | Run at low idle | 1.0 sec |

ISB Test Conditions

Parameter	Unit	A (Soot)	B (Wear Cycle)
Stage Length	H	100	250
Engine Speed	r/min	1600	Variable
Torque	N·m (lb·ft)	(325)	Variable
Fuel Rate	Kg/hr (lb/hr)	(43)	Variable
Intake Manifold Air Temperature	°C (°F)	(110)	(110)
Coolant Out Temperature	°C (°F)	(200)	(200)
Oil Sump Temperature	°C (°F)	(205)	(205)

100 hr soot: 3.5 % target

ISB Test Parameters

■ Parameters to be rated

✓ Primary Parameters

→ Tappet Wear

⇒ 2-D profile wear

⇒ mg wt loss

→ Cam lobe wear

⇒ Mircons wear

ISB Test Parameters

■ Parameters to be rated

✓ Secondary Parameters

→ Overhead wear

⇒ CWL mg loss

⇒ IASWL mg loss

Test Data

- **Data on completed testing at Cummins will be available to the industry by mid September**
- **Photos of the tappets and cam lobes will be included in the minutes**
- **Remember that sliding tappets will be used on the design of the 2007 engine**