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Unapproved Meeting Minutes of the Technical Guidance Committee Meeting

June 25, 2018

JW Marriott Desert Ridge Phoenix, Arizona

Grand Ballroom 4 Meeting Room 4:00 PM

Reply to: Patrick Lang

Southwest Research Institute, 6220 Culebra Road San Antonio, TX 78228

Phone: 210-522-2828, patrick.lang@swri.org

The meeting was called to order at 16:00

Agenda:

The meeting agenda can be found as attachment 1.

Membership Review:

Chairman Lang passed out the Membership/Attendance List. The list can be found as attachment 2. He reminded everyone that the voting structure for the TGC was restricted to Surveillance Panel Chairpersons / OEM's / Test Sponsors.

Review and Acceptance of Minutes:

Pat Lang asked for approval of the December 4, 2017 TGC Minutes. Receiving no comments on the minutes the group moved for approval of the aforementioned minutes.

Action Item List:

Pat Lang reviewed the Action Item List; the action item list can be found as attachment 3.

Fuels Task Force Update:

Fuels task force update provided by Jim Matasic (see attachment 4). Good progress is being made with reviewing the various fuel specifications. Work is nearly complete on PC-9HS and PC-10 specification. The concept of the fuel specification being put on TMC website has been accepted. The next fuel the task force plans to define will be the specification for (HF003 EEE Test Fuel, Lubes Cert Fuel).

Rating Task Force:

Rating task force report by Bob Campbell (see attachment 5). Now the rating task meets before and after the rating workshop. The new rating workshop format seems to work well. Two sessions, first session is seasoned raters, second half is for everyone, some experienced raters stayed on for second session to help novice raters. Data analysis came out fairly quickly.

Bob discussed concerns about participating labs sending (new un-experienced raters) to the workshop without being accompanied by their own internal support personnel. Bob reiterated the workshop is not a training workshop for (New Raters) and discouraged people from sending new people without a corporate mentor to guide them. Green raters can really tax the system. The workshops are technically not designed to train green raters; workshops are to 'calibrate' experienced raters.

Pat Lang commented his communication with the raters indicates they feel their concerns and comments are being heard and they are involved with the process and part of any adjustments/changes to the methods through the new workshop format.

Next workshop is in October, pre-meeting set for Sept 5th.

Bob led a discussion again about ownership of CRC manuals CRC manuals 20/21. Currently electronic versions being acquired and disseminated by TMC, but they do not have pictures, etc. The target is December 2018 to be completed. Bob said that they are looking at LED rating lighting, as someday florescent bulbs will be hard to find.

Frank Farber presented on the Manual 20 (see attachment 6). There is a limited supply of color chips, sludge depth gage, etc. A task force, mentioned by Bob, has been formed to revise the manual. Frank Farber keeping the current style for the manuals i.e., using the information bulletin system for updates to the manual. Bulletins would need to be balloted; any negatives would need to be resolved. All surveillance panels would need to stay in step with it. There would be an annual revision and manuals would be purchased through ASTM but would not be assigned a "D" number.

Old Business:

Alternate Supplier protocol:

Pat Lang asked for any comments on the document as worded and hearing none, indicated he would like to move forward recommending this to the TMB Executive Committee. The group agreed with seeking final approval from the Executive Committee. See attachment 7 for the final wording.

There was some discussion about how this would be introduced into the procedures. Subsequent discussions and recommendations indicated Frank Farber and Alyson Fick would handle the process.

Note:

Follow up recommendation by Pat Lang at the TMB Executive Committee Meeting (held immediately after the TGC Meeting) has resulted in final action on this recommendation. The Alternate Supplier Protocol was motioned, seconded, discussed, and approved by the committee. The decision by Frank Farber and Alyson Fick is to include copy of the Alternate Supplier Protocol at the end of the TMC Introductory Statement in each procedure.

ACC Conformance Statement and handling Test Anomalies:

Lengthy discussions have taken place within the TGC on how to handle test anomalies i.e., situations where data collection or sample draws were possibly not taken, lost, or spilled etc. or situations where something happened that might be outside the required procedural guidelines but sound engineering judgement would conclude the particular deviation should not invalidate a test. One of the solutions that was previously entertained was to make a change to the ACC conformance statement identifying the anomaly. As a result, a request was made to ACC to consider a modification to the current conformance statement.

The ACC's PAPTG and MAAG group provided a written response to the TGC chairman to this request (see attachment 8). In summary they feel that the ACC Code of Practice adequately outlines a process that should be followed when testing anomalies are observed. The attached letter describes in detail the sections that are applicable. As a result of this, ACC is not willing to make changes to the conformance statement at this time.

After reviewing the letter, the group agreed there is a process within ACC to review tests for conformance and possibly address these type situations, however the discussion indicated that process was more geared toward exclusion of the data from MTAC for the customer. The group discussed concern about needing a process at the testing laboratory level where these special situations could be discussed / adjudicated when the situation happens with solid engineering judgement leading to decisions made as to future validity of the test to provide continuation of testing or termination based on each particular incident.

Robert Stockwell indicated he has had communication with ACC on this subject and feels this may require Surveillance Panel draft of a "Caveat Type Statement" introduced into the procedure.

Bob Campbell agreed the procedures need to be written to provide a path to resolution for special situations to resolve issues when they appear so a laboratory does not incur additional costs running tests to completion if the decision is to invalidate due to the special case.

The group continued discussion focused on how we might draft a statement that would cover these concerns and incorporate such a caveat into the test procedures.

Action Item #1

After lengthy discussion, the TGC recommended an action item headed by Pat Lang (with input from others) to generate a generic type statement to cover or outline required actions when a test anomaly occurs, to be added to all test procedures.

D4485 Specifications, and procedural data reporting precision concerns

The group discussed variations in reporting precision between D4485 requirements and test procedural precision reporting. Chairman Lang put together a summary of the D4485 precision vs. current ASTM test procedures (see attachment 9). Originally there was an inquiry from Mike Alessi from ExxonMobil regarding the C13 test report where results in the test report are reported to more significant figures than the D4485 merit calculation. This can result in a situation where the test report result can be higher due to significant figures relative to the D4485 specification. I this is the case then what do you report? As an example, does a 30.3 round down to a 30. The answer is yes, but the data dictionary will require you to report 30.3 in the test report.

After lengthy discussion, the group agreed D4485 needs to match the procedural reporting precision. As a result, we need to look at all the mathematics / statistical evaluations / calculations for all reported

parameters included in the test and how differing levels of significant figures used during these calculations affect the reported value.

Bob Campbell commented and the group agreed we need to accomplish this now while we are still in the Draft portion of the GF-6 specification requirement.

Action Item # 2:

TGC to advise of test report precision for the GF-6 tests so that considerations can be given to the number significant figures that end up in D4485 for GF-6.

Sequence V Test Fuel Contract

Frank Farber provided an update on the Sequence V Test Fuel Supplier Contract (see attachment 10).

Scott Parke will be heading the next round of contract negotiations.

Tim Cushing commented, future negotiations for the Sequence VI Test Fuel needs to assure the correct Detergent Additive components are specified. Tim commented on the importance of the correct additive related to assuring minimal engine valve deposit formation.

New Business:

ExxonMobil provided an overview of their plans to use a palletized test cell system for their new lab. See attachment 11 for the presentation that was given by Riccardo Conti and Cliff Salvesen. There were lots of general questions about the new set up that were answered by the presenters. In general there were no major objections to the concept. As a result, ExxonMobil is moving forward with their design. Cliff mentioned that they are about one year away from completing their prove-out.

If there are any concerns that arise regarding a pallet-type system being an acceptable configuration for ASTM testing, channel all comment to the TGC chair so they can be directed to the appropriate panel for discussion/review.

The meeting adjourned at 17:48.

Attachment #1

Agenda 6/25/2018

AGENDA

ASTM Technical Guidance Committee

Patrick Lang – Chairman

Monday June 25, 2018 – 4:00 pm to 5:30 pm
JW Marriott, Phoenix Desert Ridge, Phoenix, AZ
Meeting Room: Grand Canyon Ballroom 4

1. Welcome, Introductions
2. Membership Review
3. Chairman's Comments
4. Review & Acceptance of Minutes
    - 4.1. December 4, 2017 minutes distributed via email on February 12, 2018. No comments or changes have been requested.
5. Review Action Item List (Pat Lang)
6. Fuel Task Force Update (Jim Matasic)
    - 6.1. Diesel fuel specification reviews
7. Rating Task Force Update (Bob Campbell)
    - 7.1. April 2018 Rating Workshop Summary
    - 7.2. Status of ASTM Deposit Rating Manuals 20/21
8. Old Business
    - 8.1. Alternate Supplier Protocol (Pat Lang)
    - 8.1.1. Recommended wording has been reviewed by PCMO and HD Surveillance Panels. No additional comments have been received. The TGC recommends that the wording be approved for inclusion into the PCMO and HD test procedures.

8.2. ACC conformance statement as it applies to testing anomalies (Pat Lang)

8.2.1. Review ACC PAPTG and MAAG response to the request to modify the ACC conformance statement.

8.3. Test results precision; ASTM D4485 vs. test report precision. (Pat Lang)

8.4. Procurement process within ASTM

8.4.1. First completed example is the Sequence VH fuel contract (Frank Farber).

9. New Business

9.1. ExxonMobil presentation on palletized engine test stand installations (Cliff Salvesen).

10. Next Meeting

11. Adjournment

Attachment #2

Attendance List

TGC Meeting 6-25-18

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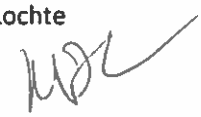
Michael Lochte 	Southwest Research Institute 6220 Culebra Road San Antonio, TX 78228-0510	Phone: (210) 522-5430 e-mail: mlochte@swri.org
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Attachment #3

Action Items List

Technical Guidance Committee (TGC)

Action Items List Status as of 6-25-18:

1. Action Item – The TGC chair to recommend to the HDEO Surveillance Panel chairs that the HDEO merit system be evaluated for whether or not the final result value should be reported to the same precision as the pass/fail limit.
    - ***Per discussion at the Dec 4, 2017 TGC Meeting the recommendation was made to come up with some specific examples where D4485 precision conflicts with test report (data dictionary) precision and review within the TGC. This item is on the 6-25-18 agenda; a summary of precision differences has been prepared for review.***

2. Action Item – The TGC to develop standardized wording for the process for substituting materials, which can be applied to all test types.

    - ***Suggested wording reviewed by PCMO and HD Surveillance Panels. This item is on the 6-25-18 agenda for final approval to be incorporated into all test procedures.***

3. Action Item – The TGC to review the parts lists in each test procedure, starting with the PCMO test types, to determine if they list all necessary parts and if they properly identify the critical test parts.

    - ***Ongoing, chair currently working with GF-6 procedure task forces to incorporate/refine these lists.***

4. Action Item – TGC to review the current document for “out of control” tests.

    - ***Open***

5. Action Item – Work towards creating equivalency testing guidelines for commissioning alternate supplier components/materials.

    - ***Some discussions but still open***

6. Action Item – Establish guidelines for the TMC when exercising the procurement process for testing materials.

    - ***The Sequence V fuel contract is the first example. The process will be reviewed during the 6-25-18 meeting.***

7. Action Item – TGC to review the current "DACA II" document.

    - ***Open***

8. Action Item – Investigate the feasibility of modifying the ACC conformance to include identification of tests with anomalies.

    - ***Review ACC response during the 6-25-18 meeting***

Attachment #4

Fuels Task Force Update
6/25/2018

TGC Fuels Task Force

Update to TGC 06/25/2018

Task Force Actions during 2018

- Work near complete on PC-10 (ULSD) and PC-9HS fuel specs
  - Still have two small items left to complete regarding decimal point discrepancies between the two fuel specs
- Discussions to be scheduled for CAT, Mack, Cummins, and Daimler Surveillance Panels for acceptance of updated fuel specs and procedure updates to remove Fuel Specs and replace with link to TMC fuel spec document. This to be followed with an Information letter.
  - Scott Parke has drafted an Information letter and a Spec document to be reviewed at our next meeting on 8/2/18
- Task Force to start work on Haltermann EEE fuel spec next

Other Test Fuel Activities

- Non-Related to TGC Fuels Task Force
  - Seq. VH Test Fuel contract is in place and work on implementing next batch is ongoing.
- Initial discussions around contract with CPChem on PC-10/PC-9HS fuel has begun.

Attachment #5

Rater Task Force Update to TGC
6/25/2018

Rater Task Force Update to TGC

6/25/2018

Passion for Solutions®

What we've been doing……..

- **Conference call 3/13 (Pre-Workshop Discussion)**
- **Light Duty Workshop week of 4/9**
- **Conference call 5/2 (Post-Workshop Discussion)**
- **Webex scheduled 9/5 for pre-HD workshop discussions**

- **Next workshop (HD), week of 10/22 in San Antonio**

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Spring Workshop update

- **New format continues to work well**
  - 2 sessions, first experienced raters, second less so
- **Improved Trainer visibility employed**
  - 5 Trainers worked second half
  - Red shirts
  - First line of defense to help the novice raters
  - Worked very well
- **Workshop data available quickly after workshop (<10 days)**
- **Suggestion to have Rater involved in opening meetings**
  - Afton Rater identified for Fall HD workshop

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CEC Manuals 20/21

- **Rater TF tasked with updating and "owning" them**
- **Questions still exist**
  - "D" number?
  - Need to meet Form and Style?
- **Ad-hoc meeting held during spring workshop**
  - Labs had different versions
  - Electronic version acquired and disseminated by TMC
- **December 2018 targeted to have them updated**

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Ongoing Actions

- **Group has an open action item to upgrade the rating booth light requirement (currently outdated T12 fluorescents required)**
  - Two booths available during Spring Workshop – limited use due to time
- **Continue to review parts availability and workshop protocols to ensure the industry are properly served**
- **Ensure more interaction between rating community and surveillance panels**

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Attachment #6

Status of Deposit Rating Manual 20

ASTM DEPOSIT RATING MANUAL 20

Revision Process

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MANUAL 20 STATE

- Manual 20 is published by ASTM International (ASTM)
  - Electronically Manual 20 exists as an MS Word document without photos or color chips
  - ASTM assembles text, photos and color chips so Manual 20 can be produced
  - Limited supply of hardcopy photos at ASTM – valves & sludge depth
  - No master photos of valve deposits exists
  - ASTM contracts out reproduction of color chips as inventory requires

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MANUAL 20 REVISION

- Rating Workshop Surveillance Panel (RWSP) has established a task force to revise Manual 20
- Fallout will be that a revised Word document will be given to ASTM to publish.
- Moving forward the TMC recommends that a bulletin system be used to modify Manual 20.

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- Revisions to Manual 20 need to be approved by the RWSP before a draft bulletin is created by the TMC.
- Once approved by RWSP, a draft pdf bulletin will be forwarded to B01 and B02 surveillance panel chairs by the TMC for review with a two week response period. If chairs request a longer review period accommodations will be made. Chairs are responsible for disseminating information if required to panel. No response will be considered as an approve.
- A negative vote at any surveillance panel will result in the bulletin being held an additional two weeks until the panel can resolve the negative. After that a majority vote rules at each panel.
- If a negative vote from any surveillance panel is cast the RWSP will need to resolve the negative before the TMC can issue the bulletin.

PROPOSED BULLETIN SYSTEM

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PROPOSED BULLETIN SYSTEM

- Bulletins will contain RWSP chair and TMC director signatures
- The TMC will issue the bulletin to the RWSP Mailing List. Each November the TMC will forward a revised MS Word document to ASTM for publication as the next version.
  - New photos or additional rating aids may be part of the revision
- Manual bulletins will be posted at www.astmtmc.cmu.edu
- Manual 20 with version control (year of publication and latest bulletin contained)will be available from the www.astm.org

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Attachment #7

Final Wording for Alternate Supplier Protocol

Draft of the wording that was generated during the August 30, 2017 Technical Guidance Committee Meeting Conference Call:

Alternate Supplier Protocol

ASTM International policy is to encourage the development of test procedures based on generic equipment. It is recognized that there are occasions where critical/sole-source equipment has been approved by the technical committee (surveillance panel/task force) and is required by the test procedure. The technical committee that oversees the test procedure is encouraged to clearly identify if the part is considered critical in the test procedure. If a part is deemed to be critical, ASTM encourages alternate suppliers to be given the opportunity for consideration of supplying the critical part/component providing they meet the approval process set forth by the technical committee.

An alternate supplier can start the process by initiating contact with the technical committee (current chairs shown on ASTM TMC website). The supplier should advise on the details of the part that is intended to be supplied. The technical committee will review the request and determine feasibility of an alternate supplier for the requested replacement critical part. In the event that a replacement critical part has been identified and proven equivalent the sole-source supplier footnote shall be removed from the test procedure.

Attachment #8

ACC Response to the Request to Modify Conformance Statement for Engine Test Anomalies

American Chemistry Council | Petroleum Additives Panel

Sent Via Email
Date: May 21, 2018

To: Patrick Lang, ASTM TGC Chair

Cc: Frank Farber, ASTM
Matt Hauschild, ACC PAPTG Chair
Mike Hoey, ACC MAAG Chair

Subject: **ACC Conformance Statement for Engine Test Reports**

Hello Pat,

The American Chemistry Council's (ACC) Product Approval Protocol Task Group (PAPTG), including consultation with PAPTG's Monitoring Agency Advisor Group (MAAG), have discussed your request to review the ACC Conformance Statement regarding the feasibility of changing the ACC conformance statement to more clearly identify tests that have had procedural anomalies but are still deemed valid by engine testing laboratories.

The ACC Petroleum Additives Product Approval Code of Practice (ACC CoP) describes guidelines and processes related to your inquiry. In particular, please review the following areas within the ACC CoP:

-Appendix A, Practice #8 states:
"If questions arise as to the validity of a specific test or test result, the test laboratory or test sponsor may seek an opinion and/or industry test severity and precision information from the ACC Monitoring Agency (see Appendix E). Such opinions and/or information shall be included in the Candidate Data Package."

-Appendix C, Guideline 8 states:
"Provide impartial expert opinions on operational validity of engine tests when requested by the test laboratory, test sponsor or his designee (Ibid, Item 1); and"

-Tab 5, Item 1 states:
"**1. Engine Test Operational Validity Opinions**
Function- To provide impartial expert opinions on the operational validity of specific engine tests when requested by the test laboratory or test sponsor.
Requesting ACC Test Operational Validity Opinions- If questions arise as to the operational validity of a specific test, the test sponsor or test laboratory may request a test operational validity opinion from the ACC Monitoring Agency. The request shall be addressed in writing to the Monitoring Agency and must provide all background information pertinent to the assessment of the operational validity of the test as well as the specific concerns of the requester. Any proprietary information contained in the request will be held confidential by the ACC Monitoring Agency. The Monitoring Agency will contact the requester if there are any questions or if further information is needed on the request.
ACC Monitoring Agency Response- The Monitoring Agency must issue either the completed written opinion or an interim written response to the requester within 10 working days of receiving the opinion request. If the Monitoring Agency and the test laboratory agree on the operational validity of a test, that decision is binding. In the event of a disagreement, the requester may seek the opinion of one or more third parties as described in

the Code, Appendix E, Item 6."

-Appendix E, Guidelines 5 and 6 states:
"**5. Any other statements related to engine test operational validity:** Should the test sponsor or test laboratory have questions about test operational validity, either may ask the ACC Monitoring Agency to review the data and render an independent opinion regarding operational validity according to Tab 5, Section 1, Item 1. The test sponsor request and the ACC Monitoring Agency response shall be included in the Candidate Data Package. If the ACC Monitoring Agency and the test laboratory agree on operational validity, the decision is binding. In the event of a disagreement, the test sponsor may seek the opinion of one or more third parties, including their own engineers or outside experts. A composite of these third-party opinions shall be included in the Candidate Data Package, and shall also be reported to the ACC Monitoring Agency in a timely fashion.

6. Engine test result validity opinions: Should the test sponsor believe that results from an engine test are invalid, even though the test has been judged to be operationally valid; the sponsor may exclude the suspect test result from MTEP (Multiple Test Evaluation Procedures) calculations. The test from which the results are discarded as non-representative shall not be counted toward the total number of times the candidate has been tested (see Appendix F). If suspect test results are excluded from MTEP calculations, the following shall be included in the Candidate Data Package:
a) Results from operationally valid, registered engine tests on oils containing performance additive package(s) representative of the chemistry in the suspect test, which support the conclusion that the suspect results are not representative of the true performance of the oil.
b) All pertinent information related to any of the following:
i. Industry test severity and precision information obtained per Tab 5, Section I, Item 2.
ii. External (knowledgeable) opinions / interpretations developed by the test sponsor.
iii. ASTM statistical data related to the test in question
c) A statement summarizing the information supporting the exclusion of the suspect test results from MTEP calculations."

ACC PAPTG reached consensus that the above guidelines/processes should adequately address your inquiry and therefore have reached consensus to not change the ACC conformance statement. If the TGC has any questions or comments, they should be sent to the ACC PAPTG Manager. Thank you.

Best regards,

Matt Hauschild
Matt Hauschild
ACC PAPTG Chair

Mike Hoey
Mike Hoey
ACC MAAG Chair

Doug Anderson
Doug Anderson
ACC PAPTG Manager

Attachment #9

D4485 Precision Comparison

Test Type	Parameter	Units	D4485 Precision	Test Report Precision, Final Original Units	Descrepancy Y/N
IIIG	Visc Increase	%	XXXX	XXXX.X	Y
	WPD	Merits	X.X	XX.XX	Y
IIIGA	MRV	mPAs	XXXXXX	XXXXX	N
IIIGB	Phosphorous Retention	%	XX	XXX.XX	Y
IIIH	Viscosity Increase	%	TBD	XXXX.X	TBD
	WPD	Merits	TBD	XX.XX	TBD
IIIHA	MRV	mPAs	TBD	XXXXX	TBD
IIIHB	Phosphorous Retention	%	TBD	XXX.XX	TBD
IVA	Average Cam Wear	µm	XX	XXX.XX	Y
IVB	Average Intake Lifter Wear	mm^3	TBD	XX.XX	TBD
VG	Average Engine Sludge	Merits	X.X	X.XX	Y
	Average Rocker Cover Sludge	Merits	X.X	X.XX	Y
	Average Engine Varnish	Merits	X.X	X.XX	Y
	Average Piston Skirt Varnish	Merits	X.X	X.XX	Y
	Oil Screen Sludge	% Area	XX	XX.XX	Y
VH	Average Engine Sludge	Merits	TBD	X.XX	TBD
	Average Rocker Cover Sludge	Merits	TBD	X.XX	TBD
	Average Engine Varnish	Merits	TBD	X.XX	TBD
	Average Piston Skirt Varnish	Merits	TBD	X.XX	TBD
	Oil Screen Sludge	Record	TBD	XX.XX	TBD
VID	FEI Sum	%	X.X	X.XX	Y
	FEI 2	%	X.X	X.XX	Y
VIE	FEI Sum	%	TBD	X.XX	TBD
	FEI 2	%	TBD	X.XX	TBD
VIF	FEI Sum	%	TBD	X.XX	TBD
	FEI 2	%	TBD	X.XX	TBD
VIII	Total Bearing Weight Loss, TBWL	mg	XX	XXX.X	Y
IX	LSPI Events, AVPIE	# of events	TBD	XX.XX	TBD
X	EOT Chain Stretch	%	TBD	X.XXXX	TBD

Test Type	Parameter	Units	D4485 Precision	Test Report Precision, Final Original Units	Descrepancy Y/N
T-11	TGA %Soot at 4.0 mm^2/s at 100 C	%	X.X	X.XX	Y
	TGA %Soot at 12.0 mm^2/s at 100 C	%	X.X	X.XX	Y
	TGA %Soot at 15.0 mm^2/s at 100 C	%	X.X	X.XX	Y
T12	Pb		XXX	XXX	N
	PB2		XXX	XXX	N
	Liner Wear		XX.XX	XX.X	N
	Top Ring Mass Loss	mg	XXX	XXX	N
	Oil Consumption		XX.X	XX.X	N
	Merits		XXX	XXX.X	Y
T-13	Cylinder Liner Wear	µm	XX.X	XX.X	N
	Viscosity Increase	%	XXX	XXX.X	Y
	Oxidation Peak	abs/cm	XXX	XXX.X	Y
	Oil Consumption	g/h max	Report	XXX.X	N/A
C-13	Deposits	Merits	XXXX	XXXX.X	Y
COAT	Average Aeration	%	XX.X	XX.XX	Y
ISB	Tappet Mass Loss, average	mg	XXX	XXX.X	Y
	Cam lobe Wear	µm	XXXX	XXX.X	Y
	Crosshead mass loss, average	mg	Report only		
ISM	Top Ring Mass Loss	mg	XXX	XXX.X	Y
	Deposits (sludge)	Merits	XXXX	XXXX.X	Y
	Crosshead mass loss	mg	XX.X	XX.X	N
	Filter pressure	kPa	XX	XX	N
	Injector adjusting screw	mg	XX	XX.X	Y
1N	Weighted demirits (WDN)	Merits	XXX.X	XXX.X	N
	Top Groove Fill	%	XX	XX	N
	Top Land Heavy Carbon (TLHC)	%	XX	XX	N

Attachment #10

VH Fuel Contract Update

FUEL CONTRACT UPDATE

June 2018

SEQUENCE V FUEL

- Contract discussions started 1st week of January 2018
- Numerous emails and teleconferences
- Special thanks to the contract team:
  - Mark Overaker & Don Phillips, Haltermann
  - Mike Lochte, Southwest Research & Al Lopez, Intertek
  - Bob Campbell, Afton & Jim Matasic, Lubrizol & Amol Savant, Valvoline
  - Tim Brooke & Tom O'Brien, ASTM International
- May15, 2018 contract signed by all parties

NEXT FUEL CONTRACTS

- Scott Parke, TMC has started communications with Haltermann and Chevron-Phillips for Sequence VIE W/DCA & PC-9HS/PC-10 fuel, respectively
- First contract draft has been sent to Chevron-Phillips
- First contract draft will be sent to Haltermann this week

Attachment #11

ExxonMobil Proposed Palletized Engine Stands

ExxonMobil

June 25, 2018

Palletized Engine Test Stands

A New Approach to Lubricant Testing

Energy lives here™

This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1A of ExxonMobil's latest report on Form 10-K or information set forth under "factors affecting future results" on the "investors" page of our website at www.exxonmobil.com). This material is not to be reproduced without the permission of Exxon Mobil Corporation.

Introduction of Fully Palletized Engine Stands

- ExxonMobil will move the Paulsboro research facilities and laboratories to the Clinton campus
- A new state-of-the-art Engine Test Center is under construction with an expected completion date of mid-2019
- Palletized engine stands will be utilized for increased flexibility and efficiency
- This new approach is compatible with the current lubricant testing methodologies and monitoring practices

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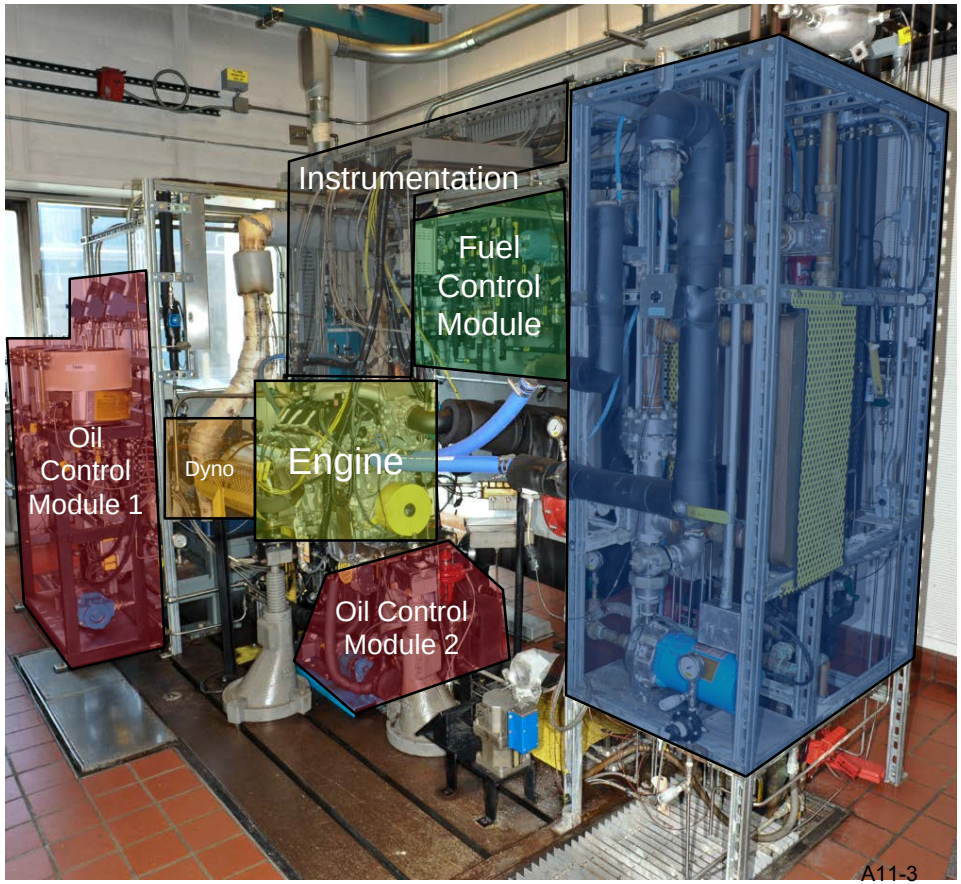
Traditional Test Stand Design

- Utilizes the entire test cell
  - Engine and dyno mounted on bedplate for vibration isolation
  - Utilities and instrument racks mounted outboard of drivetrain
  - Typical installation/test turnover time: **6 months-1 year**

(built and commissioned in test cell)



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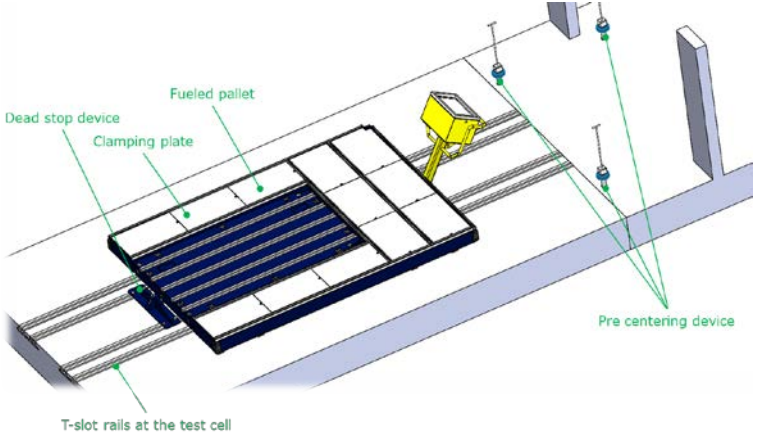
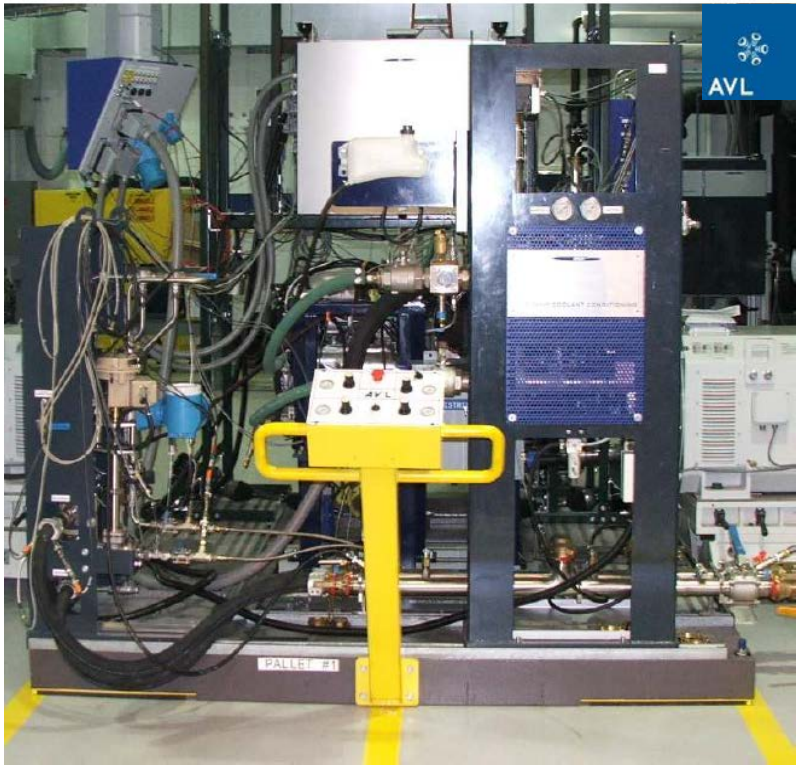
Clinton Palletized Engine Stand Design

- Engine and dyno for light-duty engines
- Engine only for heavy-duty engines
- Utilities, Data Acquisition, etc.
- Rapid test conversion by switching pallet
- Can be constructed outside of test cell



Fully loaded R&D Fueled cart/pallet assembly



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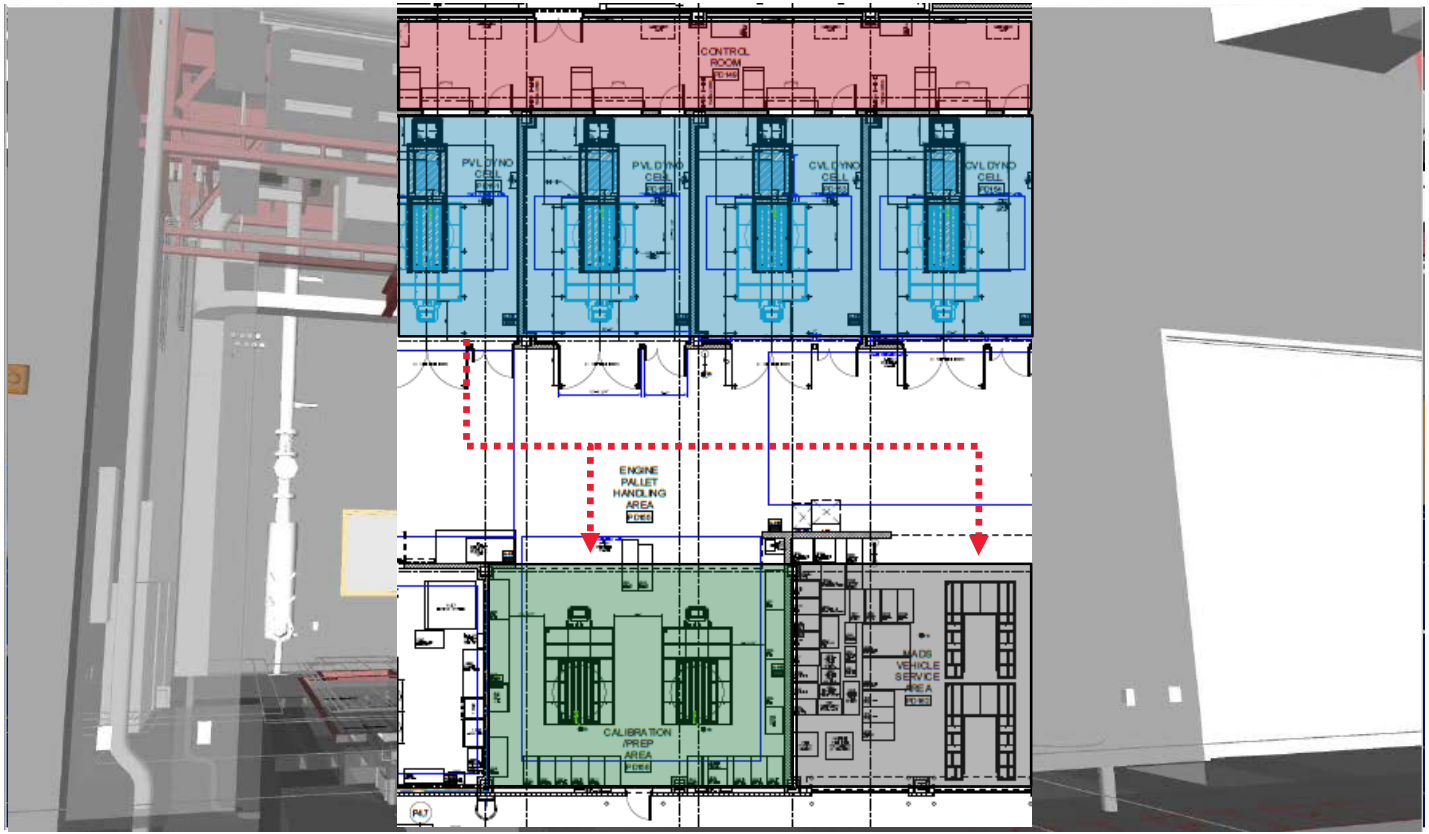
Clinton Operations



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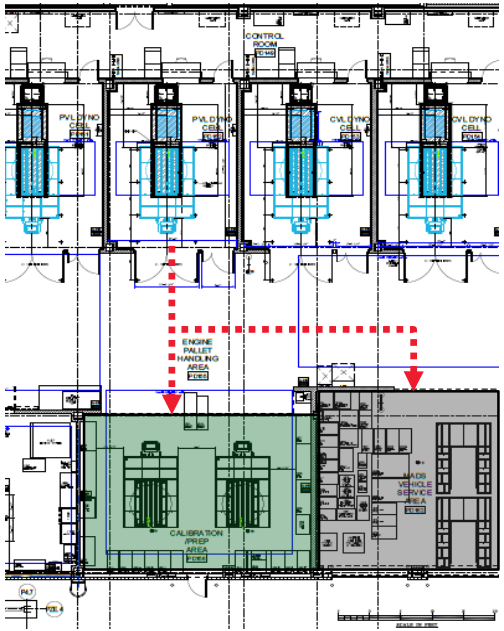
Palletized Approach Benefits



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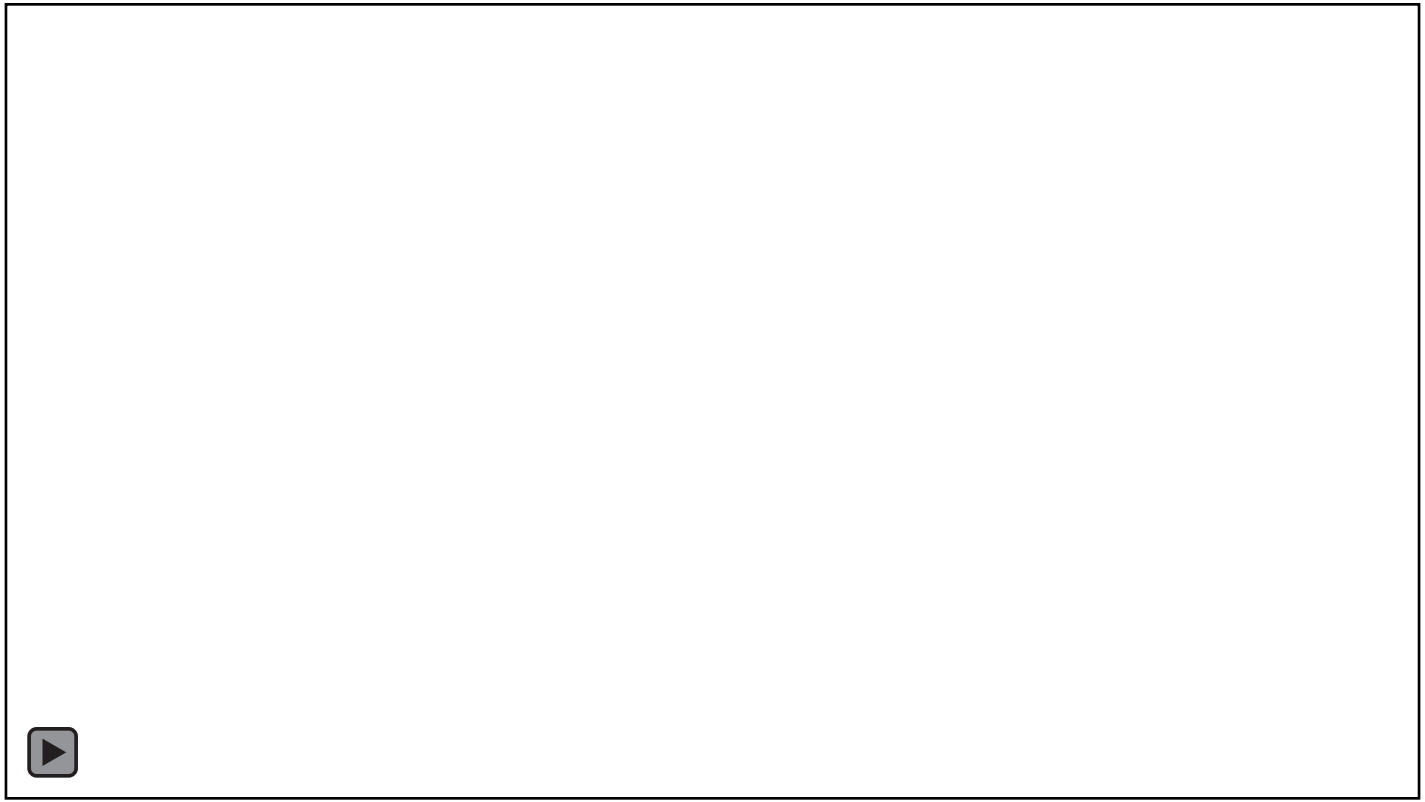
Pallet Operation



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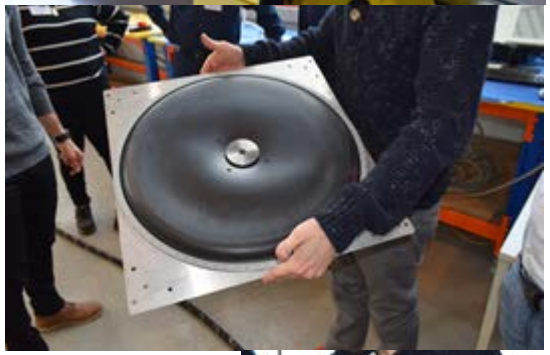
Pallet Details



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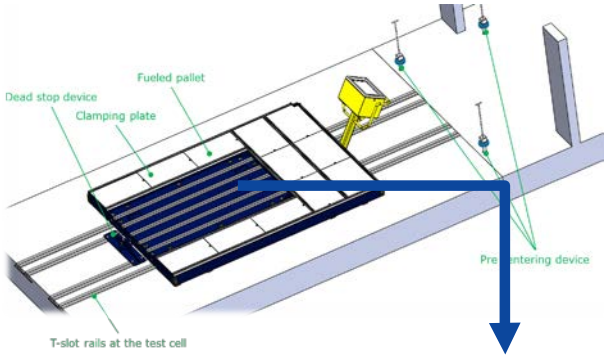
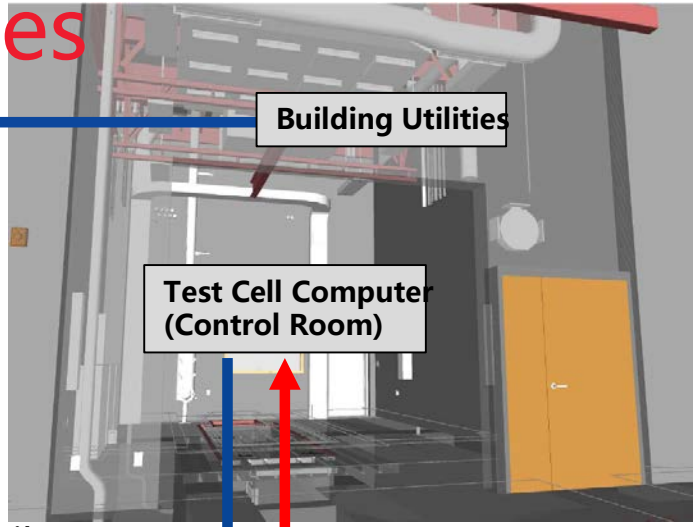
Definition of Test Stand

- *Test Stand* – a combination of machinery, instrumentation and systems that allows to evaluate a lubricant in an engine according to a

Palletized System (Mobile	Test Cell (Physical Room)
Engine	Emission Control System
Dynamometer for Light-Duty Engines	Dynamometer for Heavy-Duty Engines
Fluid Conditioning Systems	Combustion Air Handler
Control Systems (valves, sensors and transducers)	Temperature Controlled Ventilation
Data Acquisition System (input/output boards, power supply, analog-to-digital converters)	Connections to utilities (process and chilled water, electricity), inlet air, exhaust
Flow Meters	Fuel Pre-Conditioning

Merging of Calibration Files





Engine Parameters
- Coolant/Oil Channels
- Dyno/Load Parameters

+

Application File
- DAQ Software
- Test Profile

Complete Calibration File

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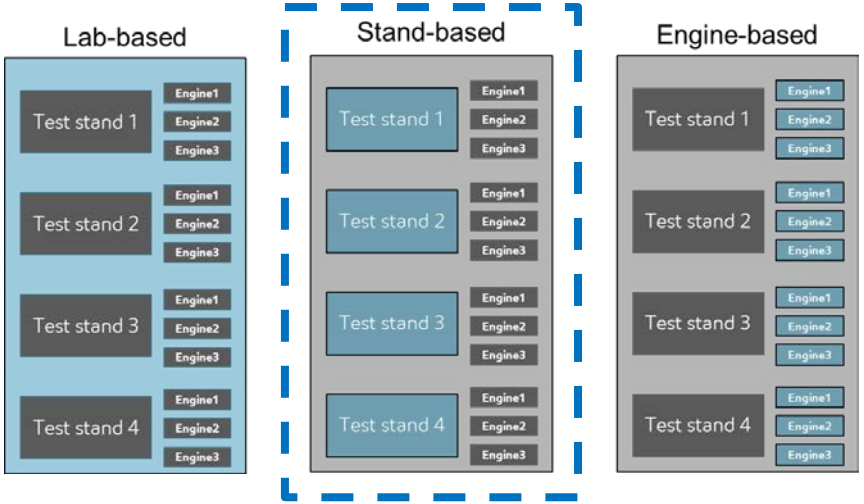
Industry and LTMS Integration

- Palletized system to be considered a “mobile” test stand
  - Critical components, controls and instrumentation onboard the pallet
- Validation Plan
  - Perform required no. of calibration tests in different test cells
  - Repeat a calibration test in same cell where a non acceptable calibration test was previously conducted
- Integration into LTMS
  - Conduct validation during Engine Test Center startup in conjunction with TMC



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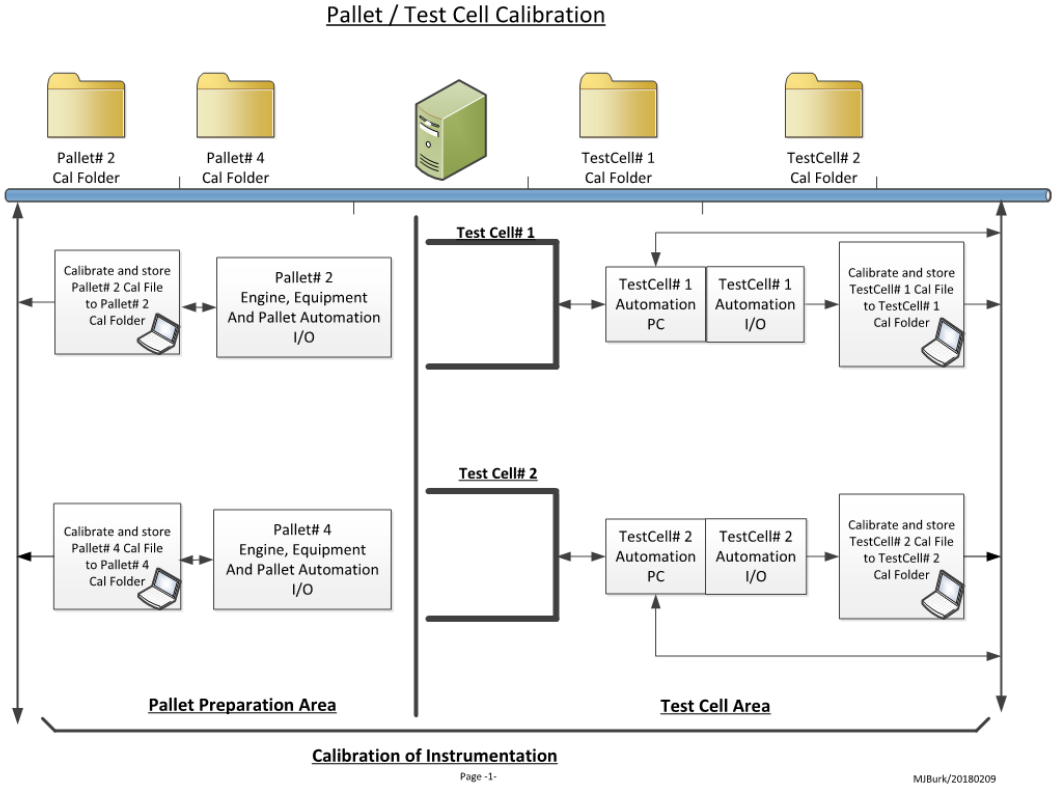
Thank You

Questions?

Back Up

Calibration of Test Stands



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Standard Engine Test Reference

Test Type	SA Level	New Stand Requirements	New Lab Requirements	Comments
Sequence VIE	Stand/engine	1 test	4 operationally valid tests	The 4 tests do not have to meet calibration criteria
Sequence IVB	No ltms yet	No ltms yet	No ltms yet	Sequence IVA requires 2 tests per stand with no Yi or Ri alarms
Sequence IIIH	Stand	2 tests with no Level 3 Ei or Level 2 Zi after 2nd test	Not defined	
GMOD	Stand	2 tests	Not defined	
Volvo T-13	Lab	1 with no Level 1 Ei for each additional	2 tests with no Level 3 Ei for 1st stand	
DD13 Scuffing	None	1 with no Level 1 Ei for each additional	2 tests with no Level 3 Ei for 1st stand	

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What is on the Mobile	What is fixed in the room?

- Emissions Control Systems
- Dynamometer (Heavy Duty Engines)
- Load Cell/Dyno speed pickup (Heavy Duty Engines)
- Combustion Air Handler
- Temperature Controlled Ventilation (Ambient Air)
- Connections to utilities
  - Process/chilled water
  - Electricity
  - Inlet Air
  - Exhaust
  - Fuel pre-conditioning

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Scenario:

Pallet moved from one room to another (i.e. Testcell 1 to Testcell 3) during a calibrated period and running registered candidate tests.

Considerations	Feedback
	• Assess during commissioning with multiple references per pallet, each in different test cells and report to TMC & stats group. • No, the engine remains bolted to the pallet, and all calibrated hardware moves with the engine/pallet.

Starting Position: The pallet should be able to move freely between test cells during a calibration period.

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Scenario:

During day-to-day operations, is the entire pallet removed for test turnaround?

Considerations	Feedback
	• For rapid turnaround tests (IIIH, IVB, etc.), typically leave pallet in test cell and pull only engine. • For longer turnaround (T13, others), can either pull just the engine or split pallet into two pieces and use only smaller, engine pallet.

Starting Position: Typically the pallet will remain in place when working through large test queue.

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Scenario:

Which cell does the reference occur in?

Considerations	Feedback
	• During commissioning references will be conducted in multiple rooms. Assuming no differences noted, future references and candidate runs will be in 1st available cell for lab operation convenience. • Pallet and reference tests will likely move between rooms naturally as test demands change, but no requirement is recommended

Starting Position: Pallet will be referenced into first available tell cell.

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Scenario:

How is calibration handled outside of testcell?

Considerations	Feedback
	• During commissioning references will be conducted in multiple rooms. Assuming no differences noted, future references and candidate runs will be in 1st available cell for lab operation convenience. • Pallet and reference tests will likely move between rooms naturally as test demands change, but no requirement is recommended

Starting Position: Pallet calibration area can perform full ASTM calibrations.

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