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Issued: 12.01.2018
Reply to: Dan Worcester
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238
Phone: 210.522.2405
Email: dworcester@swri.org

These are the unapproved minutes of the 11.30.2018 Sequence VI Conference Call.

This document is not an ASTM standard; it is under consideration within an ASTM technical committee but has not received all approvals required to become an ASTM standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of ASTM committee activities except with the approval of the chairman of the committee having jurisdiction and the president of the society. Copyright ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

The meeting was called to order at 9:04 AM Central Time by Chair Andrew Stevens.

Agenda

- 1.0 There was no Agenda. The meeting was called to discuss the recommendation for using a laser level and camera to record the oil level on a running test.

- 2.0 Roll Call: The Attendance list is **Attachment 1**.

3.0 Old Minutes

Motion: Approve the minutes from the Surveillance Panel call on 11.06.2018.
Dan Worcester, Adrian Alfonso second. Unanimous approval.

4.0 Change to the procedure for an alternate oil level Procedure.

4.1 See Attachment 2 and 3.

4.2 Lubrizol has recommended another method for oil level. This involves setting a ruler to the fill level, then using a camera for oil consumption, including the procedure to set the marks for every 200 ml drop to set measurements. Photos will not be taken and stored, just recorded by the operator as is done now.

4.3 Based on discussion, the procedure will be included in an Annex. The Lubrizol laser level will be given as a device that meets the criteria.

4.4 It was recommended Andrew create a final version and send that out as an E Ballot. This was done after the meeting. See Attachment 4.

5.0 Meeting Adjournment

The meeting adjourned at 9:26 AM Central Time

ASTM SEQUENCE VI

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ASTM SEQUENCE VI

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Ron Romano Voting Member			
Clifford Salvesen Voting Member			
Amol Savant Voting Member			
Andrew Stevens Voting Member			
Haiying Tang Voting Member			
Dan Worcester Voting Member			
VOTES			

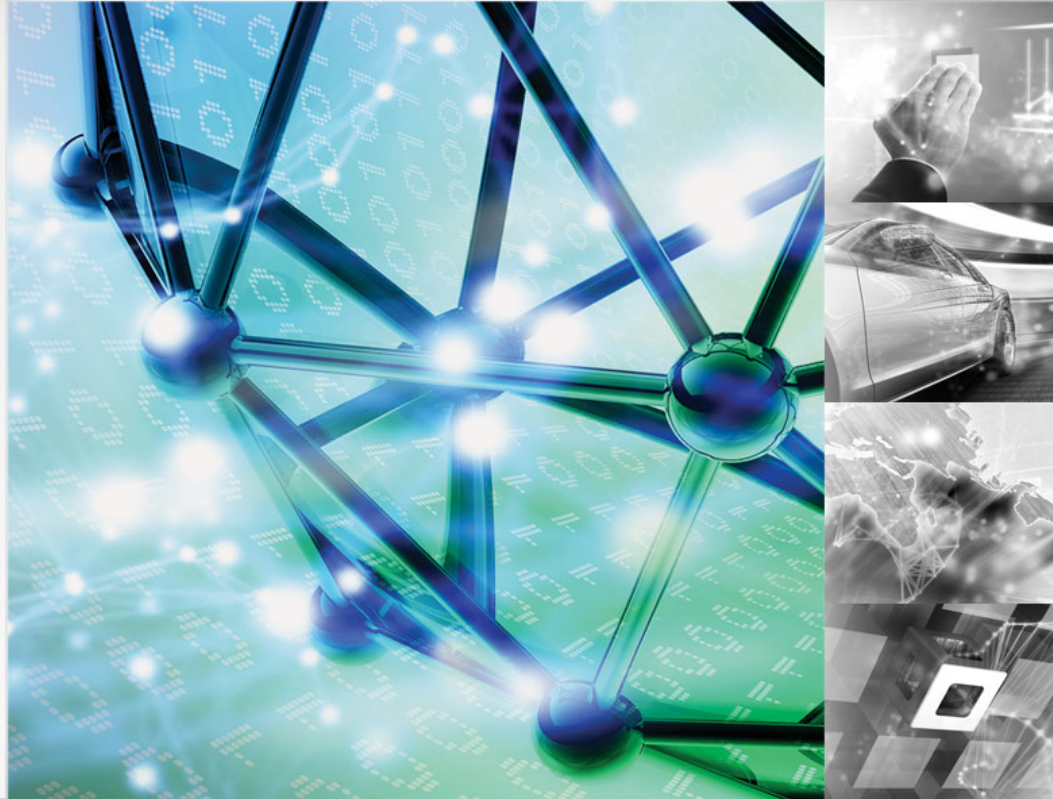
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Andrew Stevens Voting Member				
Haiying Tang Voting Member				
Dan Worcester Voting Member				
VOTES				



Seq VI Oil Consumption Method Lubrizol Alternative Setup & Procedure

29 October 2018

Summary



SUCCESS
TOGETHER

- Setup Overview
- Method Overview
- Proposal



Setup Overview

Setup Overview: Define Need



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Lubrizol

Setup Overview: New Fixture



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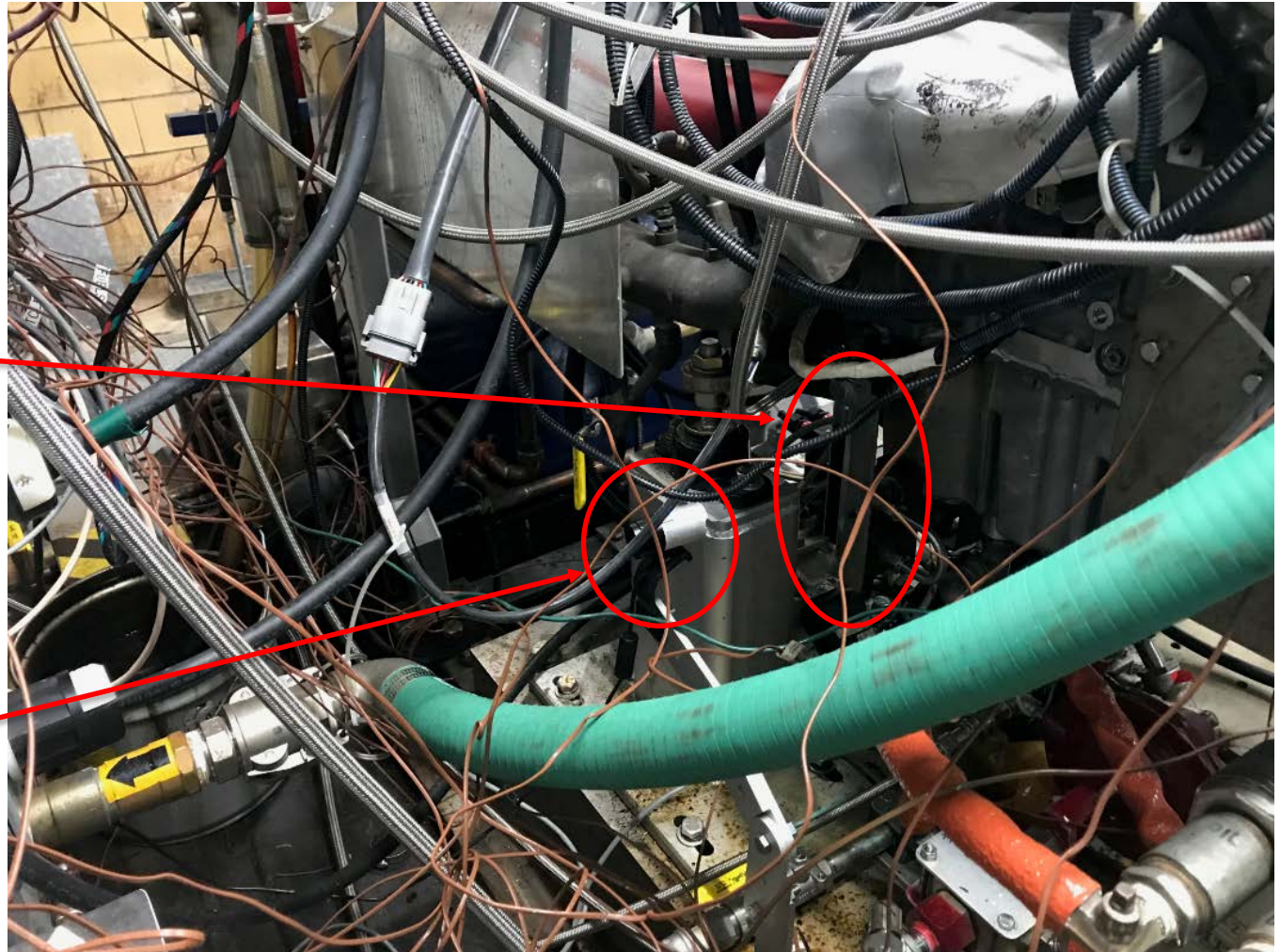
Setup Overview: Stand Placement



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Sight Glass

Camera



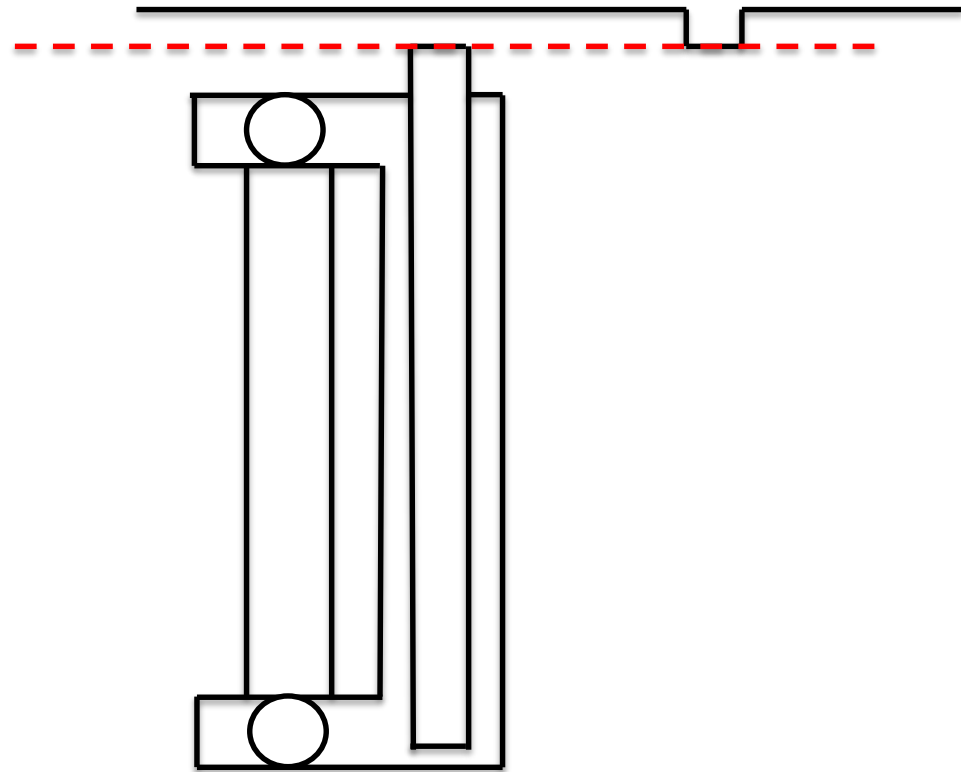


Method Overview

Method Overview: Locating Scale

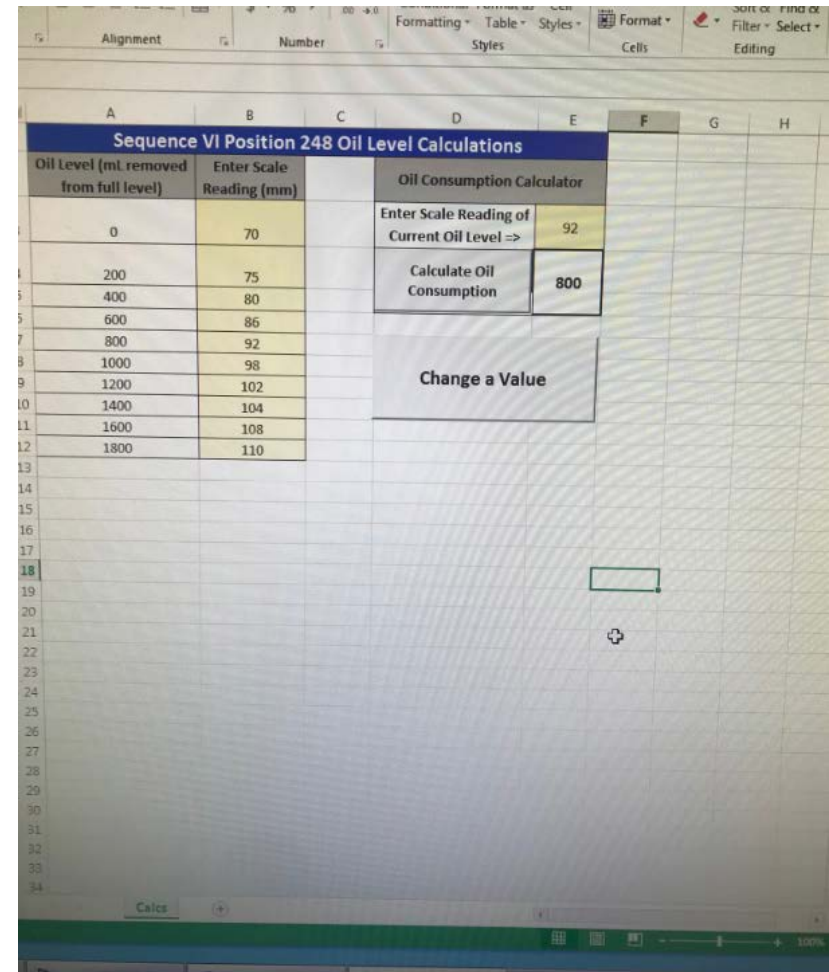


- Use a laser level and align it with the tab on the sump
- Align the zero of the scale with the level line
- Tighten down bolts to set scale in place



Method Overview: Interpolating Level

- Follow standard procedure for establishing oil level in sight glass for new engine
- Instead of paint marks on the sight glass, the reading on the scale is recorded at 200 mL increments
- For a reading during a test, the current level of the scale is recorded and entered into the Excel sheet
- The program interpolates between the points to give the exact oil level



Sequence VI Position 248 Oil Level Calculations	
Oil Level (mL removed from full level)	Enter Scale Reading (mm)
0	70
200	75
400	80
600	86
800	92
1000	98
1200	102
1400	104
1600	108
1800	110

Oil Consumption Calculator	
Enter Scale Reading of Current Oil Level =>	92
Calculate Oil Consumption	800

Change a Value



Method Overview

Proposed Procedure Changes



- NEW A11.1.2 Use a laser level to align the laser line with the bottom of the tab on the oil sump
- NEW A11.1.3 Move the scale so that its zero aligns with the laser line. Tighten screws to lock it in place.

OLD A11.1.2 becomes new A11.1.4 and subsequent numbers proceed accordingly

Proposed Procedure Changes



- A11.1.19 Measure 5.9 L of BL oil and pour into engine.
- A11.1.20 Start engine and ramp to Flush conditions.
- A11.1.21 Once stabilized at the above conditions, mark the level on the sight glass (Fig. A5.20) **or record the level on the scale** and consider this as the Oil Sump Full Level.
- A11.3 Alternative *Oil Pan Sight Glass Calibration*
- A11.2.1 With the proper full mark established on the oil pan sight glass tube (see Fig. A5.20) and the engine running at flush conditions, drain 200 mL of oil from the engine at the outlet (top) of the oil heater. Allow a few minutes for system to stabilize then mark sight glass (– 200 mL).
- A11.2.2 Repeat above in increments of 200 mL until a total of 1800 mL has been removed from engine. **Record the reading on the scale that corresponds with the current oil level.**
- A11.2.3 Return the 1800 mL of oil with engine running at flush conditions, allow the system to stabilize a few minutes. The oil level should now be at the original full mark on the sight glass. Repeat the calibration procedure if the level does not return to the original sight glass full mark.



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Appendix



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Mechanical Test (MT) – Group

Document Number: GASW406

Document Name: Oil Sight Glass Calibration

Revision #: 4

Date: 10/30/18

Technical Review: Engineer

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Oil Sight Glass Calibration

Section	Table of contents	Page
<u>Safety information</u>	<u>1</u>
<u>Purpose</u>	<u>1</u>
<u>Equipment & Parts</u>	<u>1</u>
<u>Hardware Preparation</u>	<u>2</u>
<u>Oil Leveling Instructions</u>	<u>3</u>
<u>Maintenance</u>	<u>5</u>

1. **SAFETY INFORMATION**

- 1.1. See PPE Assessments, where posted, for guidance on proper Personal Protective Equipment.
- 1.2. Follow all Lab PPE requirements.

2. **PURPOSE**

- 2.1. This document will show the process for oil level calibration for oil consumption of sequence VIE Tests.

3. **EQUIPMENT & PARTS**

- 3.1. Laser Level, self leveling or manual with bubble levels
- 3.2. Camera and mount, to be wired to stand's computer
- 3.3. Scale mounted next to the oil sight glass, notched to allow for adjustment
- 3.4. Stand for the laser level, using magnet on laser or a small shelf, adjustable for height (see instructions for examples)

Form format approved BRHL, Quality Mgr., 5/11/2017

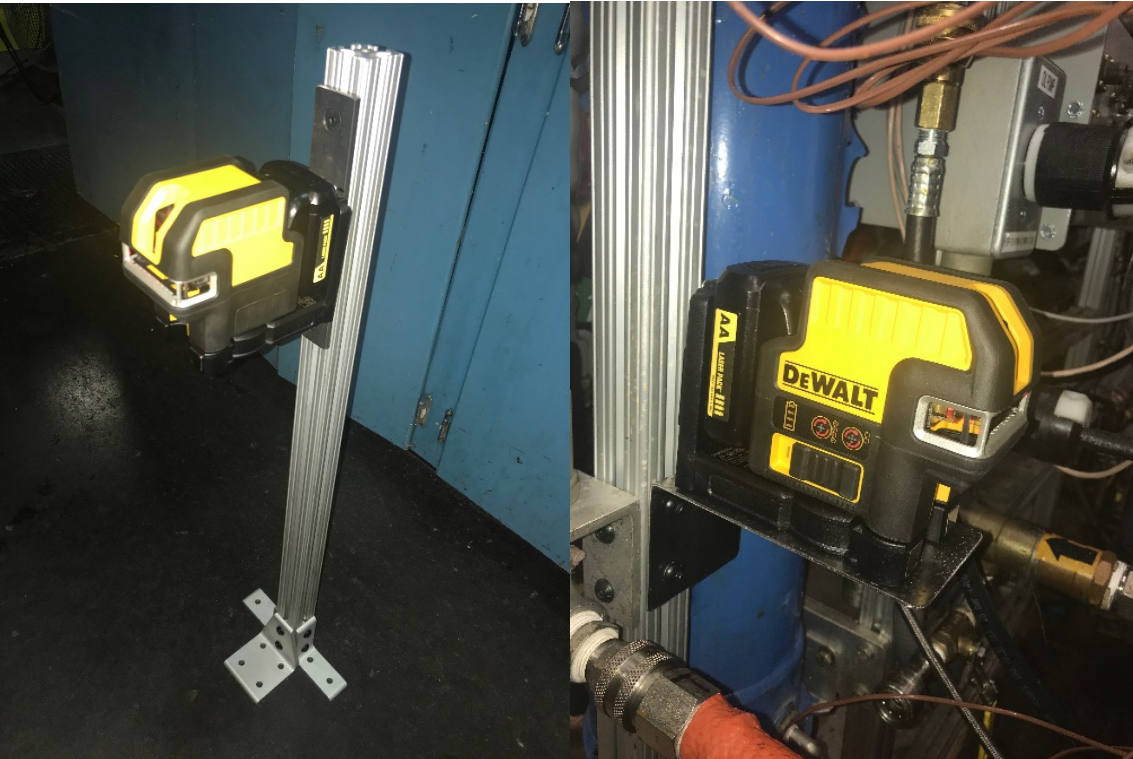
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4. HARDWARE PREPARATION

4.1. Machine slots into the scale to allow to be mounted and adjusted next to the sight glass using bolts/screws (see figure)



4.2. Create a stand for the laser that allows for height adjustment (see figure for examples)



Form format approved BRHL, Quality Mgr., 5/11/2017

All changes from previous version of this document appears with a vertical bar by the changed or removed text.

4.3. Mount camera near engine pointed towards oil sight glass and scale (see figure).



5. OIL LEVELING INSTRUCTIONS

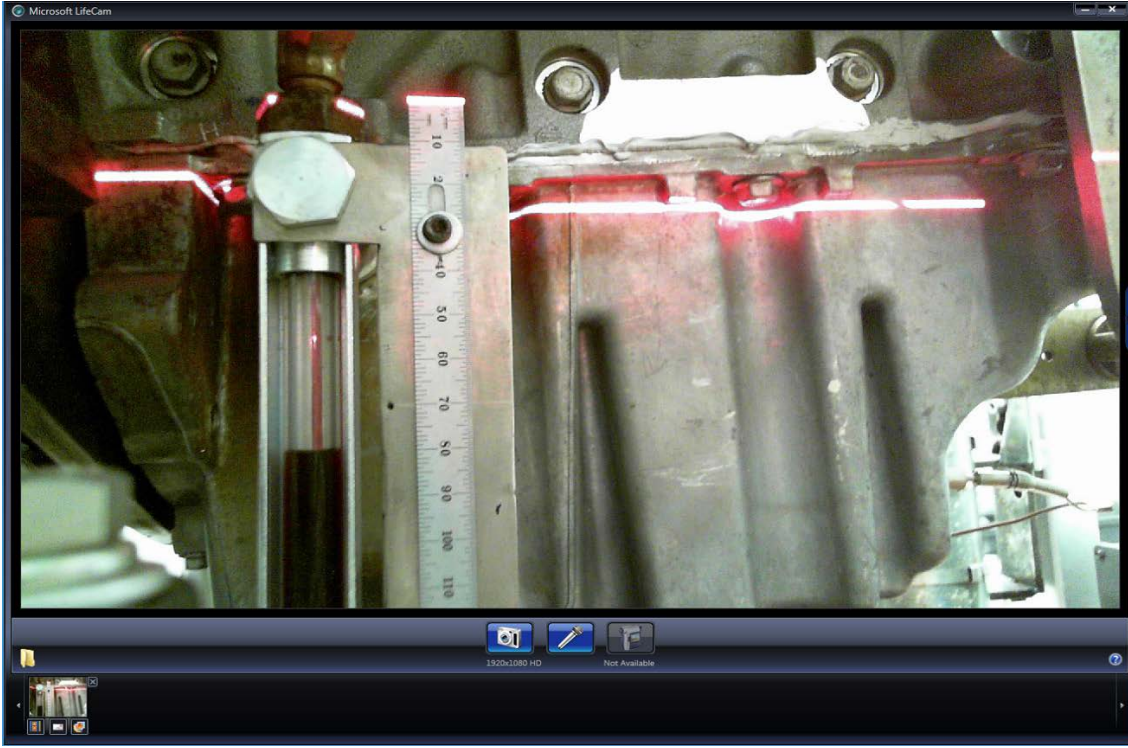
5.1. While engine is cold/not running, place level on stand and adjust height until horizontal laser is even with the bottom of the rearmost tab on the oil pan (See figure).



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- 5.2. Adjust scale so that the very top of the scale (the zero of the scale) is even with the horizontal laser, to be sure that the oil pan tab and the scale are at the same level (see view from camera) (screenshot was taken during test, oil level in this picture is not to be taken as part of the procedure).



- 5.3. Put laser away for safekeeping and to avoid damage
- 5.4. Measure 5.9L of BL oil and pour into the engine
- 5.5. Start engine and ramp to flush 1A conditions
- 5.6. Once stabilized at the above conditions, the level on the sight glass is to be recorded and marked as the full level. This full mark should be 65 ± 5 mm from the bottom of the oil pan tab, per ASTM sequence VIE Procedure.
- 5.7. With the proper full mark established on the oil pan sight glass tube and the engine running at Flush conditions, drain 200 mL of oil from the engine at the outlet (top) of the oil heater. Allow a few minutes for system to stabilize then record the scale level for 200 mL low.



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5.8. Repeat above in increments of 200 mL until a total of 1800 mL has been removed from engine. Record the sight glass levels in increments of 200 mL. Its is recommended that an excel table such as this one is used to track each engine’s level.

Oil Level (mL removed from full level)	Enter Scale Reading (mm)
0	70
200	74
400	78
600	84
800	92
1000	98
1200	103
1400	106
1600	108
1800	110

5.9. At each point in the test where oil consumption is to be recorded, record the level from the scale as viewed from the live camera feed. Use the recorded data to linearly interpolate the level of oil consumption.

6. MAINTENANCE

6.1. Be sure to keep laser level in a controlled case to prevent damage to the electronics or pendulum that could ruin self leveling capabilities.

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Document Revision Log GasW406

Revision Level	Date Approved	Approved By	Revision Description
0	06/12/2012	NAML	Update Work Instruction for VID
1	8/17/2015	NAML	Update for VIE
2	04/25/2017	JABS	Specified flush conditions
3	08/22/2017	JABS	Added step to vent sight glass
4			Updated procedure to use new laser level and camera method

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A11.1.21 Once stabilized at the above conditions, mark the level on the sight glass (Fig. A5.20) **or record the level on the scale (using alternative laser level method)** and consider this as the Oil Sump Full Level.

A11.3 *Alternative Laser Level Oil Pan Sight Glass Preparation and Calibration*

A11.3.1 This setup and method is allowable as an alternative to the method defined in A11.2.

A11.3.2 Fabricate a metal attachment for the sight glass that allows a scale to be affixed. Machine slots into the scale to allow for adjustment and mounting on the metal attachment using bolts/screws.



FIG A11.1 Oil Pan Sight Glass Using Metal Attachment with Scale

A11.3.3 Construct a stand for a laser level that allows for height adjustment. An example is provided in Fig. A11.2. A Dewalt XXXX has been found to be suitable.

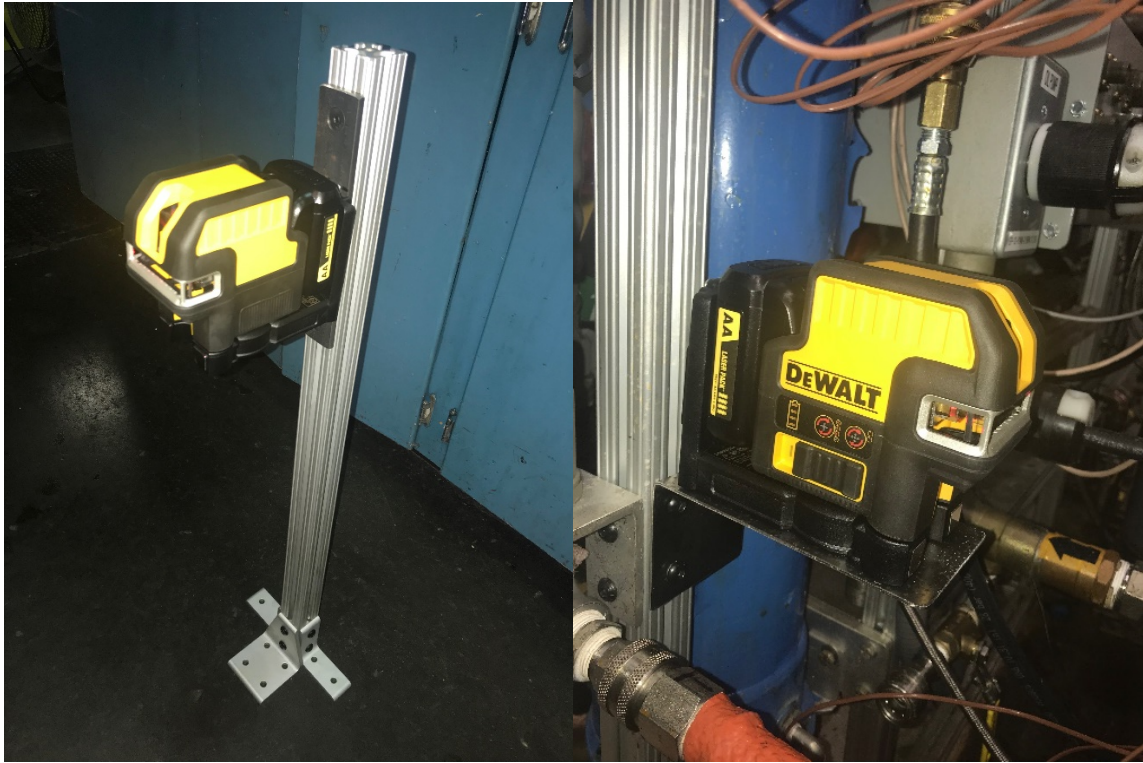


FIG A11.2 Stand for Laser Level

A11.3.4 A camera may be used to view the sight glass. If used, mount the camera near the engine pointed towards the sight glass and scale. See Fig. A11.3 for an example setup.



FIG A11.3 Camera Used to View Oil Pan Sight Glass and Scale

A11.3.5 While engine is not running, place laser level on stand and adjust height until horizontal laser is even with the bottom of the tab on the oil pan. This tab is approximately 100 mm from the top sight glass fitting and toward the front of the engine. See Fig. A11.4.



FIG A11.4 Aligning Laser Level with Oil Pan Tab

A11.3.6 Adjust the scale so that its zero mark aligns with the horizontal laser. See Fig. A11.5

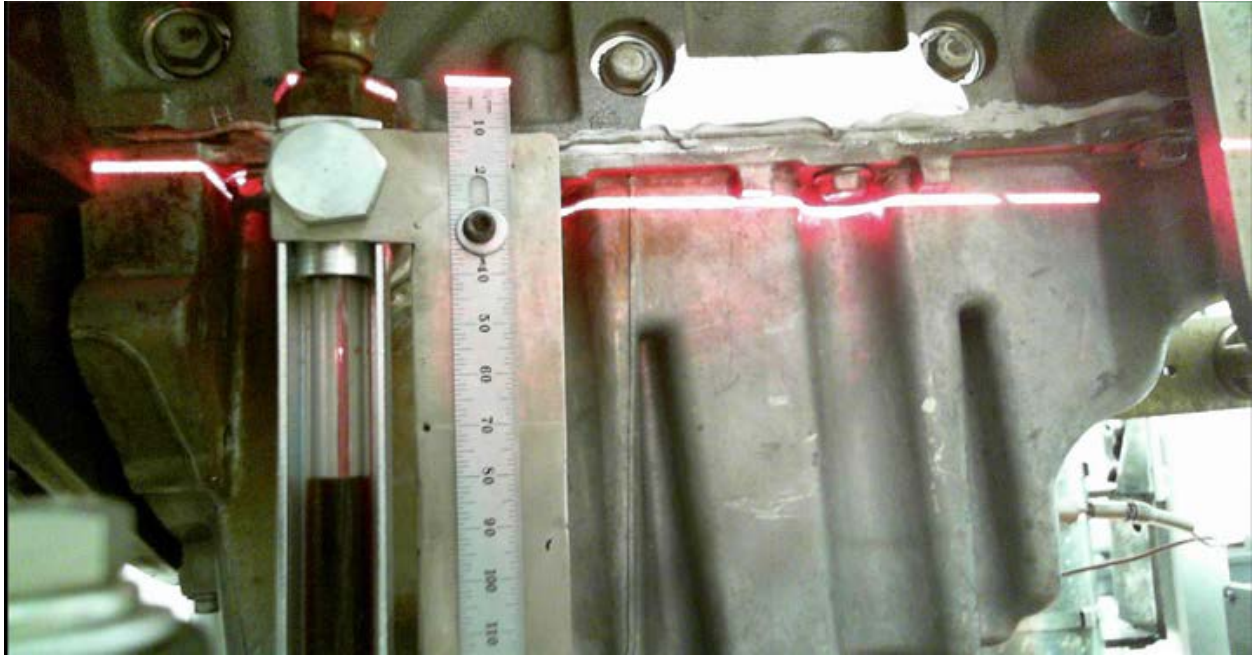


FIG A11.5 Aligning Zero of Scale with Laser

A11.3.7 Establish full mark according to A11.1. With the proper full mark established and the engine running at flush conditions, drain 200 mL of oil from the engine at the outlet (top) of the oil heater. Allow a few minutes for system to stabilize then mark sight glass (-200 mL).

A11.3.2 Repeat above in increments of 200 mL until a total of 1800 mL has been removed from engine. Record the reading on the scale that corresponds with each oil level. It is recommended that an Excel table be created to record readings. When oil level readings are taken, this table can be used to interpolate between calibration readings and give a more accurate oil level.

A11.3.3 Return the 1800 mL of oil with engine running at flush conditions, allow the system to stabilize a few minutes. The oil level should now be at the original full mark on the sight glass. Repeat the calibration procedure if the level does not return to the original sight glass full mark.