MEETING MINUTES OF
D02.B0.07 ON BENCH TEST MONITORING
June 7th , 2021

WebEx

1. CALL TO ORDER

Dennis Gaal called the meeting to order at 12:00 PM (1:00 PM EDT). The ASTM Antitrust Statement and the electronic recording of ASTM meetings is prohibited were shown on the first PowerPoint slide.

2. AGENDA

The agenda was approved as posted.

3. MEETING MINUTES

The December 3rd , 2020 meeting minutes were approved and posted on the ASTM website for subcommittee D02.B0.07.

4. OVERVIEW OF BENCH TESTS UNDER B.07 JURISDICTION

Dennis Gaal reviewed a slide of bench test methods which included reapproval dates and the present operating status. **(Attachment 1)**

5. SURVEILLANCE PANEL REPORTS

a. Mike Faile with TEOST 33C and MHT-4 (ASTM D6335 & D7097) – Attachment 2

D6335

-TEOST 33C is currently using Rod Batch M or N (N is a new batch)
-435-2 and 75-1 reference oils are in good supply at TMC, permanent limits for oil 75-1 will be discussed and set in a July SP meeting
-Precision improved over prior period (8.39 vs 10.10); remains lower than target (4.85)
-New target calculated at start of period to account for new oil 75-1
-This period had 6 failed calibrations at a 23% fail rate
-Overall test ran unusually severe (0.42 s) for performance this period versus previous period (-0.02 s)
-TEOST 33C is available at 7 labs with 9 current instruments

D7097

-MHT is currently using Rod Batch M
-Multiple catalyst batches are in use: 18AB (n=3) and 19BA (n=101)
-Oils 432 and 434-3 are currently in good supply at TMC, oil 434-3 was approved with temporary limits on November 21st, 2019
-MHT is available at 8+ labs with 40 test stands currently
-Precision is significantly worse than last period (8.40 vs 4.87) and less precise than target (5.63)
-This period had 9 failed calibrations, which were all severe
-Overall test ran slightly severe (0.17 s) for performance this period
-Overall severity on catalyst batch 19BA (n=217) is on target and on target for both oils

b. Yong-Li Mc Farland with EOFT and EOWTT (ASTM D6795 &D6794) – Attachment 3

D6795

-5 labs calibrated for this period
-Improved 0% fail rate of operationally valid tests
-Performance by CUSUM plotting is severe
-Precision by pooled s has improved to 4.7 versus 5.67 from previous period
-There is currently 1 reference oil (Oil 79), a reblend of oil 78-2
-EOFT was added to LTMS on September 1st, 2020
-Test in maintenance mode

D6794

-5 labs calibrated for this period
-There was a worsened fail rate (3.0%) of operationally valid tests
-Performance by CUSUM plotting was severe for all treat rates
-Precision by pooled s is slightly worse than previous period, but comparable to historical values
-There are two current reference oils in use (Oil 79 and Oil 77-3)
-EOWTT was added to LTMS on September 1st, 2020

c. Matt Schlaff with High Temp FOAM (ASTM D6082) – Attachment 4

-Target precision updated from 19.28 to 6 (For FOAMB18)
-All labs except AY within ±1 mean Δ/s, lab AY -1.56 (n= 1)
-All 5 discrimination runs were successful
-No Non-zero foam stability
-Precision (7 s) is improved compared to last period and is better than target precision (9 s)
-Oil FOAMB18 has a mild performance of four consecutive periods
-Oil FOAMB18 target (54) is currently set on 18 data points, SP will consider to revise limits with 30 points during next period

d. Matt Schlaff with Sulfated Ash (ASTM D874) – Attachment 4

-All labs were within + / - 1 Mean Δ/s
-All oils were within + / - 1 mean Δ/s
-Precision (0.02 s) is improved compared to last period and better than target precision (0.07 s)
-Fail rate of 0%
-One operationally invalid test: Unstable EOT ash weight

e. Matt Schlaff with Scanning Brookfield (ASTM D5133) – Attachment 4

-Fail rate of 18%; historically ranging between 6% to 26%
-Round Robin for potential new oil is currently in progress with 14 submitted runs so far
-257 total test runs this period (69 previous period), 29 operationally invalidated tests
-Precision (3.74 s) updated to current reference oils GIA17 and 1009
-Precision is the worst going back to 2015 (possibly further)
-Target pooled s is updated from 2.86 s to 1.44 s
-Severity at -0.86 Δ/s is also the worst going back at least to 2015
-9 labs reported data for this period
-Failed rate of operationally valid calibration tests at 18%
-Failed rate of operationally valid discrimination tests at 18%

f. Jessica Hawkins with Ball Rust Test (ASTM D6557) – Attachment 5

D6557

-This period had a total of 160 accepted calibrations, 8 total failed calibrations, and 1 run that were operationally invalidated by lab
-Lost test causes were due to a power outage and acid pump or syringe malfunction
-Over the course of this report, AGV severity is trending on target
-Precision for this period (13.58) was better than previous period (15.52)
-All TMC oils have a healthy supply with majority having an estimated life of 5+ years
-There were no new information letters for this period

g. Mike Lopez with CBT and HTCBT (ASTM D5968 & D6594) –Attachment 6

D5968

-No failed or lost tests this period (chair increased time period to reflect both semesters)
-Currently testing on Bath N coupons
-There were 2 labs calibrated
-Both Copper and Lead concentrations are trending mild, based on previous semesters calculations
-No precision estimate is available due to low activity (chair increased time period to reflect both semesters)

D6594

-Currently testing on Bath N coupons
-9 labs reported data
-Both Copper and Lead concentrations are trending severe
-Copper pooled s is at 0.25 for the period, slightly worse than previous period
-Lead pooled s is at 6.73 for the period, slightly better than previous period
-Chair will be coordinating with TMC to add HTCBT to LTMS for upcoming period

h. Amy Ross with Volatility (ASTM D6417 & D5800) –Attachment 7

D6417

-There was a 10% fail rate of operationally valid tests
-CUSUM leveling off but slight mild trend developing last period with sharp increase this period
-Mild performance this period (-0.81 s/-0.43 s)
-7 labs with 9 calibrated rigs
-Pooled s (0.47) less precise than target (0.39); slightly worse than last period
-Lab D furthest from target performance (-2.18 s; others <1.0 s)
-Performance for Oil 52 (-1.77 s) had a significant from last period, oil 55 performance is mild (-0.16 s) and oil 58 performance is severe (0.24 s)
-D6417 calibration requirements updates are issued as LTMS document updates

D5800

-Pooled s (0.0495) is less precise then updated target (0.0465); more precise than last two periods
-CUSUM shows continued overall severe trend, attributed to Procedure B units
-Performance is 0.35 s severe this period, less severe than previous period
-Proc B rigs are less precise than target while Proc D rigs are more precise
-Fail rate of 6% ; 9 OC (4 labs/5 rigs); 2 LC/XC, 1RD; 0 shakedown runs
-Proc B precision (0.0477) is worse than target with severe performance (0.77 s); NCK2 precision (0.042) with severe performance (0.71 s); while NCK25G precision was 0.0490 with severe performance (0.77 s)
-Proc D precision (0.0376) is better than target and last term (0.07) with continued mild performance, nearly on target (-0.15 s)

i. Justin Mills with ROBO (ASTM D7528) – Attachment 8

-Expected revision in 2021 to include updated calibration requirements and procedure to use dilute NO_2
-Final limits set for 434-3 and interim limits set for 436; will be used to replace 138-2
-Less activity than prior semesters-reduced demand coincides with launch of GF-6
-ROBO test is available at 6 labs (19 stands) as of 3/31/2021
-Precision was worse than target and tests ran with a slight mild bias (pooled s = 0.3188 and Mean Δ/s = -0.11)

j. **Mike Burke with Elastomers EOEC and LDEOC (ASTM D7216) – Attachment 9**

EOEC

-Total of 307 acceptable calibration tests, 2 failed tests, and 21 aborted tests
-Lost tests causes included corrupted data, power failure, bath temperature off-spec, test sample spilled, and wrong material run
-No information letters were issued this period
-SL107 currently has an inventory of 3155 gallons with an estimated life of 5+ years

LDEOC

-This period at a total of 373 accepted calibration tests, 8 failed tests, and 10 aborted tests
-Lost test caused included bath temperature off-spec and power failure
-No information letters were issued this period
-Polyacrylate (ACM1) test severity parameters (volume change, points hardness change, and tensile strength change) are trending mild

6. OLD BUSINESS

Yong-Li McFarland has informed the panel that there are currently two interested participants involved with the emulsion aqueous definition for D7563. There have been questions pertaining to observation of an aqueous layer, so she will arrange to have a meeting in July 2021 to move forward and has also asked that any additional volunteers contact her for involvement.

7. NEW BUSINESS

Jessica Hawkins has announced that she will step down as secretary of the D02.B0.07 surveillance panel, Dennis Gaal has asked that if anyone would like to volunteer for this position to reach out to him. Matt Schlaff has also mentioned that subcommittee 9 subsection G will make a slight adjustment to the ballot for new TEOST turbo method and will hopefully be approved by the next semester. Matt was unsure if this will be added to TMC as a new test or if this will be added alongside with the other TEOST methods. Dennis Gaal suggested that this should be discussed for the December 2021 meeting as we will then have more information and time to overview for new business.

8. NEXT MEETING

D02.B0.07 next scheduled meeting will be held on December 6th, 2021–

Marriott Anaheim, Anaheim, CA

9. ADJOURNMENT

The meeting was adjourned at 1:11 PM (1:11 PM EDT).

Respectfully,

Jessica Hawkins

Read Antitrust Statement

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Reminder: Electronic recording of ASTM meetings is prohibited.

AGENDA: D02.B0.07 Bench Test Surveillance
Monday, June 7, 2021 – 1:00-2:00 pm EDT
WebEx – details below

Chairperson's Comments

ASTM Anti-Trust Statement
ASTM Electronic Recording Policy

Approval of Agenda

Approval of Meeting Minutes – Jessica Hawkins

Overview of Bench Tests under B.07 Jurisdiction – Dennis Gaal

TMC Reports

Tom Schofield
Brittany Pfleegor

Surveillance Panel Reports

TEOST (ASTM D6335 & D7097) – Mike Faile
EOFT and EOWT (ASTM D6794 & D6795) - Yong-Li McFarland
Foam (ASTM D6082) - Matt Schlaff
Sulfated Ash (ASTM D874) - Matt Schlaff
Scanning Brookfield (ASTM D5133) - Matt Schlaff
Ball Rust Test (ASTM D6557) – Jessica Hawkins
Corrosion (ASTM D5968 & D6594) – Mike Lopez
Volatility (ASTM D6417 & D5800) – Amy Ross
ROBO (ASTM D7528) – Justin Mills
Elastomers (ASTM D7216) - Mike Birke

Old Business

New Business

Next Meeting

December 6th, 2021 – Marriott Anaheim, Anaheim, CA

Adjournment

WebEx information

You have been invited to participate in an ASTM Virtual Meeting:

Topic: D02.B0.07 Bench Test Surveillance
Host: Alyson Fick
Date: Monday, June 7, 2021
Time: 1:00 pm, Eastern Daylight Time (New York)
Session number/Access code: 132 383 3926
Session Password: ASTM2021

To join the online meeting:
1. Go to https://astm.webex.com/astm/k2/j.php?MTID=tf11496fb0130e49f644f1a4f937785fe
2. Enter your name and email address on the right side of the page.
3. Click "Join Now".
4. Follow the on-screen instructions to join the teleconference and utilize the call back feature – OR - join the teleconference by dialing the 1-877-668-4490 and entering your Session number/Access code: 132 383 3926

To join AUDIO ONLY:
1. Dial: 1-877-668-4490
2. Enter Meeting Code: 132 383 3926

D02.B0.07 Bench Test Surveillance Panels - Status June 2021

Surveillance Panel	Chairperson	Test Method	Reapproval Date	Jurisdiction
TEOST (33C)	Mike Faile	D6335	2024	D02.09.0G.2
TEOST (MHT)	Mike Faile	D7097	2024	D02.09.0G.2
Elastomer Compatibility (EOEC)	Mike Birke	D7216	2025	D02.B0.07
EO Water Tolerance (EOWT)	Yong-Li McFarland	D6794	2025	D02.B0
EO Filterability Test (EOFT)	Yong-Li McFarland	D6795	2024	D02.B0
Corrosion (CBT)	Mike Lopez	D5968	2024	D02.B0.02
Corrosion (HTCBT)	Mike Lopez	D6594	2025	D02.B0.02
Volatility by GC	Amy Ross	D6417	2024	D02.04.0H
Volatility by Noack	Amy Ross	D5800	2025	D02.06
High Temperature Foam	Matt Schlaff	D6082	2022	D02.06
Scanning Brookfield	Matt Schlaff	D5133	2025	D02.07
Sulfated Ash	Matt Schlaff	D874	2023	D02.03
Ball Rust Test	Jessica Hawkins	D6557	2023	D02.B0.01
ROBO	Justin Mills	D7528	**2026**	D02.B0.07
Homogeneity and Miscibility	Standing Item in B07	D6922	2023	D02.B0
Emulsion Test	Standing Item in B07	D7563	2021	D02.B0.07
Diesel Fuel Dilution by GC	Standing Item in B07	D3524	**2025**	D02.B0
Gasoline Fuel Dilution by GC	Standing Item in B07	D3525	2025	D02.B0
Miscibility of Two-Stroke Lubricants	Standing Item in B07	D4682	2023	D02.B0.07

Surveillance Panel	Need	TMC Monitored?	Reference Oils	Present Operating Status
TEOST (33C)	PCEO Class. Panel	Yes	435-2, 75-1	Maintenance
TEOST (MHT)	PCEO Class. Panel	Yes	432, 434-3	Maintenance
Elastomer Compatibility (EOEC)	HDEO/PCEO Class. Panel	Yes	SL107	Maintenance
EO Water Tolerance (EOWT)	PCEO Class. Panel	Yes	77-3, 79	Maintenance
EO Filterability Test (EOFT)	PCEO Class. Panel	Yes	79	Maintenance
Corrosion (CBT)	HDEO Class. Panel	Yes	43	Maintenance
Corrosion (HTCBT)	HDEO Class. Panel	Yes	1005-5, 44-4	Maintenance
Volatility by GC	HDEO/PCEO Class. Panel	Yes	52, 55, 58	Maintenance
Volatility by Noack	HDEO/PCEO Class. Panel	Yes	VOLC12, VOLD12, VOLE12	Maintenance
High Temperature Foam	HDEO/PCEO Class. Panel	Yes	FOAMB18, 66	Maintenance
Scanning Brookfield	PCEO Class. Panel	Yes	58, GIA17, 1009	Maintenance
Sulfated Ash	HDEO Class. Panel	Yes	90, 91, 820-2	Maintenance
Ball Rust Test	PCEO Class. Panel	Yes	82-1, 86, 87, 1006	Maintenance
ROBO	PCEO Class. Panel	Yes	435-1, 436, 438-2	Maintenance
Homogeneity and Miscibility	PCEO Class. Panel	No	HMA-HMF	Maintenance
Emulsion Test	PCEO Class. Panel	No	EM2, EM2-1, EM5, EM5-1	**Prepare for reapproval**
Diesel Fuel Dilution by GC	HDEO Class. Panel	No	None	Maintenance
Gasoline Fuel Dilution by GC	PCMO Class. Panel	No	None	Maintenance
Miscibility of Two-Stroke Lubricants	2T Engine Oils	No	None	Maintenance

Lubrizol

TEOST Surveillance Panel Report

D02.B0.07 Bench Tests Surveillance WebEx Meeting

Mike Faile, Chair

Monday, June 7, 2021

MOVE CLEANER
CREATE SMARTER
LIVE BETTER

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CREATE SMARTER
LIVE BETTER

ASTM D6335: TEOST-33C Summary for D02.B0.07

Status	Test Aspect	Comments
	**Method**	Test method is in good standing ▪ ASTM D6335-19 was published in January 2020 and no current work items ▪ No TMC Memos issued this period ▪ Monitored by D02.09 and the TMC
	**Parts Availability**	All TEOST-33C hardware and test materials are available ▪ All tests in period used Rod Batch M or N (N is a new batch)
	**Reference Oils**	435-2 and 75-1 reference oils in good supply at TMC ▪ Oil 75 is depleted at TMC – nearly depleted at labs as only 2 tests reported with oil 75 this period ▪ Permanent limits for severe oil 75-1 will be discussed and set in a July SP Meeting
	**Test Availability**	TEOST-33C test is available at 7 labs with 9 current instruments ▪ Combination of independent and dependent labs
	**Precision**	Precision improved over prior period (8.39 vs 10.10), but remains lower than target (4.85) ▪ New target calculated at start of period on 20201001 to account for new oil 75-1 (was 5.73 prior) ▪ Period had 6 failed calibrations (23% fail rate vs 39% prior period) ▪ 4 failed calibrations were from 2 rigs ▪ 9 shakedown runs to troubleshoot performance of a single rig ▪ 3 operationally invalid tests reported ▪ Test precision will be discussed in the July SP Meeting
	**Severity**	Overall test is unusually severe this period (0.42 s) for performance this period (-0.02 prior period) ▪ There is lab to lab variability on severity as well as oil to oil differences though (oil 75-1 was most severe despite deposit levels being similar to oil 75) ▪ Test performance will be discussed in the July SP Meeting

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ASTM D7097: TEOST-MHT Summary for D02.B0.07

Status	Test Aspect	Comments
	**Method**	Test method is in good standing ▪ ASTM D7097-19 was published in January 2020 and no current work items ▪ No TMC Memos issued this period ▪ Monitored by D02.09 and the TMC
	**Parts Availability**	All TEOST-MHT hardware and test materials are available ▪ All tests in period used Rod Batch M ▪ Multiple catalyst batches are in use – 18AB (n=3) and 19BA (n=101) this period ▪ Catalyst batch 20AB was screened by labs and is now approved for use
	**Reference Oils**	432 and 434-3 reference oils in good supply at TMC ▪ Oil 434 is depleted at TMC – still assigning out of lab inventories until gone ▪ Replacement oil 434-3 – approved with temporary limits on 20191121 ▪ Permanent limits will be set after 20+ data points are obtained (still none run since approval)
	**Test Availability**	TEOST-MHT test is available at 8+ labs with 40 test stands currently (prior period had 9 labs) ▪ Combination of independent and dependent labs
	**Precision**	Precision significantly worse than last period (8.40 vs 4.87) and less precise than target (5.63) ▪ Worst period in years ▪ Period had 9 failed calibrations (vs zero prior period) – all 9 were severe failures (4 were on 1 test rig) ▪ 2 shakedown runs to on a new rig prior to calibration ▪ 2 operationally invalid tests reported ▪ Oil 434 continues to be less precise than oil 432 ▪ Test precision will be discussed in a July SP Meeting
	**Severity**	Overall test ran slightly severe (0.17 s) for performance this period (vs -0.22 prior period) ▪ There does continue to be some lab to lab variability on severity consistent with prior periods ▪ Overall severity on catalyst batch 19BA (n=217) is on target and on target for both oils ▪ Test precision will be discussed in a July SP Meeting

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ASTM D6795
Engine Oil Filterability Test (EOFT)
and
ASTM D6794
Engine Oil Water Tolerance Test (EOWTT)

June 4, 2021

Yong-Li McFarland
Chair

Surveillance Panel Membership

14 members

Ernest Morel, Afton Chemical
Man Hon Tsang, Chevron Oronite
Dennis Gaal, Exxonmobil
Joe Franklin, Intertek
Udo Boecker, ISP
Michael Johnscher, ISP
Litchi Xie, Lubrizol Additive (Zhuhai) Co., Ltd.
Megan Browning, Lubrizol
Jason Bowden, OH Technologies Inc
Greg Miiller, Savant Group
Becky Grinfield, SwRI
Yong-Li McFarland*, SwRI
Brittany Pfleegor, TMC
Frank Farber, TMC

*Chair

Scope and Objective

It is the responsibility of this panel to provide surveillance over Test Methods D6794 and D6795 bench tests used in the ILSAC and API passenger car oil categories. The surveillance panel will review data semi-annually supporting the precision for each bench test and when necessary, conduct workshops to bring the bench tests within accepted limits. The surveillance panel will function with the support of the ASTM Test Monitoring Center (TMC) in an effort to monitor the bench tests and maintain appropriate and adequate supplies of reference oils for the monitoring process. The panel will maintain a liaison with the "expert groups" in ASTM, which may help in the maintenance and improvement of the bench test methods used in support of the current ILSAC and API categories. The surveillance panel will make recommendations for appropriate action through Subcommittee D02.B, Section 7.

ASTM D6795 Engine Oil Filterability Test (EOFT)

Title: Standard Test Method For Measuring The Effect On Filterability Of Engine Oils After Treatment With Water And Dry Ice And A Short (30 min) Heating Time

Current Business

- 5 labs calibrated
- Improved 0 % fail rate of operational valid tests
- CIFA Severity, by CUSUM plotting, is severe
- Precision, by pooled standard deviation, has improved to 4.7 from 5.67 (last period)
- 1 reference oil, Oil 79, a reblend of oil 78-2. Estimated life of 3.5 yrs.

- EOFT added to LTMS on 9/1/2020
- **Test in maintenance mode**

Test Distribution	Oil 79
Accepted for Calibration (AC)	123
Failed Acceptance Criteria (OC)	0
Operationally Invalid, by Lab (LC)	0
Operationally Invalid, by TMC (RC)	0
Aborted Calibration Test (XC)	1
Total	124 (138*)

* Previous period total

Reference Oil Supply	Oil 79
Samples at Labs	164
Gallons shipped in last 6 months	44.2
Gallons at TMC	391

Period: October 1, 2020 to March 31, 2021

ASTM D6794 Engine Oil Water Tolerance Test (EOWTT)

Title: Standard Test Method For Measuring The Effect On Filterability Of Engine Oils After Treatment With Various Amounts Of Water And A Long (6 H) Heating Time

Current Business

- 5 labs calibrated
- Worsened 3.0 % fail rate of operational valid tests. 2/3 of fails were for severe change, ¾ of fails were for 1% and 3% water.
- CIFA Severity, by CUSUM plotting, was severe for all treat rates
- Precision, by pooled standard deviation, is slightly worse than previous periods, but comparable to historical values
- 2 reference oils, Oil 79 and Oil 77-3. Estimated life 3.5 yrs, 5+ yrs.

- Added to LTMS on 9/1/2020
- **Test in maintenance mode**

Test Distribution	Oil 77-3	Oil 79	Total
Accepted for Calibration (AC)	376	378	754
Failed Acceptance Criteria (OC)	15	9	24
Aborted Calibration Test (XC)	6	4	0
Acceptable Shakedown (NN)	0	0	0
Unacceptable Shakedown (MN)	0	0	0
Total	397	391	788 (880*)

* Previous period total

Reference Oil Supply	Oil 77-3	Oil 79	Total
Samples at Labs	196	197	393
Gallons shipped in last 6 months	36	44	80
Gallons at TMC	568	391	959

Period: October 1, 2020 to March 31, 2021

Old EOFT & EOWTT Business

Both tests are down at 90% of previous period's total tests.

New EOFT & EOWTT Business

None

Thanks to TMC and Brittany Pfleegor!

D02.0B.07 D6082 HT FOAM SUMMARY 10/1/20 THROUGH 3/31/21

Performance				
Fail Rate	# Labs	Mean Δ/s	Pooled s	Pooled s Target
0	6	-0.45	7	9

- Target precision updated from 19.28 to 9 (For FOAMB18)
- All labs except AY within ± 1 Mean Δ/s Lab AY -1.56 (n=1)
- All 5 discrimination runs were successful
- No Non-zero foam stability
- Oil FOAMB18 has 4 consecutive period of mild performance
  - Target: 54: previous periods: 50, 51, 45, 49
  - Target set on 18 data point. To revisit and potential revise limits with 30 points
- Precision (pooled s) more precise than last period and target precision

Oil	Year Rec'd by TMC	Tests	TMC Inventory, gallons	Gallons Shipped last 12 months
FOAMB18	2018	D6082	88.7	1.7
66	2002	D6082	75.4	0.7

D02.0B.07 D874 SULFATED ASH SUMMARY 10/1/20 THROUGH 3/31/21

Performance				
Fail Rate	# Labs	Mean Δ/s	Pooled s	Pooled s Target
0	4	-0.35	0.02	0.07

- All labs within +/- 1 Mean Δ/s
- All oils within +/- 1 Mean Δ/s
- Precision (pooled s) more precise than last period and target precision
- One operationally invalid test: Unstable EOT ash weight

Oil	Year Rec'd by TMC	Tests	TMC Inventory, gallons	Gallons Shipped last 12 months
820-2	2001	D874	8.8	0.1
90B	2005	D874/D874QC	14.9	1.1
91	2006	D874	3.5	0.1

D02.0B.07 D5133 GELATION INDEX SUMMARY 10/1/20 THROUGH 3/31/21

Performance				
Fail Rate	# Labs	Mean Δ/s	Pooled s	Pooled s Target
18	10	-0.86	3.74	1.44

- Major LTMS update implemented at start of this period: Change from monitor by bath to monitor by stand
- 257 total tests run this period (69 previous period). 29 Operation Invalid Tests
- Round Robin for potential new reference oil in progress – 14 runs submitted so far
- Fail Rate: 18% Historically range between 6% to 26%
- Precision (pooled s) updated to current reference oils GIA17 and 1009
- Target Pooled s updated from 2.86 to 1.44. Precision this period 3.74, is the worst going back to 2015 (possibly further)
- Severity Mean Δ/s also the worst at -0.86 going back at least to 2015

Oil	Year Rec'd by TMC	Tests	TMC Inventory, gallons	Gallons Shipped last 12 months
58	1998	D6417, GI	113.9	1.3
GIA17	2017	GI	8.5	0.9
1009	2002	GI	36.8	1.3

Overview

Test Status	Validity Code	No. Tests
Acceptable Calibration Test	AC	95
Failed Calibration Test	OC	21
Operationally Invalidated by Lab	LC, LS, XC, XS	29
Operationally Invalidated After Initially Reported as Valid	RC	0
Acceptable Discrimination Tests	AS	72
Failed Discrimination Tests	OS	16
Excluded From Statistics	MC, MS	6
Industry Donated Run	AG	11
Instrument Shakedown	AN, ON	7
Total		**257**

Number of Labs Reporting Data: 9

Fail Rate of Operationally Valid Calibration Tests: 18%

Fail Rate of Operationally Valid Discrimination Tests: 18%

Unacceptable Tests

Statistically Unacceptable Calibration Tests (OC)	No. Of Tests
Gelation Index Mild	17
Gelation Index Severe	4

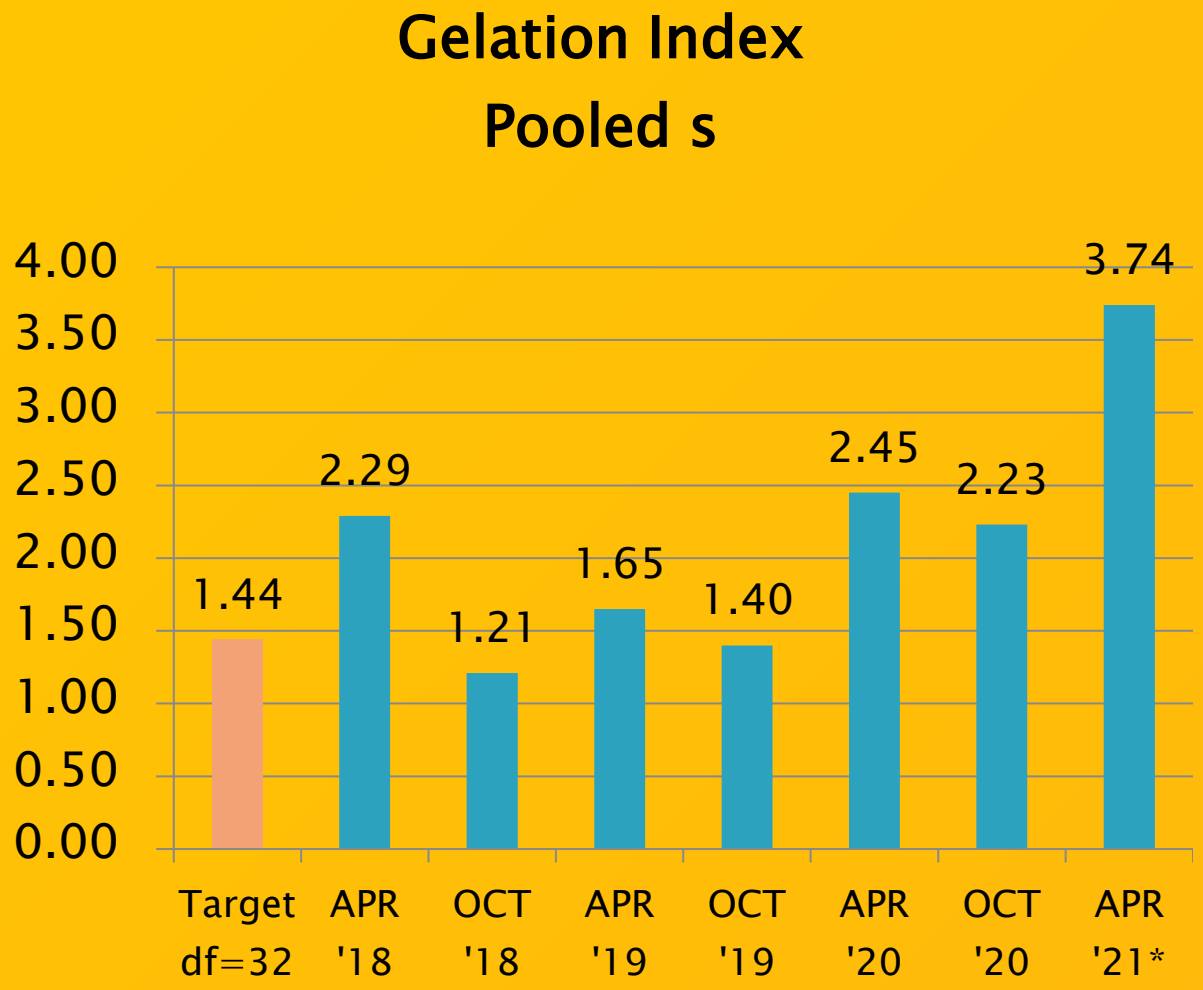
- There were also 16 severe failing discrimination runs this period, out of 88 reported as operationally valid.

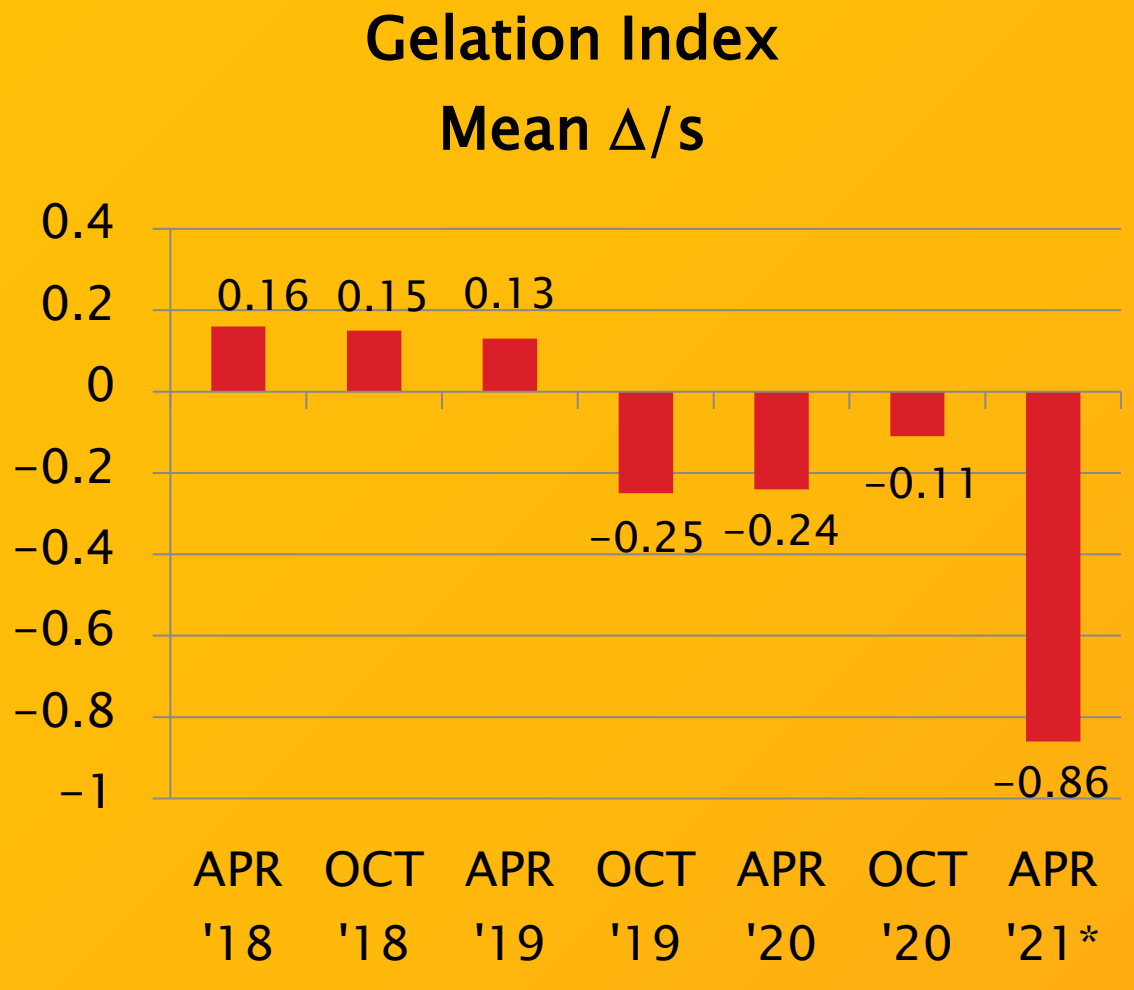
  - Of the 21 OC tests:
    - Four were between ±2-3 s from targets
    - Five were between ±3-4 s from targets
    - Three were between ±4-5 s from targets
    - Five were between ±5-6 s from targets
    - Two were between ±7-8 s from targets
    - One was between ±8-9 s from target
    - One was between ±9-10 s from target

D5133: Excluded Results

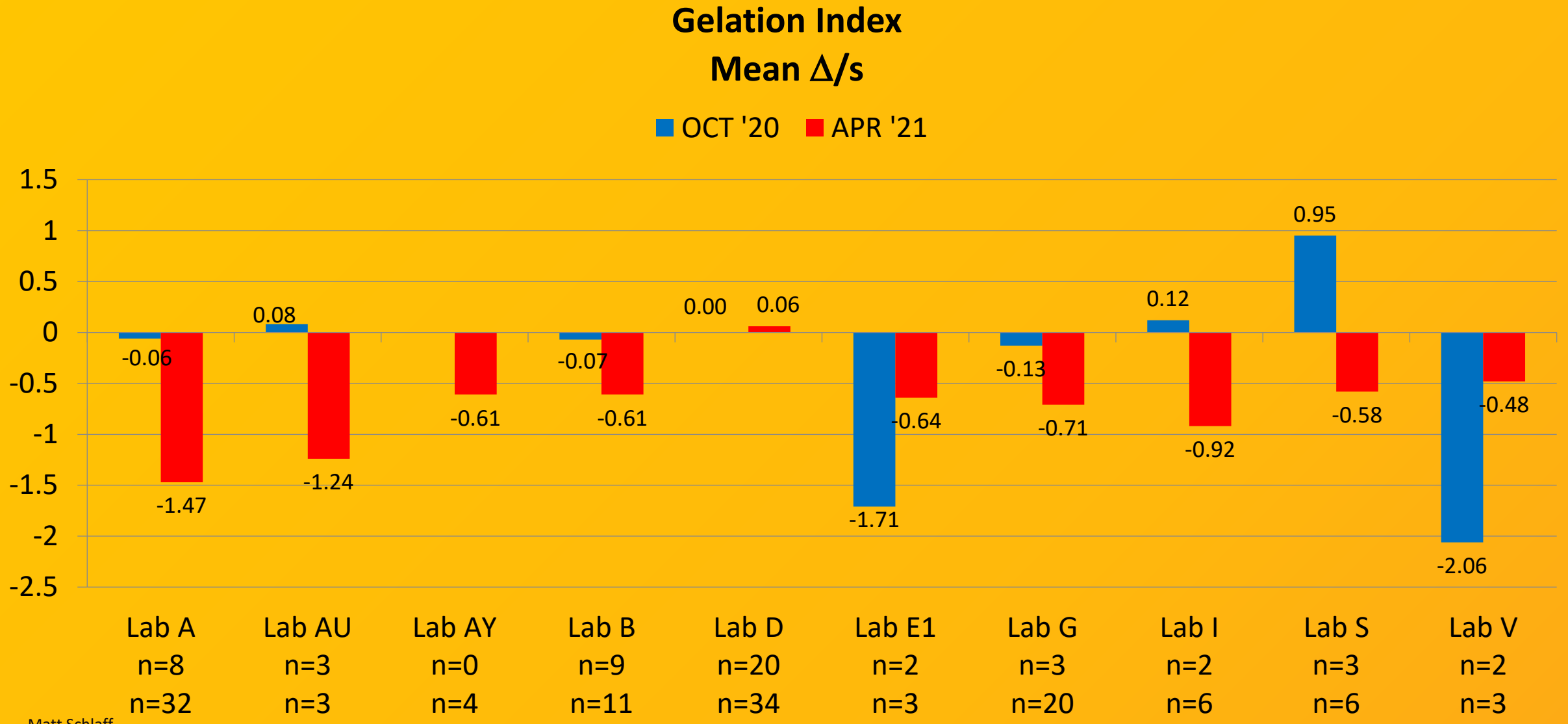
Tests Excluded From Statistics (Operationally or Otherwise)	Validity Code	No. Tests
New Stand, Failed to Calibrate Initially	MC, MS	6
Bad Head, Needing Maintenance/Repair	LC, XC, LS, XS	5
Computer or Software Failure	XC, XS	10
Bath Temperature Control Failure	LC, XS	7
Controller Connection Failure	XC	4
Incorrect Baseline Calibration	LC	1
Sample Mix-up, Wrong Stand Charged	LC	2
Stand Shakedown Run	AN, ON	7
Industry Donated Run (GIC18 RR)	AG	11
Total		**53**

Precision and Severity: By Period





Severity: By Lab



D5133: MAJOR LTMS UPDATE RESULTS IN SIGNIFICANT CHANGE IN STATISTICS

- Update effective 10/01/2020 to coincide with start of new period
- Monitoring changed from by bath to by stand (viscometer head/rotor-stator combination)
- Oil 58 changed to mild discrimination oil
- Calibration period changed from 180 days to 60 days
- Fail rate of 18% comparable to historical (range 6% to 26%)
- Precision and Performance (Bias) much worse than target and historical averages
- Poor Precision and Bias coupled with the high number invalidated tests justify the need for LTMS change. This confirms that the primary driver of test performance is the test stand itself and not the bath. Each test stand needs to be monitored individually.
- New system will better monitor true industry performance and lead to performance improvement: labs have already removed vis heads, sent heads for repair, purchased new instruments, etc…

intertek
Total Quality. Assured.

BRT SURVEILLANCE PANEL

ASTM D02.B0.7

June 7th 2021

BRT TEST ACTIVITY

*October 1,2020 – March 31,2021

Test Status	Validity Code	Validity
Accepted Calibrations	AC	160
Failed Calibrations	OC	8
Operationally Invalid, by lab	LC	1
Aborted Calibration Test	XC	2
Unacceptable Shakedown Run	MN	5
Acceptable Shakedown Run	NN	6
Total	**182**	

- 5 labs reported data

BRT FAILED TESTS BY LAB

- 8 total tests failed this period
  -4 serve average gray value
  -4 mild average gray value

Failed Parameter	LTMS Lab					#
	A	B	D	G	L	
Severe Average Gray Value	0	0	1	3	0	4
Mild Average Gray Value	0	0	0	3	1	4
Total	0	0	1	6	1	8

BRT LOST TESTS

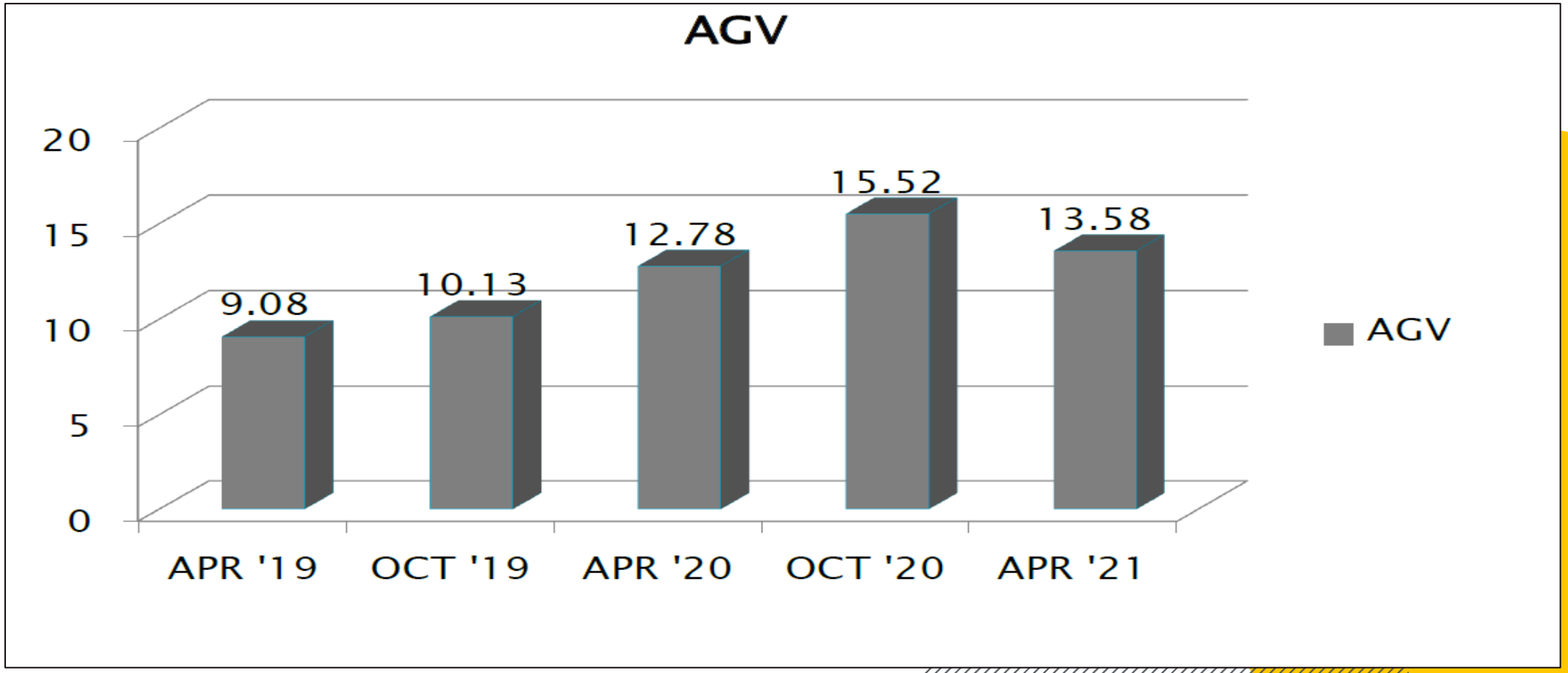
- 3 total tests lost this period
  -1 due to power outage
  -2 due to acid pump or syringe malfunction

Cause	LTMS Lab					#
	A	B	D	G	L	
Power Outage	0	0	0	1	0	1
Acid pump or syringe malfunction	0	0	1	1	0	2
Total	0	0	1	2	0	3

* Invalid and aborted calibration tests

SEVERITY AND PRECISON

- Over the course of this report, AGV severity as measured by CUSUM, is trending on target
- Precision for this period is 13.58, better than previous period.



REFERENCE OIL SUPPLY

Oil	TMC Inventory (gallons)	Quantity Shipped in last 6 months	Lab Inventory (samples)	Estimated Life
1006	31.6	0.4	46	5+ years
82-1	3.9	0.4	48	4 years
86	51.2	0.4	46	5+ years
87	95.1	0.4	43	5+ years

STATUS

- No new information letters this period.

CBT/HTCBT Surveillance Panel Report

June 2021

Web addition

D02.B0.07

Mike Lopez presenting

CBT/ HTCBT Surveillance Panel Membership:

- Infineum
- Chevron
- Savant
- OH Tech
- TMC
- ISP Institute
- SwRI
- Afton Chemical
- Lubrizol
- Intertek
- TEI

There was no reference CBT testing during this period, so all data remains the same from previous semester, April 2020.

Current Status

- Currently testing on Batch N coupons
- 2 labs calibrated.
- Test period Oct 1, 2019 – Sept 31, 2020
- No failed or lost test this period
- Copper concentration trending mild.
- Lead Concentration trending mild.
- No precision estimate available due to low activity
- One information letter sent out Oct 9, 2019 authorizing the use of coupon hangers and standardization of test results calculation precision and reporting.

Test Status	Validity Code	Number of Tests
Acceptable Calibration Test	AC	0
Failed Shakedown Run	MN	0
Total		0

Oil	TMC Inventory (gallons)	Quantity Shipped in last 6 months (gallons)	Lab Inventory (samples)	Estimated Life
43	32.1	0	35	5+ years

HTCBT(D6594)

Current Status

- Currently testing on Batch N coupons
- Test period October 1, 2020 –March 31, 2021
- 9 labs reporting data.
- Copper concentration trending severe
- Lead concentration trending severe
- Copper pooled s is at 0.25 for the period which is slightly worse than the previous period.
- Lead pooled s is at 6.73 for the period which is slightly better than the previous period.
- There no information letters have been sent out.
- I was not able to coordinate with TMC to add HTCBT to the LTMS,
  but will make it happened this semester.

Test Status	Validity Code	Number of Tests
Acceptable Calibration Test	AC	238
Failed Calibration Test	OC	12
Operationally Invalid, by lab	LC	5
Aborted Calibration Test	XC	3
Acceptable Shakedown Run	NN	25
Unacceptable Shakedown Run	MN	45
Operationally Invalid, lab Shakedown Run	LN	1
Total		329

Failed Parameter	Number of Tests
Severe Lead Concentration	9
Severe Copper Concentration	1
Severe Copper & Lead Concentration	1
Mild Copper Concentration	1
Total	12

Failed Parameter	LTMS Lab						#
	A	B	G	I	V	BB	
Severe Lead Concentration	1	0	5	0	0	3	9
Severe Copper Concentration	0	0	0	0	0	1	1
Severe Copper & Lead Concentration	0	0	0	0	0	1	1
Mild Copper Concentration	0	0	0	1	0	0	1
Total	1	0	5	1	0	5	12

Cause	LTMS Lab						#
	A	B	G	I	L	BC	
Heater Malfunction	1	0	0	0	0	0	1
Airflow Control Problems	1	0	1	0	0	0	2
Exceeded Test Time Length	1	0	0	0	0	0	1
Improper Coupon	0	0	0	0	0	1	1
Power Outage	0	0	2	0	0	0	2
Sample Contamination	1	0	0	0	0	0	1
Total	4	0	3	0	0	1	8

Oil	TMC Inventory (gallons)	Quantity Shipped in last 6 months (gallons)	Lab Inventory (samples)	Estimated Life
44-4	16.8	2.3	110	2.5 years
1005-5	32.2	5.3	246	3 years

B07 Volatility Surveillance Panel Update

ASTM Jun 07 2021 Amy Ross

Members List – Updated 20200619

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Volatility Surveillance Panel Summary – D6417

Precision and Severity	✗	• Pooled s (0.47) less precise than target (0.39); slightly worse than last period; incremental increase over the past 2 years; This period, primarily due to rigs, D5* and D6; Pooled s 0.37 without suspect results which is comparable to target and last period*
	✗	• Performance mild this period (-0.81s / -0.43*); CUSUM leveling off but slight mild trend developing last period with sharp increase this period; 5 of 7 labs performing mild to some extent; slightly severe performance APR ‘18 thru APR ’20, nearly on target
Test Status	–	• 10% fail rate (12% last period)
	✓	• 7 labs with 9 calibrated rigs; 21 cal attempts, 19AC results; 2OC (mild) results; no invalidated results
Lab/Apparatus	✗	• Lab D furthest from target performance (-2.18s; others <1.0s)
	–	• Last period, Rig D5 had 2OC results, changed column between; failed the 2-test cal this period (one -3.8s) with subsequent pass
	✗	• Rig D6 reported -5s result

Volatility Surveillance Panel Summary – D6417

Calibration Oils	✓	• Mean values for all oils comparable to target values; precision is comparable but slightly worse than target for Oils 55 and 58; Oil 52 furthest from target precision (0.47 vs 0.31)
	✗	• Oil 52 performance (-1.77s) significant increase from last period (OCT20= -0.87; APR20=0.02)
	✓	• Oil 55 performance comparable magnitude from target as last period but mild (-0.16)
	✓	• Oil 58 performance comparable magnitude from target as last period but severe (0.24)
	✓	• Healthy supply of all fluids
Method and LTMS Updates		• No updates this term • D6417 calibration requirement updates are issued as LTMS document updates • Upcoming SP meeting on June 24th at 11am

Volatility Surveillance Panel Summary – D5800

Precision and Severity	 	• Pooled s (0.0495) less precise than updated target (0.0465); more precise than last two periods; Proc B rigs are less precise than target while Proc D rigs are more precise • CUSUM shows continued overall severe trend (0.53s this period, priors 0.35s, 0.54s), attributed to Procedure B units
Test Status	  	• 10 labs with 25 calibrated rigs (comparable to last period); 11 labs reporting data; -20% cal attempts in 2020 (176 to 140) • 143 results reported; Fail rate 6%; 9 OC (4 labs/5 rigs); 2 LC/XC, 1 RC; 0 shakedown runs • 3-Ei L3 alarms (2 mild, 1 severe); 7-Zi L2 alarms (all severe) • 2 tests exceeded 3s range, compared to 5 last period (+3.8s rig G6, +3.3 rig J7) • 3 invalid runs due to vacuum leak (RC), failing QC (LC) and spilled sample (XC)

Volatility Surveillance Panel Summary – D5800

Lab/Apparatus	✗ ✗	• Rig G6 had two consecutive Zi L2 (severe) alarms before clearing on third attempt, repeated later in report period (4 OC fails total); Same pattern on rig G8 from same lab last period and into this period • Labs AY, G* and J* all saw more off-target performance (severe) than others (≥1.0s)
Precision and Severity by Procedure	✓ – ✓	• 1 NCK2 rig; 19 NCK25G rigs; 7 NS2 rigs; comparable breakdown as last period • Proc B precision (0.0477) slightly worse than target and severe perf (0.77s); NCK2 precision 0.0042, severe perf (0.71); NCK25G precision 0.0490, severe perf (0.77s) • Proc D precision (0.0376) better than target and last term (0.07) with continued mild performance, nearly on target (-0.15s)

Volatility Surveillance Panel Summary – D5800

Calibration Oils	✗ – ✓ ✗ ✗ ✓	• All oils (VOLC12, D12 and E12) were greater than target mean • VOLC12 and VOLD12 precision were worse than the target while VOLE12 was slightly better (0.0519, 0.0510, 0.0454, resp) • VOLC12 (0.46s) performance was less severe than last term • VOLD12 performance (0.67s) was much more severe than last period (0.37s) • VOLE12 performance (0.46s) was much more severe than last period (0.04s) • Supply is good for VOL C12, D12, E12 and D18; VOLD14 QC oil will be disposed of this period (2.3gal); PDSC QC analyses donated by SwRI confirmed little to no change in oxidation of fluids (will be reviewed in SP meeting)
Method and LTMS Updates	✓ ✓ ✓	• No D5800 technical memos were issued by the TMC this period • Calibration requirements will be issued as LTMS updates • Annual stats team evaluation review, performed by Elisa Santos, showed no significant changes in precision and that Ln scale is still appropriate

ASTM D7528: ROBO

Summary for D02.B0.07 – June 7, 2021

Status	Test Aspect	Comments
	Method	**Test method is in good standing**: ASTM D7528-17a was published in October 2017. ▪ Expect revision in 2021 to incorporate procedure for dilute NO2 alternative.
	Parts Availability	**All ROBO hardware and test materials are available** ▪ Nitrogen dioxide, the primary catalyst for ROBO, is available from multiple suppliers ▪ Alternative procedure with dilute nitrogen dioxide expected to be approved in 2021.
	Reference Oils	**All current reference oils are in good supply at TMC**: multiyear supply of each oil ▪ Final limits set for 434-3 ▪ Interim limits set for 436. Will be used to replace 438-2.
	Test Availability	**Test is available with no significant queues to report.** ▪ Less activity than prior semesters – reduced demand coincides with launch of GF-6 ▪ ROBO test is available at 6 labs (19 stands) – as of 3/31/2021
	Severity and Precision	**In last semester (Oct 2020 – Mar 2021) precision was worse than target and test ran with a slight mild bias:** ▪ N = 113, Pooled s = 0.3188 and Mean Δ/s = -0.11

ASTM D02.B07

ASTM D7216

ENGINE OIL ELASTOMER COMPATIBILITY (EOEC) & LIGHT DUTY ENGINE OIL COMPATIBILITY (LDEOC)

Virtual Meeting

Mike Birke

Southwest Research Institute

Petroleum Products Research Department

Surveillance Panel Membership

- Terry Bates, ASTM Facilitator
- Udo Boeker, ISP
- Jason Bowden, OHT
- Gail Evans, Lubrizol
- Joe Franklin, Intertek Automotive Research
- Adebeyo Gbolarumi, Cummins
- Becky Grinfield, SWRI
- Tom Schofield, TMC
- Greg Lytle, Solray
- Vince Donndelinger, Lubrizol
- Greg Miiller - Savant
- Kimberly Gutierrez , Intertek Automotive Research
- Doyle Boese, Infineum
- Man Hon Tsang , Chevron
- Gary Svidron, Navistar
- Gefei Wu, Ashland

Current Business (EOEC)

Test Status		Fluoroelast.	Nitrile	Polyacrylate	Silicone	VAMAC	Total
Acceptable Calibration Test	AC	56	59	59	56	51	281
Failed Calibration Test	OC	2	0	0	0	0	2
Operationally Invalid, by lab	LC	1	0	1	0	0	2
Operationally Invalid, by TMC	RC	1	0	0	0	0	1
Aborted	XC	5	5	4	4	3	21
Total		65	64	64	60	54	307

EOEC Lost Tests*

Validity	Cause	#
XC	Corrupted Data	3
XC	Power Failure (mostly weather related)	15
XC	Bath Temperature Off-Spec	1
XC	Test Sample Spilled	1
RC, LC, XC	Wrong Material Run (lab ran LDEOC elastomers in EOEC tests)	4
	Total	24

*Invalid and aborted calibration tests

EOEC Test Severity

- Fluoroelastomer (FKM)

Parameter	Period Mean Δ/s	Status
Volume Change	−0.24	Mild
Points Hardness Change	0.02	On−target
Tensile Strength Change	0.28	Severe
Elongation Change	−0.65	Mild

EOEC Test Severity

- Nitrile (NBR)

Parameter	Period Mean Δ/s	Status
Volume Change	1.72	Severe
Points Hardness Change	0.89	Severe
Tensile Strength Change	−0.60	Mild
Elongation Change	−0.70	Mild

EOEC Test Severity

- Polyacrylate (ACM)

Parameter	Period Mean Δ/s	Status
Volume Change	2.23	Severe
Points Hardness Change	−0.78	Mild
Tensile Strength Change	−0.08	On−target
Elongation Change	0.21	Severe

EOEC Test Severity

- Silicone (VMQ-1)

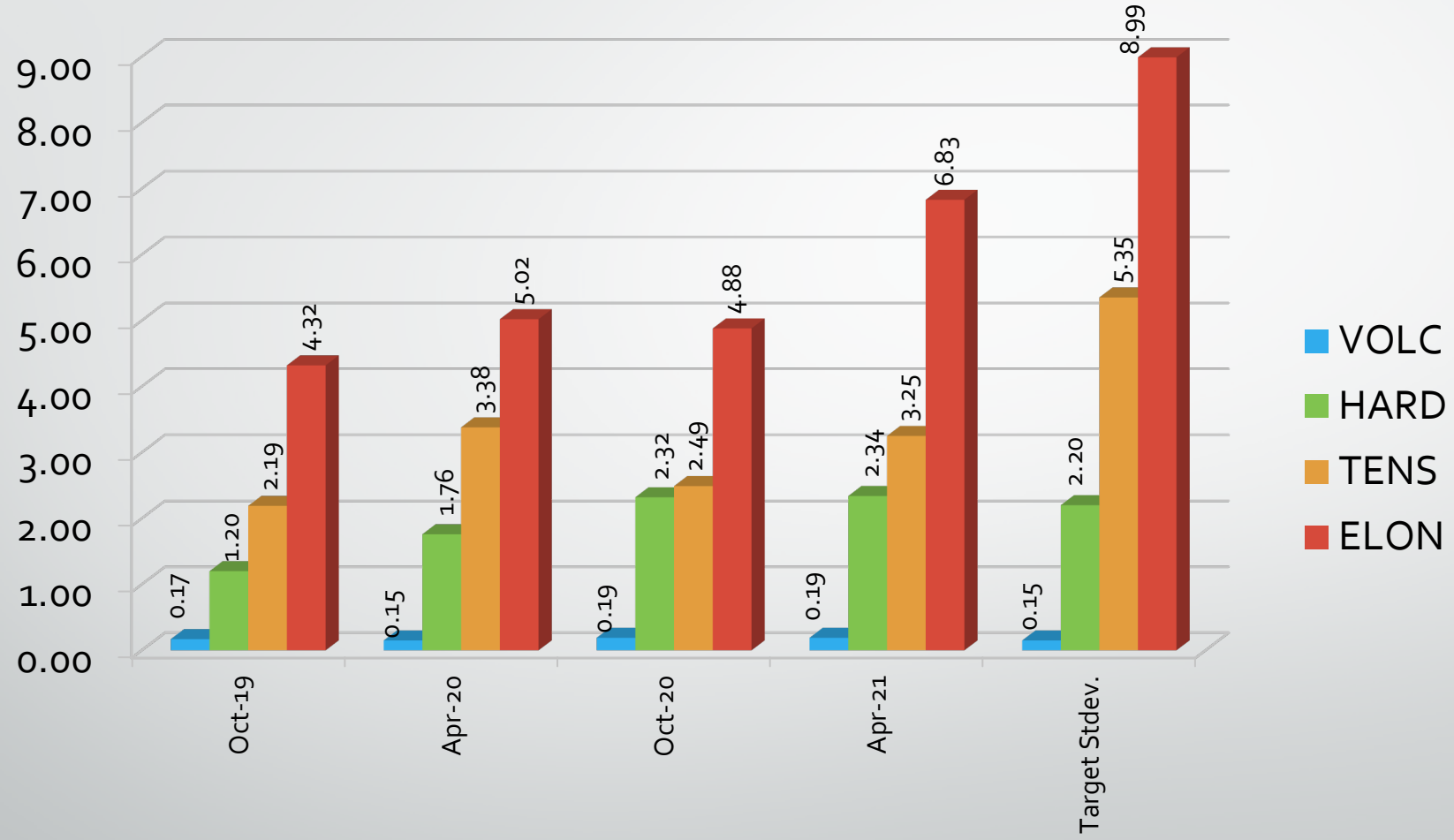
Parameter	Period Mean Δ/s	Status
Volume Change	0.44	Severe
Points Hardness Change	−0.77	Mild
Tensile Strength Change	0.59	Severe
Elongation Change	0.11	Severe

EOEC Test Severity

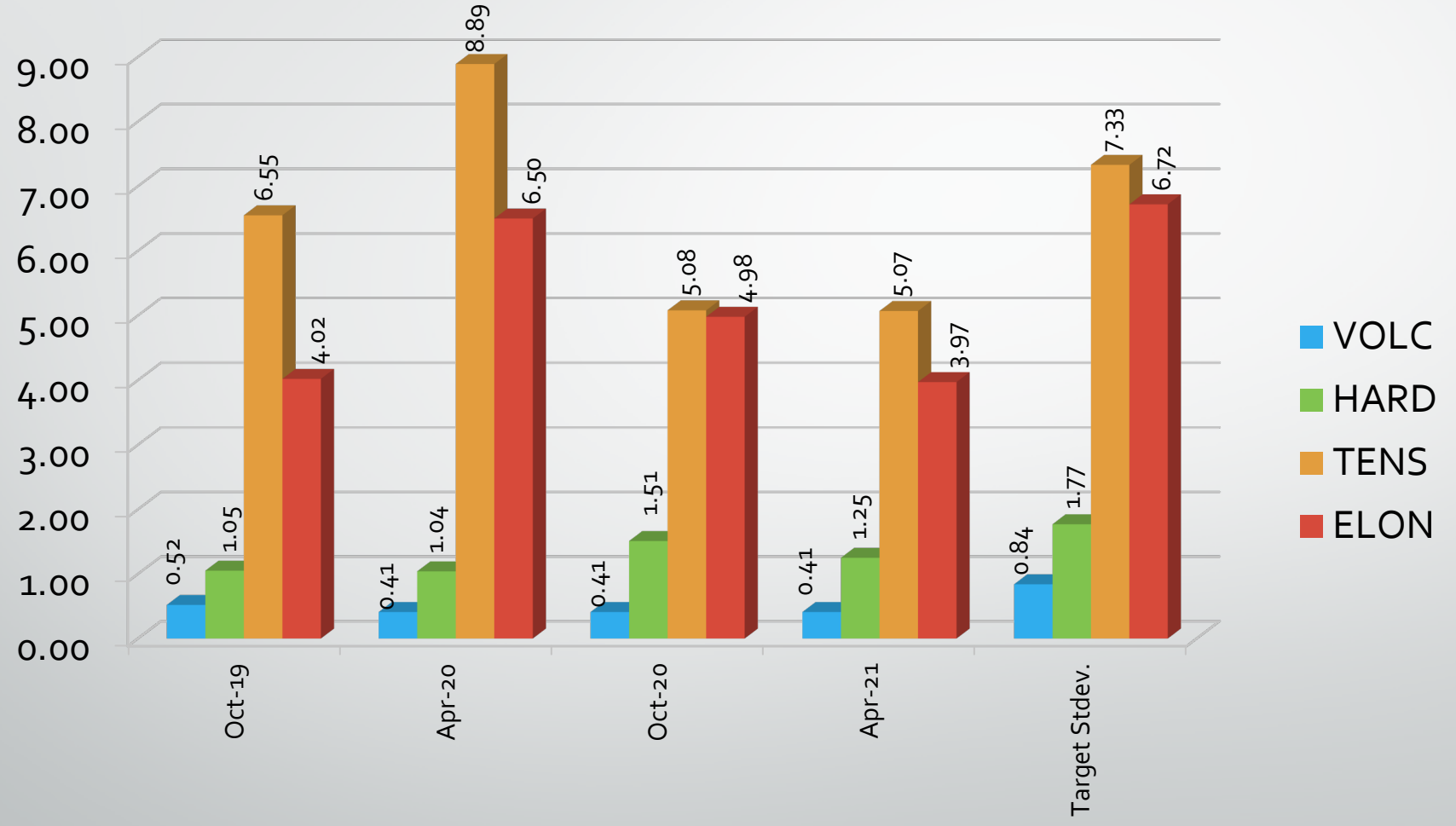
- VAMAC (MAC)

Parameter	Period Mean Δ/s	Status
Volume Change	0.18	Severe
Points Hardness Change	−0.91	Mild
Tensile Strength Change	−0.24	Mild
Elongation Change	−0.51	Mild

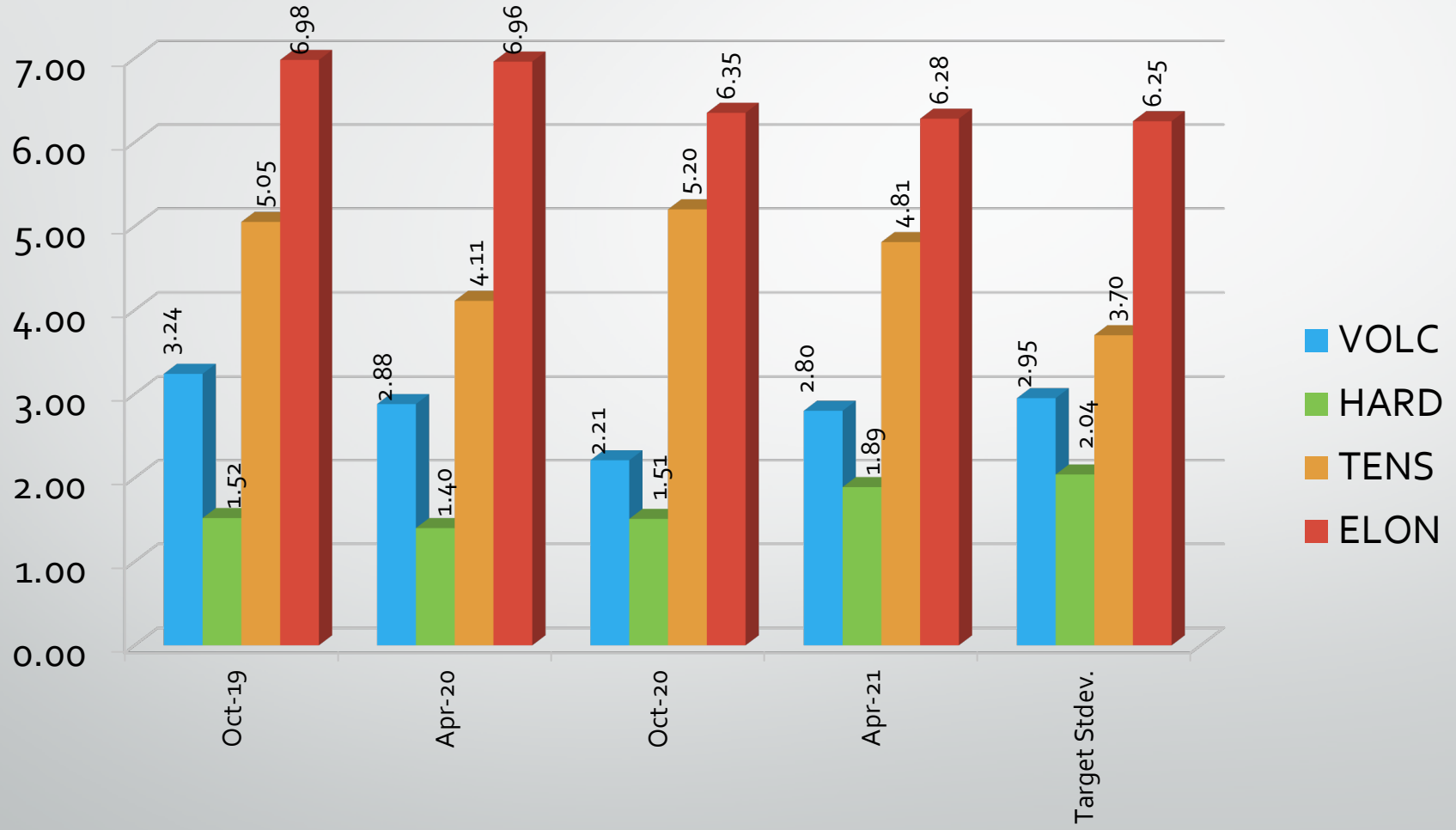
EOEC Precision Estimates - Fluoroelastomer



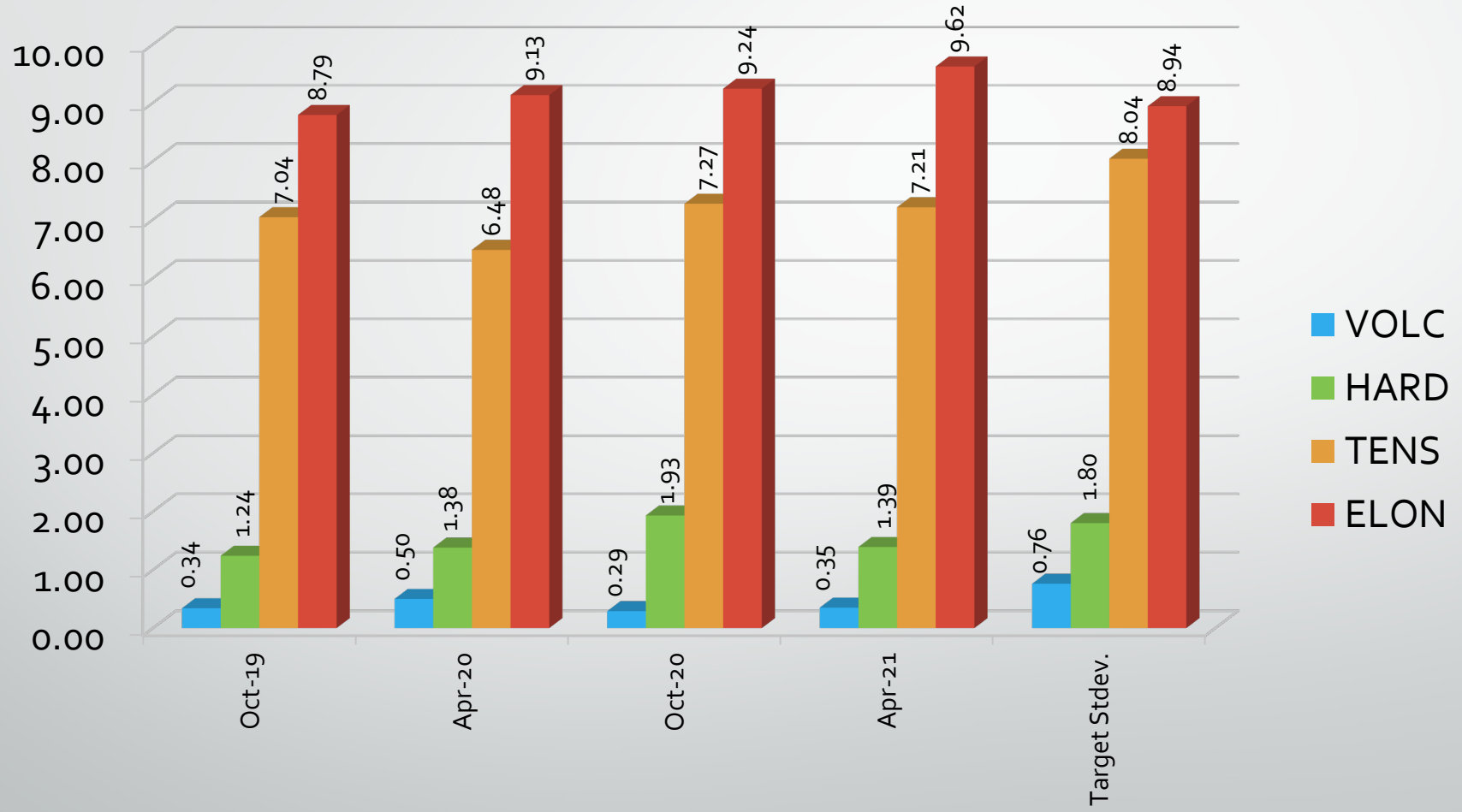
EOEC Precision Estimates - Nitrile



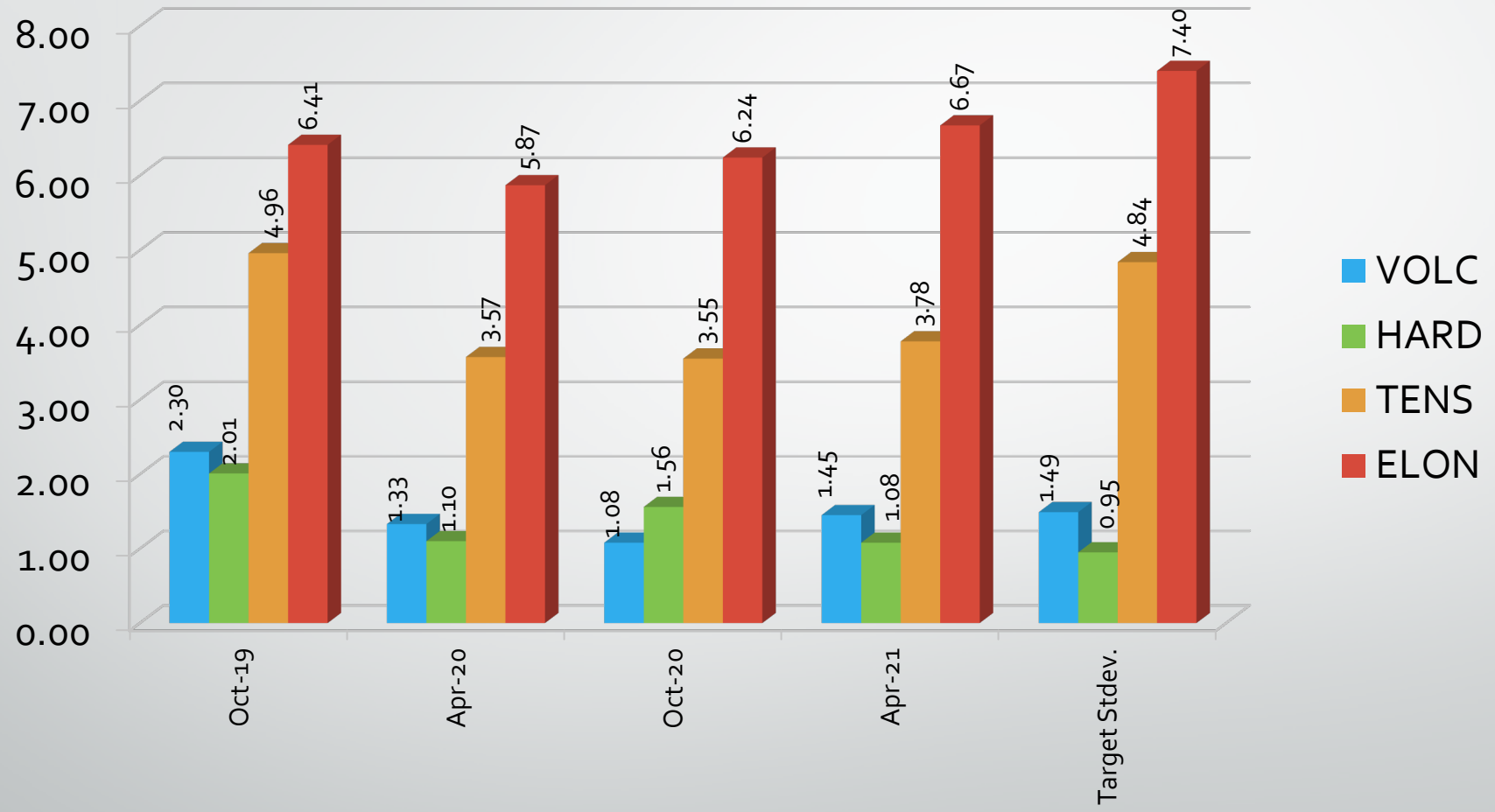
EOEC Precision Estimates - Silicone



EOEC Precision Estimates - Polyacrylate



EOEC Precision Estimates - VAMAC



Information Letters

Test	Date	IL or Memo Number	Topic
EOEC		None	Nothing issued this report period

Reference Oil Inventory Estimated Life

Oil	TMC Inventory Gallons	Gallons Shipped Past 12 Months	Estimated Life
SL107[A, B]	3155	386	5+ years

[A]TMC Inventory is used across several test methods
[B]SL107 replaces oil 1006; still assigning existing lab inventories of 1006 batches where available.

LDEOC Test Activity*

Test Status		Ethylene Acrylate	Fluoroelast.	Nitrile	Polyacrylate	Silicone	Total
Acceptable Calibration Test	AC	67	70	80	72	84	373
Failed Calibration Test	OC	3	0	2	0	3	8
Operationally Invalid, by lab	LC	0	0	0	0	0	0
Operationally Invalid, by TMC	RC	0	0	0	0	0	0
Aborted	XC	2	2	2	2	2	10
Total		72	72	84	74	89	391

*October 1, 2020 – March 31, 2021

LDEOC Lost Tests*

Validity	Cause	#
XC	Bath temperature off-spec	2
XC	Power Failure (mostly weather related)	8
	Total	10

*Invalid and aborted calibration tests

LDEOC Test Severity

- Ethylene Acrylate (AEM1)

Parameter	Period Mean Δ/s	Status
Volume Change	-1.08	Mild
Points Hardness Change	0.05	On-target
Tensile Strength Change	-0.07	On target

LDEOC Test Severity

- Fluoroelastomer (FKM1)

Parameter	Period Mean Δ/s	Status
Volume Change	−0.82	Mild
Points Hardness Change	−0.30	Mild
Tensile Strength Change	0.24	Severe

LDEOC Test Severity

- Nitrile (NBR1)

Parameter	Period Mean Δ/s	Status
Volume Change	1.21	Severe
Points Hardness Change	-0.21	Mild
Tensile Strength Change	-0.58	Mild

LDEOC Test Severity

- Polyacrylate (ACM1)

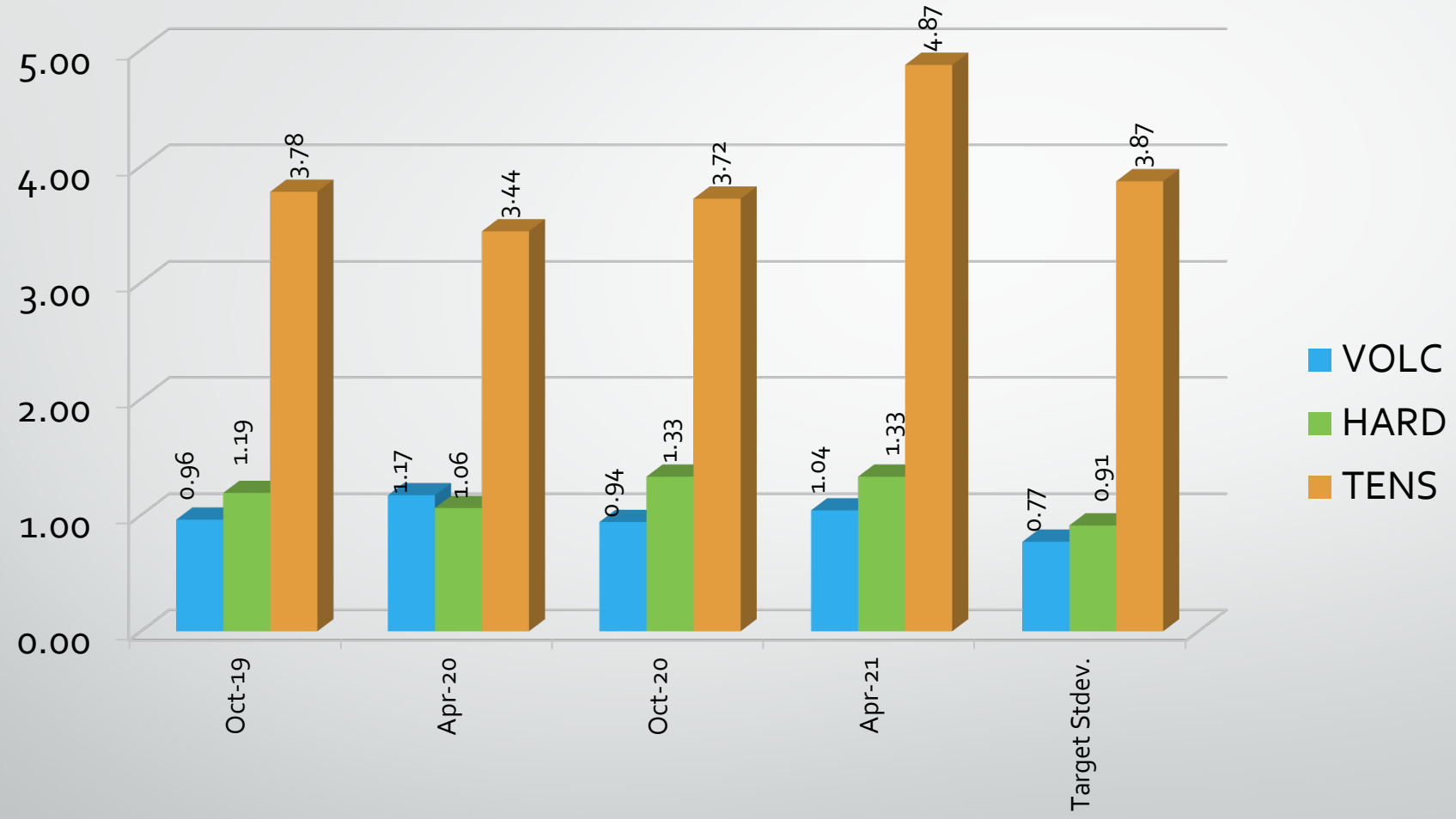
Parameter	Period Mean Δ/s	Status
Volume Change	−0.20	Mild
Points Hardness Change	−1.03	Mild
Tensile Strength Change	−0.47	Mild

LDEOC Test Severity

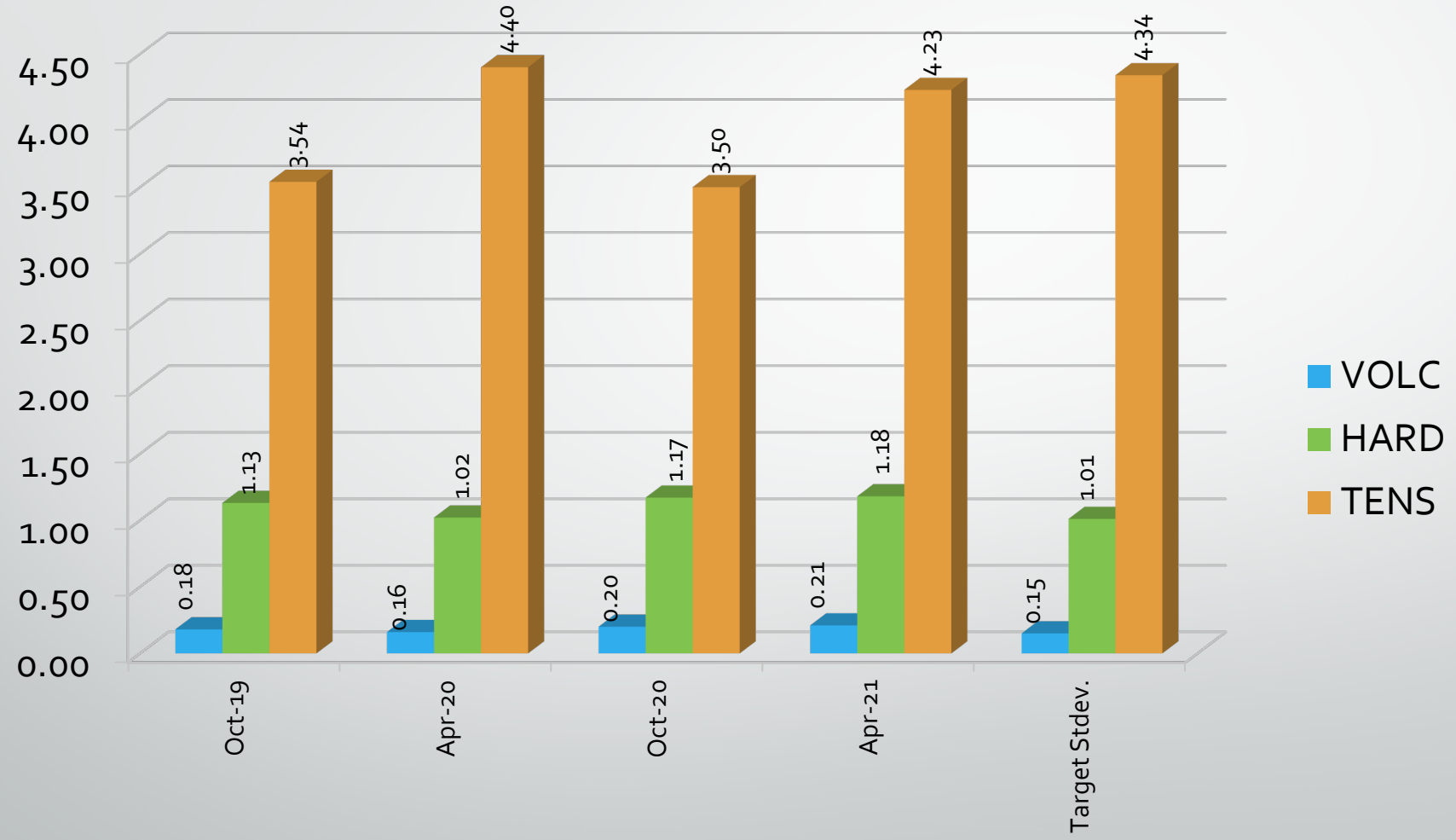
- Silicone (VMQ1)

Parameter	Period Mean Δ/s	Status
Volume Change	0.28	Severe
Points Hardness Change	−0.73	Mild
Tensile Strength Change	0.48	Severe

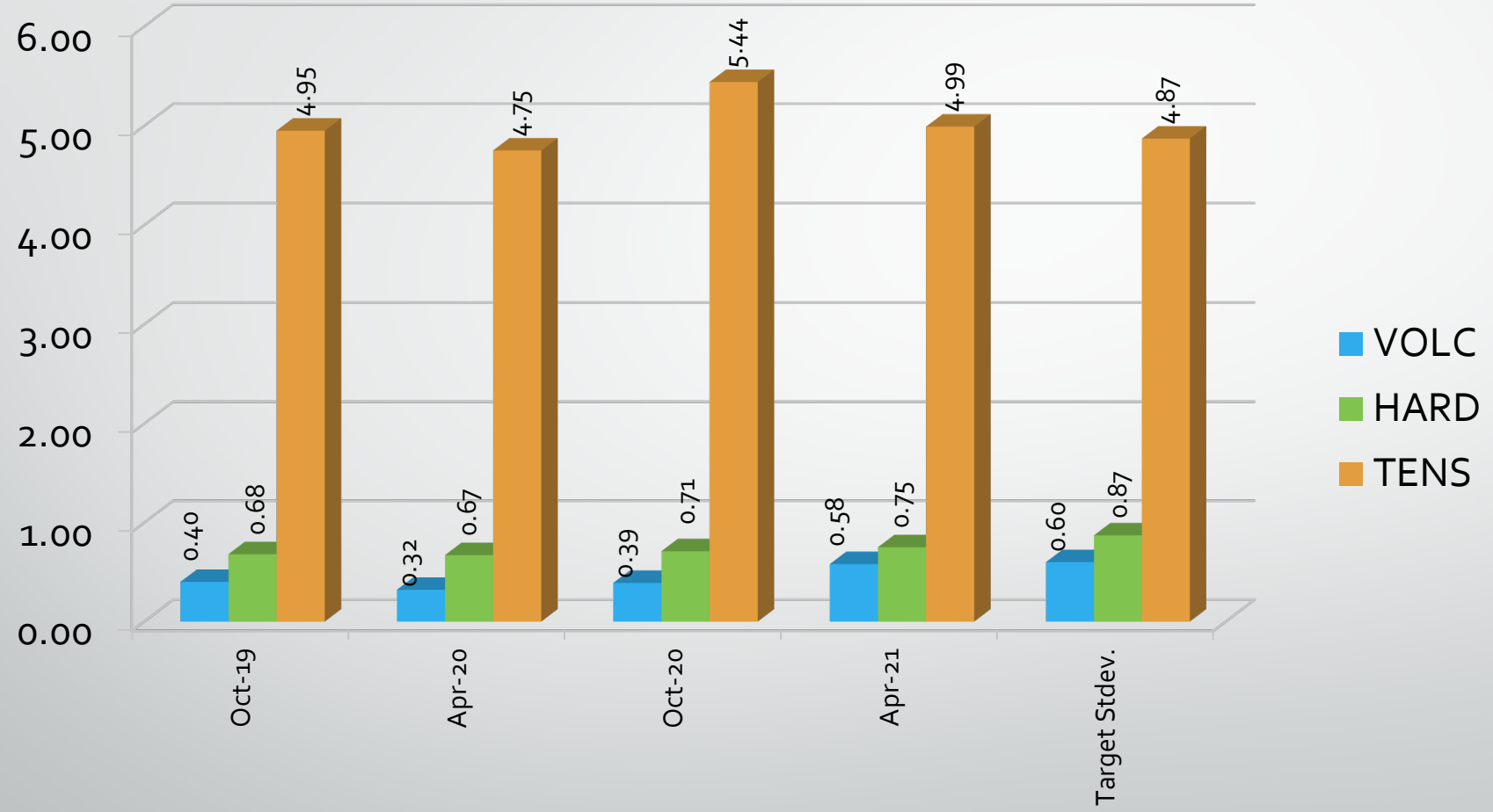
LDEOC Precision Estimates – Ethylene Acrylate



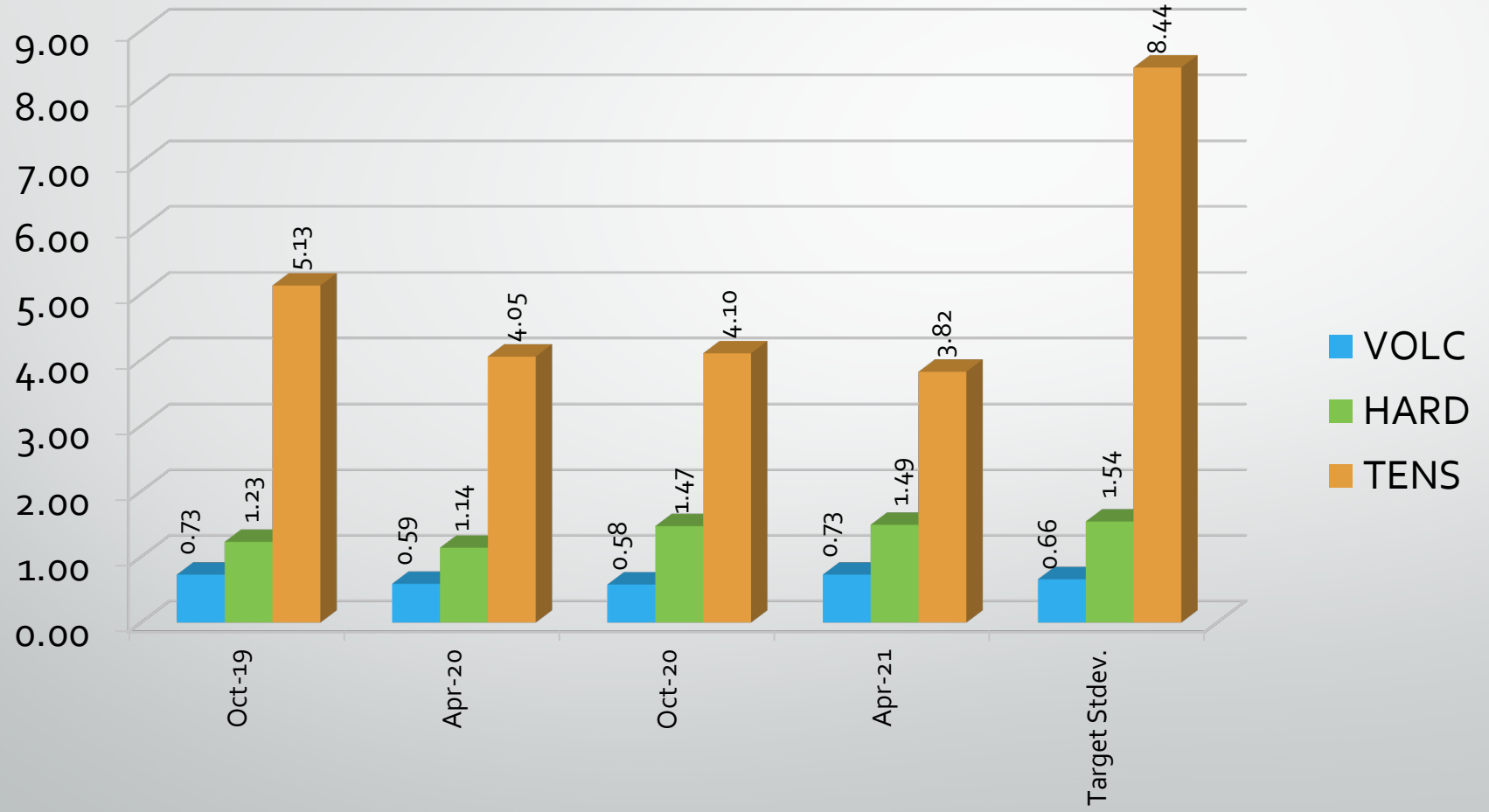
LDEOC Precision Estimates - Fluoroelastomer



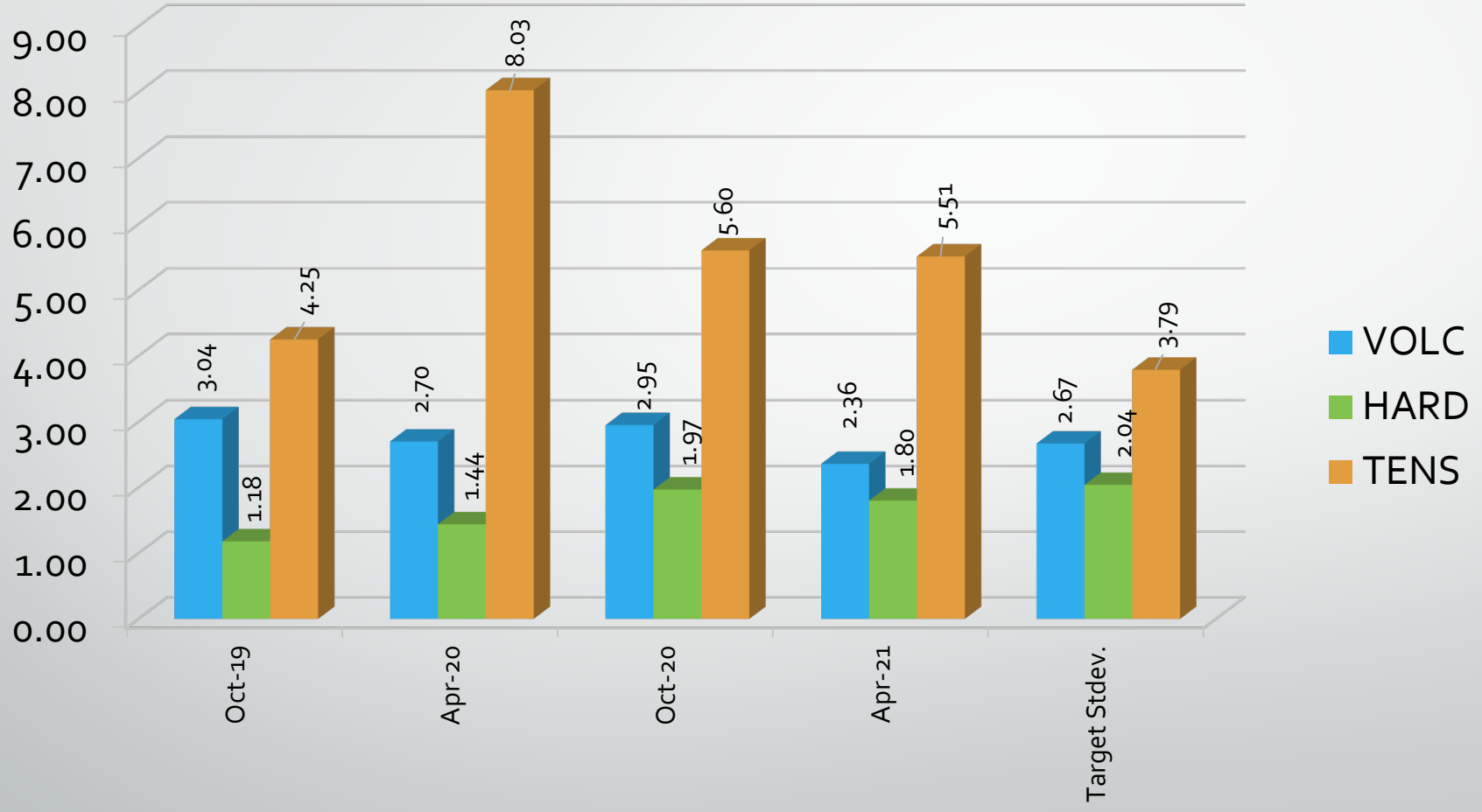
LDEOC Precision Estimates - Nitrile



LDEOC Precision Estimates - Polyacrylate



LDOEC Precision Estimates - Silicone



Information Letters

Test	Date	IL or Memo Number	Topic
LDEOC		None	Nothing issued this report period

Reference Oil Inventory Estimated Life

Oil	TMC Inventory Gallons	Gallons Shipped Past 12 Months	Estimated Life
SL107[A, B]	3155	386	5+ years

[A]TMC Inventory is used across several test methods
[B]SL107 replaces oil 1006; still assigning existing lab inventories of 1006 batches where available.

Miscellaneous Information

- Available on TMC Website:
  - Oil Assignment Request and Test File Upload
  - Live Reference Test Data Bases
  - Surveillance Panel Meeting Minutes

- www.astmtmc.cmu.edu