

To: API Lubricants Group
 Cc: Lubricants Group Mailing List
 API

Ballot for Proposal #2 VGRA Technical Principles

On Nov. 14, 2018 the Lubricants Standards Group (LSG) reviewed the BOI/VGRA Task Force Proposal #2 VGRA Technical Principles.

Incorporate following changes to Table F-1
Ballot ID 4358 (Feb. 2018)

Table F-1 – Technical Principles for New Viscosity Grades and Read Across (Applies to oils with HTHS¹⁵⁰ ≥ 2.6 mPa·s)											
Passenger Car Motor Oils	IID	L-38 /VIII	IIIE/IIIF/ IIIG	IIIGA (Note 2)	IIIGB/ IIHB	IIIH	IVA	VE	VG	VIA/VIB/ VID	
Detergent (dispersant)- inhibitor (DI) content of the read-across viscosity grade shall be equal to or higher than that of the original viscosity grade. The increase in DI is limited to the maximum allowed by the ACC Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	Note 3	
Base stock blend kinematic viscosity at 100°C of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade, considering the precision of the test method	NA	NA	✓	✓	NA	✓	✓	✓	✓	Note 3	
The viscosity modifier (VM) content of the read-across viscosity grade must be equal to or lower than that of the original viscosity grade	NA	NA	Note 4	Note 4	NA	Note 4	✓	✓ or Note 5	✓ or Note 5	Note 3	

Notes:

1. ✓ = principle is applicable; NA = not applicable.
2. Technical principles for the Sequence IIIGA are limited to 0W, 5W, and 10W multigrades.
3. New viscosity grades and associated read-across can only be added after review by the API BOI/VGRA Task Force and approval by the API Lubricants Committee.
4. Viscosity modifier content must be no more than 1.5 times higher than the viscosity modifier content in the oil on which the test was run.
5. For dispersant-type VM, the VM content of the read-across viscosity grade must be equal to or higher than the original viscosity grade.
6. Read-across viscosity grades must contain an equal amount of the same Group V base stock (e.g., ester) in the finished oil blend if a Group V base stock is used in the original viscosity grade.

Incorporate new Technical Principles table extending to low HTHS oils

**Table F-x – Technical Principles for New Viscosity Grades and Read Across
(Applies to oils with HTHS¹⁵⁰ ≥ 2.3 mPa·s)**

Passenger Car Motor Oils		IIHIB	VH
a	Detergent (dispersant)-inhibitor (DI) content of the read-across viscosity grade shall be equal or higher than that of the original viscosity grade. The increase in DI is limited to the maximum allowed by the ACC Code	✓	✓
b	Base stock blend kinematic viscosity at 100°C of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade, considering the precision of the test method	NA	✓
c	The viscosity modifier (VM) content of the read-across viscosity grade must be equal to or lower than that of the original viscosity grade	NA	✓ or Note 4

Notes:

1. ✓ = principle is applicable; NA = not applicable
2. New viscosity grades and associated read-across can only be added after review by the API BOI/VGRA Task Force and approval by the API Lubricants Group
3. Viscosity modifier content must be no more than 1.5 times higher than the viscosity modifier content in the oil on which the test was run
4. For dispersant-type VM, the VM content of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade
5. Read-across viscosity grades must contain an equal amount of the same Group V base stock (e.g., ester) in the finished oil blend if a Group V base stock is used in the original viscosity grade

BOI/VGRA Proposal 2 is given in Attachment 1, pages 2-3. The Motion to Ballot BOI/VGRA Proposal 2 is given on Attachment 1, Page 4. Background Information can be found Attachment 1, pages 5-9.

After review and discussion, the LSG agreed by voice vote to **Ballot New Table F-1 and F-x as shown in recommendations 2A and 2B in this proposal.**

Motion

Adopt New Table F-1 and F-x as shown in recommendations 2A and 2B in this proposal.

Motion by: Rick Dougherty

Second: Chris Castanien

- For: 14
- Against: 0
- Abstain: 0

Motion Passed

Lubricants Group Members should use the API Ballot System to cast their vote and make comments. The Ballot Link is: <http://Ballots.api.org>. The Lubricants Group Member votes will be counted, and all received comments reviewed and considered before the ballot results are final.

Non-Lubricants Group Members should comment on the Ballot Motion using the Ballot system. The Ballot Link is: <http://Ballots.api.org>. All comments on the Ballot Motion will be reviewed before the ballot results are final.

This Ballot will close on January 15, 2019. All Votes and/or Comments must be received by the close date.

Attachment 1

BOI/VGRA Task Force Recommendation to Lubricants Group

2: VGRA Technical Principles

R. C. Dougherty

November 14, 2018

VGRA Technical Principles - Recommendation #2a

Incorporate following changes to Table F-1
Ballot ID 4358 (Feb., 2018)

Table F-1 – Technical Principles for New Viscosity Grades and Read Across
 (Applies to oils with HTHS¹⁵⁰ ≥ 2.6 mPa·s)

Passenger Car Motor Oils	IID	L-38/VIII	IIIE/IIIF/ IIIG	IIIGA (Note 2)	IIIGB/ IIIB	IIIH	IVA	VE	VG	VIA/VIB/ VID
Detergent (dispersant)- inhibitor (DI) content of the read-across viscosity grade shall be equal to or higher than that of the original viscosity grade. The increase in DI is limited to the maximum allowed by the ACC Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	Note 3
Base stock blend kinematic viscosity at 100°C of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade, considering the precision of the test method	NA	NA	✓	✓	NA	✓	✓	✓	✓	Note 3
The viscosity modifier (VM) content of the read-across viscosity grade must be equal to or lower than that of the original viscosity grade	NA	NA	Note 4	Note 4	NA	Note 4	✓	✓ or Note 5	✓ or Note 5	Note 3

Notes:

- ✓ = principle is applicable; NA = not applicable.
- Technical principles for the Sequence IIIGA are limited to 0W, 5W, and 10W multigrades.
- New viscosity grades and associated read-across can only be added after review by the API BOI/VGRA Task Force and approval by the API Lubricants Group.
- Viscosity modifier content must be no more than 1.5 times higher than the viscosity modifier content in the oil on which the test was run.
- For dispersant-type VM, the VM content of the read-across viscosity grade must be equal to or higher than the original viscosity grade.
- Read-across viscosity grades must contain an equal amount of the same Group V base stock (e.g., ester) in the finished oil blend if a Group V base stock is used in the original viscosity grade.

VGRA Technical Principles – Recommendation #2b

Incorporate new Technical Principles table extending to low HTHS oils

Table F-x – Technical Principles for New Viscosity Grades and Read Across
(Applies to oils with HTHS¹⁵⁰ ≥ 2.3 mPa•s)

Passenger Car Motor Oils		IIIHB	VH
a	Detergent (dispersant)-inhibitor (DI) content of the read-across viscosity grade shall be equal or higher than that of the original viscosity grade. The increase in DI is limited to the maximum allowed by the ACC Code	✓	✓
b	Base stock blend kinematic viscosity at 100°C of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade, considering the precision of the test method	NA	✓
c	The viscosity modifier (VM) content of the read-across viscosity grade must be equal to or lower than that of the original viscosity grade	NA	✓ or Note 4

Notes:

- ✓ = principle is applicable; NA = not applicable
- New viscosity grades and associated read-across can only be added after review by the API BOI/VGRA Task Force and approval by the API Lubricants Group
- Viscosity modifier content must be no more than 1.5 times higher than the viscosity modifier content in the oil on which the test was run
- For dispersant-type VM, the VM content of the read-across viscosity grade must be equal to or higher than that of the original viscosity grade
- Read-across viscosity grades must contain an equal amount of the same Group V base stock (e.g., ester) in the finished oil blend if a Group V base stock is used in the original viscosity grade

Motion

- Adopt New Table F-1 and F-x as shown in recommendations 2A and 2B in this proposal.
- Motion by: Rick Dougherty
- Second: Chris Castanien
- For: 14
- Against: 0
- Abstain: 0

Lubricants Group Proposal #2

VGRA Technical Principles



Additional Information

Sequence VH – BOI/VGRA Parametric Impacts

Statisticians Report – June 22, 2018

Model 1 Regression Summary

Term	AES		AEV50		RAC		APV50	
	Credit / Debit	p-Value	Credit / Debit	p-Value	Credit / Debit	p-Value	Credit / Debit	p-Value
Lab		0.3311		0.0828		0.0481		0.9736
Stand[Lab]		0.0962		0.6827		0.3716		0.8586
Tech		<.0001		0.0331		<.0001		0.0102
BOV Calc	Credit	0.0208	Debit	0.2588	Credit	0.1677	Credit	0.1033
Relative VM Treat	Debit	0.0928	Debit	0.2647	Debit	0.3729	Debit	0.4084
BS Group / Slate	Mixed	0.7083	Debit	0.7823	Credit	0.3502	Mixed	0.8351

Statistically significant (p-Value \leq 0.05)

Borderline statistically significant (0.15 > p-Value > 0.05)

- Technology is highly significant for all parameters
- BOV Calculated is statistically significant for AES and borderline significant for APV50.
- Relative VM Treat is borderline statistically significant for AES.
- BS Group / Slate is not statistically significant for any parameter.

Sequence VH – BOI/VGRA Parametric Impacts

Statisticians Report – June 22, 2018

Model 2 Regression Summary

Term	AES		AEV50		RAC		APV50	
	Credit / Debit	p-Value	Credit / Debit	p-Value	Credit / Debit	p-Value	Credit / Debit	p-Value
Lab		0.3085		0.0443		0.0245		0.9417
Stand[Lab]		0.0707		0.6843		0.3934		0.8218
Tech		<.0001		0.0293		<.0001		0.0075
BOV Calc	Credit	0.0048	Debit	0.2020	Credit	0.0477	Credit	0.0256
Relative VM Treat	Debit	0.0636	Debit	0.2565	Debit	0.4061	Debit	0.4279
Sats D7419	Credit	0.3598	Debit	0.5183	Credit	0.2060	Credit	0.6487

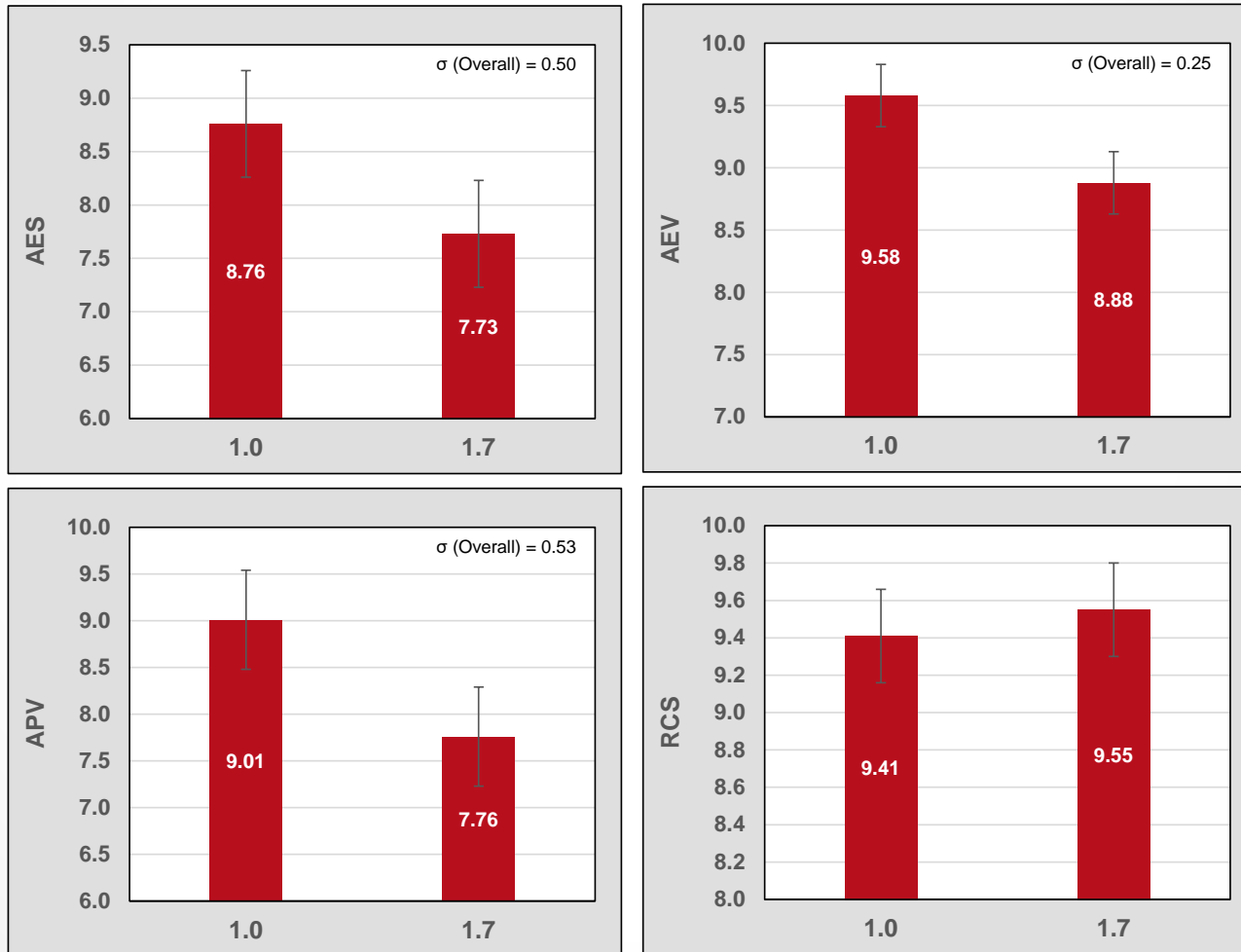
Statistically significant (p-Value ≤ 0.05)

Borderline statistically significant (0.15 > p-Value > 0.05)

- Technology is highly significant for all parameters
- BOV Calculated is statistically significant for AES, RAC and APV50.
- Relative VM Treat is borderline statistically significant for AES.
- Saturates is not statistically significant for any parameter.

Sequence VH Pairwise Comparisons: Impact of Relative VM Treat Level

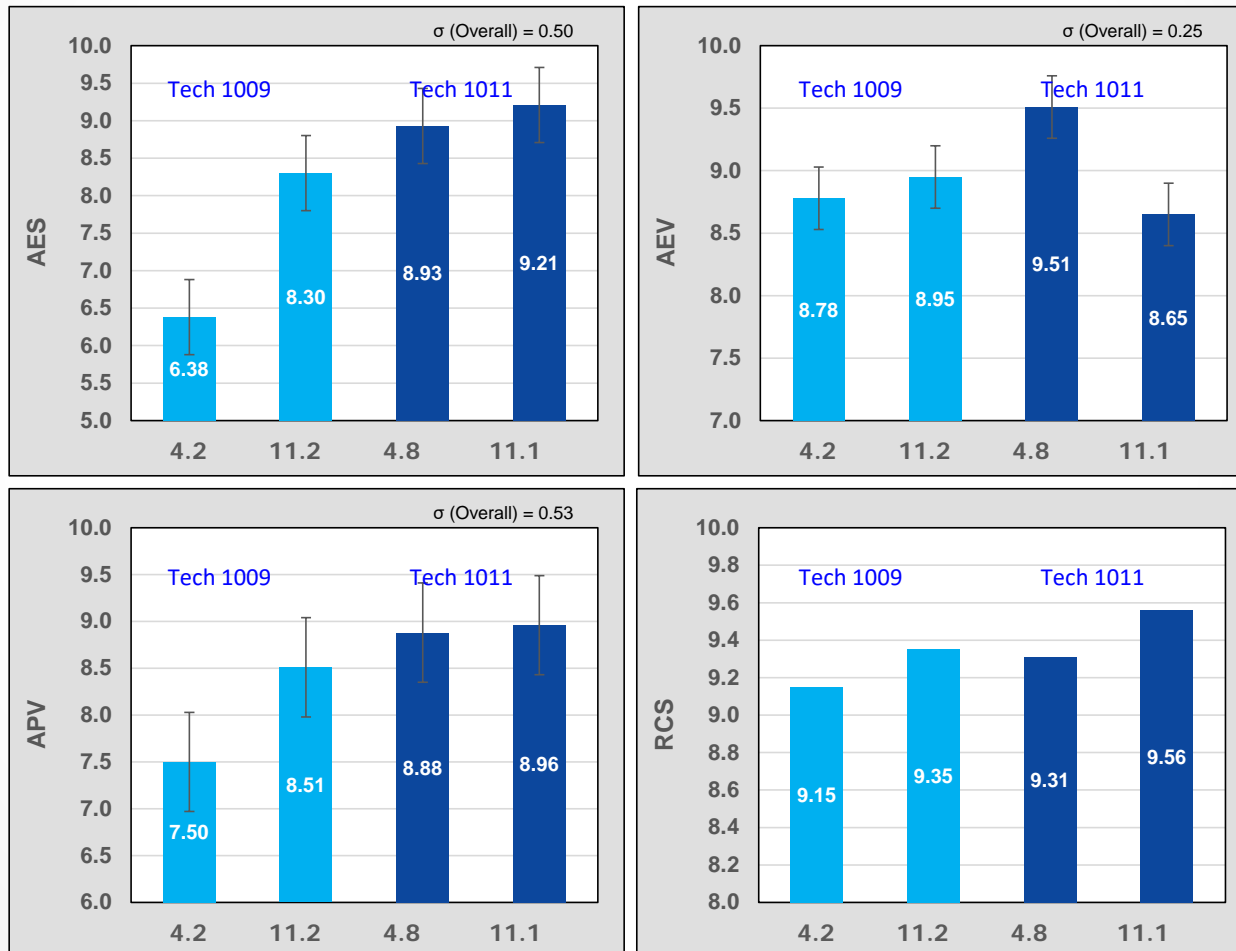
Technology 436; Group II Slate K; 4.2 cSt BOV



Trends consistent with Seq. VG Technical Principles

Sequence VH Pairwise Comparisons: Impact of Base Oil Viscosity

Group II Slate K; Relative VM Treat = 1.0



Trends generally consistent with Seq. VG Technical Principles