



GM dexos®D/dexos2

Submission Guidelines for Formulation Approval

Release Date: November 12, 2024

This document provides the basic guidelines and accepted practices for developers, marketers, and manufacturers of engine oils to obtain consistency and continuous Improvement in the approval process for dexosD/dexos2 products.

GM dexos specifications generally follow the applicable ACC, API, ACEA, and ATIEL Codes of Practice unless stated otherwise in this document. GM retains the right to modify, restrict, or exclude any rule or guideline established in the aforementioned Codes of Practice if deemed detrimental to the quality of dexos licensed products or the dexos brand at any time. GM is the sole arbitrator for any approval or rejection made during the approval process, and any prior agreements or decisions do not set a precedent for future approvals or rejections.

The latest version of this document is available on the GM dexos submissions website. New versions will replace the previous version as they are Issued. Always check the GM dexos submissions site to verify you have the currently published version.

General Rules

1. All performance (GM Engine and Sequence) test data used to support dexos licensure must be from tests that were completed (EOT Date) within five (5) years of the date of Formulation Submission Package (FSP) submission for license.
2. All core Engine Oil formulas must have at least one GM engine test completed and passed on the formula to be granted a license.
3. Base Oils with less than 95% saturates (ASTM D7419) are not permitted in dexos licensed products.
4. All requests to apply BOI, VGRA, MTAC, bracketing, etc., or to forgo testing which the requestor believes is permitted must be accompanied by a reference to and citation from the applicable supporting guidelines (i.e. ACC, API, ATEIL, etc.).
5. All data used to seek and support relief of candidate testing (level 2, minor mods, etc.) must be accompanied by a full test report when presented. Requests which solely indicate “Pass” or “Fail” results for supporting data will not be considered and will be rejected.
6. All Boosters must be identified by a unique code and that code must be used whenever that booster is documented in any dexos related system (TMC, TRC, etc.).

7. All Boosters must be defined in all TMC, TRC systems as to purpose (more than one if appropriate), function and general chemical category for all components.
8. Candidate data sets that contain a failing engine/performance test shall not be used to support a dexos application.
9. When reading test data from a non-dexos or API licensed formula for the purpose of achieving dexos approval, the tested formula and data must be ACC registered and the sponsor must ensure that it can meet current dexos specification requirements. When requested, the sponsor must provide GM with evidence that the tested formula meets all pertinent dexos tests.

Base Oil Interchange (BOI) and Viscosity Grade Read Across (VGRA) Guidelines

M111 Fuel Economy

VGRA Guideline 3 VGRA guidelines for the M111 Fuel Economy engine test

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20		no	no	no	no	no	no
0W-30	yes if <input type="checkbox"/>		no	no	no	no	no
0W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>		yes if <input type="checkbox"/>	no	no	no
5W-20	yes if <input type="checkbox"/>	no	no		no	no	no
5W-30	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>		no	no
5W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>		no
5W-50	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	

**VGRA for "non-dispersant" viscosity modifier only.
"Dispersant" type polymer must run final formulation.**

(*) Yes, VGRA is permitted provided the following requirements are met:

- The KV40 of the finished lubricant of the read-across viscosity grade is lower than or equal to that of the tested viscosity grade.
- The KV100 of the finished lubricant of the read-across viscosity grade is lower than or equal to that of the tested viscosity grade.
- The HTHS@150°C viscosity of the finished lubricant of the read-across viscosity grade is lower than or equal to that of the tested viscosity grade.

Guideline BOI.3 BOI guidelines for the M111 Fuel Economy engine test

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)									
	Group I		Group II		Group III		Group IV		Group V	
Group I	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	
	>10%	HTHS, KV40 conditions (1)	10%–30%	HTHS, KV40 conditions (1)	>30%	required	>30%	required		
Group II	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	
	10%–30%	HTHS, KV40 conditions (1)	>10%	HTHS, KV40 conditions (1)	>30%	required	>30%	required		
Group III	≤10%	not required	≤10%	not required	≤10%	not required	≤30%	not required	required	
	10%–30%	HTHS, KV40 conditions (1)	10%–30%	HTHS, KV40 conditions (1)	>10%	HTHS, KV40 conditions (1)	>30%	required		
Group IV	≤10%	not required	≤10%	not required	≤30%	not required	≤10%	not required	required	
	10%–30%	HTHS, KV40 conditions (1)	10%–30%	HTHS, KV40 conditions (1)	>30%	required	≥10%	conditions on PAO characteristics (2)		
Group V	required		required		required		required		required	

(1) No M111FE testing is required if the HTHS@150°C and KV40 values of the interchange formulation are lower than or equal to that of the original formulation.

(2) Group IV base stocks (PAOs) can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

OM646LA

VGRA Guideline 4 VGRA guidelines for the OM646LA engine test

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20		yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
0W-30	no		yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
0W-40	no	no		no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-20	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>		yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-30	no	no	yes if <input type="checkbox"/>	no		yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-40	no	no	no	no	no		yes if <input type="checkbox"/>
5W-50	no	no	no	no	no	no	

VGRA for "non-dispersant" viscosity modifier only.

"Dispersant" type polymer must run final formulation.

(*) Yes, VGRA is permitted for multigrade lubricants if the KV100 in the read-across viscosity grade is greater than or equal to that of the tested viscosity grade.

Guideline BOI.4 BOI guidelines for the OM646LA engine test

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)									
	Group I		Group II		Group III		Group IV		Group V	
Group I	not required		≤10% >10%	not required required	not required		not required		required	
Group II	≤10% >10%	not required required	≤10% >10%	not required required	≤30% >30%	not required required	≤30% >30%	not required required	required	
Group III	≤10% >10%	not required required	≤10% >10%	not required required	≤10% >10%	not required required	≤30% >30%	not required required	required	
Group IV	≤10% >10%	not required required	≤10% >10%	not required required	≤30% >30%	not required required	≤10% >10%	not required conditions on PAO characteristics (1)	required	
Group V	required		required		required		required		required	

(1) Group IV base stocks (PAOs) can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

DV6C

VGRA Guideline 1 VGRA guidelines for the DV6C₂ or M271Evo engine tests for lubricants formulated with **non-dispersant type of viscosity modifier**

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20	no	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no
0W-30	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no
0W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-20	no	no	no	yes if <input type="checkbox"/>	no	no	no
5W-30	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	no	no	no
5W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no
5W-50	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>

(*) Yes, VGRA is permitted if the **viscosity modifier concentration increase** in the read-across viscosity grade vs the tested viscosity grade is **less than 15% mass fraction relative**.

If the viscosity modifier concentration increase is larger than 15% mass fraction relative, VGRA can be permitted if **technical support data** as defined in Section h.16 of the ATC Code of Practice is available to justify read across.

VGRA Guideline 2 VGRA guidelines for the DV6C or M271Evo engine tests for lubricants formulated with **dispersant type of viscosity modifier**

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no
0W-30	no	yes if <input type="checkbox"/>	no	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
0W-40	no	no	no	no	no	no	yes if <input type="checkbox"/>
5W-20	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	no	no	no
5W-30	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	no	no
5W-40	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-50	no	no	yes if <input type="checkbox"/>	no	no	no	no

(*) Yes, VGRA is permitted if the viscosity modifier concentration variation in the read-across viscosity grade vs the tested viscosity grade is **less than +20% mass fraction relative increase or less than -10% mass fraction relative decrease**.

If the viscosity modifier concentration increase is increased by more than +20% mass fraction relative or decreased by more than -10% mass fraction relative, VGRA can be permitted if a **technical support data** as defined in Section h.16 of the ATC Code of Practice is available to justify read across.

Guideline BOI.2 BOI guidelines for the DV6C engine test

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)								
	Group I		Group II		Group III		Group IV		Group V
Group I	not required		≤10% not required >10% required	not required required	≤30% not required >30% required	not required required	≤30% not required >30% required	not required required	required
Group II	≤10% not required >10% required	not required required	≤10% not required >10% required	not required required	≤30% not required >30% required	not required required	≤30% not required >30% required	not required required	required
Group III	≤10% not required >10% required	not required required	≤10% not required >10% required	not required required	≤10% not required >10% required	not required required	≤30% not required >30% required	not required required	required
Group IV	≤10% not required >10% required	not required required	≤10% not required >10% required	not required required	≤30% not required >30% required	not required required	≤10% not required >10% conditions on PAO characteristics (1)	not required required	required
Group V	required		required		required		required		required

(1) Group IV base stocks (PAOs) can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

M271EVO Black Sludge

VGRA Guideline 1 VGRA guidelines for the DV6C₂ or M271Evo engine tests for lubricants formulated with **non-dispersant type of viscosity modifier**

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20	no	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no
0W-30	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no
0W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
5W-20	no	no	no	no	no	no	no
5W-30	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	no	no	no
5W-40	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no
5W-50	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>

(*) Yes, VGRA is permitted if the viscosity modifier concentration increase in the read-across viscosity grade vs the tested viscosity grade is less than 15% mass fraction relative.

If the viscosity modifier concentration increase is larger than 15% mass fraction relative, VGRA can be permitted if technical support data as defined in Section h.16 of the ATC Code of Practice is available to justify read across.

VGRA Guideline 2 VGRA guidelines for the DV6C or M271Evo engine tests for lubricants formulated with **dispersant type of viscosity modifier**

Test run on	Can be read-across to						
	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50
0W-20	no	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no
0W-30	no	no	yes if <input type="checkbox"/>	no	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>
0W-40	no	no	no	no	no	no	yes if <input type="checkbox"/>
5W-20	yes if <input type="checkbox"/>	no	no	no	yes if <input type="checkbox"/>	no	no
5W-30	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no	no	yes if <input type="checkbox"/>	no
5W-40	no	yes if <input type="checkbox"/>	yes if <input type="checkbox"/>	no	no	no	yes if <input type="checkbox"/>
5W-50	no	no	yes if <input type="checkbox"/>	no	no	no	no

(*) Yes, VGRA is permitted if the viscosity modifier concentration variation in the read-across viscosity grade vs the tested viscosity grade is less than +20% mass fraction relative increase or less than -10% mass fraction relative decrease.

If the viscosity modifier concentration increase is increased by more than +20% mass fraction relative or decreased by more than -10% mass fraction relative, VGRA can be permitted if a technical support data as defined in Section h.16 of the ATC Code of Practice is available to justify read across.

Guideline BOI.1 BOI guidelines for the M271Evo engine test

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)									
	Group I		Group II		Group III		Group IV		Group V	
Group I	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	required
	>10%	required	>10%	required	>30%	required	>30%	required	required	required
Group II	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	required
	>10%	required	>10%	required	>30%	required	>30%	required	required	required
Group III	≤10%	not required	≤10%	not required	≤10%	not required	≤10%	not required	required	required
	>10%	required	>10%	required	>10%	required	>10%	required	required	required
Group IV	≤10%	not required	≤10%	not required	≤10%	not required	≤10%	not required	required	required
	>10%	required	>10%	required	>10%	required	>10%	conditions on PAO characteristics (1)	required	required
Group V	required	required	required	required	required	required	required	required	required	required

(1) Group IV base stocks (PAOs), can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

EP6CDT

VGRA Guideline 6 VGRA Guideline for the EP6CDT engine test

(Applicable only to engine lubricant with non-dispersant type of viscosity modifier)

VGRA is permitted if the viscosity modifier treat-rate is decreased, or if the increase in viscosity modifier treat-rate in the read-across viscosity grade vs the tested viscosity grade is less than 15% mass fraction relative.

This VGRA Guideline is the result of a statistically designed matrix of EP6 test oils run by ATC and ATIEL on a diverse range of technologies. **As no xW-16 oil was tested during the matrix, until further testing is completed, it's not allowed to read-across any results to xW-16 lubricants.**

If the viscosity modifier treat-rate increase is greater than 15% mass fraction relative, VGRA can be permitted if technical support data (as defined in Section h.15 of the ATC Code of Practice) is available to justify read across.

Guideline BOI.5 BOI guidelines for the TDi3, OM646LA Bio & EP6CDT engine tests

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)									
	Group I		Group II		Group III		Group IV		Group V	
Group I	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	
	>10%	required	>10%	required	>30%	required	>30%	required	required	
Group II	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	
	>10%	required	>10%	required	>30%	required	>30%	required	required	
Group III	≤10%	not required	≤10%	not required	≤10%	not required	≤30%	not required	required	
	>10%	required	>10%	required	>10%	required	>30%	required	required	
Group IV	≤10%	not required	≤10%	not required	≤30%	not required	≤10%	not required	required	
	>10%	required	>10%	required	>30%	required	>10%	conditions on PAO characteristics (1)	required	
Group V	required		required		required		required		required	

⁽¹⁾ Group IV base stocks (PAOs) can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

1KD-FTV Toyota Turbo Deposit Test

VGRA Guideline 7 VGRA Guideline for the Toyota Turbo Deposit test

*(Applicable only to engine lubricant with **non-dispersant type of viscosity modifier**)*

VGRA is permitted if the **Base Oil Viscosity (BOV)** at 100°C of the read across viscosity grade is equal to or higher than that of the tested viscosity grade.

Base oil viscosity at 100°C is the kinematic viscosity of the base oil blend at 100°C of the formulation before additives, viscosity modifier and pour point depressant are added.

This VGRA Guideline is the result of a statistically designed matrix of Toyota Turbo Deposit test oils run by ATC and ATIEL on a diverse range of technologies. The results of the test matrix also showed viscosity modifier treat rates had no effect on the results of the test. **As the matrix used for testing included xW-16 oils, this guideline can be used to read-across supporting results to xW-16 products.**

No provisional BOI Guidelines have been established for the moment for this test. Consequently, there is no BOI allowed except from one 10% interchange from any base stock from group I, II, III or IV to another base stock from group I, II, III or IV.

VW TDI3

VGRA Guideline 10 VGRA Guideline for the VW TDI3 test (*)

(Applicable only to engine lubricant with **non-dispersant type of viscosity modifier**)

VGRA is permitted if the **Base Oil Viscosity (BOV) at 100°C** of the read across viscosity grade is **equal to or higher** than that of the tested viscosity grade.

Base oil viscosity at 100°C is the kinematic viscosity of the base oil blend at 100°C of the formulation before additives, viscosity modifier and pour point depressant are added.

VGRA is permitted if the **viscosity modifier treat-rate** is **decreased**, or if the **increase** in viscosity modifier treat-rate in the read-across viscosity grade vs the tested viscosity grade is **less than 15% mass fraction relative**.

If the viscosity modifier treat-rate increase is greater than 15% mass fraction relative, VGRA can be permitted if **technical support data** (as defined in Section h.16 of the ATC Code of Practice) is available to justify read across.

This VGRA Guideline is the result of a statistically designed matrix of VW TDI3 tests run by ATC and ATIEL on a diverse range of technologies. **As the matrix used for testing included xW-16 oils, this guideline can be used to read-across supporting results to xW-16 products.**

Guideline BOI.5 BOI guidelines for the TDi3, OM646LA Bio & EP6CDT engine tests

From Original base stock	To Interchange Base Stock (all % in mass of the formulated lubricant)									
	Group I		Group II		Group III		Group IV		Group V	
Group I	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	required
	>10%	required	>10%	required	>30%	required	>30%	required		
Group II	≤10%	not required	≤10%	not required	≤30%	not required	≤30%	not required	required	required
	>10%	required	>10%	required	>30%	required	>30%	required		
Group III	≤10%	not required	≤10%	not required	≤10%	not required	≤30%	not required	required	required
	>10%	required	>10%	required	>10%	required	>30%	required		
Group IV	≤10%	not required	≤10%	not required	≤30%	not required	≤10%	not required	required	required
	>10%	required	>10%	required	>30%	required	>10%	conditions on PAO characteristics (1)		
Group V	required		required		required		required		required	

(1) Group IV base stocks (PAOs) can be interchanged without additional qualification testing, providing that the interchange PAO meets the original PAO manufacturer's specifications for physical and chemical properties. The following key properties must be met in the substituted stock: KV100, KV40 and KV-40; viscosity index; Noack; pour point; unsaturates.

Sequence IVB

**Table F-9—Groups I, II, III and IV Viscosity Read-Across: Sequence IVB Test
Nondispersant Viscosity Modifier**

Test Run on	Can Be "Read-Across" to:								
	0W-16	0W-20	0W-30	5W-20	5W-30	10W-30	10W-40	15W-40	20W-50
0W-16	NA	X	X	X	X	X	X	X	X
0W-20	X	NA	X	X	X	X	X	X	X
0W-30	X	X	NA	X	X	X	X	X	X
5W-20	—	—	—	NA	X	X	X	X	X
5W-30	—	—	—	X	NA	X	X	X	X
10W-30	—	—	—	—	—	NA	X	X	X
10W-40	—	—	—	—	—	X	NA	X	X
15W-40	—	—	—	—	—	—	—	NA	X
20W-50	—	—	—	—	—	—	—	—	NA

Notes:

1. X = read-across is permitted for the viscosity grades identified based on data and some applications of the technical principles approved by API BOI/VGRA Task Force and API Lubricants Standards Group.
2. A dash (—) means that read-across is not permitted; NA = not applicable.
3. Relative viscosity modifier treat level was not found to be a statistically significant factor impacting Sequence IVB performance. The range of relative VM treat levels evaluated in the BOI/VGRA matrix was 1.0x to 1.7x.
4. New viscosity grades and associated read-across are allowed if the requirements described in F.1.3 are met.
5. Tested formulations containing Group V stocks must contain an equal amount of the same Group V base stock (e.g., ester) in the finished oil blend for application of viscosity grade read-across.

Table E-7—Sequence IVB Tests Required for Interchanging the Base Stock

Base Stock in Original Test Oil	Interchange Base Stock				
	Group I	Group II	Group III	Group IV	Group V
Group I	Required	Required	Required	Required	Required
Group II	Required	Not Required if base oil viscosity @ 100°C ≥ original	Not Required if base oil viscosity @ 100°C ≥ original	Required	Required
Group III	Required	Not Required if base oil viscosity @ 100°C ≥ original	Not Required if base oil viscosity @ 100°C ≥ original	Required	Required
Group IV	Required	Required	Required	Not Required provided the interchange Group IV meets original manufacturer's specifications in all physical and chemical properties	Required
Group V	Required	Required	Required	Required	Required

Note: The guidelines in this table were developed from data generated on oil with viscosity grades from SAE 0W-16 to SAE 20W-50. These do not restrict application of the guidelines by the marketer that is responsible for ensuring that each licensed engine oil satisfies all engine and bench test performance requirements.

Sequence VH

- VGRA Is not permitted. Run on final formulation.
- BOI Is not permitted. Run on final formulation.

Sequence VIII

- VGRA Is not permitted. Run on final formulation.
- BOI Is not permitted. Run on final formulation.

Release and Revision History

Revision #	Date	Description
1	11/12/2024	Initial release