

ILMA Engage Spring Conference

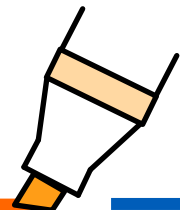
PCMO update

Padu Sreenivas / April 11, 2024

ILSAC GF-7 update

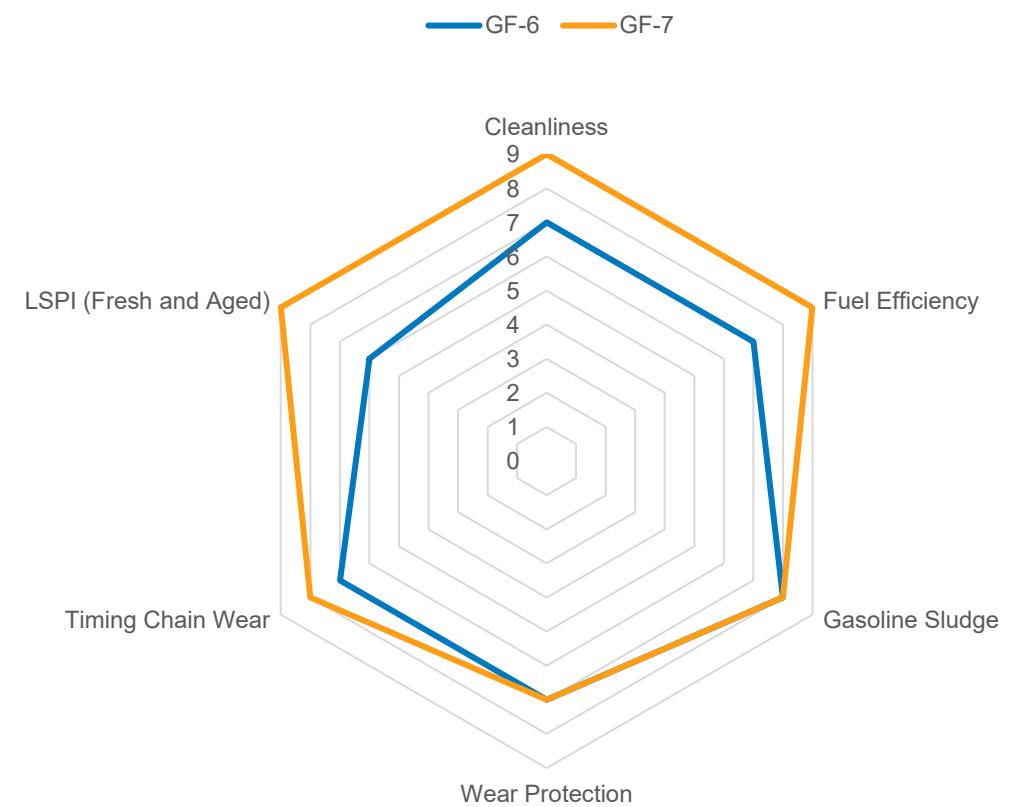
The ILSAC GF-7 Category Upgrade

ILSAC GF-7 – What is it?



- **ILSAC first license date of March 31,2025**
- Key priority is to enable OEMs to meet new CAFÉ regulations taking place on 2026MY
- Current requirements include a significant upgrade to the IIH, Aged LSPI, and VIE limits
- Most specification upgrades take years to complete, however, given the only “new” test is the Aged Oil LSPI test and development has been completed, ILSAC and OEMs timeline is achievable

ILSAC GF-6 vs. ILSAC GF-7



GF-7 Specification – Key Changes

- 1 Aged LSPI**

 - Address field issue resulting in warranty claims
 - Aged LSPI test with equivalent limits to Seq. IX
- 2 Fuel Efficiency**

 - OEMs face fines for missing CAFE limits beginning 2026MY
 - 4.3 / 2.1 FEI SUM / II for xW-20
 - 3.6 / 1.8 FEI SUM / II for xW-30
- 3 Piston Cleanliness**

 - 4.6 min WPD in Seq. IIH
- 4 GPF Adoption**

 - GPFs will be adopted to meet emissions requirements
 - Sulfated ash 0.9% max
- 5 Timing Chain Wear**

 - 0.080% max in Seq. X
- 6 Gelation Issues**

 - New Ford bench test
 - No limits, only report when available
- 7 Oil Pumpability**

 - Address field issue resulting in warranty claims
 - 40,000 cP max for fresh MRV
- 8 Elastomer Compatibility**

 - 4 new elastomers D7216
 - No limits, only report

Most meaningful changes come from the addition of the Aged LSPI test and increased IIH and VIE Limits

ILSAC GF-7 limits – Engine Tests

Test	Parameter	Current SP/GF-6 Limit	ILSAC GF-7
IIIH	PVIS	100 max	100 max
	WPD ₁	4.2 min	4.6 min
IVB	Hot Stuck Rings	None	None
	Average Intake Lifter Volume Loss	2.7 max	2.7 max
	End of Test Iron, ppm	400 max	400 max
VH	AES	7.6 min	7.6 min
	RCS	7.7 min	7.7 min
	AEV	8.6 min	8.6 min
	APV	7.6 min	7.6 min
	Oil screen clogging, %	Rate & Report	Rate & Report
	Hot Stuck Rings	None	None
VIE	XW-20 Sum	3.8 min	4.3 min
	XW-20 FEI 2	1.8 min	2.1 min
	XW-30 Sum	3.1 min	3.6 min
	XW-30 FEI 2	1.5 min	1.8 min
	10W-30 Sum	2.8 min	3.0 min
	10W-30 FEI 2	1.3 min	1.4 min
VIF	0W-16 Sum	4.1	4.3 min
	0W-16 FEI2	1.9	2.1 min
VIII ²	Bearing Weight Loss	26 max	26 max
IX	Average # of Events	5	5
Aged IX (NEW TEST)	Average # of Events	N/A	5 max
X	Number of Events/Iteration	N/A	8 max
	% increase	0.085 max	0.080 max

Footnotes:

- Sequence IIIH WPD proposed limit for ILSAC GF-7B (0W-16) is 4.2 WPD
- Sequence VIII is not required for ILSAC GF-6B and will not be required for GF-7B (0W-16)

ILSAC GF-7 limits - Bench Tests

Test	Parameter	Current SP/GF-6 Limit	GF-7 limits
D4684	MRV	60,000 max	40,000 max
D5133	Gelation Index	12 max	12 max
D4951	Phos Content	0.08% max	0.08% max
D8111	Phos Retention	81% min	81% min
D4951	Sulfur Content	0.5% max	0.5% max
D874	Sulfated Ash	-	0.9% max
D7216A2	Seals Testing	ACM1, HNBR1, VMQ1, FKM1, AEM1	Addition of New elastomers: ACM2, AEM2, AEM3, FKM3 Rate & Report
D5800	Evaporation Loss	15% max	15% max
D6278	Shear Stability	SIG	SIG
D6335	TEOST 33C	30 max	30 max
D6794	EOWTT @ 0.6%, 1.0%, 2.0% and 3.0% water	50% max reduction	50% max reduction
D6795	EOFT	50% max reduction	50% max reduction
TBD	Gelation Bench Test	-	TBD (New Method - Modified with SAE paper) – Rate & Report
D892	Fresh Foam Sequences I, II and III	10/0; 50/0; 10/0	10/0; 50/0; 10/0
D6082	High Temperature Foam Seq. IV	100 / 0	100 / 0
D7528 or D8111	Aged ROBO or IIIHA Low Temp Viscosity	SIG	SIG
D6922	Homogeneity and Miscibility	Pass	Pass
D6557	Ball Rust Test	100 min	100 min
D7563	Emulsion Retention	No water separation	No water separation

Note:

1. MRV tighter limit expected for ILSAC viscosity grades only

Current PCMO Upgrade Status

- API SQ has not been formally defined yet, but traditionally is ILSAC category with the removal of a few items such as Sequence VI
- SAE 0W-8/12 is still on the table currently for API
- Fresh Oil MRV requirement will likely only apply to ILSAC grades
- ILSAC request for GF-8 (anticipated timing 2028)
 - Timing to balance PC-12 upgrade and PCMO
 - ILSAC draft proposal has new engine (Seq. V, VI, Aged LSPI) and Bench Tests (seals, Cu corrosion, Noack) and stricter limits (IIH, etc.)
 - Expect delays

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