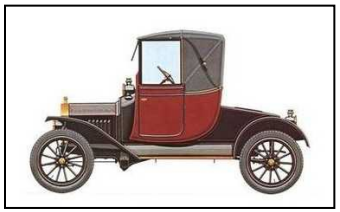
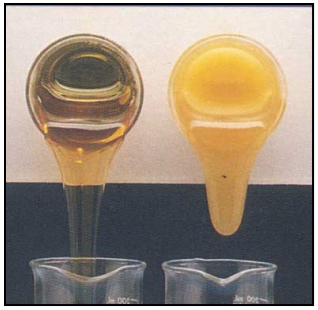
Dec. 3, 2006 – ASTM Symposium – Lake Buena Vista, FL





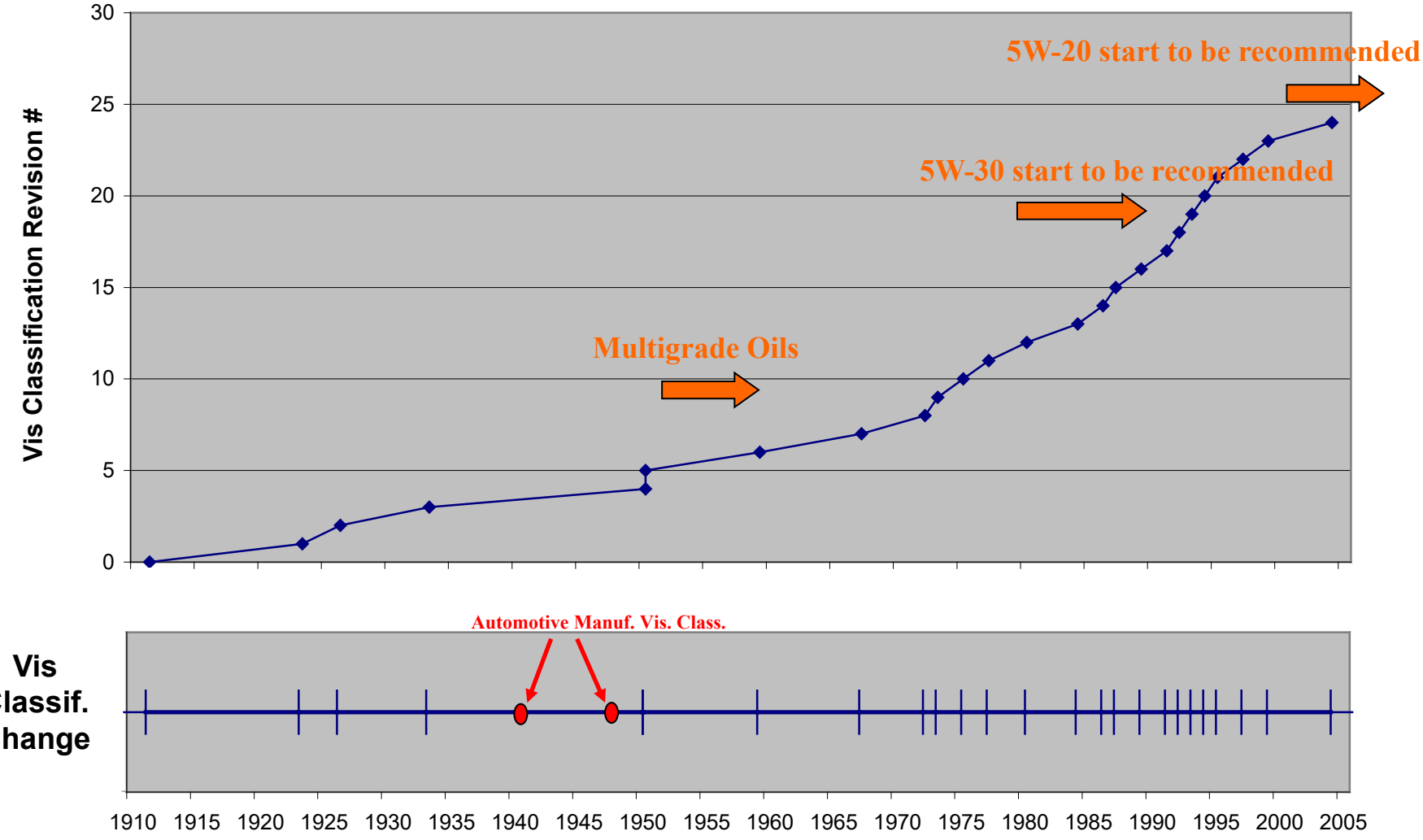
A Brief History of the SAE Viscosity Classification System

C.J. May

Introduction

- The following provides an overview of changes to the SAE viscosity classification, which celebrates its 95th birthday this year
- As an 'elder statesman' of a classification, it's seen plenty of changes and bumps along the way!
- While contemplating where we want to go, it's good to have a perspective of how we got to where we are today
- After strolling through this specification history today, you should be able to amaze your friends and family by being able to answer tricky questions like:
  - When was the first 5W specification introduced?
  - Has the classification always been based purely on viscosity/rheology?
  - Which came first, the 10W or 15W classification?
  - What's the record for referencing an 'interim' method/spec in J300?

SAE Viscosity Classification Overview



ExxonMobil Lubricants & Specialties

SAE Viscosity Classification: 1923

Specification No.[1]	Flash-Point, Deg. Fahr., Min. Cleveland Open Cup	Fire-Point, Deg. Fahr., Min.	Average Viscosity, Saybolt Universal, Sec.				Dilution with Water-White Kerosene for No.5 N.P.A Color		Pour Test, Deg. Fahr., Max.	Conradson Carbon Residue, Per Cent, Max.	Corrosion Test,
			100 Deg. Fahr.		210 Deg. Fahr.						
			Min.	Max.	Min.	Max.	Parts, Kerosene	Parts, Oil			
20	325	365	180	220	42	---	50	50	35	0.20	Required for all grades
020	325	365	180	220	42	---	50	50	10	0.20	
30	335	380	270	330	44	---	50	50	40	0.30	
030	335	380	270	330	44	---	50	50	10	0.30	
40	315	390	360	440	46	---	60	40	45	0.40	
50	355	400	450	575	50	---	70	30	50	0.60	
60	360	---	---	---	55	65	80	20	55	0.80	
80	380	---	---	---	75	85	85	15	55	1.50	
95	390	---	---	---	90	100	90	10	55	1.75	
115	400	---	---	---	110	120	95	5	60	2.00	

- **10 different viscosity classifications including two 'low temperature' grades (020, 030)**
- **High temp specs for 100/210°F**
- **20-50 grade numbers indicate first 2 digits of average 100°F SUS viscosity; 60-115 numbers are first 2 digits of average 210°F viscosity**
- **Specifications included flash, fire point, colour, pour point, carbon residue, corrosion**

SAE Viscosity Classification: 1926

Viscosity Number	Viscosity Range Saybolt Universal, Sec.	
	At 130 Deg. Fahr.	At 210 Deg. Fahr.
10	90-115	---
20	120-150	---
30	185-220	---
40	255 -	- 70
50	---	75 - 95
60	---	105 - 120

Classification totally revamped:

- **Viscosities only (other performance requirements dropped)**
- **2 temperatures: 130/210°F**
- **Low pour grades dropped**
- **No relation between Viscosity Number and viscosity or range**

SAE Viscosity Classification: 1933

Viscosity Number	Viscosity Range Saybolt Universal, Sec.	
	At 130 Deg. Fahr.	At 210 Deg. Fahr.
10	90 - <120	---
20	120 - <185	---
30	185 - <255	---
40	---	<75
50	---	75 - <105
60	---	105 - <125
70	---	125 - <150
	Viscosity Range at 0 Deg. F., Saybolt Univ. Sec. (tentative)	
	Min.	Max
10W	5,000	10,000
20W	10,000	40,000

Adopted by Auto. Manuf. Vis. Classif. 1941

- Modified high temp vis ranges, New 70 Grade Added
- 'Tentative' classifications for 10W and 20W at 0°F (based on extrapolations)

SAE Viscosity Classification: 1950

SAE Viscosity Number	Viscosity Range, Saybolt Universal, Sec.			
	At 0 F		At 210 F	
	Minimum	Maximum	Minimum	Maximum
5W	---	4,000	---	---
10W	6,000	< 12,000	---	---
20W	12,000	48,000	---	---
20	---	---	45	<58
30	---	---	58	<70
40	---	---	70	<85
50	---	---	85	110

May 1950

- **60 & 70 Grade dropped**

Oct. 1950

- **10W, 20W grades added (consistent with 1948 revised Auto. Manuf. Specs)**
- **New 5W grade added, 10 Grade eliminated**
- **Two temperatures only: 0°F for W grades, 210°F for non-W grades (some modifications of ranges**

SAE Viscosity Classification: 1959

SAE Viscosity Number	Viscosity Range, Saybolt Universal, Sec.			
	At 0 F		At 210 F	
	Minimum	Maximum	Minimum	Maximum
5W	---	4,000	---	---
10W	6,000[a]	< 12,000	---	---
20W	12,000[b]	48,000	---	---
20	---	---	45	<58
30	---	---	58	<70
40	---	---	70	<85
50	---	---	85	110

[a] Minimum viscosity at 0 F may be waived provided viscosity at 210 F is not below 40 SUS
[b] Minimum viscosity at 0F may be waived provided viscosity at 210 F is not below 45 SUS

- **Footnotes added: low temp minima waived if high temp viscosity conditions met (all oils must have min. 39 SUS viscosity at 210°F)**
- **Statement on multiviscosity numbered oils (issued in 1955 as "SAE general info") incorporated into the recommended practice (now referred to as SAE J300)**

SAE Viscosity Classification: 1967

SAE Viscosity Number	Viscosity Units[a]	Viscosity Range[b]			
		At 0 F		At 210 F	
		Min	Max	Min	Max
5W	cP	---	<1,200	---	---
	cSt	---	1,300	---	---
	SUS	---	6,000	---	---
10W	cP	1,200[c]	<2,400	---	---
	cSt	1,300	2,600	---	---
	SUS	6,000	12,000	---	---
20W	cP	2,400[d]	<9,600	---	---
	cSt	2,600	10,500	---	---
	SUS	12,000	48,000	---	---

SAE Viscosity Number	Viscosity Units[a]	Viscosity Range[b]			
		At 0 F		At 210 F	
		Min	Max	Min	Max
20	cSt	---	---	5.7	< 9.6
	SUS	---	---	45	58
30	cSt	---	---	9.6	< 12.9
	SUS	---	---	58	70
40	cSt	---	---	12.9	< 16.8
	SUS	---	---	70	85
50	cSt	---	---	16.8	< 22.7
	SUS	---	---	85	110

[a] Official values based on 210 F in cSt and 0 F in cP (D2602)
[b] Viscosity of all oils shall not be less than 3.9 cSt at 210 F
[c] Minimum vis at 0 F may be waived provided vis at 210 F is not below 4.2 cSt (40 SUS)
[d] Minimum vis at 0F may be waived provided vis at 210 F is not below 5.7 cSt (45 SUS)

- **W grades now based on measured CCS limit at 0°F; Non-W grades now based on kinematic viscosity (cSt) at 210°F**
- **Recommended temperatures in selecting operating limits for oils: -10, 0, 10, 32, 90°F**
- **Low temp cSt/SUS equivalents and high temp SUS equivalents for info only**
- **Now referred to as SAE J300a**

SAE Viscosity Classification: 1972

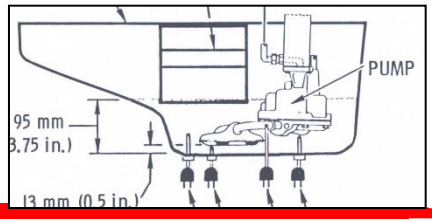
SAE Viscosity Number	Viscosity Units[a]	Viscosity Range[b]			
		At 0 F (-18C)		At 210F (99C)	
		Min	Max	Min	Max
5W	cP	---	<1,200	---	---
	cSt	---	1,300	---	---
	SUS	---	6,000	---	---
10W	cP	1,200[c]	<2,400	---	---
	cSt	1,300	2,600	---	---
	SUS	6,000	12,000	---	---
20W	cP	2,400[d]	<9,600	---	---
	cSt	2,600	10,500	---	---
	SUS	12,000	48,000	---	---

SAE Viscosity Number	Viscosity Units[a]	Viscosity Range[b]			
		At 0 F (-18C)		At 210 F (99C)	
		Min	Max	Min	Max
20	cSt	---	---	5.7	< 9.6
	SUS	---	---	45	58
30	cSt	---	---	9.6	< 12.9
	SUS	---	---	58	70
40	cSt	---	---	12.9	< 16.8
	SUS	---	---	70	85
50	cSt	---	---	16.8	< 22.7
	SUS	---	---	85	110

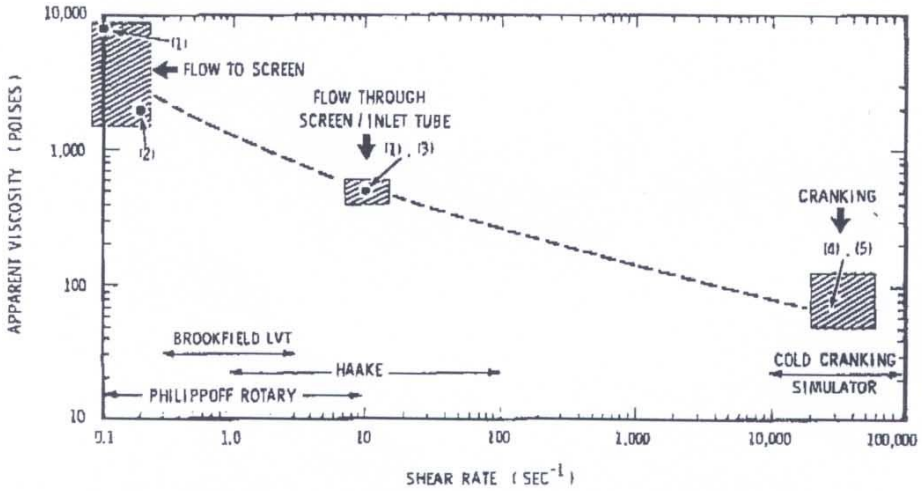
[a] Official values based on 210 F (99C) in cSt and 0 F (-18C) in cP (D2602)
[b] Viscosity of all oils shall not be less than 3.9 cSt at 210 F (99C) (39 SUS)
[c] Minimum vis at 0 F (-18C) may be waived provided vis at 210 F (99C) is not below 4.2 cSt (40 SUS)
[d] Minimum vis at 0F (-18C) may be waived provided vis at 210 F (99C) is not below 5.7 cSt (45 SUS)

- **Soft metrication of temperature values for reference**
- **Continues to be referred to as SAEJ300a**

SAE Viscosity Classification: 1973



- No changes to Table
- Text of standard notes "*It is recognized that certain low-temperature viscosity-related phenomena are not measured by the test methods of this recommended practice*" and refers to a new Appendix referencing progress in relating low temperature pumpability to oil viscosity with figure shown below (shear rate - apparent viscosity regimes)
- Recommended practice now referenced as SAE J300b



1. F. F. Tao and W. E. Waddey, "Low Shear Viscometry and Cold Flow Mechanism-Engine Oils." Paper 730481, SAE SP-382.
2. M. L. McMillan and C. K. Murphy, "The Relationship of Low-Temperature Rheology to Engine Oil Pumpability." Paper 730478, SAE SP-382.
3. R. M. Stewart and M. F. Smith, Jr., "Proposed Laboratory Methods for Predicting the Low Temperature Pumpability Properties of Crankcase Oils." Paper 730479, SAE SP-382.
4. "Determination of Low-Temperature Cranking Characteristics of Engine Oils at −20°F using CRC L-49-663 Research Test Technique." CRC Report 405, January 1967.
5. M. L. Haviland, "Engine and Transmission Lubricant Viscosity Effects on Low Temperature Cranking and Starting." SAE Transactions, Vol. 78 (1969), paper 690768.

FIG. A-1—ESTIMATED MAXIMUM OIL VISCOSITIES AT LOW TEMPERATURES (NUMBERS IN PARENTHESES DESIGNATE REFERENCES LISTED AT SIDE OF ILLUSTRATION)

SAE Viscosity Classification: 1975

- **Addition of footnote 'e' referencing 15W grade (at request of Europeans):**

  "SAE 15W may be used to identify SAE 20W oils which have a maximum viscosity at 0°F (-18°C) of 4800 cP."

- **Reference to ASTM pumpability studies moved to body of specification text with indication that specifications will be forthcoming**

- **Section added on prediluted oils for 2-cycle applications and viscosity grade classification**

- **Now referred to as SAE J300c**

SAE Viscosity Classification: 1977

Major changes to content & look of the table:

- **Viscosity Number changed to Viscosity Grade**

SAE Viscosity Grade	Viscosity Range		
	Centipoises (cP) at -18°C (ASTM D 2602)	Centistokes (cSt) at 100°C (ASTM D 445)	
	Maximum	Minimum	Maximum
5W	1,250	3.8	---
10W	2,500	4.1	---
20W[a]	10,000	5.6	---
20	---	5.6	< 9.3
30	---	9.3	< 12.6
40	---	12.5	< 16.3
50	---	16.3	< 21.9

Note: 1 cP = 1 mPa-s; 1 cSt = 1 mm^2/s

[a] SAE 15W may be used to identify SAE 20W oils which have a maximum viscosity at 0°F (-18°C) of 4800 cP.

- **SUS (and cSt at low temp) references removed along with °F temperatures**
- **Kinematic viscosities at 100°C with appropriate adjustment to limits ('W' grades included)**
- **CCS specifications based on maxima only ('W' grades)**
- **Reference to pumpability limits moved back into Appendix which now references DS-57 and comments that a recommended practice is expected in 1977 or 1978**
- **Recommended practice is now SAE J300d**

SAE Viscosity Classification: 1980

Major changes to content & look of the table:

- **Addition of 0W, 25W, formal addition of 15W to table**

SAE Viscosity Grade	Viscosity[a] (cP) at Temperature (°C)	Borderline Pumping Temperature[b] (°C)	Viscosity[c] (cSt) at 100°C	
	Max	Max	Min	Max
0W	3,250 at -30	-35	3.8	---
5W	3,500 at -25	-30	3.8	---
10W	3,500 at -20	-25	4.1	---
15W	3,500 at -15	-20	5.6	
20W	4,500 at -10	-15	5.6	---
25W	6,000 at -5	-10	9.3	
20	---	---	5.6	< 9.3
30	---	---	9.3	< 12.6
40	---	---	12.5	< 16.3
50	---	---	16.3	< 21.9

Note: 1 cP = 1 mPa-s; 1 cSt = 1 mm^2/s

[a] See Appendix

- **Multi-temp CCS limits with method added as Appendix A (-30 to -5°C depending on grade); wording added that "*only the lowest 'W' grade should be referred to on the label*"**
- **New MRV Borderline Pumping (D3829) requirements added, 5°C lower than corresponding CCS grade temperature**
- **Recommended practice is now SAE J300 SEP80**

SAE J300 APR1984

SAE Viscosity Grade	Viscosity[a] (cP) at Temperature (°C)	Borderline Pumping Temperature[b] (°C)	Stable Pour Point[c] (°C)	Viscosity[c] (cSt) at 100°C	
	Max	Max	Max	Min	Max
0W	3,250 at -30	-35	---	3.8	---
5W	3,500 at -25	-30	-35	3.8	---
10W	3,500 at -20	-25	-30	4.1	---
15W	3,500 at -15	-20	---	5.6	
20W	4,500 at -10	-15	---	5.6	---
25W	6,000 at -5	-10	---	9.3	
20	---	---	---	5.6	< 9.3
30	---	---	---	9.3	< 12.6
40	---	---	---	12.5	< 16.3
50	---	---	---	16.3	< 21.9

- **Following pumpability field failures in 1980-1982, Stable Pour test requirement added for 5W, 10W grades only and method added to Appendix (metrification of FTM 791b-203); Text wording on SPP: "interim basis only", advises how blenders should handle testing**
- **CEC-L-32-T-82 (Brookfield viscosity method) added as alternate to D3829 for BPT**
- **Clarification given on lowest 'W' grade labelling requirements**
- **SAE J300 JUN86: references section added**

SAE J300 JUN87

SAE Viscosity Grade	Viscosity[a] (cP) at Temperature (°C)	Borderline Pumping Temperature[b] (°C)	Viscosity[c, d] (cSt) at 100°C	
	Max	Max	Min	Max
0W	3,250 at -30	-35	3.8	---
5W	3,500 at -25	-30	3.8	---
10W	3,500 at -20	-25	4.1	---
15W	3,500 at -15	-20	5.6	
20W	4,500 at -10	-15	5.6	---
25W	6,000 at -5	-10	9.3	
20	---	---	5.6	< 9.3
30	---	---	9.3	< 12.6
40	---	---	12.5	< 16.3
50	---	---	16.3	< 21.9
60	---	---	21.9	< 26.1

- **BPT for 0W, 20W, 25W to be measured by D3829 or CEC Brookfield method; BPT for 5W, 10W, 15W to be measured by D4684 (slow-cool MRV)**
- **Stable Pour specs removed (text note suggests checking, and method stays in Appendix B)**
- **60 grade added**
- **1st mention of HTHS, methods, some OEM's have limits, formulators should consider these**
- **Addition of 'Intent' statement that if engine cranks the oil should pump; oil needs to meet both**

SAE J300 JUN89

SAE Viscosity Grade	Viscosity (cp) at Temperature (°C), Max		Viscosity[c, d] (cSt) at 100°C	
	Cranking[a]	Pumpability[b]	Min	Max
0W	3,250 at -30	30,000 at -35	3.8	---
5W	3,500 at -25	30,000 at -30	3.8	---
10W	3,500 at -20	30,000 at -25	4.1	---
15W	3,500 at -15	30,000 at -20	5.6	
20W	4,500 at -10	30,000 at -15	5.6	---
25W	6,000 at -5	30,000 at -10	9.3	
20	---	---	5.6	< 9.3
30	---	---	9.3	< 12.6
40	---	---	12.5	< 16.3
50	---	---	16.3	< 21.9
60	---	---	21.9	< 26.1

- **Pumpability changed from BPT to Viscosity/Yield Stress limits at defined temperatures as measured by D4684 (slow-cool) for all W grades**
- **Text continues to reference older D3829 and CEC-L-32-A-87 along with Stable Pour method which stays in Appendix B**
- **Expanded discussion of HTHS viscosity with additional references to newer methods**

SAE J300 FEB91

SAE Viscosity Grade	Low-Temperature (°C) Viscosities Cranking[1], cP	Low Temperature (°C) Viscosities Pumping[3], cP	Viscosity[4, 5] (cSt) at 100°C	
	Max	Max with no Yield Stress	Min	Max
0W	3,250 at -30	30,000 at -35	3.8	---
5W	3,500 at -25	30,000 at -30	3.8	---
10W	3,500 at -20	30,000 at -25	4.1	---
15W	3,500 at -15	30,000 at -20	5.6	
20W	4,500 at -10	30,000 at -15	5.6	---
25W	6,000 at -5	30,000 at -10	9.3	
20	---	---	5.6	< 9.3
30	---	---	9.3	< 12.6
40	---	---	12.5	< 16.3
50	---	---	16.3	< 21.9
60	---	---	21.9	< 26.1

- **All values are now critical specifications as defined by ASTM D 3244**
- **Clarification of labeling protocol, e.g. SAE 5W-30**

SAE J300 FEB92

SAE Viscosity Grade	Low-Temperature (°C) Cranking Viscosity[1], cP	Low Temperature (°C) Pumping Viscosity[3], cP	Kinematic Viscosity[4] (cSt) at 100°C		High-Temperature High-Shear Viscosity[5,6] (cP) at 150°C and 10^6 s^{-1}
	Max	Max with no Yield Stress	Min	Max	Min
0W	3,250 at -30	30,000 at -35	3.8	---	2.4
5W	3,500 at -25	30,000 at -30	3.8	---	2.9
10W	3,500 at -20	30,000 at -25	4.1	---	2.9
15W	3,500 at -15	30,000 at -20	5.6		3.7
20W	4,500 at -10	30,000 at -15	5.6	---	3.7
25W	6,000 at -5	30,000 at -10	9.3		3.7
20	---	---	5.6	< 9.3	---
30	---	---	9.3	< 12.6	---
40	---	---	12.5	< 16.3	---
50	---	---	16.3	< 21.9	---
60	---	---	21.9	< 26.1	---

- **HTHS limits defined, for W grades only; all three methods referenced (capillary, TBS, TPV)**

SAE J300 MAR93

SAE Viscosity Grade	Low-Temperature (°C) Cranking Viscosity[1], cP	Low Temperature (°C) Pumping Viscosity[3], cP	Kinematic Viscosity[4] (cSt) at 100°C		High-Temperature High-Shear Viscosity[5,6] (cP) at 150°C and 10^6 s^{-1}
	Max	Max with no Yield Stress	Min	Max	Min
0W	3,250 at -30	30,000 at -35	3.8	---	---
5W	3,500 at -25	30,000 at -30	3.8	---	---
10W	3,500 at -20	30,000 at -25	4.1	---	---
15W	3,500 at -15	30,000 at -20	5.6		---
20W	4,500 at -10	30,000 at -15	5.6	---	---
25W	6,000 at -5	30,000 at -10	9.3		---
20	---	---	5.6	< 9.3	2.6
30	---	---	9.3	< 12.6	2.9
40	---	---	12.5	< 16.3	2.9 (0W-/ 5W- / 10W-40)
40	---	---	12.5	< 16.3	3.7 (15W- / 20W- / 25W-40, 40)
50	---	---	16.3	< 21.9	3.7
60	---	---	21.9	< 26.1	3.7

- HTHS limits moved to non-W grades (40 grade split into two different requirements, however, to accommodate different multigrades/applications
- Capillary HTHS dropped from acceptable methods due to shear rate controversy
- Multi-temp CCS method D5293 official, drop from Appendix
- Reference Scanning Brookfield (D5133) in low temperature performance considerations
- Minor wording change in J300 DEC94 (remove 'as measured at point of manufacture')

SAE J300 DEC95

SAE Viscosity Grade	Low-Temperature (°C) Cranking Viscosity[1], cP	Low Temperature (°C) Pumping Viscosity[3], cP	Kinematic Viscosity[4] (cSt) at 100°C		High-Temperature High-Shear Viscosity[5,6] (cP) at 150°C and 10^6 s^{-1}
	Max	Max with no Yield Stress	Min	Max	Min
0W	3,250 at -30	60,000 at -40	3.8	---	---
5W	3,500 at -25	60,000 at -35	3.8	---	---
10W	3,500 at -20	60,000 at -30	4.1	---	---
15W	3,500 at -15	60,000 at -25	5.6		---
20W	4,500 at -10	60,000 at -20	5.6	---	---
25W	6,000 at -5	60,000 at -15	9.3		---
20	---	---	5.6	< 9.3	2.6
30	---	---	9.3	< 12.6	2.9
40	---	---	12.5	< 16.3	2.9 (0W-/ 5W- / 10W-40)
40	---	---	12.5	< 16.3	3.7 (15W- / 20W- / 25W-40, 40)
50	---	---	16.3	< 21.9	3.7
60	---	---	21.9	< 26.1	3.7

- **Following LTEP preliminary results, MRV temperatures lowered by 5°C, and viscosity limits changed from 30,000 to 60,000 cP (yield stress limit unchanged)**
- **SAE J300 APR97 revised HTHS to remove specific shear rate with return of capillary HTHS (1.4 x 10^6 s^{-1} at the wall, shear rate for rotational viscometers remained 10^6 s^{-1})**

SAE J300 DEC1999

SAE Viscosity Grade	Low-Temperature (°C) Cranking Viscosity[1], cP	Low Temperature (°C) Pumping Viscosity[3], cP	Kinematic Viscosity[4] (cSt) at 100°C		High-Temperature High-Shear Viscosity[5,6] (cP) at 150°C
	Max	Max with no Yield Stress	Min	Max	Min
0W	6,200 at -35	60,000 at -40	3.8	---	---
5W	6,600 at -30	60,000 at -35	3.8	---	---
10W	7,000 at -25	60,000 at -30	4.1	---	---
15W	7,000 at -20	60,000 at -25	5.6		---
20W	9,500 at -15	60,000 at -20	5.6	---	---
25W	13,000 at -10	60,000 at -15	9.3		---
20	---	---	5.6	< 9.3	2.6
30	---	---	9.3	< 12.6	2.9
40	---	---	12.5	< 16.3	2.9 (0W-/ 5W- / 10W-40)
40	---	---	12.5	< 16.3	3.7 (15W- / 20W- / 25W-40, 40)
50	---	---	16.3	< 21.9	3.7
60	---	---	21.9	< 26.1	3.7

- **CCS temperatures lowered by 5°C and viscosity limits adjusted accordingly to better reflect modern engine starting characteristics from LTEP studies**

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SAE Viscosity Grade	Low-Temperature (°C) Cranking Viscosity[1], mPa-s	Low Temperature (°C) Pumping Viscosity[3], mPa-s	Kinematic Viscosity[4] (mm^2/s) at 100°C		High-Temperature High-Shear Viscosity[5,6] (mPa-s) at 150°C
	Max	Max with no Yield Stress	Min	Max	Min
0W	6,200 at -35	60,000 at -40	3.8	---	---
5W	6,600 at -30	60,000 at -35	3.8	---	---
10W	7,000 at -25	60,000 at -30	4.1	---	---
15W	7,000 at -20	60,000 at -25	5.6		---
20W	9,500 at -15	60,000 at -20	5.6	---	---
25W	13,000 at -10	60,000 at -15	9.3		---
20	---	---	5.6	< 9.3	2.6
30	---	---	9.3	< 12.6	2.9
40	---	---	12.5	< 16.3	2.9 (0W-/ 5W- / 10W-40)
40	---	---	12.5	< 16.3	3.7 (15W- / 20W- / 25W-40, 40)
50	---	---	16.3	< 21.9	3.7
60	---	---	21.9	< 26.1	3.7

- **Stable Pour method and references removed (20 yrs after 'interim basis' introduction!)'**
- **Removal of 'intent' statement linking starting and pumping**
- **Change to cgs units in Table**

Summary

- J300 has seen a lot of changes, particularly over the last 20 years as rheological methods have improved and automotive engines have changed
- Although it has frequently played 'catch up' with OEM specifications (e.g. early 'W' grade classification, HTHS requirements), it has done a pretty good job of providing minimum requirements reflecting a balanced approach for a worldwide classification
- It will be interesting to see how the standard develops in the future

Acknowledgements

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- Special thanks to Debbie Brooks (SAE, Detroit) for providing many of the historical J300 documents

Answers to Questions

- When was the first 5W specification introduced?

➔ 1950

- Has the classification always been based purely on viscosity/rheology?

➔ No! Not until 1926

- Which came first, the 10W or 15W classification?

➔ 10W in 1950 (1941 'tentative') while 15W not introduced until 1975

- What's the record for referencing an 'interim' method/spec in J300?

➔ Stable Pour Pt (20 years)