



Standard Classification of Industrial Fluid Lubricants by Viscosity System¹

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1. Scope

1.1 This classification is applicable to all petroleum-base fluid lubricants and to those nonpetroleum materials which may be readily blended to produce fluid lubricants of a desired viscosity, that is, lubricants for bearings, gears, compressor cylinders, hydraulic fluids, etc.

1.2 This classification is applicable to fluids ranging in kinematic viscosity from 2 to 3200 cSt (mm²/s) as measured at a reference temperature of 40°C. In the category of petroleum-base fluids, this covers the range from kerosine to heavy cylinder oils.

1.3 Fluids of either lesser or greater viscosity than the range described in 1.2 are, at present, seldom used as industrial lubricants. Should industrial practices change, then this system, based on a mathematical series of numbers, may be extended to retain its orderly progression.

2. Referenced Documents

- 2.1 *ASTM Document:*
D341 Viscosity-Temperature Charts for Liquid Petroleum Products²
- 2.2 *SAE Standard:*³
J 300 Engine Oil Viscosity Classification
- 2.3 *ISO Standard:*⁴
ISO 3448 Industrial Liquid Lubricants—ISO Viscosity Classification

3. Significance and Use

3.1 This classification establishes a series of definite viscosity levels so that lubricant suppliers, lubricant users, and equipment designers will have a uniform and common basis for designating, specifying, or selecting the viscosity of industrial fluid lubricants.

3.2 This classification is used to eliminate unjustified intermediate viscosities, thereby reducing the total number of viscosity grades used in the lubrication of industrial equipment.

3.3 This system provides a suitable number of viscosity grades, a uniform reference temperature, a uniform viscosity tolerance, and a nomenclature system for identifying the viscosity characteristics of each grade.

3.4 This system implies no evaluation of lubricant quality and applies to no property of a fluid other than its viscosity at the reference temperature. It does not apply to those lubricants used primarily with automotive equipment and identified with an SAE number.

4. Basis of Classification

4.1 Twenty viscosity grades are given in Table 1.

TABLE 1 Viscosity System for Industrial Fluid Lubricants^A

Viscosity System Grade Identification	Mid-Point Viscosity, cSt (mm ² /s) at 40.0°C	Kinematic Viscosity Limits, cSt (mm ² /s) at 40.0°C ^{B,C}	
		min	max
ISO VG 2	2.2	1.98	2.4
ISO VG 3	3.2	2.88	3.52
ISO VG 5	4.6	4.14	5.06
ISO VG 7	6.8	6.12	7.48
ISO VG 10	10	9.00	11.0
ISO VG 15	15	13.5	16.5
ISO VG 22	22	19.8	24.2
ISO VG 32	32	28.8	35.2
ISO VG 46	46	41.4	50.6
ISO VG 68	68	61.2	74.8
ISO VG 100	100	90.0	110
ISO VG 150	150	135	165
ISO VG 220	220	198	242
ISO VG 320	320	288	352
ISO VG 460	460	414	506
ISO VG 680	680	612	748
ISO VG 1000	1000	900	1100
ISO VG 1500	1500	1350	1650
ISO VG 2200	2200	1980	2420
ISO VG 3200	3200	2880	3520

^AThis system implies no evaluation of quality.

^BThis system is used in ISO 3448.

^CIf 40°C is not the temperature used when determining the viscosity (as is sometimes the case with very viscous fluids) then the related viscosity at 40°C shall be established by using Viscosity Temperature Charts D341.

¹ This classification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.L on Industrial Lubricants.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ Available from the Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096.

⁴ Available from American National Standards Institute, 25W. 43rd St., 4th Floor, New York, NY 10036.