



Viscosities can be related horizontally only. For example, the following oils have similar viscosities: ISO 460, AGMA 7 and SAE GEAR OIL 140.

The viscosity/temperature relationships are based on 95 VI oils and are usable only for mono grade engine oils, gear oils and other 95 VI oils.

Crankcase oils and gear oils are based on 100°C viscosity. The "W" grades are classified on low temperature properties. ISO oils and AGMA grades are based on 40°C viscosity.

VISCOSITY @ 100deg C		VISCOSITY @ 40deg C	
MOTOR OILS, HYDRAULIC OILS		ISO GRADE	
SAE GRADE	RANGE (cST)	ISO GRADE	RANGE (cST)
5	3.80-*	32	28.8-35.2
10	4.10-*	46	41.4-50.6
20	5.60-9.29	68	61.2-74.8
30	9.30-12.49	100	90.0-110
40	12.50-16.29	150	135-165
50	16.30-21.89	220	198-242
60	21.90-26.09	320	288-352
80	7.0-11.00	460	414-506
90	13.50-23.99	680	612-748
140	24.00-40.99	1000	900-1100
250	41.00-UP	1500	1350-1650

Viscosities can be related horizontally only

Viscosities based on 96 VI single grade oils.

ISO are specified at 40 deg C

AGMA are specified at 40 deg C

SAE 75w, 80w, 85, 5w, & 10w

specified at low temperature.

Equivalent viscosities for 100 & 210 deg F are shown

SAE 90 to 250 and 20 to 50 specified at 100 deg C.

## ISO VISCOSITY CLASSIFICATION SYSTEM

Many petroleum products are graded according to the ISO Viscosity Classification System, approved by the international standards organization (ISO). Each ISO viscosity grade number corresponds to the mid-point of a viscosity range expressed in centistokes(cSt) at 40 deg C. For example, a lubricant with an ISO grade of 32 has a viscosity within the range of 28.8-35.2, the midpoint of which is 32.

**Rule of Thumb:** The comparable ISO grade of a given product whose viscosity in SUS at 100 deg F is known can be determined by using the following conversion formula:  
**SUS @ 100 deg F/5=cSt @ 40 deg C.**

$$cst = 0.226 \times SUS - (195/SUS)$$

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## Viscosity Data

Liquid	Specific Gravity	Viscosity (cP)	Temperature
Water H <sub>2</sub> O	1	1	68F
Fuel Oil	0.87	2.6	68F
Diesel Oil	0.89	76.2	68F
Gasoline	0.71	0.5	60F
Crude Oil	0.86	75	60F
Acetic Acid	1.05	1.23	68F
Crankcase Oil SAE 20	.88 -.94	105.6 - 173.9	130F
Crankcase Oil SAE 30	.88 -.94	173.9 - 211.5	130F
Crankcase Oil SAE 40	.88 -.94	211.5 - 376	130F
Ethylene Glycol	1.12	19.5	68F
Hydrochloric acid 31.5%	1.05	2.8	68F
Kerosene	.78 - .82	2.1 - 2.2	60F
Nitric Acid	1.37	2.6	68F
Soybean Oil	0.92	79.1	60F
Sulfuric Acid (Conc.)	1.83	26.7	68F
Glucose (Sugar Solution)	1.35 -1.44	10395 - 31680	100F
Anti-Wear Hydraulic Oil ISO 10	0.870	8.7	104F
Anti-Wear Hydraulic Oil ISO 15	0.875	13.1	104F
Anti-Wear Hydraulic Oil ISO 22	0.887	19.5	104F
Anti-Wear Hydraulic Oil ISO 32	0.873	27.9	104F
Anti-Wear Hydraulic Oil ISO 46	0.874	40.2	104F
Anti-Wear Hydraulic Oil ISO 68	0.880	59.8	104F
Anti-Wear Hydraulic Oil ISO 100	0.885	88.5	104F
Anti-Wear Hydraulic Oil ISO 150	0.889	133.4	104F
Anti-Wear Hydraulic Oil ISO 220	0.899	197.7	104F
Anti-Wear Hydraulic Oil ISO 320	0.899	287.7	104F
Premium Anti-Wear Hydraulic Oil ISO 22	0.861	18.9	104F
Premium Anti-Wear Hydraulic Oil ISO 32	0.868	27.8	104F
Premium Anti-Wear Hydraulic Oil ISO 46	0.873	40.1	104F
Premium Anti-Wear Hydraulic Oil ISO 68	0.876	59.6	104F
Premium Anti-Wear Hydraulic Oil ISO 100	0.880	88.0	104F
Premium Anti-Wear Hydraulic Oil ISO 150	0.884	132.6	104F
Premium Anti-Wear Hydraulic Oil ISO 220	0.885	194.8	104F
Premium Anti-Wear Hydraulic Oil ISO 460	0.893	410.6	104F
Premium Anti-Wear Hydraulic Oil ISO 680	0.916	622.8	104F
Premium Hydraulic Oil ISO 22	0.865	19.0	104F
Premium Hydraulic Oil ISO 32	0.868	27.8	104F
Premium Hydraulic Oil ISO 46	0.872	40.1	104F
Premium Hydraulic Oil ISO 68	0.878	59.7	104F
Premium Hydraulic Oil ISO 100	0.884	88.4	104F
Premium Hydraulic Oil ISO 150	0.893	134.0	104F



# Engineering & Technical Data

EQUIP.
HOSE/CPLG. SELECTION
<b>TECH. DATA</b>
EXT. HIGH PRESS. HOSE
GS CPLGS.
PCM CPLGS.
VERY HIGH PRESS. HOSE
PCS CPLGS.
HIGH & MED. PRESS. HOSE
MEGA-CRIMP® CPLGS.
PC CPLGS.
FIELD ATTACHABLE CPLGS.
LOW PRESS. HOSE & CPLGS.
C5/ACA HOSE & CPLGS.
C14 TEFLON HOSE & CPLGS.
THERMO-PLASTIC HOSE & CPLGS.
POLAR-SEAL® HOSE & CPLGS.
PWR. STG. HOSE & CPLGS.
QUICK DISCONNECT CPLGS.
ADAPTERS
ACCESSORIES

## Nomographic Chart

### Flow Capacity of Hose Assemblies at Recommended Flow Velocities

Based on Formula:

$$\text{Area (Sq.In.)} = \frac{0.321 \times (\text{GPM})}{\text{Velocity (Ft./Sec.)}}$$

Example: To determine the I.D. needed to transport 20 Gallons Per Minute (GPM) fluid volume...

Draw a straight line from 20 GPM on the left to maximum recommended velocity for pressure lines. The line intersects with the middle vertical column indicating a 3/4" I.D. (-12) hose. This is the smallest hose that should be used.

Recommendations are for oils having a maximum viscosity of 315 S.S.U. at 100° F, operating at temperatures between 65° F and 155° F.

