2010 MOV USERS' GROUP MEETING

SEMIFLUID GREASE FOR OIL FILLED MOV'S

Ken Brown, Eco Fluid Center Ltd. (888 442-5008)
Wayne Mackwood, Chemtura Co.
Troy Olmsted, Forsythe Lubrication Associates

www.MOVLongLife.com

OIL FILLED MOV'S

- STATIONS HAD REPORTED OIL LEAKS WITH OIL FILLED MOV'S. THESE PRESENTED HOUSEKEEPING AND CONCERNS ABOUT FUNCTIONALITY IF TOO MUCH OIL LEAKED OUT.
- SOME STATIONS HAVE USED MOV LONG LIFE GREASE TO REDUCE THE LEAKAGE.

- HOWEVER, BECAUSE THE GREASE CANNOT PENETRATE INTO ALL AREAS THIS IS MAINLY AN OPTION FOR MOV'S THAT HAD BEEN ORIGINALLY FILLED WITH OIL.
- ALSO A DISADVANTAGE IS THAT THE GEARBOX HAS TO BE OPENED TO REMOVE THE GREASE.

NEW PRODUCT REQUIRED

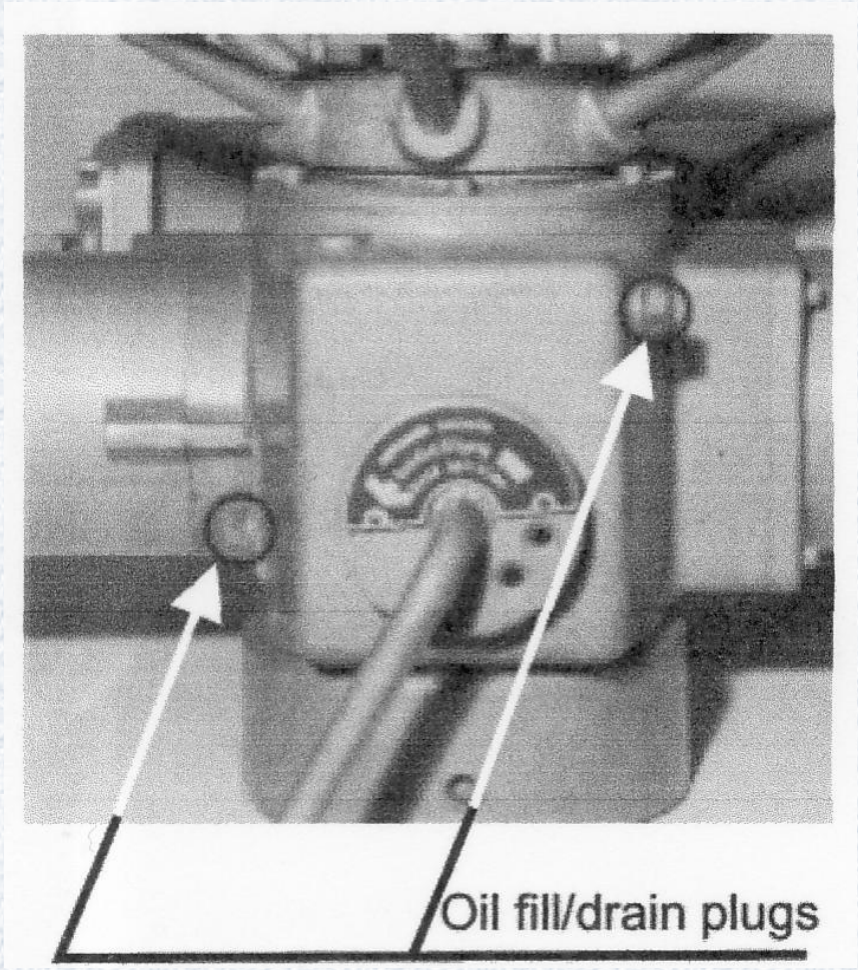
AS A SOLUTION A SEMIFLUID GREASE PRODUCT THAT POURS HAS BEEN USED FOR YEARS TO REDUCE OIL LEAKAGE PROBLEMS WITH INDUSTRIAL GEARBOXES.

HOWEVER, THIS A DIFFERENT FORMULATION THAN THE FAMILY OF MOV LONG LIFE GREASES SO THERE COULD BE ISSUES ABOUT COMPATIBILITY AND ENVIRONMENTAL QUALIFICATIONS.

SO ONE WAS MADE THE SAME. THIS 'NEW' PRODUCT IS MOV LONG LIFE 9000 WHERE 9000 CP IS THE BROOKFIELD VISCOSITY AT 25°C.

THIS VISCOSITY WAS CHOSEN BECAUSE IT IS CLOSE TO THAT WHICH HAD BEEN USED SUCCESSFULLY FOR YEARS.

THIS VALUE OF 9000 IS ALSO WELL BELOW THE MAXIMUM OF 150,000 CP GIVEN BY THE SAE (SOCIETY OF AUTOMOTIVE ENGINEERS) FOR LOW TEMPERATURE AXLE APPLICATIONS.


Oil fill/drain plugs

OIL CAPACITIES

ROTORK	
7A, 11A, 13A	0.6 LITRE
14A, 16A	1.4 LITRE
30A	2.0 LITRE
40A	3.0 LITRE
70A, 90A, 91AR, 95A	4.5 LITRE

MOV OEM REQUIREMENTS

NA5E AND 'A' RANGE
USE A "SAE 80EP"

REF. ROTORK PUBLICATION E250E ISSUE 05/05

SAE (SOCIETY OF AUTOMOTIVE ENGINEERS)
AXLE AND MANUAL TRANSMISSION
LUBRICANT VISCOSITY CLASSIFICATION
SAE J306 (June 2005)

KINEMATIC VISCOSITY @ 100°C, CST

SAE 80 7.0 MIN <11.0 MAX

NOTE: THEY DO NOT HAVE AN EP DESIGNATION

AUTOMOTIVE GEAR LUBRICANT PERFORMANCE IS DEFINED BY THE TYPE OF SERVICE IT CAN BE EXPECTED TO PERFORM SATISFACTORILY.

THE API (AMERICAN PETROLEUM INSTITUTE) SERVICE DESIGNATIONS WERE DEVELOPED TO ASSIST MANUFACTURERS AND END-USERS SELECT GEAR LUBRICANTS FOR A VARIETY OF OPERATING CONDITIONS.

THE API SERVICE DESIGNATIONS RANGE FROM GL-1 TO GL-5 AND DESCRIBE GEAR LUBRICANTS IN TERMS OF GENERAL TYPE, SEVERITY OF SERVICE AND APPLICATION.

GL-3 CONTAINS A MILD EP ADDITIVE AND IS SUITABLE FOR MANUAL TRANSMISSIONS AND SPIRAL BEVEL FINAL DRIVES.

TYPICAL NORTH AMERICAN OIL FOR MOV'S IS AN ISO VG 150 INDUSTRIAL GEAR OIL

AGMA GRADE 4EP

VISCOSITY AT 40°C 150 CST

VISCOSITY AT 100°C 14.7 CST

MOV LONG LIFE
BASE OIL VISCOSITY

AT 40°C 100 CST

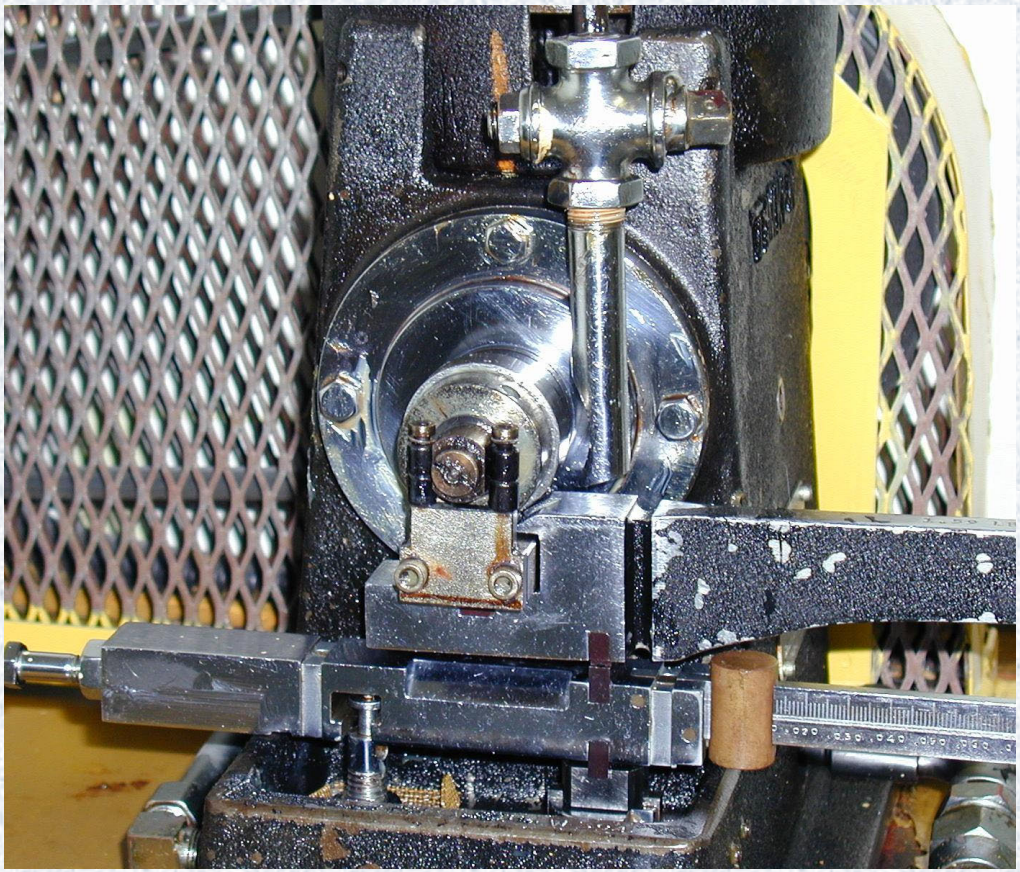
AT 100°C 10.8 CST

THIS IS SLIGHTLY LESS VISCOUS THAN AN ISO VG 150 GEAR OIL BUT IT MORE CLOSELY MEETS THE OEM'S SAE 80 VISCOSITY REQUIREMENTS

BASEOIL CONTENT

MOV LONG LIFE	
GRADE	% OIL
9000	90
0	80
1	75
2	70

TIMKEN OK LOAD



AT 100°F (38°C) A TIMKEN TAPERED ROLLER CUP IS ROTATED AT 800 RPM AGAINST A FLAT STEEL BLOCK.

4-BALL WEAR TEST

UPPER BALL IS ROTATED AGAINST THREE STATIONARY LOWER BALLS.

WEAR PROTECTION

	MOV LL 9000	ISO 150 OIL
TIMKEN OK LOAD (KG) ASTM D-2509	25	27
4 BALL EP, ASTM D-2596, LOAD WEAR INDEX (KG) WELD POINT (KG)	 60 500	 ? ?
4 BALL WEAR, ASTM D-2266, 1200 RPM, 40KG, 75°C, 1HR	 0.50	 0.43

BROOKFIELD VISCOSITY

MOV LONG LIFE 9000	
TEMPERATURE	**VISCOSITY CPS**
6°C (43°F)	14,400
25°C (77°F)	9,000
50°C (122°F)	6,000
62°C (144°F)	5,000

SOME CHANGE WITH TEMPERATURE

BROOKFIELD VISCOSITY
MOV LONG LIFE FAMILY

VISCOSITY CPS AT 25°C (77°F)	
MOV LONG LIFE 9000	9,000
MOV LONG LIFE 000	46,000
MOV LONG LIFE 00	65,000
MOV LONG LIFE 0	100,000
MOV LONG LIFE 1	>150,000

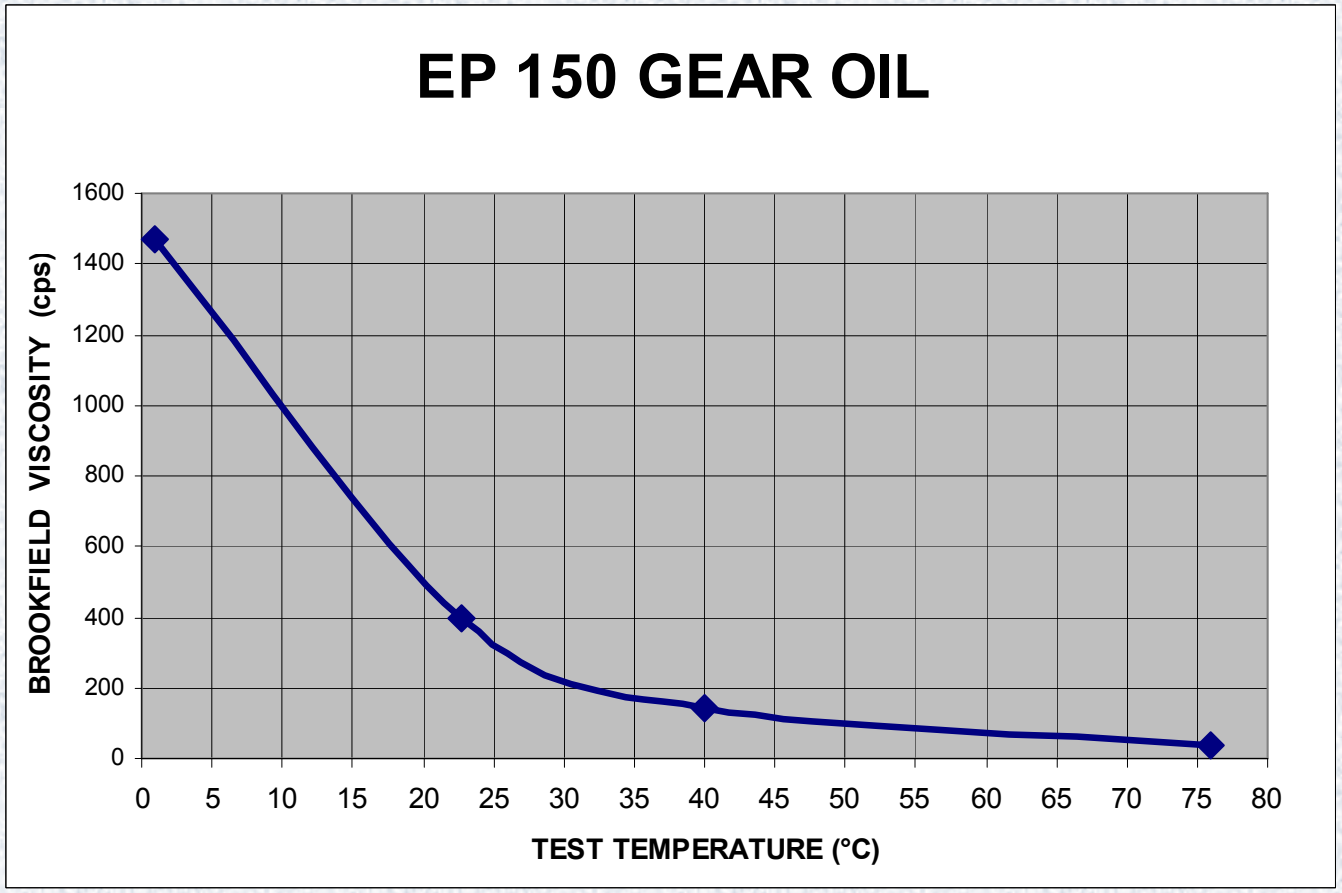
GRADES 00 AND 000 HAVE NOT BEEN COMMERCIALIZED. SHOWS HOW INCREASING CONSISTENCY CHANGES 'VISCOSITY'.

BROOKFIELD VISCOSITY VS ISO VG 150 GEAR OIL

VISCOSITY CPS AT 25°C (77°F)	
MOV LONG LIFE 9000	9,000
150 GEAR OIL	320

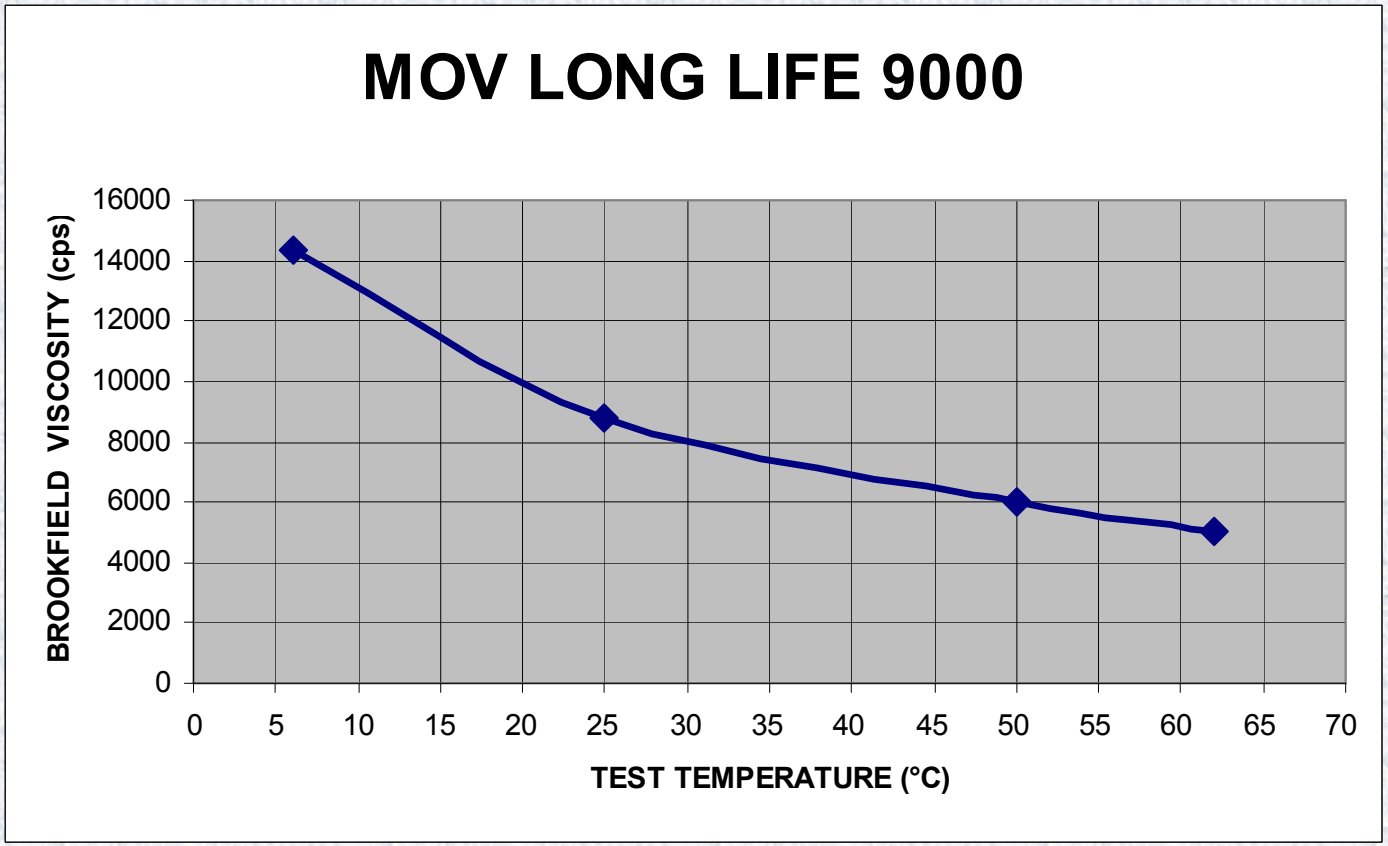
FOR SIMILAR BASE OIL VISCOSITY MUCH HIGHER EFFECTIVE VISCOSITY FOR BETTER STAYING POWER.

VISCOSITY VS TEMPERATURE



CONSIDERABLE CHANGE

VISCOSITY VS TEMPERATURE



LESS CHANGE - POSSIBLY LESS WEAR AND MORE PREDICABLE

SUMMARY

1. MOV LONG LIFE 9000 HAS THE ADVANTAGES OF OIL BECAUSE IT CAN BE POURED AND DRAINED BUT IT RETAINS SOME OF THE GOOD CHARACTERISTICS OF GREASE.

SUMMARY

2. BEING A SEMI-FLUID, IT WILL BE MUCH LESS PRONE TO LEAKS WHEN SEALS OR GASKETS HAVE BEEN COMPROMISED. RELIABILITY, SAFETY AND HOUSEKEEPING CAN BE IMPROVED.

SUMMARY

3. THE BASE OIL VISCOSITY OF MOV LONG LIFE 9000 OIL IS THAT SPECIFIED FOR AN SAE 80 OIL AND IT HAS THE REQUIRED EP (EXTREME PRESSURE) PROPERTIES.

SUMMARY

4. MOV LONG LIFE 9000 SHOULD PROVIDE JUST AS GOOD IF NOT BETTER WEAR PROTECTION AS WELL AS MUCH BETTER CORROSION PROTECTION AND OXIDATION RESISTANCE.

SUMMARY

5. SAMPLES HAVE BEEN SUBMITTED TO THE MOV OEM FOR EVALUATION AND HAVE BEEN OFFERED TO STATIONS.

THANK YOU