690

Omega
The Ultimate Lubricant

DESCRIPTION:

OMEGA 690 is a revolutionary CTA (Compensatory Thermostat Action) gear oil that surpasses the API GL-5 AND GL-6 requirements. In general, even the best ordinary gear oils can barely attain the GL-4 (or at the very best GL-5) requirements, and very rarely can oils meet API GL-6 requirement.

Notes on API GL-6: Inactive since testing equipment is no longer available. The designation API GL-6 denotes lubricants intended for gears designed with a very high pinion offset. Such designs typically require protection from gear scoring in excess of that provided by API GL-5 gear oils.

SUPREME TENACITY:

OMEGA 690 has a marked ability to follow a gear train and stay in position. This well-known OMEGA 690 trait has been subject to many - mainly unsuccessful - attempts to copy or assimilate this action. But there is always a difference between a "copy" and the genuine quality of OMEGA 690. OMEGA 690 retains a fine film on the metal surface regardless of how thoroughly it is wiped away. This ensures that OMEGA 690 is performing its major "stay put" function. Ordinary gear oils migrate away from the metal surface. They leave the friction surface exposed to direct and unprotected contact. This lends itself to oxidation that causes corrosion.

COMPENSATORY THERMOSTAT ACTION (CTA):

OMEGA 690 contains billions of extremely sensitive, micro thermostat - action Megalite* polymers that compensate for the natural tendencies of an oil to thin out or thicken when subjected to high and low temperature fluctuations, respectively. These polymers become expanded when the oil temperature is high and the oil is therefore thinner. They also contract when the temperature is low, and the oil is therefore thicker. This compensatory expansion and contraction action is essential to the quality of the lubricant and protection of the equipment on which it is used.

This unique CTA feature ensures OMEGA 690 provides uniform flow at all operating temperatures for more consistent, high lubricity performance and ensures consistent fluid drag over the extended useful operating life of the lubricant.

Megalite* polymers can be likened to a spring-loaded metal roll. Each tiny polymer is so sensitive that even very slight temperature fluctuations create either a slight expansion or contraction (depending on whether the environment was hot or cold). As soon as a temperature drop is experienced, the polymer's "spring" immediately shuts, allowing the fluidity of the lubricant to retain its original characteristics and bypass clearances with the same dynamic "bearing" friction as that during ambient temperature conditions. The lubricant avoids becoming heavy and viscous. Similarly when a temperature increase takes place, before the lubricant has a chance to thin out and begin "floating" through clearances, the polymers expand, taking with their expansion an equal "filling" of the lubricant and thereby retaining the essential viscosity stability needed for the well-being of the equipment.

Without "CTA" (Compensatory Thermostat Action), as provided by OMEGA 690, the oil characteristic easily becomes thick and heavy during temperature drops. This results in the difficult coursing of the equipment, draining of energy due to increased fluid drag, increase in oil consumption and the formation of heavy deposits that become hard -- clogging the systems and filters. In hot climatic conditions, equipment wears rapidly and any number of internal "hot spots" formed soon transform into gums and varnishes, forming heavy carbon build-up. OMEGA 690 resists these costly and regular defects through the scientific development of CTA.

EXTREME PRESSURE:

OMEGA 690 is heavily-fortified with carefully-calibrated, extreme pressure- resistant supplements. Its additional supplements for corrosion resistance, oxidation resistance, water wash qualities and many others far outnumber those of most ordinary gear oils. The special extreme pressure supplements are designed to withstand such adverse performance conditions as:

Load	Inductance	Limited Radiation
Compression	Displacement	High Pressure Displacement
Impact	Contact Migration	Explosive Migration
Shock	Surface Depolarization	Implosive Fragmentation
Impression	Capacitance	Reverberation
Thermal Conductivity	Contact Chaff	

FRICTION MODIFICATION:

OMEGA 690 contains a selection of friction modifiers. These supplements have been only recently developed and OMEGA 690 is considered to be one of the very few gear oils to boast their usage.

WATERPROOF:

OMEGA 690 is completely water and water wash resistant. It resists condensation and humidity, rain and other forms of water and moisture contact without thinning or contamination.

VIBRATION RESISTANT:

OMEGA 690 dramatically reduces the noise level in a gear system. This prevents scuffing, scoring, galling, pitting and scraping. These major causes of noise (and wear) are largely eliminated and OMEGA 690 promotes the near-silent running of gears of gearboxes.

VERSATILE RANGE:

- **OMEGA 690 is available in seven different grades:**
  OMEGA 690 SAE 90
  OMEGA 690 SAE 140
  OMEGA 690 SAE 80W90
  OMEGA 690 SAE 85W140
  OMEGA 690 SAE 75W90
  OMEGA 690 SAE 75W140
  OMEGA 690 ISO VG 460

- **Military Specifications**
  OMEGA 690 meets or exceeds the following U.S. Military specifications:

MIL-L-2105D	SAE J2360 (Formerly MIL-PRF-2105E)

- **Automotive Specifications**

API GL 5 / GL 6, MT-1	GM HN-1561, HN-2040
PG-2 Limited Slip	MB 235.8
MACK GO-H, MACK GO-J	Arvin Meritor 0-76N
EATON PS-037	SCANIA STO – 1:0

- **Industrial Specifications**
  US STEEL 224
  CINCINNATI MILACRON
  AGMA 9005-D94
  (Non-exhaustive list of manufacturers)

LIMITED SLIP DIFFERENTIAL PERFORMANCE:

OMEGA 690 performs perfectly well in limited slip differentials. In contrast, ordinary gear oils form a heavy energy- consuming drag and the oil migrates away from the friction area.

HYPOID GEAR APPLICATION:

OMEGA 690 can be used in hypoid gears where the pinion gear is less than 25% of the crown wheel or where the pinion-and-crown-wheel has more than 2 inches (50mm) of offset. Ordinary gear oils, even those which can meet the API GL-4/5 requirements are unable to achieve this performance.

APPLICATION:

Initial fill, top-up or refill of:

(a) Automotive Transmissions
(b) Hypoid differentials (especially limited slip type)
(c) Industrial gearboxes

TOTAL RANGE MULTIGRADE: SAE 75W140

OMEGA 690 SAE 75W140 is formulated with a special blend of fully synthetic base fluids to provide outstanding low-temperature fluidity as well as superior high-temperature oil film strength.

- **LOW TEMPERATURE APPLICATION:** OMEGA 690 SAE 75W140 is eminently suitable for use at ambient temperatures as low as –40°C. It gives the gear a smooth and quiet start during cold running and yet maintains a high oil viscosity to protect the gear metal surfaces from all forms of wear and scoring after warming up.
- **FUEL ECONOMY:** Because of the lower fluid drag generate during the starting period, OMEGA 690 SAE 75W/140 produces fuel savings of up to 5% when compared to monograde or conventional multigrade gear oils.
- **OUTSTANDING SHEAR STABILITY:** Because of the severe shearing encountered in gear service, ordinary multigrade and extra-range multigrade gear oils can suffer from huge viscosity loss during service. The special blend of fully synthetic base fluids in OMEGA 690 SAE 75W140 is designed to overcome this shortcoming. When tested according to the Volkswagen KRL test method, the viscosity drop is less than 5%
- **SUPER PERFORMANCE:** Like other grades of OMEGA 690, SAE 75W140 meets and exceeds the API GL-6 performance level. It protects gears from wear and scoring in a manner far superior to that of ordinary gear oils meeting the API GL-5 standard.

OMEGA 690 ISO VG 460 PERFORMANCE CHARACTERISTICS:

With its high base on viscosity, OMEGA 690 ISO VG 460 is recommended for high load application, including many demanding gear applications in the canning / bottling plants, conveyors, paper, construction, and mining industries.

OMEGA 690 ISO VG 460 meets or exceeds the following industrial specifications:

US Military:	Automotive:	Industrial:
MIL-L-2105D	API GL 5 / GL 6, MT-1	US Steel 224
SAE J2360 (Formerly MIL-PRF-2105E)	Mack GO-J, Mack GO-H	Cincinnati Milacron
	PG-2 Limited Slip	AGMA 9005-D94
	EATON PS-037	
	GM HN-1561, HN-2040	
	MB 235.8	

TYPICAL DATA:

TEST	ASTM	TEST RESULT						
		SAE 90	SAE 140	SAE 80W90	SAE 85W140	SAE 75W90	SAE 75W140	ISO VG 460
ISO Viscosity Grade	D-2422	150	320	150	320	100	220	460
Appearance	Visual	Red	Red	Red	Red	Red	Red	Red
Density Kg/L @ 15.0°C	D-1298	0. 910	0.914	0.910	0.914	0.903	0.884	0.913
Viscosity, cSt @ 40°C	D-445	166	343	166	343	103	197	460
Viscosity, cSt @ 100°C	D-445	16.4	26	16.4	26	14.5	25	32
Viscosity Index	D-2270	103	102	103	102	145	160	102
Flash Point, COC, °C (°F)	D-92	219 (426)	222 (432)	219 (426)	222 (432)	200 (392)	220 (428)	222 (432)
Fire Point, COC, °C (°F)	D-92	237 (459)	249 (480)	237 (459)	249 (480)	-	-	245 (473)
Pour Point, °C (°F)	D-97	-28 (-18)	-15 (5)	-28 (-18)	-15 (5)	-45 (-49)	-45 (-49)	-12 (10)
Total Acid Number, mg KOH/g	D-974	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Foaming Characteristics -								
All Sequences, After Settling	D-892	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Copper Strip Corrosion, 3 hrs. @ 100°C	D-130	1b	1b	1b	1b	1b	1b	1b
Four Ball, Wear Scar Dia, mm	D-2266	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Four Ball, Weld Load, Kg	D-2596	> 450	> 450	> 450	> 450	> 450	> 450	> 450
Timken, OK Load, lbs	D-2782	70	70	70	70	70	70	70
FZG, Pass Stages	DIN 51354	12	12	12	12	12	12	12
Sulphur, % Mass	D-129	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Phosphorus, % Mass	D-1091	0.075	0.075	0.075	0.075	0.075	0.075	0.075

The characteristics given above are typical of current production only and slight batch to batch variations should be expected.