



Maximum Efficiency Hydraulic Fluid

Innovation for industry and the
environment

Maximum Efficiency Hydraulic Fluid

- more power
- faster response
- better fuel economy
- reduced emissions
- lower total costs

Fueling global progress

In hydraulic equipment field, current commonly used specifications for hydraulic fluids do not adequately address the in-service operational performance efficiency, fuel economy and environmental sustainability. To address this situation, technology experts from Evonik RohMax have developed a new performance definition called Maximum Efficiency Hydraulic Fluid (MEHF). These special hydraulic fluids deliver efficiency and cost savings to the industry, and provide health and environmental benefits to the global community.

The MEHF performance definition answers challenges from various stakeholders.

Lubricant manufacturers

- Create higher value products
- Able to work with all base stocks

OEMs

- Enable more efficient equipment design
- Allow more consistent equipment operation
- Lower operating temperatures
- Lower costs to achieve equivalent performance

Equipment owners and operators

- Lower energy consumption
- Higher productivity
- Lower operating costs
- Reduced waste

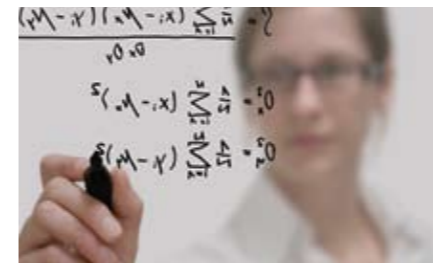
The global community

- Reduced fuel and energy consumption
- Reduced greenhouse gas emissions
- Reduced particulate emissions
- Reduced used oil waste disposal

MEHF Performance Requirements

	Comments	Units	Method	Limit	Limit	Limit
Viscosity grade	New oil	ISO VG	ISO 3448 or ASTM D 2422	27.6	46	68
Viscosity index	New oil		ISO 2909 or ASTM D 2270	>150	>150	>150
Shear stability	Minimum KV 100 after shear in bench tests, predicts operating viscosity in the pump oil	mm ² /s (cSt)	Kinematic Viscosity @100°C (ASTM D 455) after 40-minute Sonic Shear (ASTM D 5621)	>5.9	>7.5	>10.0
Low temperature viscosity	"L" grade must be at least one grade lower than the ISO VG	mPa · s (cP)	Brookfield Viscosity requirements according to ASTM D 6080	≤750 @-15°C "L22"	≤750 @-8°C "L32"	≤750 @-2°C "L46"
Total energy savings* – Denison T6 vane pump	vs. HM fluid, same ISO VG, VI=100	%	80°C, 250 bar, 1500 rpm	48000		42000

*Relative difference in the amount of energy input to the pump to generate the same amount of hydraulic work.
 **ISO 32 pump tests must be run at 70°C to meet OEM minimum viscosity requirements.



MEHF works in theory

MEHF technology is derived from a detailed thermodynamic modeling of hydraulic systems. Consult with Evonik Rohmax experts to view calculators and models that show efficiency improvement of MEHF over conventional fluids.



MEHF works in the lab

Evonik Rohmax has published several technical papers detailing the results achieved in our lab tests. Ask an Evonik Rohmax expert for copies of these publications.



MEHF is proven in the field

Our real-time, real-world field tests proved that MEHF delivers operational efficiency and fuel economy.

MEHF outperforms monograde oil

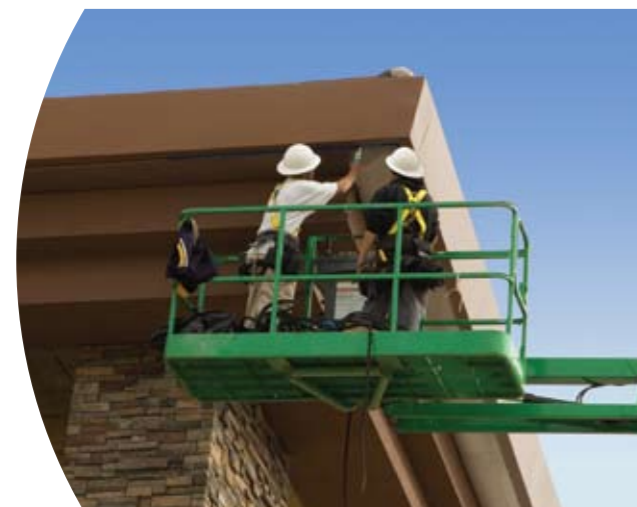
Field Test Results

	Monograde Oil	Fluid with MEHF	Percent Improvement
Efficiency Fuel consumed per work cycle (kg/cycle)	0.334	0.297	+18.4%
Fuel Economy Fuel consumed per hour (kg/hour)	19.5	16.8	+13.8%
Productivity Work cycles per hour (cycles/hour)	53.5	56.6	+5.8%

- Medium size tracked hydraulic excavator, moderate load and work cycle.
- Mild ambient temperature conditions for both fluids (45-65°F/7-18°C).

- Oil sump temperatures were similar and mild for both fluids. The average daily sump temperature range was 90-142°F/32-61°C.
- Test compared 10W (L46-46) monograde to MEHF 46 (L32-100).
- Results were consistent with lab bench tests and theoretical models.

Benefits achieved through the use of MEHF are dependent on operating and equipment conditions. Following manufacturer best operating practices will help achieve the highest levels of performance, cost savings and equipment life.



Changing global standards for efficiency and performance

Evonik RohMax is part of Evonik Industries AG, the global market leader in specialty chemicals. We develop, manufacture and market VISCOPLEX® high performance lubricant additives around the world. Our products and services are backed by more than 65 years of additive technology expertise combined with industry knowledge from relationships with original equipment manufacturers (OEMs), regulatory and governmental officials, industry organizations, blenders, refiners and equipment operators. This insight enables us to develop solutions that benefit both the industry and the environment.

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