SINCE 1839 Schaeffer MANUFACTURING COMPANY

ISO 9001 CERTIFIED

TECHNICAL DATA

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#114MG SYNTHETIC PLUS NATURAL GAS ENGINE OIL SAE 15W-40

Synthetic Plus Natural Gas Engine Oil SAE 15W-40 is a superior low ash multi-grade para-synthetic natural gas engine oil that is formulated for use in stationary 2-stroke and 4-stroke stoichometric and lea -burning natural gas engines and alternately fueled vehicles powered by compressed natural gas, liquefied natural gas or LPG.

Synthetic Plus Natural Gas Engine Oil SAE 15W-40 is blended from the finest quality hydro-treated polyalphaolefin (PAO) synthetic base fluids and high viscosity index severely solvent refined severely hydro-finished 100% paraffin base petroleum oils available. This unique combination provides the Synthetic Plus Natural Gas Engine Oil SAE 15W-40 with the following advantages.

1. **Superior Cold Weather Start ability and Operating Characteristics.** This results in less friction and lubricant drag in the engine during cold weather startup.
2. **Superior Oxidative Stability.** Any oil, as it is increasingly exposed to high temperature operation, undergoes the process of oxidation; thus resulting in the oil's thickening and the buildup of acidic components. Prevention of oil oxidation is particularly important for today's hotter running, low emissions engines. Because of the PAO's and the 100% pure paraffin base oil's uniform and closed molecular structure, the process of oxidation is greatly reduced.
3. **Excellent Resistance to Thermal Degradation.**
4. **Lower Volatility.** This results in less oil consumption.
5. **Low Pour Point and Borderline Temperature Pumpability.**
6. **A High Natural Viscosity Index.**
7. **Extended Oil Drain Capability and Intervals.**

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Blended into the PAO synthetic base fluids and 100% paraffin base oils is a highly specialized multifunctional performance additive package, that contains the proper balance of detergent, dispersant, rust and oxidation inhibitors and antiwear additives and a highly shear stable viscosity index improver. This specialized multifunctional performance additive package provides the following performance advantages:

1. **Excellent piston groove, land and skirt cleanliness.**
2. **Elimination of piston and skirt varnish.**
3. **Improved oxidation and nitration stability.**
4. **A vast reduction in piston ring sticking.**
5. **A reduction and modification of carbon deposits on piston crown, combustion chamber walls, spark plugs, cylinder walls, etc.**
6. **Reduced piston, ring cylinder wall and bearing wear.**
7. **Reduced bearing corrosion.**
8. **Extended oil filter life.**
9. **Longer spark plug life.**
10. **Minimized combustion chamber ash accumulation and plug fouling.**
11. **Catalytic converter compatibility.**
12. **Excellent TBN retention. This allows for the products use in natural gas engines that are fueled by sour gas or fuel gas that contains up to 0.3% sulfur as hydrogen sulfide and small amounts of total organic halides such as chlorides.**
13. **Superior valve train-wear protection.**
14. **Excellent high temperature/high shear performance in order to provide excellent oil film thickness and engine protection at high operating temperatures and shear rates, while minimizing lubricant frictional resistance.**
15. **Excellent thermal and oxidative stability and anti coking properties.**
16. **Superior low volatility characteristics.**
17. **Rapid circulation and good pumpability at low temperatures**
18. **Excellent shear stability in order to stay in grade over the oils drain interval.**
19. **Excellent anti-foaming characteristics.**
20. **Longer oil drain capability.**
21. **Increased engine durability and reliability.**
22. **Increased engine life and reduced maintenance cost due to downtime.**

Further blended into these synthetic blend base fluids, the highly advanced proprietary low ash performance additive package and shear stability viscosity index improver are

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two proven frictional modifiers, Micron Moly®, a liquid soluble type of Moly and Schaeffer Mfg's own proprietary additive Penetro®. These two proven frictional modifiers once plated, the Moly forms a long lasting slippery tenacious lubricant film, which prevents the metal surfaces from coming into contact with each other. By preventing metal-to-metal contact, damaging frictional wear is prevented from occurring. This prevention of metal-to-metal contact and reduction in wear results in:

*** Increased Fuel Economy.**
*** A Low Coefficient of Friction.**
*** Significantly Less Bearing, Ring, Piston, Cylinder and Valve-Train Wear.**
*** Increased Engine Efficiency.**
*** Increased Engine Durability.**
*** Increased Engine Life.**
*** Less Downtime.**
*** Reduced Maintenance**

Synthetic Plus Natural Gas Engine Oil SAE 15W-40 meets and exceeds the following manufacturer's requirements: Caterpillar, Cooper Bessmer, Cooper-Enterprise, Cummins CES 20074, Detroit Diesel 7SE272, DeLaval, Dresser-Clark, Dresser-Rand, Mack natural gas engine requirements, John Deere natural gas engine requirements Superior and Waukesha.

TYPICAL PROPERTIES

SAE Grade	15W-40
Specific Gravity 60°F/15°C	0.87
Viscosity @ 40°C, cSt (ASTM D-445)	107-111
Viscosity @ 100°C, cSt (ASTM D-445)	14.00-16.00
High Temperature High Shear Viscosity 302F°/150°C cP (ASTM D-4683)	4.3
Cold Cranking Viscosity cP @-20°C (ASTM D-5293)	5,460
Mini-Rotary Viscosity cP @-25°C TP-1 (ASTM D-4684)	17,500
Viscosity Index ASTM D-2270	145
Flash Point °F/°C ASTM D-92	460°/237.78°
Flash Point °F/°C ASTM D-92	495°/257.22°
Stable Pour Point °F/°C (FTM 7916 Method 203)	<-41°/<-42°
Scanning Brookfield Gelation Index @-20°C	4.0
Sulfated Ash Content %wt. (ASTM D-874)	0.4%
Total Base Number (ASTM D-2896)	5.1
Total Acid Number (ASTM D-664)	2-3

Typical Properties Continued

Foam Inhibition Test (ASTM D-892)	
Sequence I	0/0
Sequence II	0/0
Sequence III	0/0
NOACK Volatility (ASTM D-5800)	
% Evaporation Loss @ 250°C	10.5%
Volatility % loss @ 700°F (ASTM D-2281)	5.5%
Shear Stability % Viscosity Loss 90 Passes (ASTM D-7901)	9.9%
Calcium % wt.	.104-.118
Phosphorous % wt.	.024-.031
Zinc % wt.	0.28-0.4
Nitrogen % wt.	.081-.098