



Product Code #007
Long Drain Synthetic Natural Gas Engine Oil

Product Code #007 is premium quality, long drain, synthetic SAE 40 natural gas engine oil designed for use in 4-stroke natural gas engines and compressors. This oil is designed to outperform conventional petroleum oils with improved oxidation, heat, and sludge resistance and enhanced cold temperature performance.

Properties:

- Low ash <0.5%
- Excellent TBN Retention
- Meets SAE 20W-40 viscosity requirements
- Greatly extends drain intervals based on oil analysis
- Excellent detergency for clean operation
- Extends time between cylinder head and bottom end rebuilds
- Reduces combustion chamber deposits
- Greatly reduces valve wear & recession
- Improved engine protection over petroleum in extreme temperatures

TYPICAL TECHNICAL PROPERTIES

Long Drain Natural Gas Engine Oil	
Ash Content	<0.5%
Kinematic Viscosity @100°C cSt (ASTM D-445)	14.3
Kinematic Viscosity @40°C cSt (ASTM D-445)	104.1
Viscosity Index (ASTM D-2270)	140
TBN	5.69
Flash Point °C (°F) ASTM D-92)	267 (513)
Fire Point °C (°F) ASTM D-92)	288 (550)
Pour Point °C (°F) ASTM D-97)	-40 (-40)
Noack Volatility, % weight loss (g/100g) (ASTM D-5800)	3.2%
Four-Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1hr, scar diameter	.35



Product Code #103
Synthetic Biodegradable Hydraulic Oil

Product code #103 is a synthetic SAE 5W-20 biodegradable hydraulic oil for use in stationary or mobile hydraulic systems that require an ISO-32, ISO-46 or SAE 5W-20 viscosity. It is designed for use where environmental concerns require a low toxicity, environmentally friendly oil.

Properties:

- Shear stable
- Rapidly separates from water
- Compatible with seals
- Non foaming
- Rust and oxidation inhibited
- Does not contain heavy metals
- Ashless anti-wear additives
- Exhibits low toxicity
- Biodegradability
- Long lasting

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic Biodegradable Hydraulic Oil</i>	
SAE Viscosity Grade	5W-20
ISO Viscosity Grade	32/46
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	7.20
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	40.08
Viscosity Index (ASTM D-2270)	144
Flash Point °C (°F) (ASTM D-92)	268 (514)
Fire Point °C (°F) (ASTM D-92)	289 (552)
Pour Point °C (°F) (ASTM D-97)	-46 (-51)
Four Ball Wear Test @ 40 kg, 75°C, 1200 rpm, 1 hr, scar diameter, mm (ASTM D-4172B)	0.41
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1A (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)
Demulsibility ASTM D-1401 Oil/Water/Cuff (minutes)	40/40/0 (10)
Biodegradability OECD 301	Pass



Product Code #115-168
Synthetic Anti-Wear Hydraulic Oil

Product codes #115-168 are high quality synthetic hydraulic oils for use in low and high pressure, mobile or stationary hydraulic systems. They range in viscosity grade from ISO-15 to ISO-68 and the appropriate viscosity grade is excellent for use with gear, vane and piston type pumps.

Product #'s 115-168 are **Full Synthetic, Maximum Efficiency Hydraulic Fluids (MEHF)**. These products are capable of improving hydraulic system efficiency by 4.5% - 10%, which results in improved overall efficiency and reduces energy consumption & fuel costs.

These synthetic hydraulic oils feature outstanding thermal stability and cold flow properties. They resist the formation of varnish that sticks valves and they improve hydraulic efficiency in cold temperatures.

Properties:

- Shear Stable
- Resists heat
- Rust and Oxidation inhibited
- Features zinc based anti-wear additive system
- Readily separates from water
- Designed for long life
- -76° F pour point (ISO 15 and 22)
- Compatible with seals and zinc based petroleum anti-wear hydraulic oils
- Minimizes pump chatter and cavitation in cold weather.

Formulated to meet or exceed the following specifications:

- **Denison HF-0, HF-1 and HF-2**
- **Eaton/Vickers M-2950-S and I-286-S**
- **Cincinnati Machine**
 - ISO 32, (P-38 & P-68)
 - ISO 46, (P-55 & P-70)
 - ISO 68, (P-54 & P-69)
- **U.S. Steel 127 and 126**
- **Racine, variable volume vane pumps**
- **DIN 51524, Part 2**
- **AFNOR E48-603**
- **Lee Norse 100-1**

TYPICAL TECHNICAL PROPERTIES

Synthetic AW Series Anti-wear Hydraulic Oils	ISO 15 (115)	ISO 22 (122)	ISO 32 (132)	ISO 46 (146)	ISO 68 (168)
ISO VG - ASTM D-2422	15	22	32	46	68
VK 100°C - ASTM D-445	4.4	5.9	7.3	9.7	12.3
VK 40°C - ASTM D-445	14.8	20.7	32.0	48.0	67.3
Viscosity Index - ASTM D-2270	237	256	205	192	184
Density - ASTM D-1298	6.910	6.964	7.001	7.063	7.089
Flash Point °C (°F) - ASTM D-92	172 (341)	174 (345)	228 (471)	230 (457)	237 (467)
Fire Point °C (°F) - ASTM D-92	184 (363)	188 (370)	248 (503)	254 (496)	256 (503)
Pour Point °C (°F) - ASTM D-97	-60 (-76)	-60 (-76)	-51 (-71)	-47 (-60)	-45 (-54)
Four-Ball Wear Test - ASTM D-4172 (40 kg, 1200 rpm, 75° C, 60 min.)	0.48	0.45	0.45	0.44	0.44
Copper Strip Corrosion Test - ASTM D-130	1A	1A	1A	1A	1A
Foam - ASTM D892 Sequence I, II, III Test End	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Dielectric Strength - ASTM D877 Voltage, kV AC	43.6	43.6	46.20	45.4	45.4
Demulsibility - ASTM D1401 Oil/Water/Cuff (min)	40/40/0 (15)	40/40/0 (15)	40/40/0 (10)	40/40/0 (10)	40/40/0 (10)
Rust Test - ASTM D665 A & B Fresh Water and Synthetic Sea H ₂ O	Pass	Pass	Pass	Pass	Pass



Product Code #203 **Synthetic Two Cycle Injector Oil**

Product Code #203 Synthetic Two Cycle Injector Oil is a synthetic formulation designed for modern two cycle motors. It has excellent lubricity to protect pistons and bearings. It is recommended for use in direct fuel injected, electronic fuel injected and carbureted motors.

Product #203 is formulated to meet or exceed the following specifications:

- **TC-W3, API TC**

Properties:

- **Minimizes piston and combustion chamber deposits and smoke**
- **Protects against wear**
- **Protects against ring sticking**
- **Recommended for use as injection oil or at 50:1 pre mix**
- **Excellent for outboard motors (including DFI models), snowmobiles, motorcycles, ATVs, and personal watercraft and hand-held power equipment**
- **Compatible with other TC-W3 type 2-cycle oils.**

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic Two Cycle Injector Oil</i>	
Vk 100 °C, cSt	7.7
Vk 40 °C, cSt	38.7
VI	173
Density, lb/gal	7.149
Color	Blue
Flash Point, °C (COC)	89
Fire Point, °C (COC)	89
Pour Point, °C	-46



Product Code #310, 330, 350
Synthetic Transmission Oil SAE 10W, 30 & 50

Product codes #310, 330 & 350 are high quality synthetic transmission oils designed to provide excellent all temperature performance in heavy-duty transmissions, wet brakes, and hydraulic systems. These transmission oils provide superior shear stability for greater equipment protection than conventional petroleum oils with standard viscosity index improvers. Product codes #310, 330 & 350 are thermally stable and resistant to oxidation from high temperatures. They contain premium additives designed to improve equipment and oil life.

Properties:

- Excellent performance in automatic and manual transmissions
- Provides quick shifting
- Designed to prevent clutch slippage
- Anti-wear fortified
- Maintains viscosity grade throughout service life
- Provides excellent all temperature performance
- Compatible with common metallic and nonmetallic friction materials
- Controls break noise and vibration
- Does not contain VI improvers

Product codes #310, 330, & 350 are formulated to meet or exceed the following specifications:

- Caterpillar TO-4 & TO-4M (SAE 30 Multi-Season)
- ZF/Meritor™ (Rockwell) O-81 (SAE 50)
- Allison® C-4, C-3
- Komatsu® TO-10, TO-30 & TO-50
- Mack TO-A (SAE 50)
- API GL-1
- MIL-L-2104B

TYPICAL TECHNICAL PROPERTIES

Product Code	310	330	350
SAE Viscosity Grade	10W	30	50
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	7.1	11.0	18.3
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	40.5	76.2	159.0
Viscosity Index (ASTM D-2270)	138	133	128
Flash Point °C (°F) (ASTM D-92)	254 (489)	259 (498)	268 (514)
Fire Point °C (°F) (ASTM D-92)	270 (518)	272 (522)	292 (558)
Pour Point °C (°F) (ASTM D-97)	-51(-60)	-46 (-51)	-36 (-33)
Four Ball Wear Test 40 kg. 75°C, 1200 rpm, 1 hour (ASTM D-4172 B)	.35	.35	.35
Noack 250°C, 1 hour, percent weight loss (DIN 51581)	5.3%	3.63%	3.48%



Product Code #355 **Full Synthetic CD-50 Manual Transmission Oil**

Product code #355 is a SAE 50, non-EP long drain synthetic lubricant for manual transmissions used in over-the-road trucks, heavy equipment and other applications. Examples include Eaton Roadranger, Fuller, Mack, Arvin/Meritor (Rockwell), and Navistar (International).

#355 is a non-original equipment manufacturer (OEM) approved product designed for use up to 500,000-miles or 5-years, depending on transmission type, in over-the-road truck manual transmissions where the equipment manufacturer supports this drain interval. It contains field proven technology that, when tested in a lower quality formulation, demonstrated outstanding wear protection and oxidation resistance throughout a 500,000-mile service life.

Product code #355 is formulated to meet or exceed the following specifications:

- API GL-1
- MIL-L-2104B&D
- MIL-L- 46152B
- International TMS-6816 (Navistar)
- Mack TO-A Plus
- Eaton Roadranger[®] PS-081
- ZF Meritor[™] O-81 (formerly Rockwell)
- Eaton/Roadranger[®] PS-164 (Rev. 7)

Properties:

- Shear Stable and maintains viscosity
- Non-corrosive to yellow metals such as brass, bronze and copper
- Promotes long seal life
- Anti-foam
- Rust & Oxidation inhibited
- Anti-wear fortified
- Resists heat degradation for long oil life

Notes - For optimum performance thoroughly drain transmissions containing motor oils. Mixing oils will reduce the performance benefits and reduce the extended drain interval recommendations.

#355 Synthetic CD-50 Manual Transmission Oil is not recommended for use in engine crankcase applications.

#355 Synthetic CD-50 Manual Transmission Oil should not be mixed with EP gear oils. Thoroughly drain and flush with #213 prior to use.

TYPICAL TECHNICAL PROPERTIES

Synthetic CD-50 Manual Transmission Oil	
SAE Viscosity Grade	50
ISO Viscosity Grade	150
Color	Red
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	18.63
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	160.97
Viscosity Index (ASTM D-2270)	133
Flash Point °C (°F) (ASTM D-92)	249 (480)
Fire Point °C (°F) (ASTM D-92)	276 (529)
Pour Point °C (°F) (ASTM D-97)	-33 (-27)
Four Ball Wear Test @ 40 kg, 75°C, 1200 rpm, 1 hr, scar diameter, mm (ASTM D-4172B)	0.38
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)



Product Code # 395
Synthetic Heavy-Duty Automatic Transmission Fluid

Product code #395 is a premium quality, synthetic lubricant used in heavy-duty automatic transmissions. It is formulated with the quality level to support extended drain intervals, where applicable.

This product is a non-Allison approved TES-295 quality synthetic automatic transmission fluid designed for use in Allison transmissions according the recommendations of Allison per document #1099D.

Product code #395 is formulated to meet or exceed the following specifications:

- Allison TES-295
- Allison C-4
- GM DEXRON® III
- Ford MERCON®
- ZF TE-ML 14C
- Voith G 607 & G 1363

Properties:

- Excellent thermal & oxidative stability for long transmission life
- Exceptional all weather performance in both hot and cold temperature extremes
- Durable friction properties ensure smoother shifting transmissions
- Shear stable for long term viscosity protection

Typical Technical Properties

Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	7.41
Kinematic Viscosity @, 40°C cSt (ASTM D-445)	37.14
Brookfield Viscosity @ -40°C (cP)	8411
Density @ 60°F (lb/gal)	7.038
Flash Point, °C (°F)	230 (446)
Pour Point, °C (°F)	-55 (-67)
Four Ball Wear Test (ASTM D-4172B: 40 kg, 75°C, 1200 rpm, 1 hr) mm	0.45
Copper Corrosion (150°C, 3 hr.)	1B



Product Code #396
Synthetic ATF

Product Code #396 is a Synthetic Automatic Transmission Fluid (ATF) that provides excellent performance, versatility and durability in standard automatic and heavy-duty automatic transmission applications.

Formulated to meet or exceed the following specifications:

- Allison C-3 & C-4
- Caterpillar TO-2
- Chrysler ATF+, +2, +3, +4
- FORD MERCON & MERCON V
- GM; DEXRON II & III (GM 6297M, 6417M)
- Honda Z-1 (not CVT transmissions)
- Mitsubishi/Hyundai Diamond SP II & III
- Toyota Type T & T-IV
- Voith – G 1363
- ZF TE-ML 14B

Hydraulic Specifications:

- Vickers I-286-S & M-2950-S

Properties:

- Reduces inventory and eliminates the possibility of fluid miss-application.
- Resists high temperatures and oxidation better than petroleum oils.
- Friction durability for smoother shifting.
- Capable of extended drain intervals
- Excellent cold flow properties.
- Shear stable

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic ATF</i>	
VK 100°C, cSt (ASTM D-445)	7.36
VK 40°C cSt (ASTM D-445)	35.46
Viscosity Index (ASTM D-2270)	180
Flash Point (ASTM D-92) °C, °F	228 (442)
Pour Point (ASTM D-97) °C, °F	-46 (-51)
Four Ball Wear (ASTM D-4172B) (75°C. 1,200 rpm. 40kg, 1 hr)	0.40
Brookfield Vis., (ASTM D-2683) -20°C, cP -40°C, cP	1,090 11,400



Product Code #397
Synthetic ATF

Product Code #397 is a Synthetic Automatic Transmission Fluid (ATF) that provides excellent performance, versatility and durability in automatic transmission applications.

Product Code #397 is formulated to meet GM DEXRON®VI and Ford MERCON®SP

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic ATF</i>	
VK 100°C, cSt (ASTM D-445)	5.82
VK 40°C cSt (ASTM D-445)	28.12
Viscosity Index (ASTM D-2270)	156
Flash Point (ASTM D-92) °C, (°F)	224 (435)
Pour Point (ASTM D-97) °C, (°F)	-48 (-54)
Four Ball Wear (ASTM D-4172B) (75°C. 1,200 rpm. 40kg, 1 hr)	0.40
Brookfield Vis., (ASTM D-2683) -20°C, cP	995
-40°C, cP	8784



**Full Synthetic Universal Tractor
Transmission/Hydraulic Oil – UTTO
Product Code #398**

Product code #398 is SAE 5W-30 viscosity and is designed as an all weather tractor transmission/hydraulic oil without the need for seasonal oil changes. It can be used in combinations of hydraulic systems, power take-off systems, wet brakes, transmissions and final drives.

Properties:

- Formulated to reduce wear
- Resists heat
- Extends fluid and equipment life
- -47°F pour point
- Protects against rust
- Suppresses wet brake chatter
- Non-foaming
- Compatible with seal and hose material

Formulated to meet or exceed the following specifications:

Tractors & Off Road Equipment:

- **AGCO/Duetz-Allis/Allis-Chalmers**
Power Fluid 821 XL, 257541, 246634
- **Allison - C-4, C-3, C-2**
- **Bleaus**
- **Case Corp. J.I. Case & IH – MS-1207 (Hy-Tran® Plus), MS-1210 (TCH Fluid JIC145), MS-1230 (Poclain Equip-high pressure systems), B-6, MS-1206 (PTF), MS-1205 (TFD-II), MS-1204 (TFD), JIC-185, JIC-144, Jic-143, B-5**
- **Caterpillar – TO-2**
- **Clark – TA 12, TA 18, HR 500, HR 600**
- **Dresser CED – Trans/Hyd Fluid**
- **Hesston Fiat – Oilofiat Tutela Multi-F, AF-87**

- **John Deere** –J20C, J20D, J20A/B, J14B, JD 303, J21A
- **Kubota** - UDT
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- **Landini** – Tractor II Hyd. Fluid
- **Leyland**
- **Massey-Ferguson** – M-1141, M-1135, M1143, M1129-A, M-1127-A/B, M-1110
- **New Idea Power Units**
- **New Holland Ford** – M2C134-A/B/C/D, FNHA-2-C-201.00, FNHA-2-C-200.00, M2C86-B, M2C53-A, M2C41-B, M2C48-C
- **Oliver** – Q-1802 Type 55
- **Steiger** – Hyd/Trans SEMS 17001
- **Sundstrand** – Hydrostatic Transmission Fluid
- **Valmet**
- **Versatile** – M2C134-D FNHA-2-C-2001.00, ,Spec 24M, Spec 23M
- **White Farm (Oliver)** – Q-1826, Q-1802, Q-1766B, Q-1722, Q-1705
- **Yanmar**

Hydraulic Systems:

- **ABEX/Dennison** – HF-0, HF-2, HF-1
- **Plessey-Sunstrand** – Hydraulic. Fluid
- **Sperry Vickers** – M-2950-S, I-286-S

TYPICAL TECHNICAL PROPERTIES

#398 Synthetic Universal Tractor Transmission/Hydraulic Oil – UTTO	
SAE Viscosity	5W-30
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	9.7
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	56.8
Viscosity Index (ASTM D-2270)	157
Flash Point °C (°F) (ASTM D-92)	246 (475)
Fire Point °C (°F) (ASTM D-92)	266 (510)
Pour Point °C (°F) (ASTM D-97)	-44 (-47)
Four-Ball Wear Test (ASTM D-4172B: 40kg, 75°C, 1200 rpm, 1 hr.), Scar, mm	0.35
Cold Crank Simulator -30°C (ASTM D-5293 or 2602)	5,617
Brookfield Viscosity (ASTM D-2683) @ -40°C	18,105



Product Code #410-466
Full Synthetic R&O Gear & Bearing Oil

Product codes #410-466 are high quality rust and oxidation inhibited, synthetic oils fortified with ashless anti-wear additives for excellent gear and bearing protection. They are designed for superior performance in a wide variety of applications. Application examples include hydraulics, circulating systems, pumps, compressors, and helical, spur, or worm gearboxes. Consult the equipment manufacturer for the correct viscosity and lubricant performance requirements.

Properties:

- Excellent cold flow properties
- Resists high temperatures
- Shear stable
- Anti-foam
- Does not contain heavy metals
- Rapidly separates from water
- Ashless, no zinc, anti-wear formula
- Non-corrosive to yellow metals
- Replaces Mobil SHC 600 Series

Formulated to meet or exceed the following specifications:

- **Hydraulic**
 - Denison HF-0, HF-1 and HF-2 (ISO 10 thru 100)
 - Vickers M-2950-S and I-286-S (ISO 10 thru 100)
 - U.S. Steel 127 and 136
 - Lee Norse 100-1
 - Jeffrey No. 87
 - BF Goodrich 0152
 - Commercial Hydraulics
- **Cincinnati Machine**
 - ISO 10 (P-62)
 - ISO 32 (P-38 and P-68)
 - ISO 46 (P-54 and P-70)
 - ISO 68 (P-54 and P-69)
- **Industrial Gear Reduction**
 - AGMA 0S-7S
 - AGMA 0-8
 - AGMA 7C-8C

TYPICAL TECHNICAL PROPERTIES

Synthetic Circulating Oils	ISO 10 (410)	ISO 15 (411)	ISO 22 (412)	ISO 32 (413)	ISO 46 (414)	ISO 68 (416)	ISO 100 (450)	ISO 150 (455)	ISO 220 (462)	ISO 320 (463)	ISO 460 (464)	ISO 680 (466)
R&O Gear Oil Classification	-	-	-	0	1	2	3	4	5	6	7	8
AGMA Synthetic Gear Classification	-	-	-	0S	1S	2S	3S	4S	5S	6S	7S	-
VK-100°C-ASTM D-445	2.9	3.6	4.7	6.2	7.6	10.2	13.7	19.3	25.6	32.7	42.7	54.7
VK-40° - ASTM D-445	10.9	15.2	22.6	33.5	43.9	67.1	100.9	156.1	232.3	332.1	482.5	688.5
Viscosity Index ASTM D-2270	116	121	129	136	141	138	136	141	141	139	139	139
SPGR-ASTM D-1298	0.8193	0.8234	0.8319	0.8393	0.8418	0.8504	0.8550	0.8811	0.8916	0.8871	0.8922	0.8961
Density-ASTM D-1298	6.822	6.930	6.926	6.989	7.009	7.071	7.119	7.337	7.424	7.387	7.429	7.462
Flash Point °C (°F) ASTM D-92	184 (363)	210 (410)	236 (457)	264 (507)	258 (496)	256 (493)	260 (500)	282 (540)	280 (536)	280 (536)	278 (532)	280 (536)
Fire Point °C (F) ASTM D-92	194 (381)	226 (439)	264 (507)	276 (529)	274 (525)	272 (522)	276 (529)	300 (572)	300 (572)	304 (579)	300 (572)	300 (572)
Pour Point °C (°F) ASTM D-97	-66 (-87)	-68 (-90)	-68 (-90)	-53 (-63)	-50 (-58)	-48 (-54)	-45 (-49)	-40 (-40)	-39 (-38)	-35 (-31)	-32 (-26)	-31 (-24)

Noack-DIN 51581	NA	NA	NA	3.9%	4.3%	3.3%	2.9%	2.9%	2.3%	2.0%	1.8%	1.8%
Four-Ball Wear Test ASTM D-4172 Mod. (40kg, 1200rpm, 75°C, 60 min)	0.60	0.50	0.50	0.45	0.45	0.45	0.45	0.35	0.35	0.35	0.35	0.35
Copper Strip Corrosion Test ASTM D-130- Mod. (250°F, 3 hrs)	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A
Copper Strip Corrosion Test ASTM D-130 (250°F 24 hrs)				1B	1B	1B	1B	1B	1B	1B	1B	1B
RBOT ASTM D-2272, minutes				1815	1820	1810	1805	1815	1800	1815	1810	1805
Rust Test ASTM D-665A&B	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Foam, ml (ASTM D-892) Sequence I, II, III Test End and After 10 min. Settling	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
FZG Failure Stage [DIN 51534 mod. (A/16.6/90)				11	11	11	11	12	12	12	12	12



Product Codes #471 - 491 **Full Synthetic EP Gear Oil**

Product Codes #471-491 are synthetic extreme pressure (EP) industrial gear oils for use in enclosed spur, bevel, herringbone, helical, and chain drive gear boxes and other applications that require an AGMA EP or AGMA S gear oil. They are formulated to outperform petroleum EP gear oils and provide excellent gear and bearing protection in extreme hot and cold temperature, heavily loaded environments.

Properties:

- Sulfur/Phosphorus additives for EP protection
- Rust & Oxidation inhibited
- Shear stable
- Non-foaming
- Rapidly separates from water
- Compatible with seals
- Compatible with petroleum EP oils

Specifications:

- U.S Steel 224
- AGMA 250.04
- AGMA 9005-D94
- AGMA 9005-E02
- DIN 51517 part 3
- David Brown S1.53.101
- Cincinnati Milacron
 - ISO 100 P-76
 - ISO 150 P-77
 - ISO 220 P-74
 - ISO 320 P-59
 - ISO 460 P-35
 - ISO 460 P-78

These EP Industrial Gear Oils are not recommended for use with automotive differential hypoid gears.

Product Code #471-491 EP Industrial Gear Oils are not compatible with polyglycol gear oils. Thorough flushing prior to changeover is required.



Product Code #503-515 **Full Synthetic Compressor Oils**

Product code #503 – 515 are high quality synthetic compressor oils with a viscosity grades ranging from ISO-32 to ISO-150. These synthetic compressor oils are non-detergent products fortified with ashless anti-wear additives. They are formulated to outperform petroleum-based compressor oils.

Properties:

- Non-foaming
- Rust and Oxidation inhibited
- Rapidly separates from water
- Non-corrosive to yellow metals
- Anti-wear formula
- Capable of extended oil drain intervals

Application Recommendations:

Use the appropriate viscosity grade of product codes #503 – 515 in single and multi-stage rotary screw, vane, and reciprocating compressor crankcases and cylinders, vacuum pumps and other compressor applications.

They are recommended for use up to 8000 hours or more if the oil is determined to be suitable for continued use by oil analysis. The oil's service life is dependent on operating conditions and maintenance practices. Oil analysis is recommended, at minimum, every 1,000 hours of operation.

They are compatible with petroleum oils, most synthetic oils, and almost all seals, paints, plastics and materials commonly used in compressors*.

Product codes #503 – 515 are suitable for use with the following process gases: nitrogen, hydrogen, helium, carbon monoxide, carbon dioxide (dry), ethylene, methane, propane, butane, propylene, butylenes, natural gas, benzene, butadiene, furnace (crack gas), hydrogen sulfide (dry), sulfur hexafluoride, synthetic gas, and sulfur dioxide.

*Not compatible with silicon (Sullair 24kt) or poly glycol (PAG) fluids, such as, Ingersoll-Rand SSR Ultra Coolant and Sullube 32. Marginal compatibility with polycarbonate plastic, butyl, ethylene-propylene and SBR rubber. Polycarbonate bowls should be metal covered.

Not recommended for “breathing air” or refrigeration compressors.

TYPICAL TECHNICAL PROPERTIES

Synthetic Compressor Oils	# 503 ISO 32	# 504 ISO 46	# 506 ISO 68	# 510 ISO 100	# 515 ISO 150
SAE Grade	SAE 10W	SAE 20	SAE 30	SAE 40	SAE 50
ISO VG ASTM D-2422	32	46	68	100	150
Product Code	601	602	603	604	605
VK 100°C ASTM D-445	6.1	7.5	10.4	13.6	17.8
VK 40°C– ASTM D-445	32.8	43.4	68.5	100.0	149.1
Viscosity Index - ASTM D-2270	136	140	138	135	133
Flash Point °C (°F) - ASTM D-92	262 (504)	256 (493)	254 (489)	262 (504)	252 (486)
Fire Point °C (°F) - ASTM D-92	274 (525)	270 (518)	270 (518)	274 (525)	270 (518)
Pour Point °C (°F) - ASTM D-97	-53 (-63)	-50 (-58)	-48 (-54)	-45 (-49)	-42 (-36)
Four-Ball Wear Test - ASTM D-4172 (40 kg, 1200 rpm, 75° C, 60 min.)	0.45	0.45	0.45	0.45	0.45
Copper Strip Corrosion Test - ASTM D-130	1A	1A	1A	1A	1A
Rust Test ASTM D665 A & B Fresh Water and Synthetic Sea Water	Pass	Pass	Pass	Pass	Pass
Foam, ml (ASTM D-892) Sequence I, II, III Test End - and After 10 minutes settling	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0



Product Codes 523 - 535 **Synthetic Ester Compressor Oils**

Product codes #523 - 535 are premium compressor oils engineered with synthetic ester base oils for superior valve cleanliness and extended drain intervals. They are designed for use in reciprocating compressor and vacuum pump cylinders and crankcases where excellent oxidation resistance, anti-wear protection, and the control of hard carbon deposits are needed.

These products are capable of 8,000-hour drain intervals or longer if determined by oil analysis. Oil life expectancy depends on the operating conditions and maintenance practices. Oil analysis is recommended, at minimum, every 1,000 hours of operation.

Properties:

- **High film strength**
- **Ashless, anti-wear additives**
- **Non-detergent formula**
- **Non foaming**
- **Rapidly separates from water**
- **Rust and Oxidation inhibited**
- **Controls hard carbon and lacquer deposit**

Product codes 523 - 535 are not recommended for breathing air or refrigeration compressors. They are suitable for use with the following process gasses: Air, Butadiene, Benzene, Carbon monoxide, Carbon dioxide (dry), Furnace (crack) gas, Ethylene, Sulfur hexafluoride, Helium, Natural gas, Methane, Propane

Seal, paint, and plastic compatibility recommendations:

Recommended

- **Seals** - Viton®, High Nitrile Buna N (>36%), Teflon®
- **Paints** – Epoxy paint, Oil-resistant Alkyd
- **Plastics** – Nylon, Delrin®, Celcon®, PBT
- **Oil types** – Petroleum, PAO, Diester, Polyolester

Not Recommended

- **Seals** – Neoprene, SBR Rubber, Low Nitrile Buna N
- **Paints** – Acrylic Paint, Lacquer
- **Plastics** – Polystyrene, PVC, ABS
- **Oil types** – Polyglycol, Silicone

TYPICAL TECHNICAL PROPERTIES

Synthetic Compressor Oils	# 523 ISO 32	# 524 ISO 46	# 526 ISO 68	# 531 ISO 100	# 535 ISO 150
ISO VG ASTM D-2422	32	46	68	100	150
VK 100°C ASTM D-445	6.0	7.7	9.6	12.26	16.00
VK 40°C– ASTM D-445	32.5	45.8	69.0	100.58	152.84
Viscosity Index - ASTM D- 2270	133	135	119	114	109
Flash Point °C (°F) - ASTM D- 92	255 (491)	252 (486)	262 (504)	268 (514)	274 (525)
Fire Point °C (°F) - ASTM D-92	281 (538)	277 (531)	284 (543)	286 (547)	291 (556)
Pour Point °C (°F) - ASTM D- 97	-52 (-62)	-49 (-56)	-43 (-45)	-39 (-38)	-36 (-33)
Four-Ball Wear Test - ASTM D-4172 (40 kg, 1200 rpm, 75° C, 60 min.)	0.40	0.40	0.40	0.38	0.38
Noack Volatility, % Weight loss DIN 51581	4.09	4.97	2.86	3.70	3.89



Product Code 546
Synthetic Ester Compressor Oil ISO 32/46

Product code 546 is premium compressor oil engineered with synthetic ester base oils and is compatible with other esters, polyalphaolefin (PAO), polyglycols and petroleum oils. It is formulated to provide extended drain intervals up to 8,000 hours or longer if determined by oil analysis. Product code 680 is designed for use in rotary screw and vane compressors where excellent oxidation resistance, anti-wear protection, and the control of carbon deposits are needed. Oil life expectancy depends on the operating conditions and maintenance practices. Oil analysis is recommended, every 1,000 hours of operation.

Properties:

- **Compatible with polyglycol fluids such as Sullube[®] 32 & Ingersoll-Rand SSR Ultra-Coolant[®]**
- **Non-detergent formula**
- **Anti-foam**
- **Rapidly separates from water**
- **Rust and Oxidation inhibited**
- **Controls carbon and varnish**

Product code 546 is not recommended for breathing air or refrigeration compressors. In addition to air, it is suitable for use with the following process gasses: Nitrogen, Hydrogen, Helium, Carbon monoxide, Carbon dioxide (dry), Ethylene, Methane, Propane, Butane, Propylene, Butylenes, Natural Gas, Benzene, Butadiene, Furnace (crack gas), Hydrogen Sulfide (dry), Synthetic Gas, Sulfur Dioxide.

Seal, paint, and plastic compatibility recommendations:

Recommended

- **Seals** - Viton[®], High Nitrile Buna N (>36%), Teflon[®]
- **Paints** – Epoxy paint, Oil-resistant Alkyd, Two-Part Urethane
- **Plastics** – Nylon, Delrin[®], Celcon[®], PBT
- **Oil types** – Petroleum, PAO, PAG

Not Recommended

- **Seals** – Neoprene, SBR Rubber, Low Nitrile Buna N
- **Paints** – Acrylic Paint, Lacquer
- **Plastics** – Polystyrene, PVC, ABS
- **Oil types** – Silicone

TYPICAL TECHNICAL PROPERTIES

Synthetic Ester Compressor Oil ISO 32/46

Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	7.32
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	40.12
Viscosity Index (ASTM D-2270)	149
Noack Volatility, % Weight loss DIN 51581	3.7
Four Ball Wear Test (ASTM D-4172) 40 kg, 1200 rpm, 75°C, 1 hr., mm	0.40
Flash Point °C (°F) (ASTM D-92)	256 (493)
Fire Point °C (°F) (ASTM D-92)	282 (540)
Pour Point °C (°F) (ASTM D-97)	-56 (-69)
Foaming Seq I, II and III (50/50 mix of PAG and 680)	0/0



Product Code #671
Full Synthetic 75W-90 Gear Oil

Product code #671 SAE 75W-90 is an extreme pressure synthetic gear oil for use with hypoid gears in differentials and, where applicable, manual transmissions found in cars, trucks, and heavy equipment. It is designed to outperform petroleum gear oils.

Product code #671 is formulated to meet or exceed the following specifications:

- **API GL-5 & MT-1**
- **MIL-PRF-2105E**
- **MACK GO-J**
- **Dana SHAES 234 (formerly Eaton PS- 037)**
- **Arvin/Meritor 0-76N (75W-90)**

Properties:

- Extreme Pressure (EP) fortified for heavy load gear protection
- Resists heat degradation
- Anti-Foam
- Promotes long seal life
- Rust & Oxidation inhibited
- Shear stable and maintains viscosity
- All season performance
- Compatible with most limited slip differentials

TYPICAL TECHNICAL PROPERTIES

Synthetic 75W-90 Gear Oil	
SAE Viscosity Grade	75W-90
Color	Yellow/Amber
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	15.2
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	119
Viscosity Index	133
Brookfield Viscosity, cP (150,000 Max)	116,958 @ -40C
Flash Point °C (°F) (ASTM D-92)	216 (421)
Fire Point °C (°F) (ASTM D-92)	232 (450)
Pour Point °C (°F) (ASTM D-97)	-43 (-45)
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)



Product Codes #672 and #682
Long Drain 75W-90 & 80W-140 Synthetic Gear Oils

Product codes #672 SAE 75W-90 and #682 SAE 80W-140 are premium quality, long drain, synthetic gear oils for use with hypoid gears in differentials and, where applicable, manual transmissions found in cars, trucks, and heavy equipment.

#672 and #682 are non-original equipment manufacturer (OEM) approved products designed for use up to 500,000-miles in over-the-road truck differentials where the equipment manufacturer supports this drain interval. They contain field proven technology that, when tested in a lower quality formulation, demonstrated outstanding wear protection and oxidation resistance throughout a 500,000-mile service life.

Product codes #672 and #682 are formulated to meet or exceed the following specifications:

- API GL-5 & MT-1
- MIL-PRF-2105E
- MACK GO-J Plus
- Dana SHAES 256 (formerly Eaton PS-163)
- Arvin/Meritor 0-76N (75W-90)
- Arvin/Meritor 0-80 (80W-140)
- International (Navistar) TMS-6816

Properties:

- Extreme Pressure (EP) fortified for heavy load gear protection
- Resists heat degradation
- Anti-foam
- Promotes long seal life
- Rust & Oxidation inhibited
- Shear stable and maintains viscosity
- All season performance
- Compatible with most limited slip differentials

TYPICAL TECHNICAL PROPERTIES

<i>Long Drain Synthetic Gear Oils</i>		
SAE Viscosity Grade	75W-90 #672	80W-140 #682
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	15.8	26.2
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	125.5	259.7
Viscosity Index (ASTM D-2270)	133	131
Flash Point °C (°F) (ASTM D-92)	216 (421)	214 (417)
Fire Point °C (°F) (ASTM D-92)	232 (450)	230 (446)
Pour Point °C (°F) (ASTM D-97)	-51 (-60)	-39 (-38)
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (Pass)	1b (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)	0/0/0 (Pass)
Brookfield Viscosity (ASTM D-2683)	92,146 @ -40°C	53,125 @ -26°C



Product Code #673
Full Synthetic 75W-140 Gear Oil

Product code #673 SAE 75W-140 is an extreme pressure synthetic gear oil for use with hypoid gears in differentials and, where applicable, manual transmissions found in cars, trucks, and heavy equipment. It outperforms petroleum gear oils.

Product code #673 is formulated to meet or exceed the following specifications:

- **API GL-5 & MT-1**
- **MIL-PRF-2105E**
- **MACK GO-J**
- **Dana SHAES 234 (formerly Eaton PS- 037)**
- **Arvin/Meritor 0-76M (75W-140)**

Properties:

- Extreme Pressure (EP) fortified for heavy load gear protection
- Resists heat degradation
- Anti-Foam
- Promotes long seal life
- Rust & Oxidation inhibited
- Shear stable and maintains viscosity
- All season performance

TYPICAL TECHNICAL PROPERTIES

<i>#673 Synthetic 75W-140 Gear Oil</i>	
SAE Viscosity Grade	75W-140
Color	Amber
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	25.68
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	185.58
Viscosity Index	173
Brookfield Viscosity, cP (150,000 Max)	124,210 @ -40C
Flash Point °C (°F) (ASTM D-92)	210 (410)
Fire Point °C (°F) (ASTM D-92)	225 (437)
Pour Point °C (°F) (ASTM D-97)	-48 (-54)
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)



Product Code #681
Synthetic 80W-90 Gear Oil

Product code #681 SAE 80W-90 is an extreme pressure synthetic gear oil for use with hypoid gears in differentials and, where applicable, manual transmissions found in cars, trucks, and heavy equipment. It is designed to outperform petroleum gear oils.

Product code #681 is formulated to meet or exceed the following specifications:

- API GL-5 & MT-1
- MIL-PRF-2105E
- MACK GO-J
- Dana SHAES 234 (formerly Eaton PS- 037)
- Arvin/Meritor 0-76D (80W-90)

Properties:

- Extreme Pressure (EP) fortified for heavy load gear protection
- Resists heat degradation
- Anti-Foam
- Promotes long seal life
- Rust & Oxidation inhibited
- Shear stable and maintains viscosity
- All season performance
- Compatible with most limited slip differential

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic 80W-90 Gear Oil</i>	
SAE Viscosity Grade	80W-90
Color	Yellow/Amber
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	14.7
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	116.0
Viscosity Index (ASTM D-2270)	130
Flash Point °C (°F) (ASTM D-92)	216 (420)
Pour Point °C (°F) (ASTM D-97)	-43 (-45)
Falex EP (ASTM D3233B) Failure load, LbF	1500
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (Pass)
Foam Tendency Sequence I/II/III (ASTM D-892)	0/0/0 (Pass)
Brookfield Viscosity (ASTM D-2683) @ -26°C	40,482



Product Code #683
Full Synthetic 80W-140 Gear Oil

Product code #683 SAE 80W-140 is an extreme pressure synthetic gear oil for use with hypoid gears in differentials and, where applicable, manual transmissions found in cars, trucks, and heavy equipment. It is designed to outperform petroleum gear oils.

Product code #683 is formulated to meet or exceed the following specifications:

- **API GL-5 & MT-1**
- **MIL-PRF-2105E**
- **MACK GO-J**
- **Dana SHAES 234 (formerly Eaton PS-037)**
- **Arvin/Meritor 0-80 (80W-140)**

Properties:

- Extreme Pressure (EP) fortified for heavy load gear protection
- Resists heat degradation
- Anti-Foam
- Promotes long seal life
- Rust & Oxidation inhibited
- Shear stable and maintains viscosity
- All season performance
- Compatible with most limited slip differentials

TYPICAL TECHNICAL PROPERTIES:

<i>Synthetic 80W-140 Gear Oil</i>	
SAE Viscosity Grade	80W-140
Color	Yellow/Amber
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	25.89
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	248.31
Viscosity Index (ASTM D-2270)	134
Brookfield Viscosity, cP (150,000 Max)	143,256 @ -26°C
Flash Point °C (°F) (ASTM D-92)	220 (428)
Fire Point °C (°F) (ASTM D-92)	230 (446)
Pour Point °C (°F) (ASTM D-97)	-43 (-45)
Copper Corrosion 121°C (250°F) 3 hr. (ASTM D-130)	1b (pass)
Foam Tendency Sequence I/II/III (ASTM D892)	0/0/0 (pass)



Product Code #702
0W-20 Synthetic Motor Oil

Product Code #702 is a high performance synthetic motor oil designed to outperform conventional petroleum oil. Its performance exceeds the current requirements for gasoline engines by delivering exceptional wear protection, maximizing fuel economy and offering excellent low temperature performance.

Product #702 is formulated to meet or exceed the following specifications:

- API SM, SL, CF

Properties:

- Excellent low temperature performance
- Maximized fuel economy
- Resists sludge and carbon build-up
- High detergency for clean engines
- Highly oxidation resistant

TYPICAL TECHNICAL PROPERTIES

0W-20 Synthetic Motor Oil	
Vk 100 °C, cSt	8.8
Vk 40 °C, cSt	46.0
VI	175
CCS, cP	5778 (-35°C)
Density, lb/gal	7.076
Color	L3.0
Flash Point, °C (COC)	220
Fire Point, °C (COC)	234
Pour Point, °C	-44
TBN	9.0
Four Ball Wear Test 40 kg, 1,800 rpm, 150 °C, 1 hour	0.58



Product Code PL705
0W-40 Synthetic Motor Oil

Product Code PL705 is a high performance synthetic motor oil designed to outperform conventional petroleum oil. Its performance exceeds the current requirements for gasoline engines by delivering exceptional wear protection, maximizing fuel economy and offering excellent low temperature performance.

Product PL705 is formulated to meet or exceed the following specifications:

- API SM/CF

Properties:

- Excellent low temperature performance
- Maximized fuel economy
- Resists sludge and carbon build-up
- High detergency for clean engines
- Highly oxidation resistant

TYPICAL TECHNICAL PROPERTIES

<i>0W-40 Synthetic Motor Oil</i>	
Vk 100 °C, cSt	14.93
Vk 40 °C, cSt	89.93
VI	181
CCS, cP	4,445 (-35°C)
Density, lb/gal	6.98
Color	L2.5
Flash Point, °C (COC)	226
Fire Point, °C (COC)	242
Pour Point, °C	-48
TBN	8.16
Four Ball Wear Test 40 kg, 1,800 rpm, 150 °C, 1 hour	0.47



Full Synthetic 5W-20, 5W-30, 10W-30 & 10W-40 Motor Oils **Product Codes 752, 753, 763 & 764**

Product Codes #752, 753, 763 & 764 are API licensed synthetic motor oils for use in modern gasoline engines (API SM) and diesel engines (API CF) requiring those specifications. SAE 5W-20, 5W-30, and 10W-30 meet ILSAC GF-4 fulfilling new car warranty requirements. These oils are designed to outperform conventional petroleum motor oils with improved oxidation, heat, and sludge resistance and enhanced cold temperature performance.

Properties:

- Improved engine protection over petroleum in extreme temperatures
- Mid Sulfated Ash, Phosphorus & Sulfur (SAPS) formulation
- Provides excellent anti-wear protection for newer and older engines
- Very low oil volatility
- Friction modified for enhanced fuel economy

Application Recommendations:

Product Codes 752, 753, 763, & 764 are recommended for gasoline and, where appropriate, diesel engines according to the performance specifications as listed and the OEM specified viscosity.

#752 SAE 5W-20

- API SM/CF
- ILSAC GF-4
- Ford WSS-M2C930-A
- Daimler Chrysler MS-6395N

#753 SAE 5W-30

- API SM/CF
- ILSAC GF-4
- Ford WSS-M2C929-A
- Daimler Chrysler MS-6395N
- GM 4718M

#763 SAE 10W-30

- API SM/CF
- ILSAC GF-4
- Ford WSS-M2C205-A
- Daimler Chrysler MS-6395N
- GM 4718M

#764 SAE 10W-40

- API SM/CF

TYPICAL TECHNICAL PROPERTIES

Synthetic 5W-20, 5W-30, 10W-30 & 10W-40 Motor Oils				
	#752	#753	#763	#764
SAE Grade	5W-20	5W-30	10W-30	10W-40
Kinematic Viscosity @100°C cSt (ASTM D-445)	8.5	10.5	10.5	15.7
Kinematic Viscosity @40°C cSt (ASTM D-445)	45.4	58.2	63.6	104.4
Viscosity Index (ASTM D-2270)	165	173	155	160
CCS Viscosity, cP @ (°C) (ASTM D-2602)	3818 (-30)	4341 (-30)	4007 (-25)	6036 (-25)
Flash Point °C (°F) ASTM D-92)	226	234	232	234
Fire Point °C (°F) ASTM D-92)	236	246	248	248
Pour Point °C (°F) ASTM D-97)	-43	-43	-40	-38
Noack Volatility, % weight loss (g/100g) (ASTM D-5800)	10.7	8.9	6.7	5.7
Four-Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1hr, scar diameter	0.43	0.43	0.43	0.43
Total Base Number (ASTM D-2896)	9	9	9	9



Product Code 754
5W-40 Synthetic Engine Oil

Product Code 754, SAE 5W-40 is a non-licensed engine oil suitable for use in gasoline & diesel engines according to the listed specifications.

- API SL/CF
- ACEA C3-04, A3/B3-04, A3/B4-04
- MB 229.31, 229.51
- VW 502.00, 505.00, 505.01

TYPICAL TECHNICAL PROPERTIES

#754 Synthetic Engine Oil SAE 5W-40	
Vk 100 °C, cSt	13.5
Vk 40 °C, cSt	79.9
VI	173
CCS, cP	5255 (-30)
SpGr, g/ml	0.8453
Density, lb/gal	7.038
Color	L3.0
Clarity	CLEAR
Flash Point, °C (°F) (COC)	226
Fire Point, °C (COC)	244
Pour Point, °C	-42
TBN	7.8



Product Code 767
Synthetic 15W-50 Motor Oil

Product Code 767 is a synthetic motor oil for use in modern gasoline engines (API SM) and diesel engines (API CF) requiring those specifications. This oil is designed to outperform conventional petroleum motor oils with improved oxidation, heat, and sludge resistance and enhanced cold temperature performance.

Properties:

- Improved engine protection over petroleum in extreme temperatures
- Mid Sulfated Ash, Phosphorus & Sulfur (SAPS) formulation
- Provides good anti-wear protection for newer and older engines
- Low oil volatility
- Friction modified for enhanced fuel economy

TYPICAL TECHNICAL PROPERTIES	
Synthetic 15W-50 Motor Oil	
SAE Grade	15W-50
Kinematic Viscosity @100°C cSt (ASTM D-445)	18.73
Kinematic Viscosity @40°C cSt (ASTM D-445)	127.54
Viscosity Index (ASTM D-2270)	166
CCS Viscosity, cP @ (°C) (ASTM D-2602)	4851 (-20)
Flash Point °C (°F) ASTM D-92	234 (453)
Fire Point °C (°F) ASTM D-92	248 (478)
Pour Point °C (°F) ASTM D-97	-38
Noack Volatility, % weight loss (g/100g) (ASTM D-5800)	6.0
Four-Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1hr, scar diameter	0.43
Total Base Number (ASTM D-2896)	9

Formulated to meet or exceed API SM/CF



Product Code #769
Synthetic 20W-50 Motor Oil

Product Code #769 is a synthetic motor oil for use in modern gasoline engines (API SM) and diesel engines (API CF) requiring those specifications. This oil is designed to outperform conventional petroleum motor oils with improved oxidation, heat, and sludge resistance and enhanced cold temperature performance.

Properties:

- Improved engine protection over petroleum in extreme temperatures
- Mid Sulfated Ash, Phosphorus & Sulfur (SAPS) formulation
- Provides good anti-wear protection for newer and older engines
- Low oil volatility
- Friction modified for enhanced fuel economy

Application Recommendations:

- Product Code #769 is recommended for gasoline and, where appropriate, diesel engines according to the performance specifications as listed and the OEM specified viscosity. API SM/CF

TYPICAL TECHNICAL PROPERTIES	
Synthetic 20W-50 Motor Oils	
Kinematic Viscosity @100°C cSt (ASTM D-445)	18.84
Kinematic Viscosity @40°C cSt (ASTM D-445)	129.45
Viscosity Index (ASTM D-2270)	164
CCS Viscosity, cP @ (°C) (ASTM D-2602)	3429 (-15)
Flash Point °C (°F) ASTM D-92)	236
Fire Point °C (°F) ASTM D-92)	250
Pour Point °C (°F) ASTM D-97)	-38
Noack Volatility, % weight loss (g/100g) (ASTM D-5800)	6.12
Four-Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1hr, scar diameter	0.43
Total Base Number (ASTM D-2896)	9.02



Product Code #773
10W-40 Synthetic Motorcycle Oil

Product Code #773 is a high performance synthetic motorcycle oil designed to outperform conventional petroleum oil. It is recommended for use in both liquid and air-cooled four-stroke engines and four or two-stroke motorcycle wet clutch transmissions. It is also ideal for use in ATV engines.

Product #773 is formulated to meet or exceed the following specifications:

- API SJ, SG, CD • JASO MA

Properties:

- Improved heat resistance over conventional mineral oils
- Resists sludge and carbon build-up
- High detergency for clean engines
- Highly oxidation resistant
- No friction modifiers for excellent wet clutch compatibility and smooth shifting
- Zinc and Phosphorus anti-wear additives

TYPICAL TECHNICAL PROPERTIES

<i>10W-40 Synthetic Motorcycle Oil</i>	
Vk 100 °C, cSt	14.13
Vk 40 °C, cSt	79.57
VI	185
CCS, cP	5746 (-25)
Density, lb/gal	7.106
Color	L2.0
Flash Point, °C (COC)	230
Fire Point, °C (COC)	250
Pour Point, °C	-41
TBN	8.43
Four Ball Wear Test 40 kg, 1,200 rpm, 75 deg C, 1 hour	0.35



Product Code #775
20W-50 Synthetic Motorcycle Oil

Product Code #775 is a high performance synthetic motorcycle oil designed to outperform conventional petroleum oil. It is recommended for use in both liquid and air-cooled four-stroke engines including V-Twin, motorcycle wet clutch transmissions, and where applicable, primary chaincases. Product Code #775 is excellent for both new engines and older high mileage engines.

Product #775 is formulated to meet or exceed the following specifications:

- API SJ, SG, CD • JASO MA

Properties:

- Improved heat resistance over conventional mineral oils
- Resists sludge and carbon build-up
- High detergency for clean engines
- Highly oxidation resistant
- No friction modifiers for excellent wet clutch compatibility and smooth shifting
- Zinc and Phosphorus anti-wear additives

TYPICAL TECHNICAL PROPERTIES

20W-50 Synthetic Motorcycle Oil	
Vk 100 °C, cSt	19.67
Vk 40 °C, cSt	134.31
VI	168
CCS, cP	3596 (-15)
Density, lb/gal	7.158
Color	L4.5
Flash Point, °C (COC)	230
Fire Point, °C (COC)	250
Pour Point, °C	-38
TBN	10.50
Four Ball Wear Test 40 kg, 1,200 rpm, 75 °C, 1 hour	0.38



Product Code 782
5W-40 Synthetic Engine Oil

Product Code 782 contains the most current additive chemistry available and is recommended for all four-stroke diesel motors, both on and off road.

Fights Acids • Resists Oxidation • Long Lasting • Controls Cylinder Bore Polishing • Resists Soot Thickening • Controls Deposit Build-up • Highly Dispersant & Detergent • Excellent Hot and Cold, All Season Oil

API CI-4+/SL/CF • Mack EO-N Premium Plus 03 • Cat ECF-1 • Volvo VDS-3 • Global DHD-1 • Cummins CES 20076, 20077, 20078 • Daimler Chrysler 228.3, 229.1

TYPICAL TECHNICAL PROPERTIES

<i>#782 Synthetic Engine Oil SAE 5W-40</i>	
Vk 100 °C, cSt	14.35
Vk 40 °C, cSt	90.29
VI	165
CCS, cP	5126 (-30)
SpGr, g/ml	0.8602
Density, lb/gal	7.163
Color	L4.5
Clarity	CLEAR
Flash Point, °C (COC)	224
Fire Point, °C (COC)	240
Pour Point, °C	-38
TBN	11.02



Product Codes #783 and #786 Synthetic Diesel Oils

Product codes #783 SAE 5W-40 and #786 SAE 15W-40 are premium synthetic diesel oils that are formulated to meet the new CJ-4 diesel oil requirements for model year 2007 and newer diesel engines.

Product codes #783 and #786 are formulated to meet the following specifications:

- API CJ-4, CI-4+, CH-4, CF
- API SM, SL, SJ
- MACK EO-O Premium Plus
- DDC Power Guard 93K218
- Caterpillar ECF-3, ECF-1
- Cummins CES 20081
- Volvo VDS-4
- MB 228.3
- MTU Type II

TYPICAL TECHNICAL PROPERTIES

<i>Synthetic Diesel Engine Oil</i>		
SAE Viscosity Grade	<u>5W-40 #783</u>	<u>15W-40 #786</u>
Vk 100 °C, cSt	15.34	15.25
Vk 40 °C, cSt	92.62	106.30
VI	176	151
CCS, cP	5852 (-30)	5261 (-20)
Density, lb/gal	7.158	7.171
Color	L4.0	L4.0
Flash Point, °C (COC)	226 (439)	238 (460)
Fire Point, °C (COC)	242 (468)	254 (489)
Pour Point, °C	-44 (-47)	-38 (-36)
TBN	8.02	8.02
Four Ball Wear Test 40 kg, 1,200 rpm, 75°C, 1 hour	.44	.44



Product Code 785
Synthetic 10W-40 Motor Oil

Product Code #785 is a SAE 10W-40 synthetic motor oil for use in modern gasoline and diesel engines. This is designed to outperform conventional petroleum motor oils with good rust protection, improved oxidation, heat, and sludge resistance and enhanced cold temperature performance.

Properties:

- Improved engine protection over petroleum in extreme temperatures
- Provides good anti-wear protection for newer and older engines
- Low oil volatility
- Provides good anti-rust protection
- Neutralizes acids
- Excellent soot dispersion properties
- High detergency

Application Recommendations:

Product Code 785 is recommended for gasoline and, where appropriate, diesel engines according to the performance specifications as listed and the OEM specified viscosity.

- API SL/CF, CI-4

TYPICAL TECHNICAL PROPERTIES

Product Code 785 Synthetic 10W-40 Motor Oil	
SAE Grade	10W-40
Kinematic Viscosity @100°C cSt (ASTM D-445)	14.62
Kinematic Viscosity @40°C cSt (ASTM D-445)	97.16
Viscosity Index (ASTM D-2270)	155
CCS Viscosity, cP @ (-25 °C) (ASTM D-2602)	6149
Flash Point °C (°F) ASTM D-92)	230 (446)
Fire Point °C (°F) ASTM D-92)	246 (478)
Pour Point °C (°F) ASTM D-97)	-40
Noack Volatility, % weight loss (g/100g) (ASTM D-5800)	7.7
Four-Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1hr, scar diameter mm.	0.40
Total Base Number (ASTM D-2896)	10.87



Product Code #787

Semi-Synthetic Diesel and Gasoline Motor Oil SAE 15W-40

Product code #787 is a semi-synthetic, API CI-4 Plus/SL licensed SAE 15W-40 motor oil for use in four-stroke diesel engines, both on and off road, and gasoline engines. It is designed to provide enhanced performance over conventional petroleum oils with improved oxidation, heat, and sludge resistance.

Properties:

- Resists acid buildup
- Resists heat & oxidation
- Guards against cylinder bore polishing
- Controls deposit build-up
- Highly dispersant and detergent
- Formulated for modern EGR diesel engines

Product code #787 is formulated to meet or exceed the following specifications:

- API CI-4+/SL/CF
- Mack EO-N Premium Plus 03
- Cat ECF-1
- Volvo VDS-2/VDS-3
- Global DHD-1
- Cummins CES 20076, 20077, 20078
- DDC Power Guard 93K214

TYPICAL TECHNICAL PROPERTIES

<i>Semi-Synthetic Diesel and Gasoline Motor Oil SAE 15W-40</i>	
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	15.6
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	114.9
Viscosity Index (ASTM D-2270)	144
Flash Point °C (°F) (ASTM D-92)	232 (450)
Fire Point °C (°F) (ASTM D-92)	239 (462)
Pour Point °C (°F) (ASTM D-97)	-36 (-33)
Four Ball Wear Test @ 40kg, 75°C, 1200 rpm, 1 hr, scar diameter, mm (ASTM D-4172B)	.35
Total Base Number	12.1



Product Code #788
15W-40 Synthetic Diesel and Gasoline Engine Oil

Product code #788 is a synthetic 15W-40 motor oil for use in four-stroke diesel engines, both on and off road, and gasoline engines. It is designed to provide enhanced performance over conventional petroleum oils with improved oxidation, heat, and sludge resistance.

Properties:

- Resists acid buildup
- Resists heat & oxidation
- Guards against cylinder bore polishing
- Controls deposit build-up
- Highly dispersant and detergent
- Formulated for modern EGR diesel engines

Product code #788 is formulated to meet or exceed the following specifications:

- API CI-4+/SL/CF
- Mack EO-N Premium Plus 03
- Cat ECF-1
- Volvo VDS-2/VDS-3
- Global DHD-1
- Cummins CES 20076, 20077, 20078
- DDC Power Guard 93K21

TYPICAL TECHNICAL PROPERTIES

Synthetic Diesel and Gasoline Engine Oil SAE 15W-40	
Vk 100 °C, cSt	14.82
Vk 40 °C, cSt	96.45
VI	157
CCS, cP	4529 (-20)
Density, lb/gal	7.141
Color	L4.5
Flash Point, °C (COC)	232
Fire Point, °C (COC)	246
Pour Point, °C	-37
TBN	11.28
Four Ball Wear Test 40 kg, 1,200 rpm, 75°C, 1 hour	0.40



Product Code #790
15W-50 Synthetic Diesel and Gasoline Engine Oil

Product code #790 is a synthetic 15W-50 motor oil for use in four-stroke diesel engines, both on and off road, and gasoline engines. It is designed to provide enhanced performance over conventional petroleum oils with improved oxidation, heat, and sludge resistance. It is recommended for use in both liquid and air-cooled four-stroke engines including V-Twin, motorcycle wet clutch transmissions, and where applicable, primary chaincases.

Properties:

- Resists acid buildup
- Resists heat & oxidation
- Guards against cylinder bore polishing
- Controls deposit build-up
- Highly dispersant and detergent
- Formulated for modern EGR diesel engines

Product code #790 is formulated to meet or exceed the following specifications:

- API CI-4+/SL/CF
- JASO MA
- Mack EO-N Premium Plus 03
- Cat ECF-1
- Volvo VDS-2/VDS-3
- Global DHD-1
- Cummins CES 20076, 20077, 20078
- DDC Power Guard 93K2

TYPICAL TECHNICAL PROPERTIES

#790 Synthetic Diesel and Gasoline Engine Oil SAE 15W-50	
Vk 100 °C, cSt	18.85
Vk 40 °C, cSt	129.46
VI	165
CCS, cP	3476 (-20)
Density, lb/gal	7.202
Color	L5.0
Flash Point, °C (COC)	228
Fire Point, °C (COC)	244
Pour Point, °C	-37
TBN	10.88
Four Ball Wear Test 40 kg, 1,200 rpm, 75°C, 1 hour	0.40



Product Code 791
Semi-Synthetic EP Slide-way, Gear and Chain Oil, ISO 68

Product Code 791 is a heavy duty lubricant designed for EP applications found in gear, chain and machine tool applications. This product provides excellent lubricity and film strength needed to prevent scoring and wear during equipment operation.

Properties:

- Tackified for excellent adhesion and water resistance
- Rust and corrosion inhibited
- EP additives prevent stick/slip and slideway scoring

Not recommended for use on yellow metal or worm gear applications operating at or above 200°F.

TYPICAL TECHNICAL PROPERTIES

<i>Product Code 791</i>	
ISO Viscosity Grade	ISO-68
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	9.37
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	68.87
Viscosity Index (ASTM D-2270)	113
Flash Point °C (°F) (ASTM D-92)	242 (468)
Fire Point °C (°F) (ASTM D-92)	254 (489)
Pour Point °C (°F) (ASTM D-97)	-27 (-17)
Four Ball Wear Test @ 40 kg, 75°C, 1200 rpm, 1 hr, scar diameter, mm (ASTM D-4172B)	.40



Product Codes #792-794
Synthetic High Temperature Lubricating Oil

Product Codes #792-794 are synthetic high temperature lubricating oils that are primarily recommended for applications such as stentors, dryers, heat setting machines, tenter frames, continuous board press, oven conveyors and chains, or wherever a lubricant with high-temperature properties is required. These oils are compatible with most seals, paints, petroleum oils and metals including bronze-type components.

Properties:

- Excellent film strength and anti-wear protection at high temperatures
- Rust & Oxidation inhibited
- Thermally stable with a high resistance to oxidation
- Exceptionally low volatility
- Exceptional multifunctional lubricant
- Compatible with petroleum and synthetic lubricants
- Minimizes carbon deposits
- Low degree of smoke and fumes

TYPICAL TECHNICAL PROPERTIES

Synthetic HT Series High Temperature Lubricating Oils	792	793	794
ISO Viscosity Grade – ASTM D-2422	220	320	460
AGMA Classification	5	6	7
Viscosity 100°C, cSt - ASTM D-445	18.0	24.0	32.3
Viscosity 40°C, cSt - ASTM D-445	216.5	314.5	481.0
Viscosity Index (VI) – ASTM-2270	90	96	99
Specific Gravity (g/ml) – ASTM D-1298	0.9665	0.9646	0.9672
Density (lbs./gal.) – ASTM D-1298	8.049	8.033	8.055
Noack Volatility (%WL) – DIN 51581	1.16	1.11	1.07
Four-Ball - ASTM D-4172 (40 kg, 1200 rpm, 75°C, 1 hr., mm)	0.40	0.40	0.40
Flash Point °C (°F) – ASTM D-92	274 (525)	274 (525)	270 (518)
Fire Point °C (°F) – ASTM D-92	304 (579)	304 (579)	296 (565)
Pour Point °C (°F) – ASTM D-97	-26 (-15)	-24 (-11)	-22 (-8)
Copper Corrosion Test – ASTM D-130 (250°F, 3 hrs.)	1A	1A	1A



Product Codes #812
Synthetic Chaincase Lubricant

Product code 812 is an EP chaincase lubricant designed for closed chains. Ideal for snowmobiles, ATVs and general equipment.

TYPICAL TECHNICAL PROPERTIES

Vk 100 °C, cSt	10.25
Vk 40 °C, cSt	66.77
VI	140
Refractive Index	1.4670
API Gravity	35.2
Specific Gravity, (g/ml)	.8488
Flash Point °C (°F) (ASTM D-92)	256 (493)
Fire Point °C (°F) (ASTM D-92)	275 (527)
NOACK (% WT loss) (ASTM D 5800)	4.09%
Pour Point °C (°F) (ASTM D-97)	-46 (-51)
Four Ball Wear Test 40 kg, 1,200 rpm, 75 deg C, 1 hour	.40



Product Codes #815 and #832 Shock Absorber Fluids

Product codes #815 and #832 are premium shock absorber fluids that are formulated with high viscosity index, shear stable synthetic base stocks fortified with specialized additives for rigorous duty.

#815 and #832 are recommended for forks and shocks on cars, trucks, snowmobiles, motocross and cruiser motorcycles, ATVs and other racing or recreational use vehicles with rebuildable shocks. As some settling may occur over time, it is recommended the fluid be agitated before use.

Properties:

- **Multi-part additive system, anti-foam designed to prevent foam**
- **Keeps seals soft**
- **Anti-wear fortified**
- **Superior cold temperature properties**
- **Excellent heat resistance**
- **Minimizes shock fade**

TYPICAL TECHNICAL PROPERTIES

<i>Shock Therapy Suspension Fluid</i>		
SAE Viscosity Grade	815 ISO-15	832 ISO-32
Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	4.4	7.3
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	15.7	32.1
Viscosity Index (ASTM D-2270)	210	205
Flash Point °C (°F) (ASTM D-92)	175 (347)	202 (396)
Fire Point °C (°F) (ASTM D-92)	192 (378)	217 (423)
Pour Point °C (°F) (ASTM D-97)	-54 (-60)	-48 (-54)
Four Ball Wear Test (ASTM D-4172: 40 KG, 75°C, 1200 rpm, 1 hr scar Diameter, mm)	0.40	0.40
Foam Tendency Sequence I/II/III (ASTM D-892)	65/0, 60/0, 65/0	65/0, 60/0, 65/0
Blender Test (25°C, low speed, 1 min.)	2.5 mins to settle 8% foam	2.5 mins to settle 8% foam



Product Code 866 **Engine Flush**

Product Code 866 is an engine flush designed to help restore power, prepare engines for new oil, and will not harm gaskets or seals.

Recommended Mix Ratio

16 ounces of engine flush to 5 quarts

Flushing Instructions

1. FLUSH - *Change the oil filter and add the flush (about 10% of oil capacity). Idle the engine 15 – 30 minutes, then immediately drain the old oil and flush.
2. INSTALL – Remove the old oil filter and replace with a new oil filter
3. POUR – Fill the engine's crankcase with motor oil of the viscosity grade recommended by you vehicle's manufacturer.

**NOTE: Engine Flush is not recommended for transmissions, differentials, motorcycles, ATV's or small engines*

TYPICAL TECHNICAL PROPERTIES

Refractive Index	1.4350
API Grav.	41.7
SpGr, (g/ml)	0.8170
Density, (lb/gal)	6.802
Color	L0.5
Clarity	CLEAR
Flash Point °C (°F) (ASTM D-92)	60 (144)
FTIR Reference Comparison	MATCH



Product Code 877
Limited Slip Additive

Product Code 877 is a limited slip additive formulated to eliminate gear-housing chatter in cars, trucks, and SUVs equipped with limited-slip, posi-traction, and locking differentials. This additive can be used with both synthetic and petroleum gear lubricants.

Not for use in automatic transmissions or other applications requiring automatic transmission fluid.

TYPICAL TECHNICAL PROPERTIES

Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	9.90
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	75.42
Viscosity Index (ASTM D-2270)	112
Flash Point °C (°F) (ASTM D-92)	175 (381)
Fire Point °C (°F) (ASTM D-92)	224 (403)
Pour Point °C (°F) (ASTM D-97)	-15 (5)