AP 6291N

PAG Synthetic Base Stock-ISO 46

Application

AP 6291N is a high performance water-insoluble polyalkylene glycol base stock with an ISO 46 viscosity. This product as a synthetic base fluid is used in the formulation of industrial lubricants such as compressor oil, industrial gear oil, grease, chain oil and steam turbine oil.

Feature

- High viscosity index and good lubricity improver
- Excellent oxidation resistance
- Biodegradability
- Reduced deposit forming and excellent detergency

Typical Properties

Property	Unit	Value	Test Method
Appearance	---	Colorless to slightly yellow	Visual
Acid Value	mg KOH/g	0.1	ASTM D664
Moisture	%	0.2	ASTM E203
Kinematic Viscosity at 100 ^{0}C	cSt	9	ASTM D445
Kinematic Viscosity at 40 ^{0}C	cSt	46	ASTM D445
Viscosity Index	---	180	ASTM D2270
Flash Point	^{0}C	210	ASTM D92
Pour Point	^{0}C	-48	ASTM D97

Storage and Handling

Stored in dry and ventilated place.

APEX Technology FZ Co.
E-mail: info@apextech.ae

AP 7281L

Synthetic Colloidal Graphite

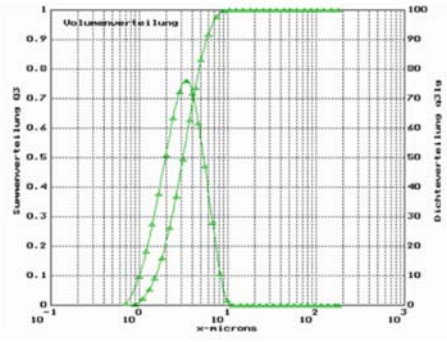
Description

AP 7281L is a synthetic colloidal graphite powder which is used as an extreme pressure and anti-wear additive in lubricating grease formulations. It imparts high load carrying capacity to grease under severe working conditions. This product can enhance friction characteristics of greases in 4-ball test.
Nominal dosages would range from 3 to 5 %wt. of the finished grease.

Typical Properties

Property	Unit	Value	Method
S	%	0.03 Max.	Infrared Detection
Si	%	0.04-0.10	
Fe	%	0.07-0.15	
Ca	%	0.02-0.08	ICP
Al	%	0.01-0.05	
Mg	%	0.001-0.005	
V	%	0.001-0.005	
Ash (Total)	%	0.1-0.2	
Spec. Surface	cm^2/g	9.200	Laser diffraction
Bulk Weight	g/l	100	tamped volume measuring
Tamped Weight	g/l	130	
Carbon	%	99.5 Min.	loss at red heat 900 ^0C
Humidity	%	0.5 Max.	loss after drying at 110 ^0C
Particle Size	%	85 Min. < 7 µ	Laser diffraction
	%	33 Min. < 3 µ	

Typical particle size distribution:



Storage and Handling

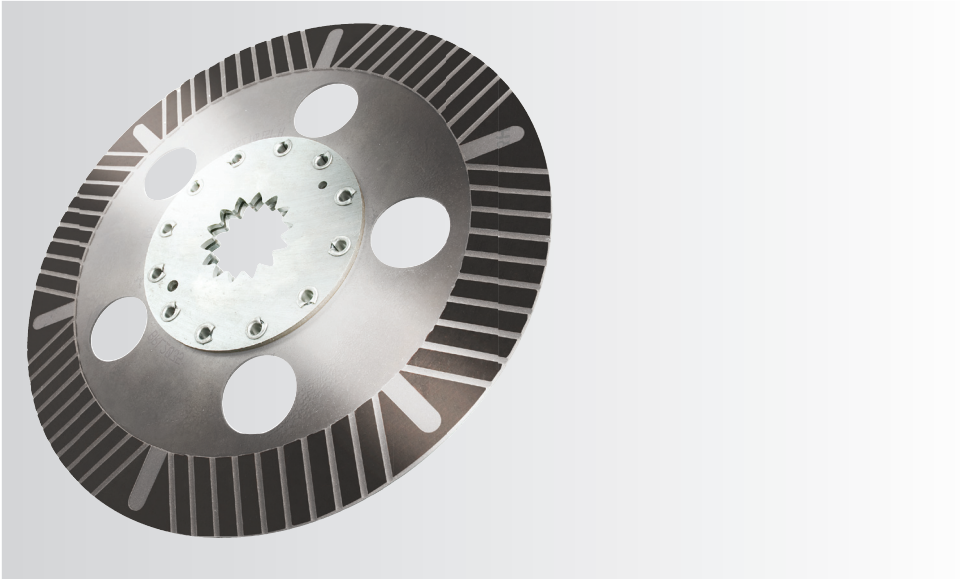
It is stable under ambient temperatures and dry conditions.

APEX Technology FZ Co.
E-mail: info@apextech.ae

DRIVELINE

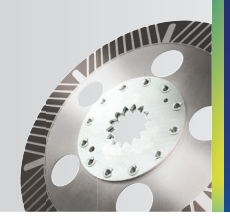
HiTEC® 8805

Off Road Additive Package



Economic, Low-treat STOU

Afton® CHEMICAL
Passion for Solutions™



HiTEC® 8805 Off Road Additive Package

Economic, Low-treat STOU

Ploughing Ahead™

Key Performance Benefits

HiTEC® 8805 additive package is the latest STOU technology from Afton Chemical aimed at the low tier market. This is in response to the demand for a low treat rate, service fill, STOU for machines that are now out of warranty.

HiTEC® 8805 additive provides valuable protection to help economically extend machine life, reduce downtime, improve performance and prevent wet brake chatter.

Key performance benefits of HiTEC® 8805 additive include:

- Based on advanced and patented additive technology developed for higher API performance categories
- Low treat, low cost
  Highly cost effective and competitive in the market
- Wet brake performance
  Improved brake performance and reduced brake chatter
- Excellent hydraulic performance
  Demonstrated by Vickers 104C hydraulic vane pump wear test

Recommended Dosage

At an economic treat rate of 5.1% HiTEC® 8805 additive provides API CD engine performance and API GL4 gear performance. Good hydraulic and wet brake performance has also been demonstrated. Please contact your Afton Chemical representative for specific recommendations.

Typical Characteristics

Appearance:	Dark brown oily liquid
Density at 15, g/ml:	1.063
Flash Point, °C (PMCC):	145 min.
Kinematic Viscosity at 100°C, mm^2/s:	60
Total Base Number, mg KOH/g:	207

Handling Information

Max Handling Temp: 50°C
Shelf Life: 24 months at ambient temperature

Valuable Protection For Machinery Out of Warranty

Typical Formulations

SAE Viscosity Grade	15W-40	20W-40
HiTEC® 8805	5.1	5.1
Pour Point Depressant	0.5	0.1
Non-dispersant OCP VII	8	4
150 SN Base Oil	57.6	-
500 SN Base Oil	-	90.8
600 SN Base Oil	28.8	-

Approvals

Product	Transmission Specs: ZF TE-ML 06A, API GL-4		Engine Specs: API CD/SE	Hydraulic Specs: Suitable for hydraulic use, Sperry Vickers/Eaton: I-280-S		Wet Brake Specs: Suitable for wet brake use
	Off Road Specifications					
HiTEC® 8805	2	2	3	2	3	2

Approvable Meets requirements Suitable for use

1 Formal approval 2 Self-certifying 3 Obsolete

Afton CHEMICAL

ENGINE OILS

HiTEC® 11100

Passenger Car Engine Oil Additive

GF-5 Additive Technology for Maximum Performance

Afton® CHEMICAL
Passion for Solutions™

HiTEC® 11100 Passenger Car Engine Oil Additive

GF-5 Additive Technology for Maximum Performance

Application

HiTEC® 11100 is a new additive technology designed to meet the latest ILSAC GF-5 and API SN industry requirements as well as the performance demands of the new GM dexos1® specification in cost-effective formulations. HiTEC® 11100 is designed for the manufacture of all ILSAC and non-ILSAC viscosity grades in a wide range of industry basestocks in conjunction with HiTEC® 5751 OCP VI improver (50 SSI). HiTEC® 11100 already contains a pour point depressant (PPD) and so no supplemental PPD should be necessary in order to meet low temperature properties of any of these grades. HiTEC® 11100 can also be used to meet both ILSAC GF-5 and dexos1® in an SAE 5W-30 grade using HiTEC® 5754 OCP VI improver (35 SSI) in selected basestocks to meet the more severe Noack volatility demands of the dexos1® specification. Contact Afton Chemical directly for specific instructions on obtaining a dexos1® license for your finished oil.

Recommended Dosage

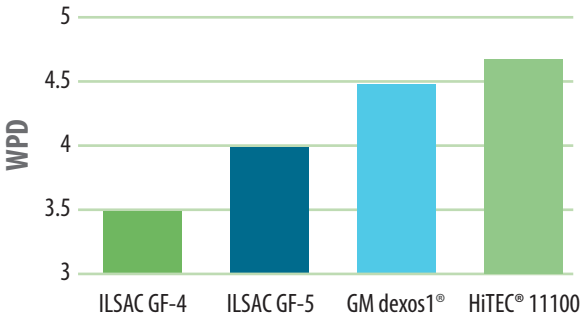
HiTEC® 11100 is used at 10.1% wt. to formulate multi-grade and can also be used for mono-grade engine oils. A wide range of basestocks can be used with this technology. Please contact your Afton Chemical representative for specific formulation recommendations.

Key Performance Benefits

- Robust technology that exceeds the demands of the new ILSAC GF-5 specification
- Covers both API SN and API SN Resource Conserving license requirements
- Approved against GM dexos1® specification with no additive modifications, boost or changes in treat rate

Sequence IIIG Test

Afton's HiTEC® 11100 additive beats GF-5 requirements by nearly 20%.



Typical Characteristics

Appearance	Dark brown viscous liquid
Specific Gravity @ 15.6/15.6°C	0.971
Density, lb/gal.	8.09
Viscosity @ 100°C, cSt	89
TBN, mgKOH/g	78
Flash Point, °C (PMCC)	135 min.

Handling Information

Max Handling Temp: 70°C
Shelf Life: 3 months @ 50°C
36 months @ ambient (10-40°C)

*dexos1® is a registered trademark of General Motors Corporation.

Afton® CHEMICAL

ENGINE OILS

HiTEC® 11180

Passenger Car Engine Oil Additive

Delivering Optimum Protection for TGDI Designs and the Latest GM dexos 1™ Gen 2 Approval Capability

Afton® CHEMICAL
Passion for Solutions™

HiTEC® 11180 Passenger Car Engine Oil Additive

Delivering Optimum Protection for TGDI Designs and the Latest GM dexos 1™ Gen 2 Approval Capability

Application

HiTEC® 11180 is a new additive technology formulated to exceed the performance requirements of the current ILSAC GF-5 specification and address the enhanced performance demands of the latest turbocharged gasoline direct injection (TGDI) engine designs. These engines represent a more severe application for the lubricant as they:

- Produce abrasive soot which can contribute to increased engine wear
- Run hotter, producing an increased tendency to form performance limiting deposits
- Have the potential for severe engine damage as a result of combustion pre-ignition

The current ILSAC GF-5 quality oils in the market may not adequately address all of these new performance demands and HiTEC® 11180 has been developed specifically to ensure optimum protection for TGDI designs.

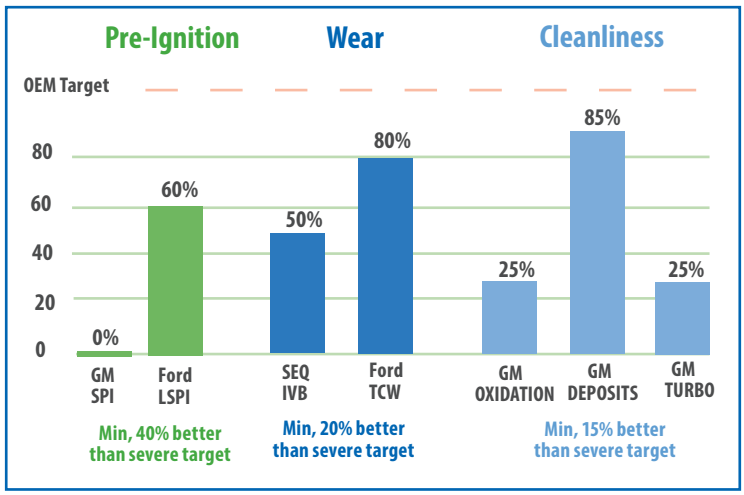
HiTEC® 11180 continues to fully meet the licensed requirements of both ILSAC GF-5 and API SN specifications. In addition, HiTEC® 11180 can be used to meet the latest GM dexos 1™ Gen 2 approval requirements in selected approved formulations. For specific details of the range of licensed formulations that can be supported with this technology platform please contact your Afton Chemical representative.

Recommended Dosage

HiTEC® 11180 is used at 10.1% wt. to formulate all recommended grades and approved oils. Please contact your Afton Chemical representative for specific formulation recommendations.

Key Performance Benefits

- Fully meets the license and approval requirements of the ILSAC GF-5 and API SN specifications and has GM endorsement for approval against the dexos 1™ Gen 2 specification in selected formulations
- Delivers enhanced performance in the areas of wear, cleanliness and fuel economy in the latest TGDI engine designs, exceeding the capabilities of market GF-5 oils
- Provides protection against the potential for pre-ignition in TGDI designs, fully meeting both the currently defined OEM requirements and the anticipated future industry performance targets



Typical Characteristics

Appearance	Dark brown viscous liquid
Specific Gravity @ 15.6/15.6°C	0.967
Density, lb/gal.	8.06
Viscosity @ 100°C, cSt	87
Flash Point, °C (PMCC)	135 min.

Handling Information

Max Handling Temp: 70°C
Shelf Life: 3 months @ 50°C, 36 months @ ambient (10-40°C)

*dexos1 ™ is a trademark of General Motors Corporation.

Afton® CHEMICAL

ENGINE OILS

HiTEC® 11458

Passenger Car Engine Oil Additive

Exceeds ILSAC GF-6/API SP standards and enabling excellent fuel economy and robust performance

Afton® CHEMICAL
Passion for Solutions™

HiTEC® 11458 Passenger Car Engine Oil Additive

Exceeds ILSAC GF-6/API SP standards and enabling excellent fuel economy and robust performance

Application

HiTEC® 11458 is a new additive technology formulated to exceed the performance requirements of the ILSAC GF-6/API SP specification and address the enhanced performance demands of the latest turbocharged gasoline direct injection TGDI and non TGDI engine designs. These TGDI engines represent a more severe application for the lubricant in terms of the wear and deposit control and also have the potential for severe engine damage as a result of combustion pre-ignition. HiTEC® 11458 provides LSPI and timing chain wear protection, improve piston cleanliness and fuel economy while maintaining sludge control, wear control and all the other excellent properties of modern oils.

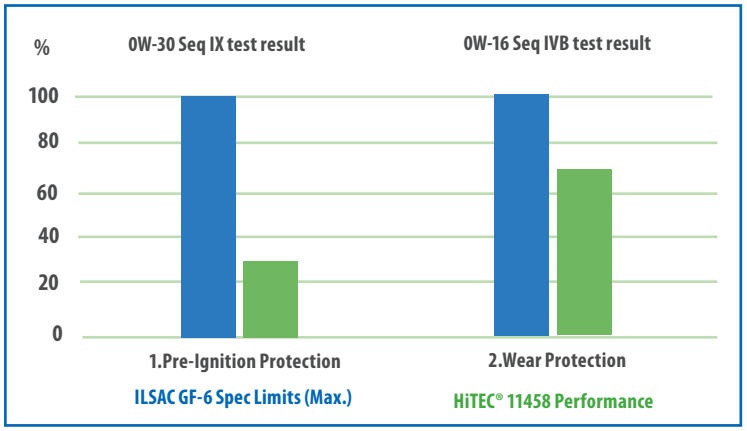
HiTEC® 11458 continues to fully meet the licensed requirements of both ILSAC GF-6 and API SP specifications. For specific details of the range of licensed formulations that can be supported with this technology platform, please contact your Afton Chemical representative.

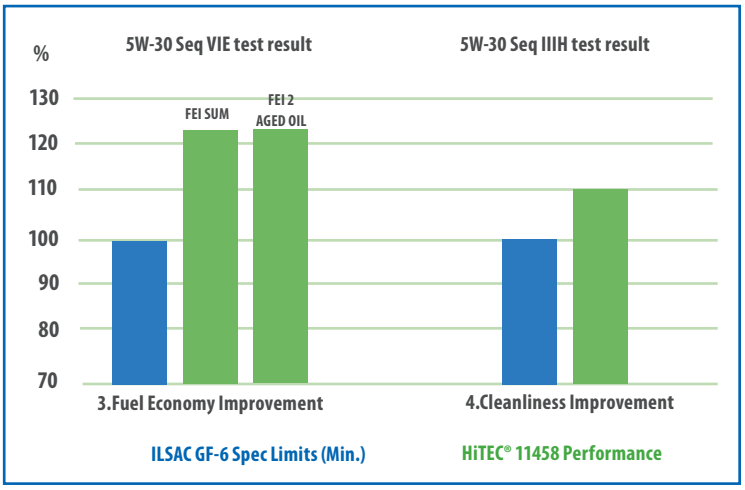
Recommended Dosage

HiTEC® 11458 is used at 8.3% wt. to formulate all recommended grades. Please contact your Afton Chemical representative for specific formulation recommendations.

Key Performance Benefits

- Fully meets the license and approval requirements of the ILSAC GF-6 and API SP specifications in all applicable viscosity grades and a wide range of industry basestocks
- Delivers enhanced performance in the areas of wear protection, piston cleanliness and fuel economy (both in fresh and aged oils) in the latest engine designs and protects against the potential for pre-ignition (LSPI) in these engines
- Single core package technology can cover all applicable industry viscosity grades, including 0W-16, in all market base oils
- Product source from Singapore with shorter lead time and better service to Asia Pacific customers
- Provide consistent and robust performance with Afton liquid VM HiTEC® 5748 Made In Singapore





Typical Characteristics

Appearance	Dark brown viscous liquid
Specific Gravity @ 15.6/15.6°C	0.971
Viscosity @ 100°C, cSt	63
TBN, mgKOH/g	86
Flash Point, °C (PMCC)	135 min.

Handling Information

Recommended Storage and Handling Temp: 45-50°C
Max Handling Temp (< 5 days): 70°C
Shelf Life @ 10-40°C, 36 months

Afton® CHEMICAL

Aluminium Iso Propoxide (AIP)

Grease Thickener

Application

AIP is a salt of isopropanol with aluminium which is an important component for producing aluminium complex greases and gives improved characteristics such as excellent water resistance, good mechanical stability and good low temperature pumpabilitiy to final product. It has also many applications in other industries like rubber and plastic industry, printing ink and water-proofing agent.

AIP is soluble in alcohol, isopropyl alcohol, benzene, toluene, chloroform and carbon tetrachloride.

Typical Properties

Property	Unit	Value
Molecular Formula	---	$C_9H_{21}O_3Al$
Density	g/cm^3	1.035
Aluminium	%	12-15
Aluminium Iso-Propoxide	%	99.0 Min
Initial Melting Point	$^{\circ}C$	110-142
Solubility in toluene (1:10)	---	Transparent

Storage & Handling

Store in closed containers in a cool, dry, well-ventilated area. Avoid exposure to direct sunlight and moisture as it is easy to absorb moisture and reacts with water into aluminium hydroxide and isopropanol.
It should not be exposed to atmosphere for long time.

APEX Technology FZ Co.
E-mail: info@apextech.ae

J-2070

Ethylene Propylene Copolymer (EPDM)

Application

J-2070 is an ethylene propylene diene rubber (EPDM) grade which offers optimum mooney viscosity, good cure rate, narrow molecular weight distribution, optimum ethylene content, good low temperature resistance and good processability.

Typical Properties

Property	Unit	Value
Volatility	%	0.5
Ash Content	%	0.05 Max
Ethylene Content	%	54-60.8
ENB	%	0.9−2.9
Mooney Viscosity ML (1+4) 125 °C	-	39-49
Vanadium Content	mg/kg	5 Max
300% Stress at Elongation (160 °C, 30 Min)	MPa	5 Max
Tensile Strength (160 °C, 30 Min)	MPa	13 Max
Elongation at Failure (160 °C, 30 Min)	%	390 Max

Storage and Handling

Stored in a ventilated, clean and dry warehouse at ambient temperature, preventing from rain, contamination and direct sunlight. It shall be stringently kept from direct sunlight, otherwise cross linking may occur. During transportation it shall be prevented from sun shining and rainwater soaking. The carriages shall be kept clean and tidy to avoid the packaging damaging and mixing with debris. The shelf life is two years.

APEX Technology FZ Co.
E-mail: info@apextech.ae

Polyurea Thickener

Description

This Polyurea thickener dramatically lower the threshold and cost of Urea Grease manufacturing.

Features

- Convenient
- Safe
- More Cost-Efficient
- Quality consistent and property assurance

Typical Properties

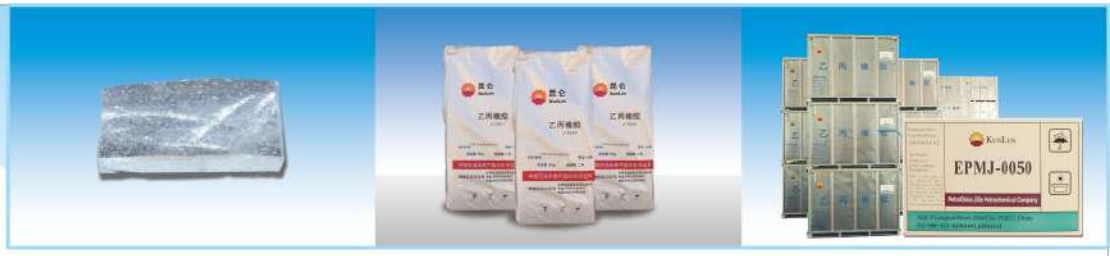
Property	Unit	Value
Appearance	---	White Or Beige Powder
Granularity (80 Sieve Mesh Pass)	%	90 Min
Water	%	1 Max
Specification Of Grease Made Of 500N Thickened By Polyurea Thickener		
Thickener Ratio	%	14
Dropping Point	^{0}C	280 Min
Worked Penetration	0.1mm	295 Max

Storage and Handling

The product is hygroscopic. It should be store sealed. The product tends to form lumps after storage, this does not affect application, but the lump s hould be smashed before use. The product contains some fine particulate, which are easy to flotation. Store in a well ventilated area.

APEX Technology FZ Co.
E-mail: info@apextech.ae

PetroChina



EPM J-0050

Applications:

Solid olefin copolymer designed for use as a Viscosity Thickener for engine oils. It offers better shear stability and low temperature properties to passenger car motor oils and heavy duty engine oils.

Advantages:

★Viscosity thickener and low temperature properties

★Readily dissolves in base oils

★Better pour point characteristics with proper point depressant

Specifications:

Appearance	Clear Polymer
Volatility,% ≤	0.50
Ash Content ,% ≤	0.04
Ethylene Content wt,%	49.3 ~ 54.3
Vanadium Content mg/kg ≤	2
Mooney Viscosity ML(1+4)100℃	45–55
300% Stress at Elongation MPa(160℃, 30Min) ≥	1.8
Tensile Strength MPa, (160℃, 30Min) ≥	3.5
Elongation at Failure, % (160℃,30Min) ≥	360
SSI	45–50
Molecular Weight Distribution	Narrow

Packing: in 25kg composite bag, 42bags in an iron box

Transportation and Storage:

Stored in a ventilated, clean and dry warehouse at ambient temperature, preventing from rain, contamination and direct sunlight. It shall be stringently kept from direct sunlight, otherwise cross linking may occur. During transportation it shall be prevented from sun shining and rainwater soaking. The carriages shall be kept clean and tidy to avoid the packaging damaging and mixing with debris. The shelf life is two years.

PetroChina

EPM J-0030

Applications:

Solid amorphous olefin copolymer designed for use as a Viscosity Index Modifier for engine oils. It offers excellent shear stability and excellent low temperature properties to passenger car motor oils and heavy duty engine oils.

Advantages:

★Good shear stability and low temperature properties

★Readily dissolves in base oils

★Good pour point characteristics with proper point depressant

Specifications:

Appearance	Clear Polymer
Volatility,% ≤	0.50
Ash Content ,% ≤	0.04
Ethylene Content wt,%	47.8 ~ 52.8
Vanadium Content mg/kg ≤	2
Mooney Viscosity ML(1+4)100℃	21-27
SSI	35-38

Packing: in 25kg composite bag, 42bags in an iron box

Transportation and Storage:

Stored in a ventilated, clean and dry warehouse at ambient temperature, preventing from rain, contamination and direct sunlight. It shall be stringently kept from direct sunlight, otherwise cross linking may occur. During transportation it shall be prevented from sun shining and rainwater soaking. The carriages shall be kept clean and tidy to avoid the packaging damaging and mixing with debris. The shelf life is two years.

BASF The Chemical Company

® = Registered trademark of BASF SE

IRGALUBE® ML 605 A

Antiwear hydraulic and Industrial gear oil package

Typical chemical and physical properties

IRGALUBE ML 605 A is a proprietary blend of ashless additives to formulate EP grade ashless hydraulic fluids and industrial gear oils. It includes demulsifier and antifoam agents.

Appearance	Clear, yellow to brown liquid
Viscosity at 40 °C	115 mm^2/s
Density at 20 °C	0.98 g/cm^3
Flash point	> 100 °C (COC)
Solubility Mineral oil	> 5%
Nitrogen content	0.9 %
Phosphorus content	0.4 %
Sulfur content	20 %

Applications and typical treat levels

Industrial lubricants formulated with IRGALUBE ML 605 A (e.g. at 0.8 %) meet or exceed the following
High load carrying hydraulic fluids:
- SEB specifications (SEB = Stahl-Eisen-Blatt - German Steel Industry)
- Brugger Weingarten requirements
- Busak & Shamban micro scratching test

Industrial gear oil:
- DIN 51517 Part 3 (CLP) Edition January 2004

Benefits

Easy to handle liquid, readily soluble in mineral oil

Metal surface protection

IRGALUBE ML 605 A based lubricants protect equipment (pumps, gears, metal surfaces) effectively
- good FZG, Brugger-Weingarten, Timken, FE8 and vane pump tests
- excellent rust prevention

Lubricant (oxidation inhibition) protection

Very good thermal and oxidative stability
Excellent surface properties (air release, foam, demulsibility)
All BASF lubricant additives and packages are compatible with one another

Restrictions

The compatibility of hydraulic fluids formulated using IRGALUBE ML 605 A with other hydraulic fluids, particularly those containing zinc and / or calcium, should always be carefully checked.
Lubricants formulated with IRGALUBE ML 605 A may discolor in use. This has no negative effect on the lubricant characteristics and performance.

Test oil

		Specifications	
IRGALUBE ML 605 A (%)	0.80	SEB	DIN 51517/3
Base stock [51] , Group I, VG 46	balance	181'222	CLP

Lubricant characteristics

TAN (DIN 51 558 Part 1) (mg KOH/g)	0.25	report	report
TBN (DIN 51 558 Part 1) (mg KOH/g)	25	report	report
Pour Point (DIN 51597/ISO 3016)(°C)	- 9 [1]	- 15	-12

[1] this is base stock related

Base stock characteristics

Base stock [51] technology		solvent refined		
ISO viscosity grade		46	46	46
Aromatic carbon content	(%)	8.0		
Sulfur content	(%)	0.5		

Metal surface protection

Lubricants formulated with IRGALUBE ML 605 A and solvent refined mineral oil provide excellent metal protection.

Rust prevention (DIN 51 585/ASTM D 665) 60 °C, 24 hr

Procedure A: distilled water	pass	pass	pass
Procedure B: synthetic sea water	pass	-	-

Copper corrosion prevention (DIN 51 759/ASTM D 130) 3 hr, 125 °C

Copper strip	(rating)	1b	1b max.	-

Copper corrosion prevention (ASTM D 130) 3 hr, 100 °C

Copper strip	(rating)	1a	-	2a max.

Thermo-Oxidative stability

Lubricants formulated with IRGALUBE ML 605 A also show good oxidative stability.

TOST test (ASTM D 943) 95 °C, H_2O, Fe and Cu catalysts

Time to TAN = 2.0 mg KOH/g	(hrs)	2600	1000 min	1000 min.

Performance benefits: Good protection of the equipment and long-term lubricant stability

EP-Hydraulic fluid

				Specifications	
Test oil	IRGALUBE ML 605 A (%)	0.80	1.5	SEB	DIN 51517/3
	Base stock [51] , Group I, VG 46	balance	balance	181'222	CLP

Wear inhibition and load carrying capacity

Lubricants formulated with IRGALUBE ML 605 A and a solvent refined mineral oil exhibit antiwear and EP characteristics required in the SEB 181'222 specification.

FZG gear test (DIN 51354) A /8.3 /90	Failure Load Stage	> 12	-	10 min.	12 min.
4 ball test (DIN 51 350) 1 hr,400 N, RT, 1420 rpm	Weld load	2400	-	-	-
	Wear scar diameter	0.43	-	-	-
Timken (ASTM D 2782)	OK load [1]	35	75	30 min.	-
Timken (SEB 181'302)	Ring and block wear at 25 lbs [1] (mg)	1.2	1.0	6 max.	-
	Ring and block wear at 35 lbs [1] (mg)	2.3	-	-	-
	Ring and block wear at 75 lbs [1] (mg)	-	4.1	-	-

[1] Data assessed at the "Institut fuer Erdoel - und Erdgasforschung", Germany

Brugger-Weingarten	Max. load carrying capacity of lubricating oil film (N/mm^2)	47	51	-	-
Vickers vane pump test V 104-C-10 (DIN 51389 Part 2) 1440/min, 140 bar, 25 l/min, 250 h, 13 mm^2/sec	Weight loss vane (mg)	2	-	30 max.	-
	Weight loss ring (mg)	84	-	120 max.	-
Busak & Shamban micro scratching test	Visual assessment	pass	-	-	-

Industrial Gear oil

Test oils	IRGALUBE ML 605 A (%)	0.80	0.80		
	Base stock VG 100, Group I	balance	-		
	Base stock VG 460, Group I	-	balance		
FAG FE 8 roller bearing test (DIN 51819 Part 3) 7,5/min, 80 k N, 80°C, 80 hrs	Weight loss roller bearing (mg)	12	< 2		30 max
	Weight loss in cage (mg)	28	32		report

Test oil				Specifications	
	IRGALUBE ML 605 A	(%)	0.80	SEB	DIN 51517/3
	Base stock [51] , Group I, VG 46		balance	181'222	CLP

Interfacial properties and seal compatibility

Lubricants formulated with IRGALUBE ML 605 A and solvent refined mineral oil pass the air release, foam, demulsibility and seal compatibility specification requirements.

Interfacial properties

Air release (DIN 51381 /IP 313) 50 °C	Separation time	(mins)	10	10 max.	-
Foam (DIN 51 666/ASTM D 892)					
Sequence I, 24 °C	Initial foam	(ml)	0	100 max.	100 max.
	Residual foam after 10 mins	(ml)	nil	nil	nil
Sequence II, 93.5 °C	Initial foam	(ml)	0	50 max.	100 max.
	Residual foam after 10 mins	(ml)	nil	nil	nil
Sequence III, 24 °C	Initial foam	(ml)	0	100 max.	100 max.
	Residual foam after 10 mins	(ml)	nil	nil	nil
Demulsibility (DIN 51 599 /ASTM D 1401) 54 °C, 40ml oil, 40ml dist.water	Oil/water/emulsion		40/40/0	40/40/0	40/40/0
	Separation time		6	20 max.	30 max.

Seal compatibility

Seal compatibility (DIN 53 521) SRE-NBR1 7 days, 100 °C	Change in volume	(%)	+ 5.1	report	report
	Change in Shore A hardness	(%)	- 3		

Test oil

			Specifications	
IRGALUBE ML 605 A	(%)	0.80	SEB	other
Base stock [51] , Group I, VG 46		balance	181'222	requirements

Water compatibility

Lubricants formulated with IRGALUBE ML 605 A and solvent refined mineral oil have good filterability times both on Denison and AFNOR tests.

Denison filterability test
(TP-02100)
1.2 micron filter, 72 h, storage in darkness before filtration,
100 ml fluid, time to filter 75 ml

Procedure A: No water	(sec)	82	-	Denison 600 max.
Procedure B: 2 % water	(sec)	88		2 times A max.

AFNOR filterability test
(NFE 48-691)
320 ml oil with 0.64 ml H_2O;
72 h/70 °C + 24 h/RT in the dark,
0.8 μm filter, p = 1 bar

Filterability Index*	(FI)	1.14	-	AFNOR 2.0 max

* Filterability index (FI) = $(T_{300} - T_{200})/2(T_{100} - T_{50})$

Safety and Handling	Please read Material Safety Data Sheet (MSDS) before handling.
Product Specifications	This information is available on request through our local representative.
Packaging	This information is available on request through our local representative.

Safety

When using this product, the information and advice given in our **Safety Data Sheet** should be observed. Due attention should also be given to the **precautions** necessary for handling chemicals.

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights, etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

BASF Corporation
100 Campus Drive
Florham Park. NJ 07932
www.basf.com/automotive-oil

Product	| Type
LUBRIZOL® 1038U	**Automotive Gear Oil**

A Universal gear lubricant additive formulated to meet key global industrial and automotive gear oil requirements

Application

Developed to meet the key requirements of API GL-4 for manual transmissions and API GL-5 for hypoid axles plus Industrial Gear Oil applications

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Recommended for use at: 3.9 % by weight

In suitable base fluids to meet the requirements of:-

- API GL-5
- ZF TE-ML 07A
- ZF TE-ML 08
- ZF TE-ML 24A

Recommended for use at: 1.95 % by weight

In suitable base fluids to meet the requirements of:-

- API GL-4
- ZF TE-ML 08
- ZF TE-ML 24A

Recommended for use at: 1.35 % by weight

In suitable base fluids to meet the requirements of:-

- API GL-3

Recommended for use at: 1.0 % by weight

In suitable base fluids to meet the requirements of:-

- AGMA 9005-E02
- DIN 51517 PART 3
- ISO 12925-1 CKC/CKD
- U.S. Steel 224

Also meets David Brown Types M, A and E

Physical Characteristics

	Minimum	Target	Maximum
FLASH POINT, C, PMCC		84	
LBS PER U.S. GAL @ 15.6 C		8.28	
LBS PER IMP GAL @ 15.6 C		9.94	
POUR POINT, C		-66	
SPECIFIC GRAVITY @ 15.6 C	0.974	0.994	1.014
VISCOSITY @ 100 C, CST		2.72	
VISCOSITY @ 40 C, CST		9.1	

Chemical Characteristics

	Minimum % Weight	Typical	Maximum % Weight
NITROGEN	0.80	0.89	0.98
PHOSPHORUS	1.38	1.54	1.70
SULFATED ASH		0.07	
SULFUR	28.9	32.1	35.3

Additional Characteristics

Appearance : Light Amber Clear Liquid

LUBRIZOL® 1038U Unloading, storage and blending instructions

General handling instructions - In general, The Lubrizol Corporation recommends, as a minimum, the use of neoprene or nitrile rubber gloves and safety glasses or chemical splash goggles. The Material Safety Data Sheet should be consulted for specific information and for information on health and safety when handling this product

Fire and explosion hazard data

	Flash Point (method)	Classification	
	84°C PMCC	Combustible	
Temperature recommendations			
Unloading	Pumping Temperature	Ambient°C	°F
	Maximum temperature	60°C	140°F
Storage			
Maximum temperature for long-term storage		45°C	113°F
Blending			
Maximum base oil temperature for mechanical or in-line mixing		60°C	140°F
Equipment recommendations			
Type of Pump	Centrifugal		
Type of transfer line	Ball Launched, Insulated		
Transfer line size	2-3inch/5-8 cm.		
Heat source			
Type	n/a		
Storage tank	n/a		
Viscosity data	**cSt**	**SUS**	
at 25°C, 77°F	16	80	
at 40°C, 104°F	9	56	
at 100°C, 212°F	3	35	
Notes			
Pour Point	-66°C,-86°F		
Low Flash Point-Use caution when handling this material			

Additional Recommendations

* Holding the material in excess of this temperature may cause chemical degradation. Use steam for heating and tracing only when the material is in motion to avoid localized overheating. Cold Temperature Storage - If product has been stored below its pour point temperature it should be heated to 21°C/70°F before using.

Effective: 8/23/2017 2:18:57 AM

DRIVELINE

HiTEC® 3488

Multifunctional CVT / Step-AT Fluid Additive Package

Two
Transmissions.
One Solution.
Endless
Efficiency.

An Innovative Product Providing Superior Versatility
for both CVT and Step-AT Service Fill Application

Afton® CHEMICAL
Passion for Solutions®

HiTEC® 3488 Multifunctional CVT / Step-AT Fluid Additive Package

An Innovative Product Providing Superior Versatility for both CVT and Step-AT Service Fill Application

Application

HiTEC® 3488 is a truly innovative Multifunctional CVT and Step Automatic Transmission Fluid Additive Package designed to formulate transmission fluids with group III base oil. HiTEC® 3488 technology has been proven in a comprehensive test program including vehicles, dynamometers and rig test. Excellent performance data has been obtained in multiple tests where CVTF or ATF specifications or applications are called for or referenced.

Key Performance Benefits

For the Oil Marketer:

- Multifunctional and multi-vehicle suitability enabling optimized supply chain, reduced operational cost and mitigated misapplication risk
- Assurance through excellent performance proven by comprehensive lab testing and field trials

For the Driver:

- Excellent total ATF performance demonstrated in JASO M315, critical GM and Ford tests to provide better protection of transmission and extended service interval for step-AT
- High Steel on Steel friction and good wear performance for CVT validated in belt box test
- Good balance of both torque capacity and anti-shudder performance to provide:
  - Higher safety factor
  - Longer transmission life
  - Enhanced driving comfort

Recommended Dosage

HiTEC® 3488 additive package is recommended for use at 17.2% weight with suitable API Group III base oils. Please contact your Afton Chemical representative for formulation recommendation

Typical Characteristics

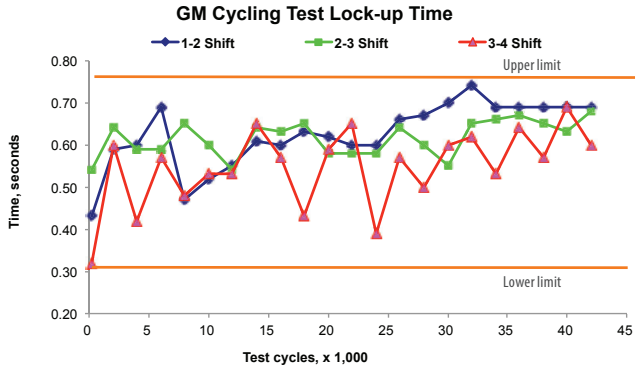
Inspection	Typical
Appearance:	Dark Brown Liquid
Specific Gravity @ 15.6/15.6°C:	0.912
Kinematic Viscosity @ 100°C, cSt	110
Flash Point, (PMCC), °C	160

Handling Information

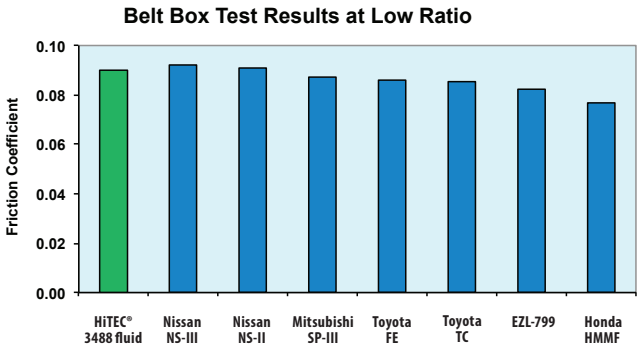
Maximum handling temperature: 70 °C

Shelf life @ ambient: 24 months

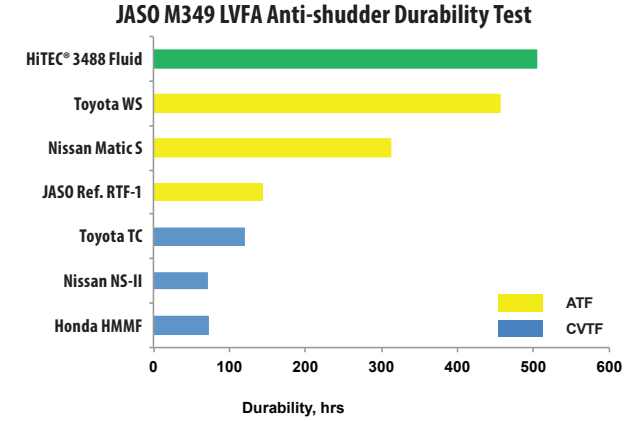
Excellent Total ATF Performance



High Steel on Steel Friction for CVT



Superior Anti-shudder Durability



Afton CHEMICAL

Infineum D3503

Description

Infineum D3503 is a performance additive package for formulating premium quality diesel engine oils. Used at the recommended treat rate in combination with approved base stocks and viscosity modifiers, Infineum D3503 provides engine oils meeting API CK-4, FA-4, and applicable OEM performance specifications. Some claims are base stock and viscosity grade dependent. For more information, contact your local Infineum representative.

Performance

Performance Level:	SAE Viscosity Grade:	Mass %:
API CK-4	10W-30, 15W-40	14.5
API FA-4	10W-30	14.5

~13.3 volume%

Typical Inspections

Property:	Value[(a)]:	Unit:	Method[(b)]:
Appearance	Brown viscous liquid		ITM 50-022
Base Number	68	mg KOH/g	ASTM D2896
Density @ 15 C, kg/m3	961	kg/m3	ASTM D4052
Density @ 60 F, lb/gal	8.00	lb/USG	ASTM D4052
Flash Point Deg C	184	°C	ASTM D93
Kinematic Viscosity @ 100 C	183	cSt	ASTM D445
Kinematic Viscosity @ 40 C	4467	cSt	ASTM D445
Magnesium	0.69	%(m)	ASTM D5185
Molybdenum	0.05	%(m)	ASTM D4951
Nitrogen	0.75	%(m)	ASTM D5291
Phosphorus	0.79	%(m)	ASTM D5185
Sulfated Ash	6.9	%(m)	ASTM D874
Sulfur	1.99	%(m)	ASTM D4951
Zinc	0.87	%(m)	ASTM D5185

(a)Not a specification, (b)Methods typically used by Infineum manufacturing plants

Handling / Precautions

Failing to adhere to recommended storage and handling temperatures may lead to product degradation. For product safety data, refer to the relevant SDS.
Localized high temperatures should be avoided during heating, especially when product cannot be agitated. Electrical, steam or hot oil heating systems with a self limiting maximum temperature not exceeding 120 Deg. C/250 Deg. F (e.g. low pressure steam at 1 bar(g) or 15 psi(g) are recommended.

Min Load/Unload Temp:	60 °C (140 ° F)
Max Load/Unload Temp:	65 °C (149 ° F)
Vis @ Min Load/Unload Temp:	1,210 cSt
Vis @ Max Load/Unload Temp:	900 cSt
Maximum Storage Temperature:	60 °C (140 ° F)
Do not reheat above:	65 °C (149 ° F)

For detailed data please refer to the relevant MSDS.

Further Information

For further information please contact your local Infineum affiliate or representative.

Version: 17 October 2018 (1.0)

AP 4136A

VI Improver for Hydraulic Lubricants

Application

AP 4136A is a viscous solution of alkyl methacrylate polymer in neutral oils recommended for hydraulic fluids with superior flow properties. It provides exceptional thickening efficiency for all types of base oils and is targeted for use in applications where a balance between thickening efficiency and shear stability is required
AP 4136A offers a balance between thickening efficiency and shear stability. Used in combination with suitable PPDs, formulators can achieve optimal low-temperature viscosities and pour points.

Feature

- Balanced thickening efficiency and shear stability
- Effective in lubricants formulated with solvent-refined or hydrotreated base oils

Recommended Dosage

Typical dosages would range from 5–15 wt. % in finished product depending on base oil and desired properties.

Typical Properties

Property	Unit	Value
Appearance	---	Clear to Slightly Hazy Pale
Density @ 25°C	kg/m3	0.86
Viscosity @ 100°C	cSt	700-1400
Flash Point	°C	170 Min
*Sonic Shear (ASTM D5621)	%	28
*KRL ,20 hours (CEC L-45-A-99)	%	48

*Group II 150N Base oil with 5% AP 4136A

Storage and Handling

The product in original package can be stored for at least 2 years at ambient storage conditions and temperature without any deterioration
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APEX Technology FZ Co.
E-mail: info@apextech.ae

Infineum T4762

Description

At the recommended treat rate of 10.5 mass % (9.5 vol %) using an approved Group III base stock, Infineum T4762 produces a multi-vehicle automatic transmission fluid that can be licensed with GM for use in DEXRON®-VI applications.

Performance

Performance Level:	Mass %:
GM DEXRON®-VI	10.5
JASO Class 1-A	
Ford M-LV/M-SP	
Toyota WS	
Hyundai SP-IV	
Nissan Matic S	
Honda D-W1	

10.5 mass% with suitable group III basestocks
Primary Applications:
Qualification testing and OEM approvals are required to use OEM trademarks on finished ATF
Approval / Certification can be obtained
Meets the requirements
Suitable for Use

Typical Inspections

Property:	Value[(a)]:	Unit:	Method[(b)]:
Boron	0.07	%(m)	ASTM D5185
Density @ 15 C, kg/m3	931	kg/m3	ASTM D4052
Density @ 60 F, lb/gal	7.77	lb/USG	ASTM D4052
Flash Point Deg C	148	℃	ASTM D93
Kinematic Viscosity @ 100 C	81	cSt	ASTM D445
Nitrogen	1.36	%(m)	ASTM D5291
Phosphorus	0.18	%(m)	ASTM D4927

(a)Not a specification, (b)Methods typically used by Infineum manufacturing plants

Handling / Precautions

Follow precautions normally taken for handling lube oil stocks. This product is temperature sensitive. Do not heat over the maximum loading / unloading temperature to avoid possible release of extremely odorous alkyl mercaptans and/or toxic hydrogen sulfide.

Localized high temperatures should be avoided during heating, especially when product cannot be agitated. Electrical, steam or hot oil heating systems with a self limiting maximum temperature not exceeding 120 Deg. C/250 Deg. F (e.g. low pressure steam at 2 bar(g) or 30 psig) are recommended.

It is strongly recommended that for long term storage the temperature should not exceed 45℃ (113℉).

Min Load/Unload Temp:	38 ℃ (100 ° F)
Max Load/Unload Temp:	45 ℃ (113 ° F)
Vis @ Min Load/Unload Temp:	1,200 cSt
Vis @ Max Load/Unload Temp:	809 cSt
Maximum Storage Temperature:	45 ℃ (113 ° F)
Do not reheat above:	45 ℃ (113 ° F)

For detailed data please refer to the relevant MSDS.

Version: 19 October 2012 (1.0)

Further Information

For further information please contact your local Infineum affiliate or representative.

Version: 19 October 2012 (1.0)