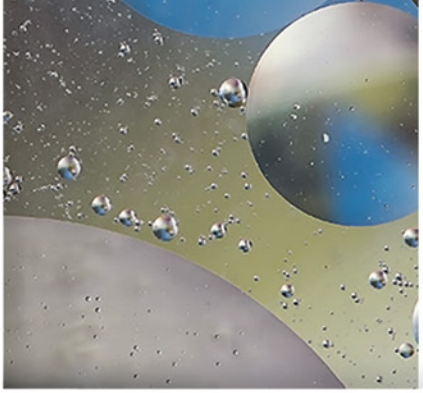
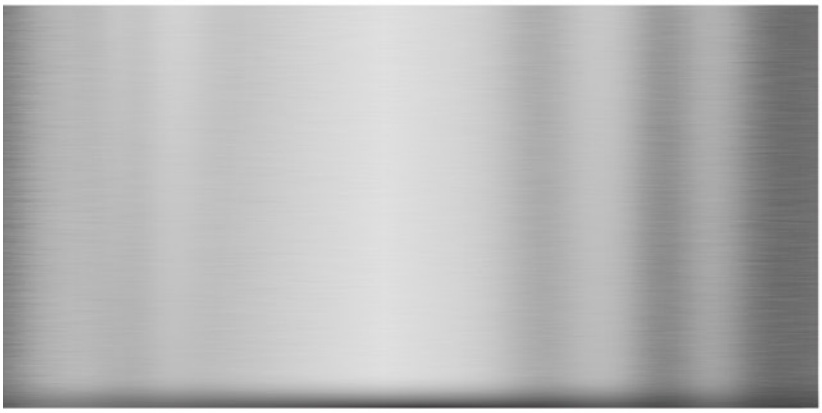
PETRO-CANADA™
BASE OILS

HOLLYFRONTIER™
BASE OILS

HF SINCLAIR BRANDS





WORLD-CLASS BASE OILS FOR WORLD-CLASS FORMULATIONS

HF SINCLAIR BRANDS

You have the requirements...

We have the base oils

GROUP I, II, II+, III

HF Sinclair brand products cover a large slate of base oils for nearly all your formulations, from heavy industrial through high-performance transportation and specialty applications.

With a full spectrum of Group I, II, II+ and III oils targeted across all industrial and transportation applications, our oils reliably deliver the characteristics needed for the most demanding applications of your finished formulations. Whatever your needs, from high solubility and cost effectiveness to high viscosity index and low volatility, we provide base oils that deliver the building blocks for enhanced performance:

- Exceptional oxidation and thermal resistance for long lubricant life
- Extreme low-temperature properties geared to protect equipment and ensure cold-weather start requirements

With two world-class facilities in Tulsa, Oklahoma (USA), and Mississauga, Ontario (Canada), we are committed to supplying you with products to keep you at the forefront of innovation. HollyFrontier Base Oils products are designed and produced by a team of highly experienced chemists and engineers, consistently delivering unmatched product quality and reliability. We also produce the widest range of Base Oils in North America.

Whether it is a Group I, II, II+, or III base oil, we invite you to learn more about each in the following pages, where you will find the specific base oil best positioned to enhance your finished product performance and marketability.

- CONSTRUCTION
- INDUSTRIAL
- METALWORKING
- MINING
- SMALL ENGINES
- TRANSPORTATION

HollyFrontier Base Oils

Group I

Long recognized as one of the largest manufacturers of Bright Stock, our Tulsa refining operations also produce one of North America's broadest ranges of high-quality Group I base stocks. They are refined from a slate of domestic sweet crudes with characteristics making them desirable for lubricant production. The combination of desirable crude properties and our proprietary improvements in the refining process results in base oils ideal for the development of market-leading industrial and transportation oils.

With high oxidative stabilities, low sulfur, high saturates, low aromatics, high solvency, low wax, and a low NOACK volatility, you need to look no further for the optimal solution for blending your heavy-duty lubricants.

GROUP I APPLICATIONS:

- ADDITIVES
- AUTOMOTIVE
- AVIATION
- BAR & CHAIN
- COATINGS
- COMPRESSOR OILS
- CONSTRUCTION
- GEAR OILS
- GREASE
- HEAT TRANSFER OILS
- HYDRAULIC OILS
- MARINE
- METALWORKING OILS
- MINING
- QUENCHING OILS
- RAILROAD ENGINES
- ROLL OILS
- SMALL ENGINE OILS
- TRANSMISSION
- SHOCK ABSORBERS
- VISCOSITY CORRECTION FLUID

These HollyFrontier Group I characteristics offer a complete solution:

FEATURES

- Optimal solvency
- Low sulfur content
- Good oxidative stability
- North American sweet crude source

BENEFITS

- Good low-temperature properties
- Consistent quality for product dependability
- Excellent additive response for cost-effective formulations
- Supply reliability

GRADE DESIGNATION			SN 70	SN 100	SN 148	SN 150	SN 250	SN 525	SN 560	SN 600	SN 150BS
	ASTM	Temp	TYPICAL PROPERTIES								
Viscosity, SUS	D2161	@100°F @210°F	67 35.8	106 39.8	128 41.6	155 43.5	263 50.0	525 64.3	560 66.2	625 69.8	2722 158.5
Viscosity, cSt	D445	@40°C @100°C	11.5 2.8	20.1 4.0	24.7 4.6	30.0 5.2	50.8 7.1	97.8 10.9	107.1 11.6	119.4 12.5	506.9 32.3
Viscosity Index	D2270		84	93	96	99	96	95	95	96	95
Pour Point, °C	D5950		-24	-15	-18	-15	-12	-15	-12	-12	-12

Petro-Canada Base Oils

PURITY™ Group II, II+

PETRO-CANADA BASE OILS

AN HF SINCLAIR BRAND

Our crystal clear Group II, II+ PURITY™ base oils are produced by a state-of-the-art process using a combination of dual stage hydrotreating, and in some instances, catalytic dewaxing. The resulting oils exhibit a high viscosity index, low volatility, a better resistance to heat, outstanding resistance to oxidation and impressive low-temperature performance. To save costs, they can be used in formulations to minimize the amount of synthetic base stocks needed to achieve synthetic blend performance. There is a full range of PURITY™ II, II+ base oils available to help you optimize cost and/or performance in a wide range of automotive, industrial and specialty lubricants.

GROUP II, II+ APPLICATIONS:

- COATINGS
- COMPRESSOR OILS
- GEAR OILS
- GREASE
- HEAT TRANSFER OILS
- HEAVY-DUTY ENGINE OILS
- HYDRAULIC OILS
- METALWORKING OILS
- PASSENGER CAR MOTOR OILS
- QUENCHING OILS
- ROLL OILS
- SMALL ENGINE OILS

These PURITY™ Group II, II+ characteristics will help you compound outstanding automotive and industrial lubricants:

FEATURES

- Minimal aromatics, sulfur and nitrogen content
- Clear, colorless and odorless
- High viscosity index
- Low volatility
- Meets current conventional specifications

BENEFITS

- Excellent oxidative, color and thermal stability
- Superior low-temperature properties
- Excellent additive response for cost-effective formulations
- Group II+ excels as an adjustment stock to optimize cost and performance

			GROUP II										GROUP II+
			PURITY L35	PURITY L40	PURITY L45	PURITY L50	PURITY L60	PURITY L65	PURITY 1017	PURITY 1020	PURITY 2204	PURITY 5700	PURITY 1003
	ASTM	Temp	TYPICAL PROPERTIES										
Viscosity, cSt	D445	@40°C	3.83	3.62	6.31	5.51	9.61	9.33	21.4	21.3	40.2	107	21.7
	D445	@100°C	1.40	1.37	1.94	1.78	2.51	2.57	4.33	4.16	6.27	11.8	4.45
Viscosity, SUS	D2161	@100°F	39	39	48	45	61	59	112	112	207	556	113
Viscosity Index	D2270		-	-	-	-	80	104	109	93	103	99	117
Pour Point, °C	D5950		-57	-27	-57	-12	-21	-42	-21	-21	-18	-15	-24

Petro-Canada Base Oils

PURITY™ VHVI Group III

PETRO-CANADA BASE OILS

AN HF SINCLAIR BRAND

These are the ideal base oils specifically designed for your highest performance formulations and more demanding product applications. Produced at our Mississauga base oil refinery, one of the few Group III refineries in North America, they undergo hydroisomerization, a more extensive process than used in producing our Group II, II+ oils. A specialized catalyst isomerizes entrained wax molecules and converts them to isoparaffinic hydrocarbons. The resulting PURITY™ VHVI Group III base oils have an exceptionally high viscosity index, which may provide end performance characteristics similar to lubricants based on polyalphaolefins (PAOs) at a lower cost. They have low volatility, high stability and excellent low-temperature properties as well, making them ideally positioned to meet surging technical demands for a higher level of performance and enhanced equipment protection.

GROUP III APPLICATIONS:

- COMPRESSOR OILS
- GEAR OILS
- GREASE
- HEAT TRANSFER OILS
- HEAVY-DUTY ENGINE OILS
- HYDRAULIC OILS
- METALWORKING OILS
- PASSENGER CAR MOTOR OILS
- QUENCHING OILS
- ROLL OILS
- SMALL ENGINE OILS

These PURITY™ Group III characteristics will help you formulate the highest performance automotive and industrial lubricants:

FEATURES

- Engineered for synthetic performance
- Highly saturated isoparaffinic content
- Minimal aromatics, sulfur and nitrogen
- Very high viscosity index
- Very low volatility

BENEFITS

- Designed for ultra-low viscosity grades such as 0W-16
- Excellent additive response
- Exceptional shear stability
- Outstanding oxidative, color and thermal stability
- Superior performance across extreme low and high temperatures
- May replace more expensive PAOs and other Group III+ stocks

			GROUP III GRADE DESIGNATION						
			VHVI 2	VHVI 3	VHVI 4	VHVI 4L	VHVI 4M	VHVI 6	VHVI 8
	ASTM	Temp	TYPICAL PROPERTIES						
Viscosity, cSt	D445 D445	@40°C @100°C	9.35 2.58	16.0 3.71	21.3 4.51	21.3 4.46	21.4 4.50	32.9 6.01	51.9 8.14
Viscosity Index	D2270		106	120	127	123	124	130	128
Pour Point, °C	D5950		-45	-30	-24	-24	-24	-24	-21
CCS Viscosity, cP	D5293	@ -20°C	-	-	-	-	-	1279	-
		@ -25°C	-	497	-	-	-	-	-
		@ -35°C	-	-	2848	3133	3116	-	-

Quality, safety and efficiency with

World-class Support

LEADING-EDGE TECHNICAL ASSISTANCE

We know base oil. And we have over a century of experience in its use. Our technical specialists are first-rate, with leading-edge expertise. They can guide you toward the most efficient and rewarding use of our base oil products in your present or planned applications.

CERTIFIED ISO 9001

Our oils are produced in strict compliance with statistical process control, managed through the latest version of the ISO 9001 Quality Management System to ensure consistent quality.

REACH REGISTRATION

In accordance with the European Union (EU) REACH legislation, HF Sinclair, as a "non-EU manufacturer," has designated The Acta Group EU, Ltd (Acta EU) as our Only Representative (OR). Acta EU will retain records of the annual volume of substances imported by customers into the EU, and will ensure, where applicable, that the latest hazard communication (i.e., Safety Data Sheet) on these substances is supplied.

TRANSPORTATION LOGISTICS

We are proud to offer one of the most efficient and reliable transportation systems in the industry. The core components of the program include safety, information availability, equipment and service. Our fleet of rail cars operates out of our centrally located refineries, and our terminals are strategically located around the country, ensuring prompt bulk delivery. Our motor carriers operate on an impressive level of on-time delivery, with their performance monitored through our "Carrier of the Year" program.

1. Electronic Information System (EIS)

The technology at the heart of our transportation system enables accuracy, speed, current information and integration with your system.

2. Rail Tracking Service

Our performance measurement and management system provides daily reports on car location and forecasted arrival dates. Daily reports contain standard railroad CLM reporting.

3. Rate Tracking Service

Our freight rating system ensures freight cost accuracy on invoices and enables prompt return of rate requests.

4. Electronic Data Interchange (EDI)

We send all bill of lading information to the railroads via EDI, ensuring accuracy and timeliness in processing.

5. Transportation Service

Our integrated system can offer an attractive economy of scale to best meet your needs because we combine our inbound and outbound requirements for greater negotiating power. All this translates into added reliability and convenience, as well as savings for you.

We also offer convenient access to international shipments by sea, as well as shipments using Flexibag and ISOTANK via Texas and Oklahoma terminals.

Reference Charts

GREASE COMPATIBILITY

● COMPATIBLE
● BORDERLINE
● INCOMPATIBLE

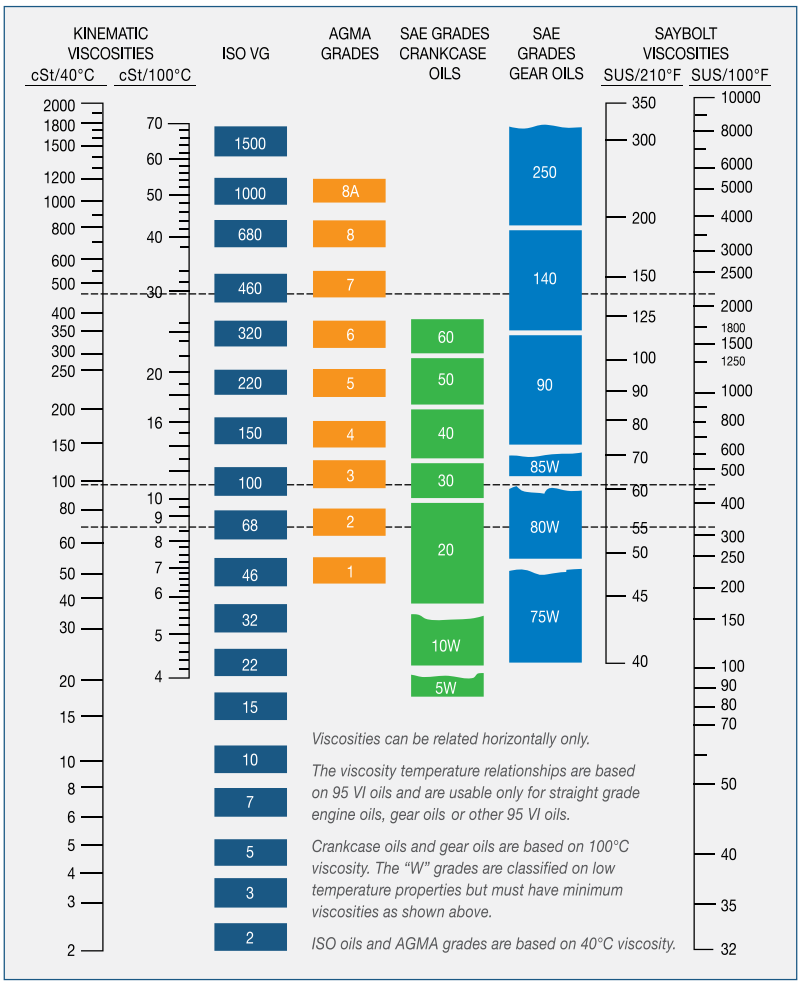
	Aluminum Complex	Barium	Calcium	Calcium 12-hydroxy	Calcium Complex	Bentone (Clay)	Lithium	Lithium 12-hydroxy	Lithium Complex	Polyurea	Sodium (Soda Base)
Aluminum Complex	●	●	●	●	●	●	●	●	●	●	●
Barium	●	●	●	●	●	●	●	●	●	●	●
Calcium	●	●	●	●	●	●	●	●	●	●	●
Calcium 12-hydroxy	●	●	●	●	●	●	●	●	●	●	●
Calcium Complex	●	●	●	●	●	●	●	●	●	●	●
Bentone (Clay)	●	●	●	●	●	●	●	●	●	●	●
Lithium	●	●	●	●	●	●	●	●	●	●	●
Lithium 12-hydroxy	●	●	●	●	●	●	●	●	●	●	●
Lithium Complex	●	●	●	●	●	●	●	●	●	●	●
Polyurea	●	●	●	●	●	●	●	●	●	●	●
Sodium (Soda Base)	●	●	●	●	●	●	●	●	●	●	●

SAE CRANKCASE OIL VISCOSITY CLASSIFICATIONS

SAE VISCOSITY GRADE	Low Temperature Viscosities		High Temperature Viscosities		
	Engine Cranking Max. cPs Temp. (C°)	Low-Temp (C°) Pumping Viscosity 60,000 mPa.s Max.	Viscosity at 100°C, cSt		High Shear (cP) at 150°C and 10^6 S^{-1} Min.
			Min.	Max.	
WINTER SERVICE					
0W	6200 @ -35	-40	3.8	--	--
5W	6600 @ -30	-35	3.8	--	--
10W	7000 @ -25	-30	4.1	--	--
15W	7000 @ -20	-25	5.6	--	--
20W	9500 @ -15	-20	5.6	--	--
25W	13000 @ -10	-15	9.3	--	--
SUMMER SERVICE					
8	--	--	4	<6.1	1.7
12	--	--	5	<7.1	2.0
16	--	--	6.1	<8.2	2.3
20	--	--	6.9	<9.3	2.6
30	--	--	9.3	<12.5	2.9
40	--	--	12.5	<16.3	3.5*
40	--	--	12.5	<16.3	3.7**
50	--	--	16.3	<219	3.7
60	--	--	21.9	<26.1	3.7

* (0W-40, 5W-40, AND 10W-40 GRADES) ** (15W-40, 20W-40, 25W-40, AND 40 GRADES)

VISCOSITY EQUIVALENTS



ISO VISCOSITY GRADES

Viscosity System Grade Indentification	Mid-Point Viscosity cSt (mm^2/s)* @ 40°C)	Approx. Viscosity SUS@100°F
ISO VG 10	10	60
ISO VG 15	15	75
ISO VG 22	22	105
ISO VG 32	32	150
ISO VG 46	46	215
ISO VG 68	68	315
ISO VG 100	100	465
ISO VG 150	150	700
ISO VG 220	220	1000
ISO VG 320	320	1500
ISO VG 460	460	2150
ISO VG 680	680	3150
ISO VG 1000	1000	4650
ISO VG 1500	1500	7000

** The metric unit for viscosity is the millimeter squared per second. It is numerically the same as the centistoke (cSt)*

Our Values

SUSTAINABILITY

- We continuously work to identify and implement important steps on our sustainability journey to position our business for the future, including making key investments in our Renewables business.
- We believe this will enable us to capture new opportunities and enhance our sustainability efforts as our industry evolves.

SAFETY FIRST

- As our core value, our goal is to make sure everyone returns home safely each day. The phrase “Goal Zero” highlights our determination to operate our facilities in a safe manner each day.
- Safety and reliability are essential components of the successful operation of our business and to our commitment to protect the well-being of our workforce, communities and the environment.
- Anchored by our Operational Excellence Management System (OEMS), our integrated programs promote consistent application with common safety goals in mind.

OUR COMMITMENT TO THE ENVIRONMENT

- We believe the right to operate must be earned by being a good neighbor and steward of the environment. We remain steadfast in our goals to protect the environment.
- Our OEMS provides the infrastructure through which we identify, monitor and reduce environmental risks.
- Our commitment to a sustainable future requires us to thoughtfully develop and strategically execute an approach, which enables us to have a deep understanding of our impact on the environment and determine how we can minimize it.

SUPPORTING COMMUNITIES

- We strive to be a good corporate citizen and to have a positive impact in the communities in which we live and work.
- We seek to create a better future for our people, their families and communities through monetary donations and in-kind contributions, including volunteer time, to many worthy causes.
- We support more than 200 organizations, with a focus on local community support, education, hunger and the environment.

OUR PEOPLE

- Driven by our core values of Safety, Integrity, Teamwork Ownership and Inclusion, we provide enhanced support to our employees.
- We continue to expand our efforts to attract, retain and develop a diverse and inclusive workforce.
- Our commitment to diversity and inclusion is reflected in the way we support our employees, our communities, and our investments in organizations that advance underrepresented racial and ethnic groups, women and veterans.

GOOD GOVERNANCE

- Strong and effective governance processes play an essential role in our ability to effectively identify and manage risk.
- We remain focused on providing policies and practices at the management and board level to support the long-term viability of the company.

DOING BUSINESS ETHICALLY

- Our long-standing commitment to doing business ethically is fundamental to how we operate. Our Code of Business Conduct and Ethics sets forth the ethical standards we hold ourselves to and describes our commitment to do business in compliance with the law.
- We hold our business partners to the same standards through our Supplier and Distributor Codes of Business Conduct and Ethics.

For immediate and helpful answers to your technical questions, please visit, hollyfrontierspecialties.com or petrocanadalubricants.com

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LUB4143E (2024.03)