



AN HF SINCLAIR BRAND

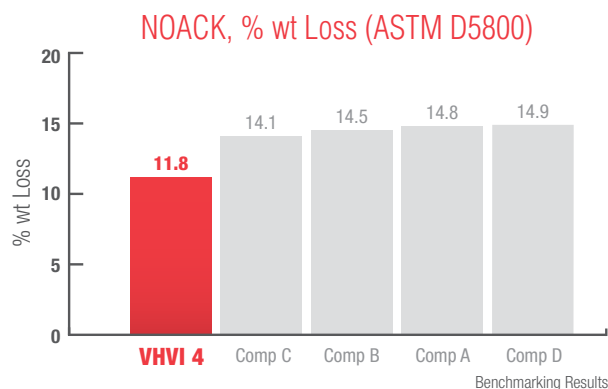
PURITY™ VHVI Specialty Base Oils

The clear choice from start to finish.

Petro-Canada PURITY™ VHVI Specialty Base Oils, an HF Sinclair brand, are produced at HF Sinclair's Mississauga base oil refinery, one of the few Group III refineries in North America. The result is highly isoparaffinic, saturated base oils with a high viscosity index. These highly pure base oils are clear and bright, and are well suited to help formulators meet ever-increasing technical demands. Formulating with PURITY™ VHVI base oils results in leading edge lubricants with high performance and long life for enhanced equipment protection.

FEATURES

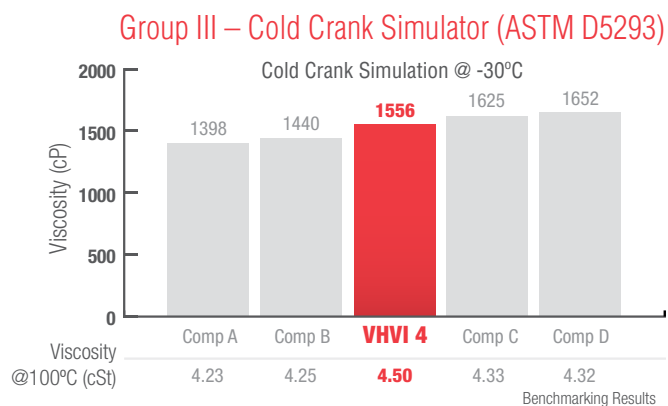
- High purity
- Very high viscosity index
- Very low volatility
- Excellent low temperature properties
- Outstanding oxidative and thermal stability



Low volatility is critical in finished formulations for reduced oil consumption and emissions, particularly with increased oil drain intervals and higher engine operating temperatures.

BENEFITS

- Well positioned to meet needs of future ultra-low viscosity grades such as 0W-16
- Excellent response to additives
- Shear stability permits development of premium HTHS motor oils
- Can replace more expensive PAOs / GP III+ in many high performance lubricant applications



Note: VHVI 4 has a higher Vis @100°C, but a comparable CCS Cold Crank Viscosity measures ease of starting at low temperatures (wear at low temperatures). Lower cranking resistance means faster, easier starting in engine oils.

Clear Advantage

FORMULATING

- PURITY™ VHVI's excellent low temperature properties and low volatility allow for the formulation of challenging multi-grades, such as SAE 0W-20, without the use of PAO in a wide range of additive packages
- PURITY™ VHVI can help you reduce or eliminate the need for PAO and Group III+ in your formulations, optimizing cost and performance
- Due to the higher viscosity of Petro-Canada 4 cSt base oil, customers may need only one ISO grade for formulating
- Benefits of formulating with PURITY™ VHVI base oils include leading edge lubricants with high performance, long life and enhanced equipment protection

RELIABLE SUPPLY AND WORLD CLASS SUPPORT

- Over 40 years of experience producing base oils that are among the purest in the world
- Consistent and reliable quality
- Strategically located to deliver bulk shipments by rail, truck and marine globally to meet your needs
- Produced under ISO 9001, ISO / TS 16949 registered quality management system
- Produced under ISO 14001 registered environmental management system
- World class research and development and an experienced team to support your business
- A full range of PURITY™ base oils available to meet customer requests

TYPICAL PROPERTIES OF PURITY™ VHVI

PROPERTY	ASTM TEST METHOD	PRODUCT NAME						
		VHVI 2	VHVI 3	VHVI 4	VHVI 4L	VHVI 4M	VHVI 6	VHVI 8
Density @ 15°C, kg/L	D4052	0.831	0.833	0.832	0.836	0.835	0.839	0.846
Color, ASTM	D1500	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<1.5
Viscosity								
@ 40°C, cSt	D445	9.35	16.0	21.3	21.3	21.4	32.9	51.9
@ 100°C, cSt	D445	2.58	3.71	4.51	4.46	4.50	6.01	8.14
SUS @ 100°F	D2161	60	86	111	111	112	175	266
Viscosity Index	D2270	106	120	127	123	124	130	128
Pour Point, °C (°F)	D5950	-45 (-49)	-30 (-22)	-24 (-11)	-24 (-11)	-24 (-11)	-24 (-11)	-21 (-6)
Flash Point, PM, °C (°F)	D93	179 (354)	186 (367)	210 (410)	-	-	225 (437)	242 (468)
Flash Point, COC, °C (°F)	D92	187 (369)	204 (399)	230 (446)	227 (441)	227 (441)	241 (466)	262 (504)
Cold Crank Simulator								
@ -20°C, cP	D5293						1279	
@ -25°C, cP	D5293		497					
@ -35°C, cP	D5293			2848	3133	3116		
NOACK Volatility, % wt	D5800	60	30	12	14	14	9	3
Composition								
% Saturates	PCM435	99.9	>99.5	99.8	>99.75	>99.75	99.8	99.8
% Aromatics	PCM435	0.1	<0.5	0.2	<0.25	<0.25	0.2	0.2
Sulfur, ppm	D5453	<1	<1	<1	<1	<1	<1	<1

To learn more about how our base oils can help your business visit:

petrocanadalubricants.com

or contact us at lubecsr@hfsinclair.com

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