Consumer Lubricants Presentation

Understanding Engine Lubricants & Their Changing Technology

Agenda for Today

1. Understanding Viscosity Requirements
2. The Impact of Viscosity on Fuel Economy
3. Mineral versus Synthetic Lubricants – Advantages & Disadvantages
4. Decoding Automotive Lubricant Specifications
5. Does Brand Really Matter ? Why Choose Shell Automotive Lubricants?

Understanding Viscosity Requirements

1

What is oil viscosity?

- Viscosity: A measure of the oil's thickness and ability to flow at certain temperatures. Generally, the thicker the oil, the higher the viscosity and the thinner the oil, the lower the viscosity

- Viscosity index: Indicates how much the oil will thin when it is subjected to heat. The higher the index, the less an oil will thin when it is heated

Viscosity at **low** temperatures (W=Winter)

0W-30 **5W-30** **10W-40**

Viscosity at **high** temperatures

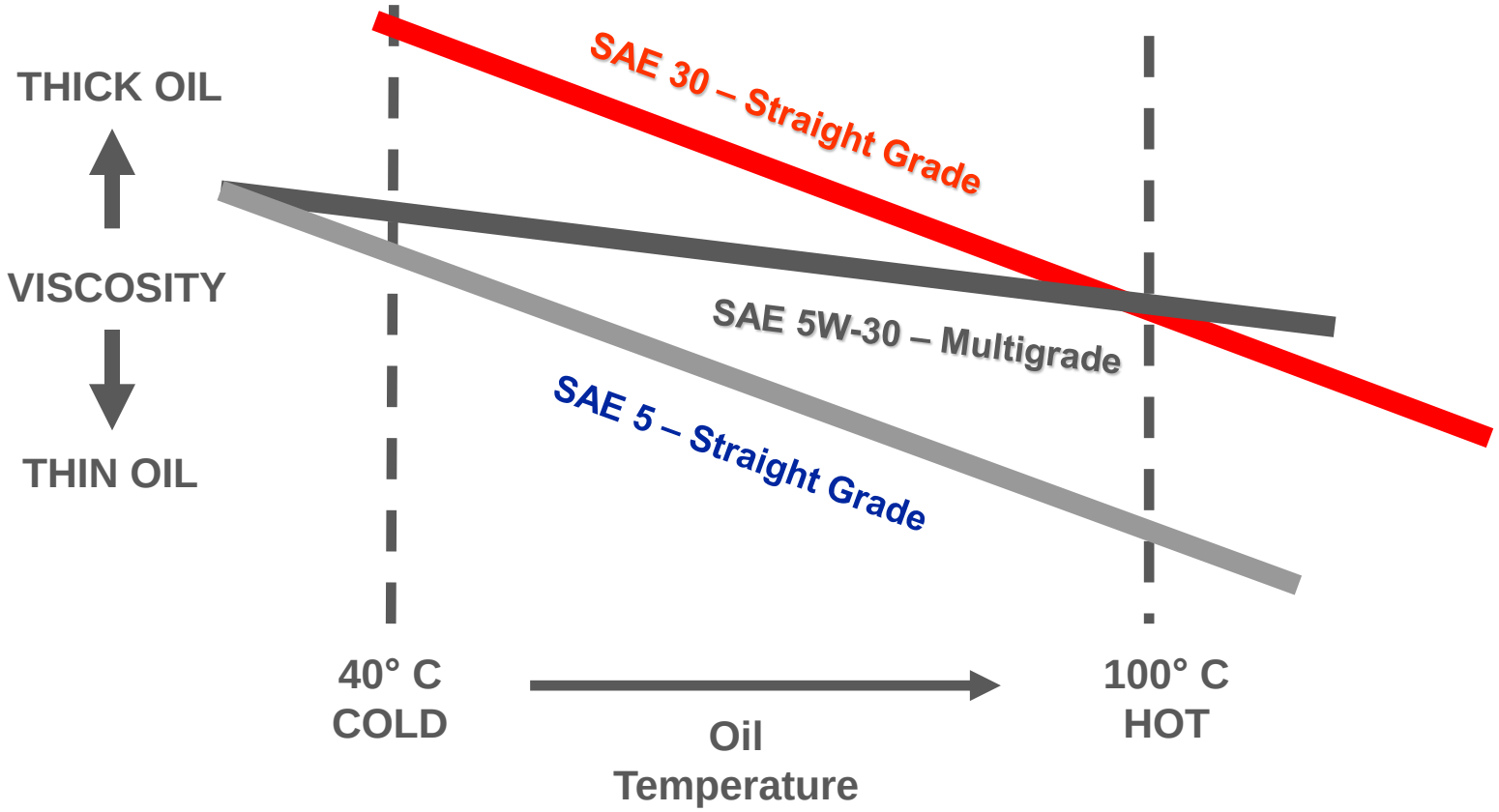
Viscosity grades: Lower numbers indicate thinner oil (low viscosity) and higher numbers indicate thicker oil (high viscosity)

What is oil viscosity?

- The SAE grade of a lubricant is written as: SAE **x**W-**y**, where **x** is related to low temperature viscosity, **y** is related to high temperature viscosity
  - The low-temperature viscosity (the first number, 5W in a 5W-30 oil) indicates how quickly an engine will crank in winter and how well the oil will flow to lubricate critical engine parts at low temperatures. The lower the number the more easily the engine will start in cold weather
  - The high-temperature viscosity (the second number, 30 in a 5W-30 oil) provides thickness, or body, for good lubrication at operating (hot) temperatures
- The larger the number, the higher the viscosity
- The SAE viscosity classification says **NOTHING** about oil quality

How does it work?

- Oils thin when heated
- Multigrades thin less when heated, providing more consistent oil pressure
- SAE 5W-30 = SAE 5W when cold but SAE 30 when hot (100 ° C)



Why is it important to use the viscosity recommended by OEMs?

- Your engine was designed to use oil with a specific viscosity in order to lubricate mechanical parts properly
- If you use oil that is too thin, you may run into wear issues. If the oil is too thick, engine efficiency may decrease
- **Always follow the vehicle owner's manual to determine the correct SAE viscosity grade for your engine**

Why has there been a move towards low viscosity oils?

- **Improved Technology**
  - In the past, oil had to be relatively thick to protect engine components, which were often highly susceptible to wear. Today, engine parts are machined with greater precision and from improved materials. Oil circulation technology has also improved
- **OEM Recommendations**
  - OEMs now only recommend oils of 10W-30 or lower
  - Lower viscosity engines oils have been associated with better fuel economy in many engines (e.g., Ford uses 5W20 and GM 10W30). With new government regulations to improve fuel economy, engine manufacturers are looking for every possible way to improve fuel economy
- **Lower-viscosity grades of motor oil such as the Shell Helix next-generation range**
  - Make engine starting easier
  - Offer less resistance to moving parts during normal running
  - Take less power from the engine to deliver enhanced fuel economy

OEM Recommendations Histogram

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CHEVROLET	SH/SJ 10W30/15 W40 MINERAL	SH/SJ 5W30 / 10W30 MINERAL	10W30 /5W30 SJ/ SL/ SEMI OR MINERA L	10W30 /5W30 SJ/ SL/ SEMI OR MINERAL	10W30 /5W30 SJ/ SL/ SEMI OR MINERAL	10W30 /5W30 SJ/ SL/ GROUP II +MINERA L	10W30 /5W30 SJ/ SL/ GROUP II +MINERA L	10W30 /5W30 SJ/ SL/ GROUP II +MINERA L	10W30/5 W30 SL/ GF-3 / GROUP II	5W30/10 W30 SL/GF-3 // SEMI SYNT	5W30/10 W30 SL/GF-3 // SEMI SYNT	5W30/10 W30 SL/GF-3 // SEMI SYNT	SM/GF-4 - 5W30 GroupII and III	DEXOS 5W30 GROUP III	DEXOS 5W30 GROUP III	DEXOS 5W30 GROUP III
TOYOTA	10W40/30 CD/CF-4/SG/SH	10W40/3 0 CD/CF-4/SG/SH	5W30/1 0W30/ SJ/SL/CF /CF-4	5W30/10 W30/ SJ/SL/CF/ CF-4	5W30/10 W30/ SJ/SL/CF/ CF-4	5W30/10 W30/ SL/SH/CF	5W30/10 W30/ SL/SH/CF	5W30/10 W30/ SL/SH/CF / ACEA C2	5W30/10 W30/ SL/SH/CF / ACEA C3	5W30/10 W30/ SL/SH/CF / ACEA C4	5W30/ SL/SM/B 1/CF/ ACEA C	5W30/ SL/SM/B 1/CF/ ACEA C	5W30/ SL/SM/B 1/CF/ ACEA C	5W30/0 W20 SL/SM	5W30/0 W20 SL/SM	0W20 /SM/SN
HYUNDAI	CF/15W40 , 10W40 SG, SH/ CF	CF/15W4 0 , 10W40 SG, SH/ CF	15W40 /10W 40/ 10W30 / SL/ ACEA A3 B4/CF/ CF-4	15W40 /10W 40/ 10W30 /ACEA SL/ /CF/ CF-4	15W40 /10W 40/ 10W30 /ACEA SL/ /CF/ CF-4	15W40 /10W 40/ 10W30 /ACEA SL/ /CF/ CF-4	15W40 /10W 40/ 10W30 /ACEA SL/ /CF/ CF-4	SM - 5W30 / 10W30	SL/SM 5W30/ 10W30	SL/SM 5W30/ 10W30	SL/SM 5W30/ 10W30	SM - 5W30/ 10W30	SM - 5W30/ 10W30/ ACEA A3 B4	SM - 5W30/ 10W30/ ACEA A3 B4	SM - 5W30/ GF-3, GF-4	SM - 5W30/ 5W20, GF-4 ACEA C3 SM/SN
KIA	CD 15W40/SH 15W40/SJ 15W40/10 W40 SH/ 20 w50	CD 15W40/S H 15W40/SJ 15W40/1 0W40 SH/ 20 w50	10W30 CF-4/SH	10W30 CF-4/SH	10W30 CF-4/SH	10W30 CF-4/SH	10W30 CF-4/SH	SM - 5W30/ ACEA B4	10W30/5 W30 SL/ CF-4	10W30/5 W30 SL/ CF-4	SM - 5W30	SM - 5W30	SM/GF-4 - 5W20	SM/GF-4 - 5W20	5W20 SM/GF-4/ SM/GF-4/C3	5W20 SM/GF-4/ SM/GF-4/C3

OEM recommends fully synthetic or group III in all vehicles manufactured and low SAPS

OEM recommends lubes that need only group II and some group III

OEM recommends lubes that need more than 50% group II base stock

OEM recommends lubes that need more than 30% group II base stock

OEM recommends base stock group II+mineral

OEM recommends mostly mineral oils

OEM recommends high viscous mineral oils

The Impact of Viscosity on Fuel Economy

2

Video –The Link Between Viscosity & Fuel Economy

https://shell-da.kzo-eu.com/player/medium/1456376673732662641

Synthetic vs Mineral Lubricants – Advantages

3

Mineral Oil vs Synthetic Oil

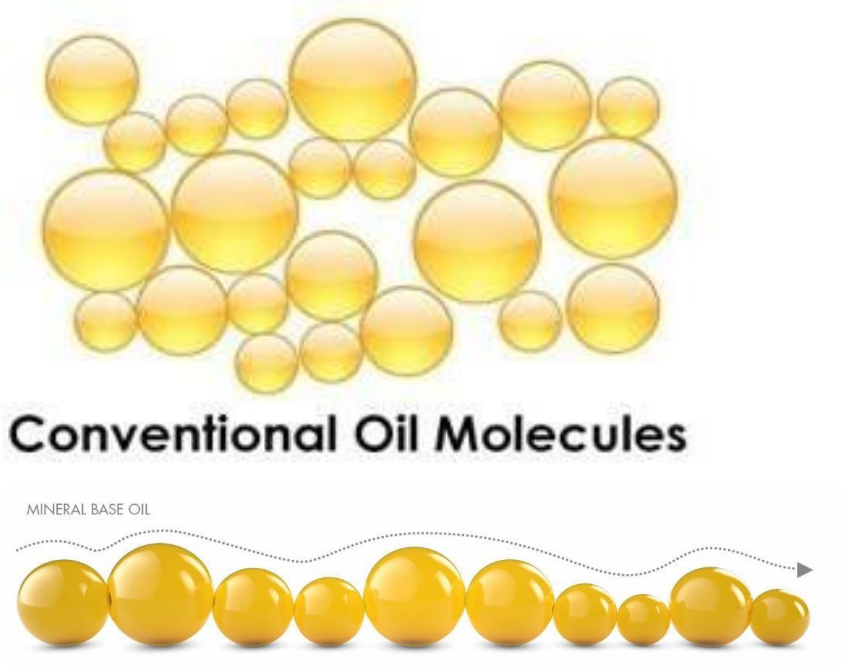
- 2 main classes of lubricating oils:
  - Mineral
  - Synthetic

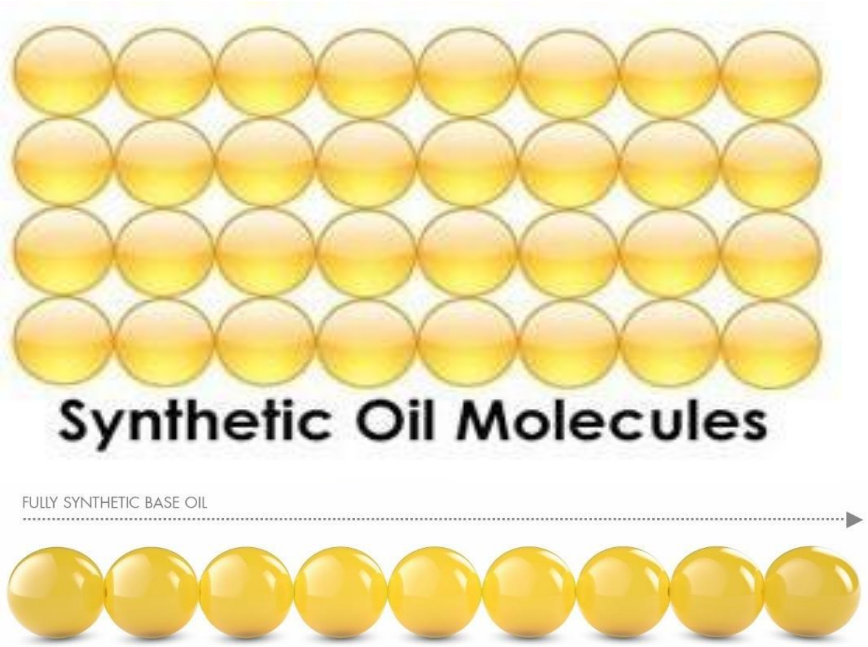
- 2 classes of Synthetic oils:
  - Full synthetics
  - Synthetic technology – also known as semi-synthetic or synthetic blend – a combination of synthetic & mineral oil)

API Base Oil Classification

API Base Oil Designations				
Group	**Sulfur, %**		**Saturates,%**	**VI**
I – Mineral Solvent refined	**>0.03**	**and /or**	**<90**	**80-120**
II – Hydrotreated	**<0.03**	**and**	**>90**	**80-120**
II+*	**<0.03**	**and**	**>90**	**110-120**
III – Severely Hydrocracked	**<0.03**	**and**	**>90**	**>120**
IV – Synthetic Hydrocarbons (SHCs)	**PAOs (Polyalphaolefins)**			
V	**All products not in Group I – IV** (Naphthenics, Synthetic Esters, PAGs, Phosphate Esters, etc)			

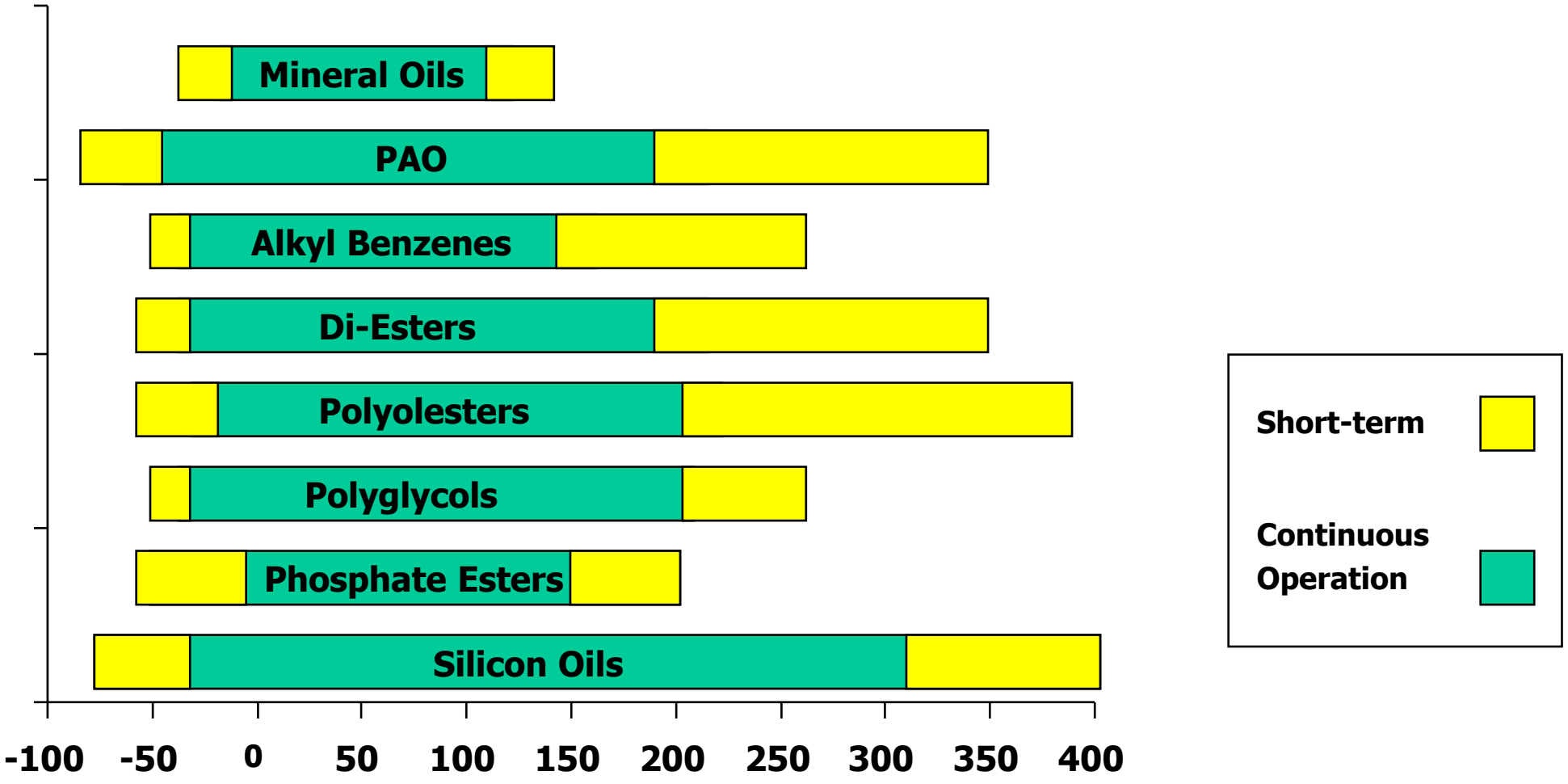
Conventional Mineral vs Synthetic Base Oils





- They are higher in purity and quality than mineral base oils, which means fewer unwanted components, including sulphur-containing compounds and reactive or unstable hydrocarbons
- More uniform molecules result in less friction and better load carrying capability

Base oils - Temperature Range Comparison



Properties of Mineral vs Synthetic Base Oils

Properties of Synthetic Base Oils compared to Mineral Oils	VT Properties	Anti-Wear Properties	Anti-Friction Properties	Paint Compatibility	Seal Compatibility	Mineral Oil Compatibility	Low Temp. Properties	High Temp. Oxid.Stability	Inflammability	Relative Cost
Mineral Oil	O	O	+	+ + +	+ + +	+ + +	O	O	-	1
XHVI	+ +	O	+	+ + +	+ + +	+ + +	O	+	-	3
PAO	+	O	+	+ + +	+ + +	+ + +	+	+ +	-	5
Alkyle Benzene	O	O	+	+ + +	+ + +	+ + +	+	O	-	2
Di-Esters	+ +	O	+	-	O	+	+	+	O	5
Polyol-Esters	+ +	O	+ +	-	O	O	+ +	+ + +	O	5
Polyglycols	+ +	+ + +	+ + +	+	+	-	+	+ + +	O	6
Phosporic Acid Esters	-	+ +	+ +	-	O	-	O	+	+ +	6
Silicon Oil	+ + +	-	-	+ +	+ + +	-	+	+	+	40

+++ excellent ++ very good + good O adequate - not suitable

Benefits of Synthetic Oils

- Using high-quality synthetic oil will help take better care of the engine and reduce deposit formation, which may reduce power, performance, and fuel economy. Synthetic oil generally performs better mechanically and chemically compared to mineral oils. Synthetic oil also has better high and low temperature properties
- Using synthetic oils will:
  - Maintain engines as close to a factory clean state as possible
  - Save on maintenance after the warranty has ended
  - Reduce fuel consumption / improve fuel efficiency
  - Allow for easier flow at start-up temperatures, when most wear occurs
  - Reduce the formation of sludge and corrosive acids

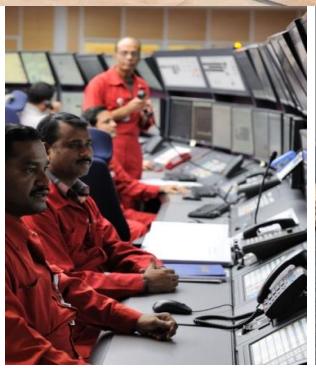
Synthetics should be recommended for:

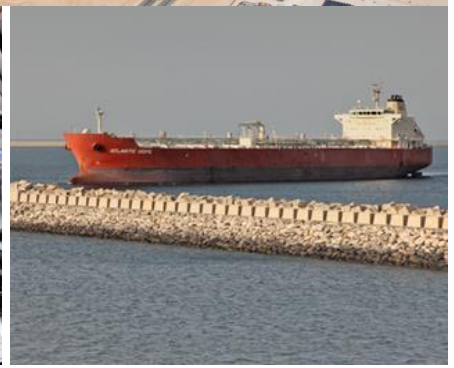
- Customers who want to keep the same oil change intervals, but:
  - Run with full loads for long periods
  - Operate in very hot or cold climates
  - Tow trailers and boats for long periods at high speeds or up hills
  - Often forget to change their oil at the recommended interval
  - Drive for long periods in congested city traffic
  - Are keen to reduced exhaust emissions and keep their engines clean
  - Want to extend the life of their engine

Synthetics Reimagined & Reinvented – Shell PurePlus Technology

Shell
PUREPLUS
TECHNOLOGY

Shell GTL – Converting Natural Gas to Liquid Products





1973

n Laboratory Amsterdam grams/d

1983

n Pilot plant Amsterdam 3 bbl/d

1993

n Bintulu Malaysia current capacity

TODAY

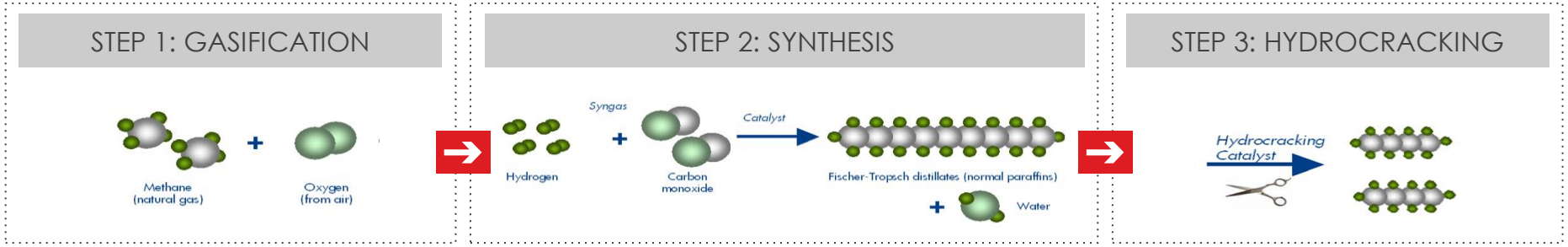
n Pearl GTL Qatar 140,000 bbl/d

SHELL: 40+ Years GTL Development & Innovation

WHAT IS THE GAS TO LIQUID PROCESS?

Extraction

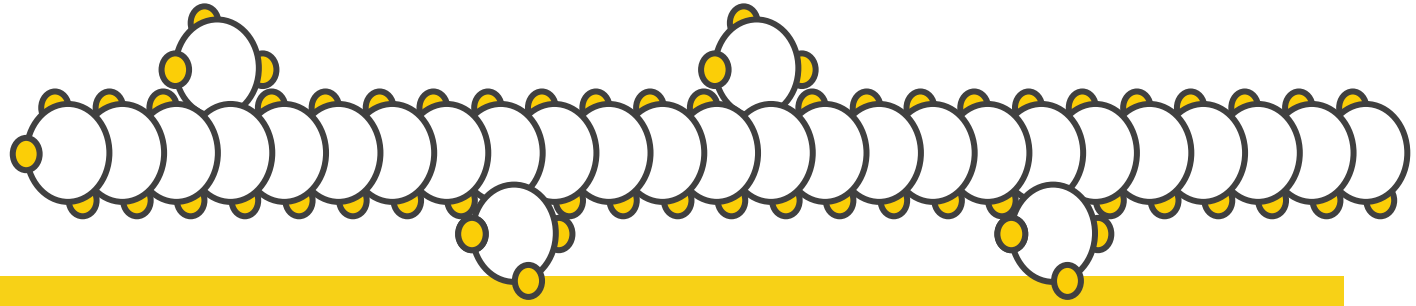
Fischer-Tropsch Synthesis



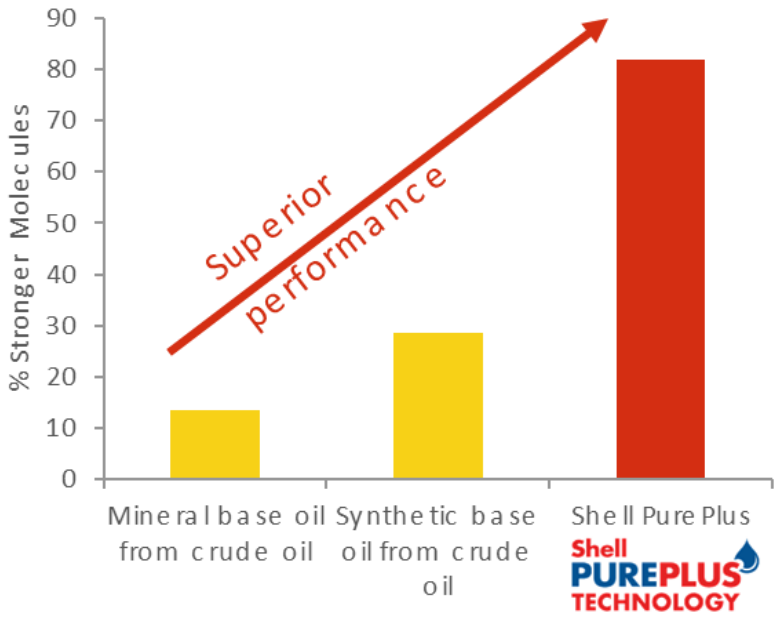
2020

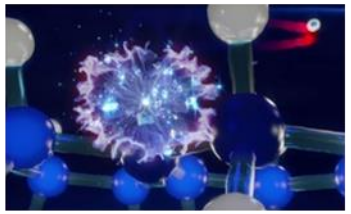
SHELL "MADE FROM NATURAL GAS" TECHNOLOGY

- Compared to traditional base oils, GTL base oils made from natural gas provide:
  - Superior volatility control
  - Better low/high temperature performance
  - Enhanced oxidation stability
  - Superior air release characteristics

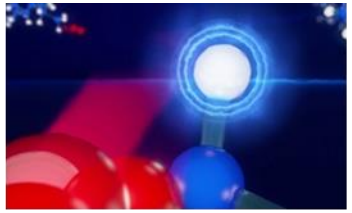


Typical GTL Molecule
Linear, minor branched hydrocarbons predominate; low content of naphthenics and aromatics





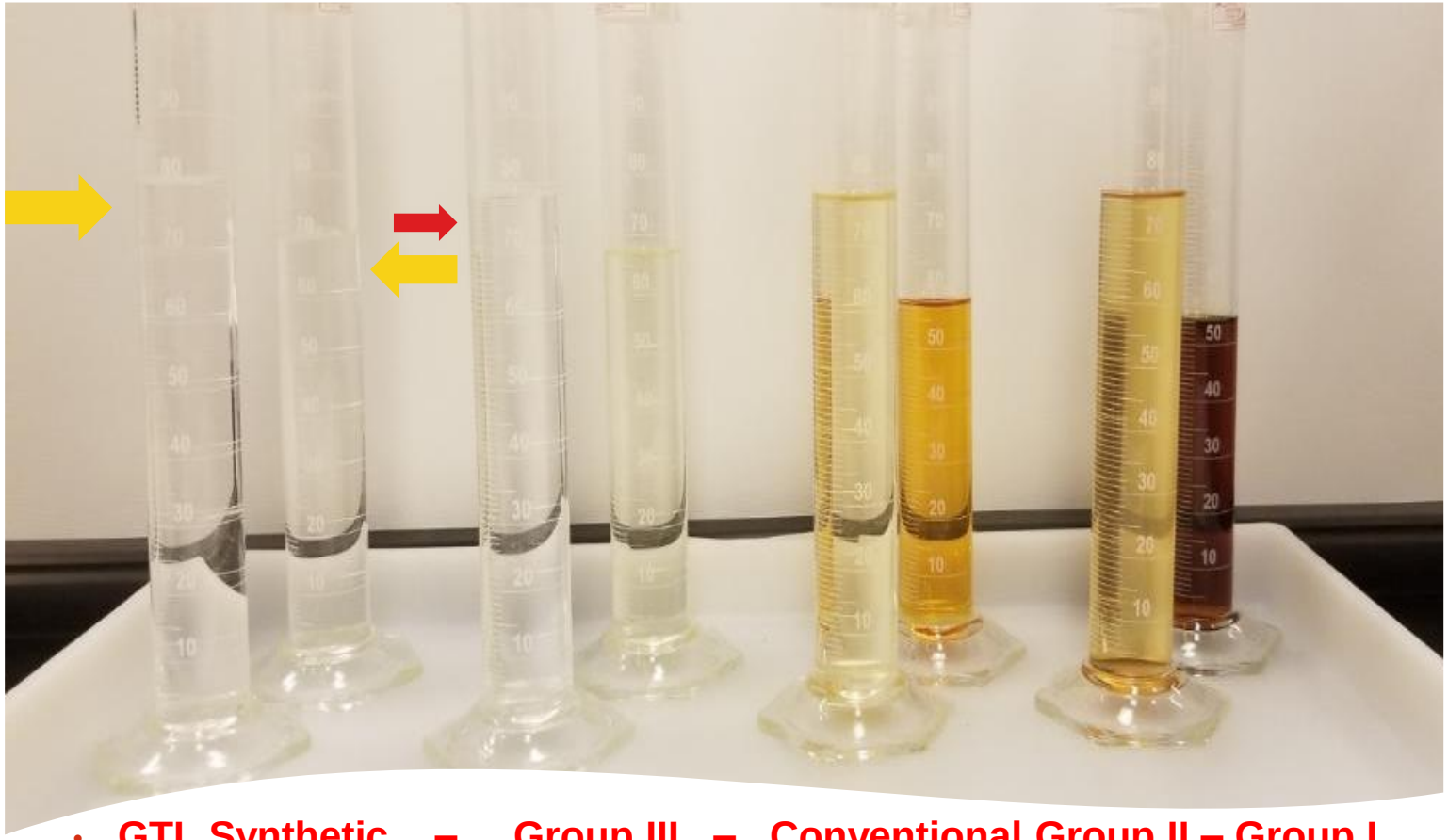
Weaker molecular bonds break more easily at extreme high temperatures.



Stronger molecular bonds, enable Shell GTL to withstand high-temperature attack.

BENEFIT OF GTL IN OXIDATION AND VOLATILITY

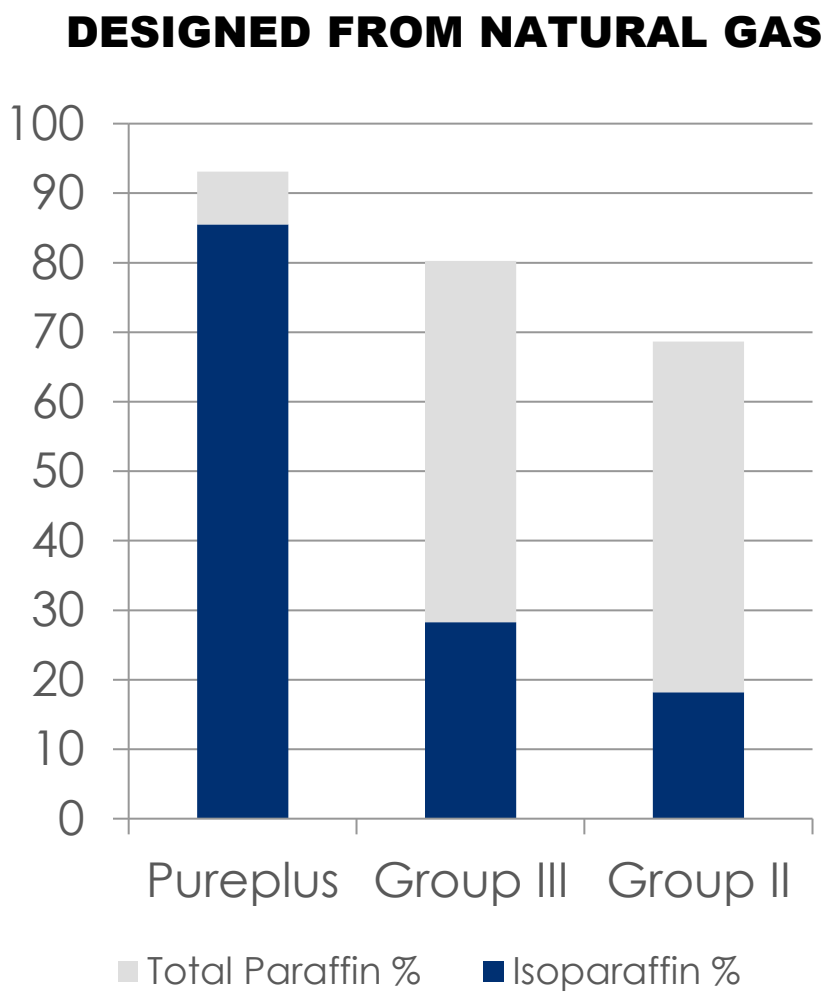
- Before and after the oxidation (heating) test



- **GTL Synthetic – Group III – Conventional Group II – Group I**
- **Samples before were being aged in 250 deg C oven for 1 hour**
- **Can you see three significant differences?**

SHELL GTL: **PurePlus Technology – Designed from natural gas**

- The molecular structure of PurePlus is a key part of the performance of Shell Helix Ultra!
- The key is ISOPARAFFINS.
- Shell Pureplus Technology has significantly more ISOPARAFFINS than leading group II or group III base oils!



SHELL HELIX ULTRA WITH PUREPLUS TECHNOLOGY

A REVOLUTION IN MOTOR OIL

INNOVATION
SHELL PUREPLUS TECHNOLOGY

- crystal-clear base oil
- virtually none of the impurities found in crude oil.
- superior lubricants that keep most advanced engines cleaner than conventional engine oils can.

PROVEN EXPERTISE
ACTIVE CLEANSING TECHNOLOGY

- ACTIVE CLEANSING TECHNOLOGY
- Superior cleansing and protection for today's engines
- Protection that exceeds industry standards and
- Keeps critical engine components cleaner.

FACTORY CLEAN
SHELL HELIX ULTRA

SHELL PUREPLUS TECHNOLOGY – FACTORY CLEAN

- meaning that no other motor oil keeps your engine closer to factory clean.*
- Made with a unique combination of Shell PurePlus Technology and Active Cleansing Technology
- It delivers even higher levels of cleansing and protection
- It maintains the engine in the best condition like the day they come off the production line

* Based on Sequence VG sludge test results using 0W-40.

SHELL HELIX ULTRA: **ENHANCED PRODUCT BENEFITS**

INNOVATION
SHELL PUREPLUS TECHNOLOGY

PROVEN EXPERTISE
ACTIVE CLEANSING TECHNOLOGY

FACTORY CLEAN
SHELL HELIX ULTRA

I ENHANCED VISCOSITY

- Faster oil flow for quicker engine warm-up
- Easier starting in cold weather
- Maintain oil's performance in extreme temperatures

II REDUCED FRICTION

- Fuel economy up to 3%**
- Improved piston cleanliness

III REDUCED OIL CONSUMPTION

- Compared with conventional group II and III base oils due to low-volatility oils

* Based on Sequence VG sludge test results using 0W-40.
** Based on the M111 FE test compared with the industry reference oil. Fuel economy varies from 1,7% up to 3% depending on the different vehicle types and the applied engine oil (e.g. up to 3% fuel economy with Shell Helix Ultra Professional AF 5W-30).

FACTORY CLEAN

NO OTHER MOTOR OIL CAN KEEP ENGINES CLOSER TO FACTORY CLEAN*

We know that engines are in the best condition the day they come off the production line and that's why we designed Shell Helix Ultra, the oil of choice for Ferrari. Made with a unique combination of Shell PurePlus Technology and Active Cleansing Technology it delivers even higher levels of cleansing and protection, meaning that no other motor oil keeps your engine closer to factory clean.*

PROUD DRIVERS CHOOSE SHELL HELIX ULTRA

Shell HELIX ULTRA Motor oils

*Based on sequence VG sludge test results using 0W-40

SHELL HELIX ULTRA SN : **PISTON CLEANLINESS**

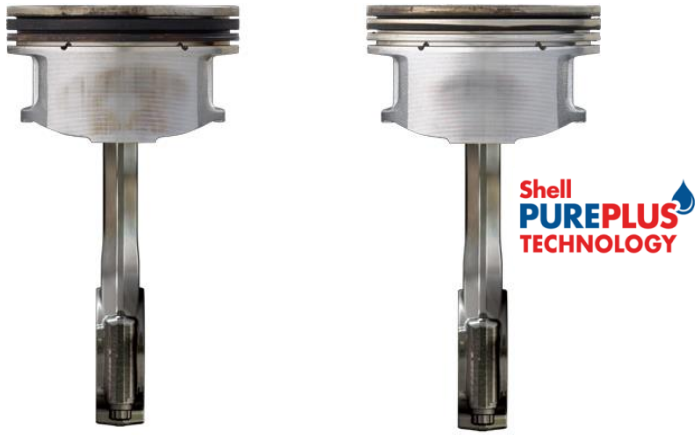
TECHNICAL PROOF

- Shell Helix Ultra uses Shell PurePlus Technology and Active Cleansing Technology to unlock levels of cleansing performance that lesser base oils cannot achieve.
  In severe industry engine tests, this combination enabled Shell Helix Ultra SN to achieve 65% superior piston cleanliness, i.e. results that far exceed the industry-standard requirements.[1]

CONSUMER BENEFIT

- Maintain fuel economy and performance

Industry standard | Shell Helix Ultra SN



- Shell Helix Ultra with Shell PurePlus Technology acheived significantly better results compared to conventional Group II and Group III base oils in sequence IIIG oxidation and piston deposit test.

1Average percentage achieved based on ILSAC GF-5 and Sequence IIIG pistons deposit tests using 5W-30. Applicable to Shell Helix Ultra SN 5W-30, 5W-20 and 10W-30

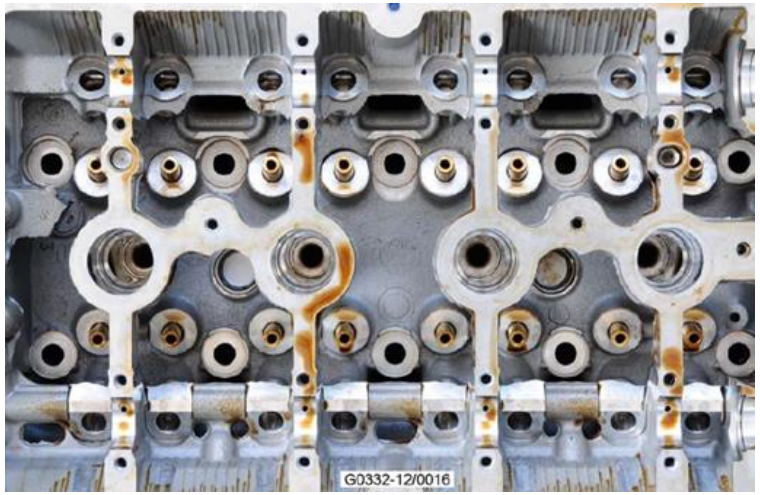
SHELL HELIX ULTRA: **CLEANLINESS IN MODERN ENGINES**

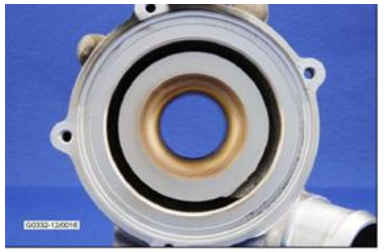
TECHNICAL PROOF

- In severe endurance tests using the latest-technology turbocharged and downsized engines, Shell Helix Ultra demonstrated superb engine cleanliness. This enables critical engine components to operate at design efficiency throughout the engine's life, thereby protecting fuel economy and power output.

CONSUMER BENEFIT

- Maintain fuel economy and performance





Picture 53: Compressor housing

Picture 54: Compressor plate

Test parts from PSA EP6 CDT Endurance Test proposed for inclusion in ACEA 2014 passenger car engine oil specifications. Evaluation on Shell Helix Ultra 5W-40.

SHELL HELIX ULTRA SN

The fully synthetic oil Shell Helix Ultra SN has been formulated with Shell's latest innovation, **PurePlus Base Oil** and Active Cleansing Technology to be the best in the Shell Helix family. It works harder to protect than semi-synthetic motor oils by continuously helping to prevent dirt and sludge build-up.

Exceeds specifications:

0W-20: API SN and ILSAC GF-5

5W-30: API SN; ILSAC GF-5; Chrysler 6395S; GM 6094M, 4718M; and Ford WSS-M2C946-A

10W-30: API SN; ILSAC GF-5; Chrysler 6395S; and GM 6094M and 4718M

Lubricants for PCMO (Passenger Car Motor Oil)
Main Shell Helix Product Lines

Increase Protection Efficiency>>>>>

Customer value proposition (CVP)			Story	
			What is it?	Reason to believe
Top tier	Shell Helix Ultra		Next generation, fully synthetic premium motor oil made from natural gas that delivers ultimate engine performance[1]	**PurePlus Technology** designed from natural gas, has stronger molecules to manage extreme temperatures inside your engine
Mid tier	Shell Helix HX8		Entry-level fully synthetic motor oil that provides protection in different demanding driving conditions	**Flexi-Molecule Technology** activates at high pressure to protect when your engine needs it most
Mid tier	Shell Helix HX7		Synthetic technology motor oil that protects by adapting to every drive	**Flexi-Molecule Technology** responds and adapts to pressure when your engine needs it most
Low tier	Shell Helix HX5		Good-value enhanced mineral oil that provides protection for total engine reliability	**Active Cleansing Technology** offers enhanced protection by maintaining oil thickness and keeping your engine clean

Decoding Automotive Lubricants Specifications

4

API SERVICE CATEGORIES FOR GASOLINE ENGINES

Automobile Model Year

API[1] Service Categories

1930 | 1951 | 1967 | 1971 | 1979 | 1988 | 1993 | 1996 | 2001 | 2004 | 2010 | 2011 | 2015 | 2018[2]

SA	SB	SC	SD	SE	SF	SG	SH	SJ	SL	SM	SN	SN PLUS	
ILSAC*	There was no ILSAC Specification Prior to 1993						GF-1	GF-2	GF-3	GF-4	GF-5		
General Motors	There was no dexos® Specification Prior to 2010[3]										dexos1™	dexos1™ Gen2	

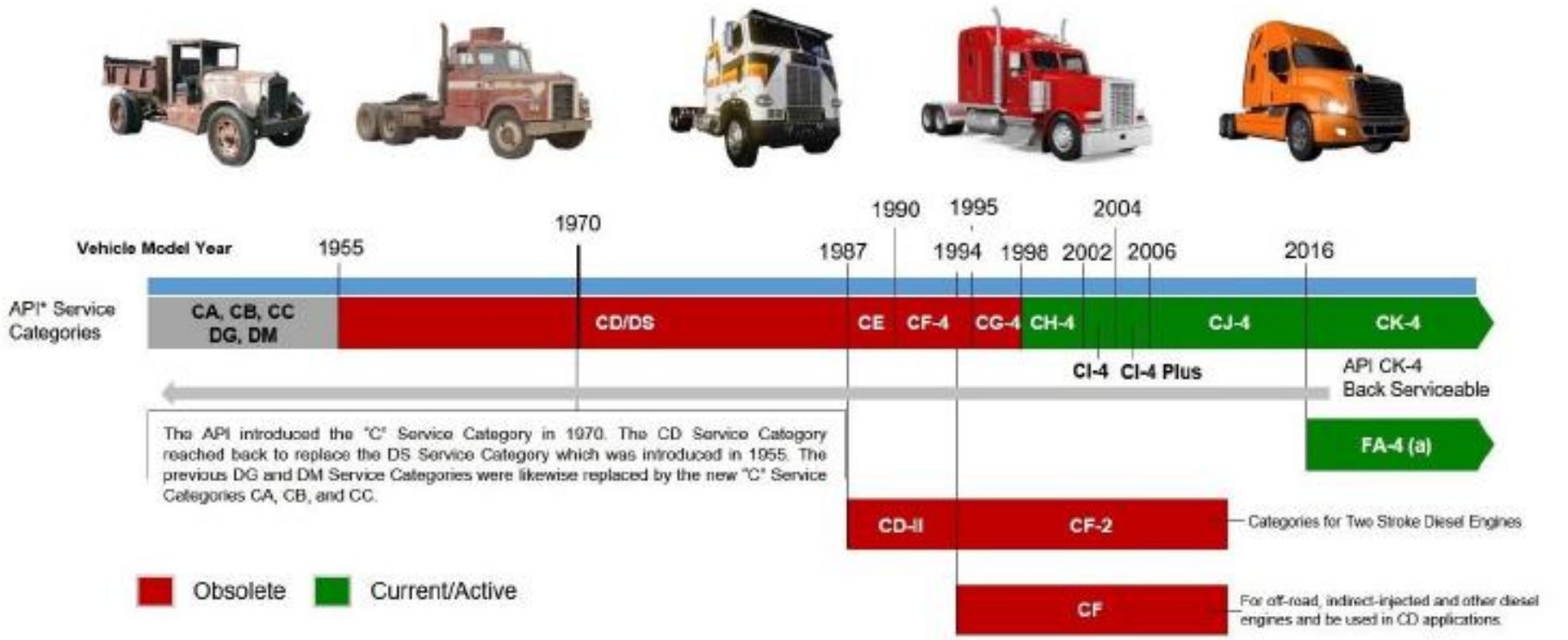
API SN PLUS
ILSAC GF-5
dexos1™ Gen2
Back Serviceable

Obsolete/Can Cause Equipment Harm | Obsolete | Current/Active

Look for the "API Donut" and the two letter code on the back of the bottle. If the label says API Service "SA," it's an engine oil made for use in cars built prior to 1930. API SA through SH motor oils are classified by the API as "OBSOLETE." Always consult your owner's manual for the correct viscosity grade and performance specification(s) required for your vehicle.

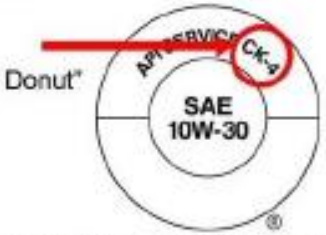
Look for the two letter code on the "API[1] Donut"

API SERVICE CATEGORIES FOR DIESEL ENGINE OIL



Look for the "API Donut" and Service Category on the back of the bottle. If the label says API Service "CA," it's an engine oil made for use in cars built prior to 1961. API CA through CG-4 motor oils are classified by the API as "OBSOLETE." Always consult your owner's manual for the correct viscosity grade and performance specification(s) required for your vehicle.

Look for the Service Category on the "API* Donut"



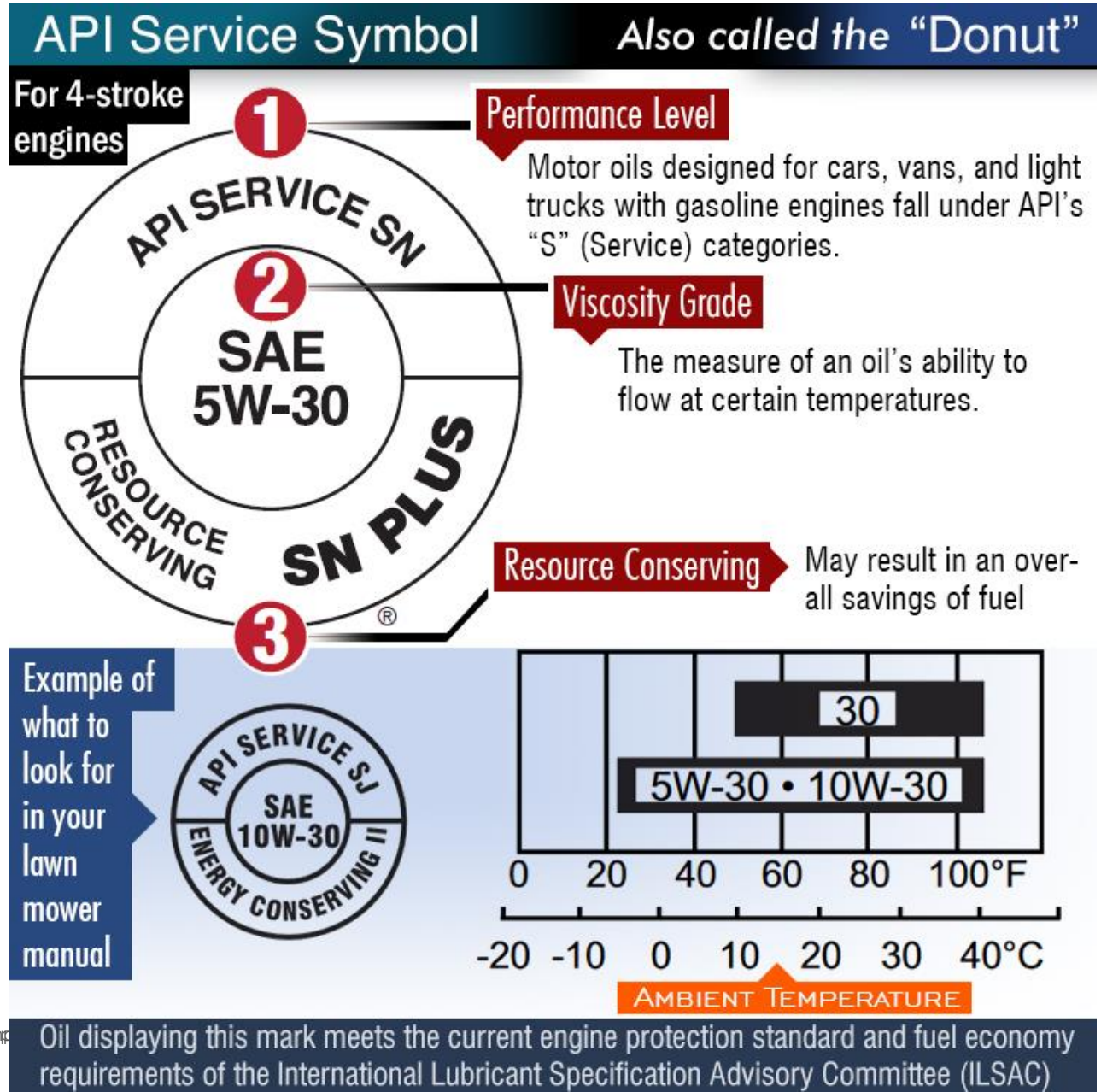
Note: This chart is provided for illustrative purposes only. The categories have differing relevance depending on your region. While API CH-4 is essentially irrelevant in North America today, it is a dominant (and in some cases a high tier) category in other markets. CI-4/CJ-4 may also have much longer life in certain developing regions of the world. **Always refer to your vehicle manufacturer's recommendations for the appropriate API Service Category required for use in your engine.**

(a) API FA-4 are formulated for use in certain engines designed to meet 2017 on-highway emission standards, and are not backward compatible or interchangeable with other diesel engine oils meeting current service categories.

** American Petroleum Institute*

Rev DS4-2019

THE API DONUT



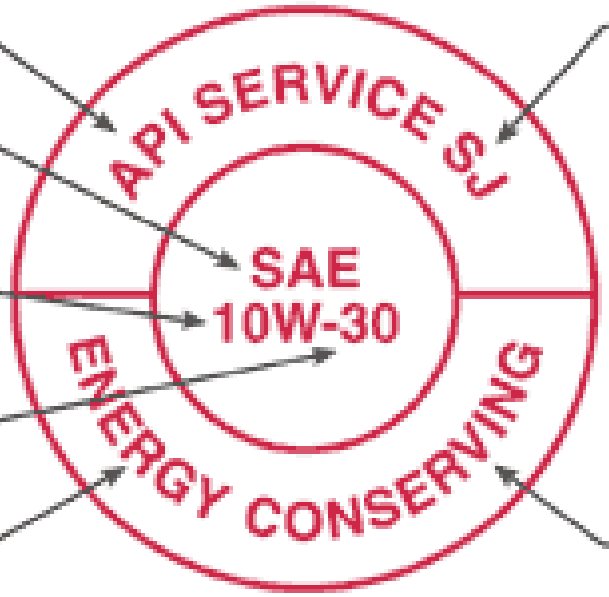
API - American Petroleum Institute

SAE viscosity grade (Society of Automotive Engineers)

SAE 10W at low temperature

SAE 30 at high temperature

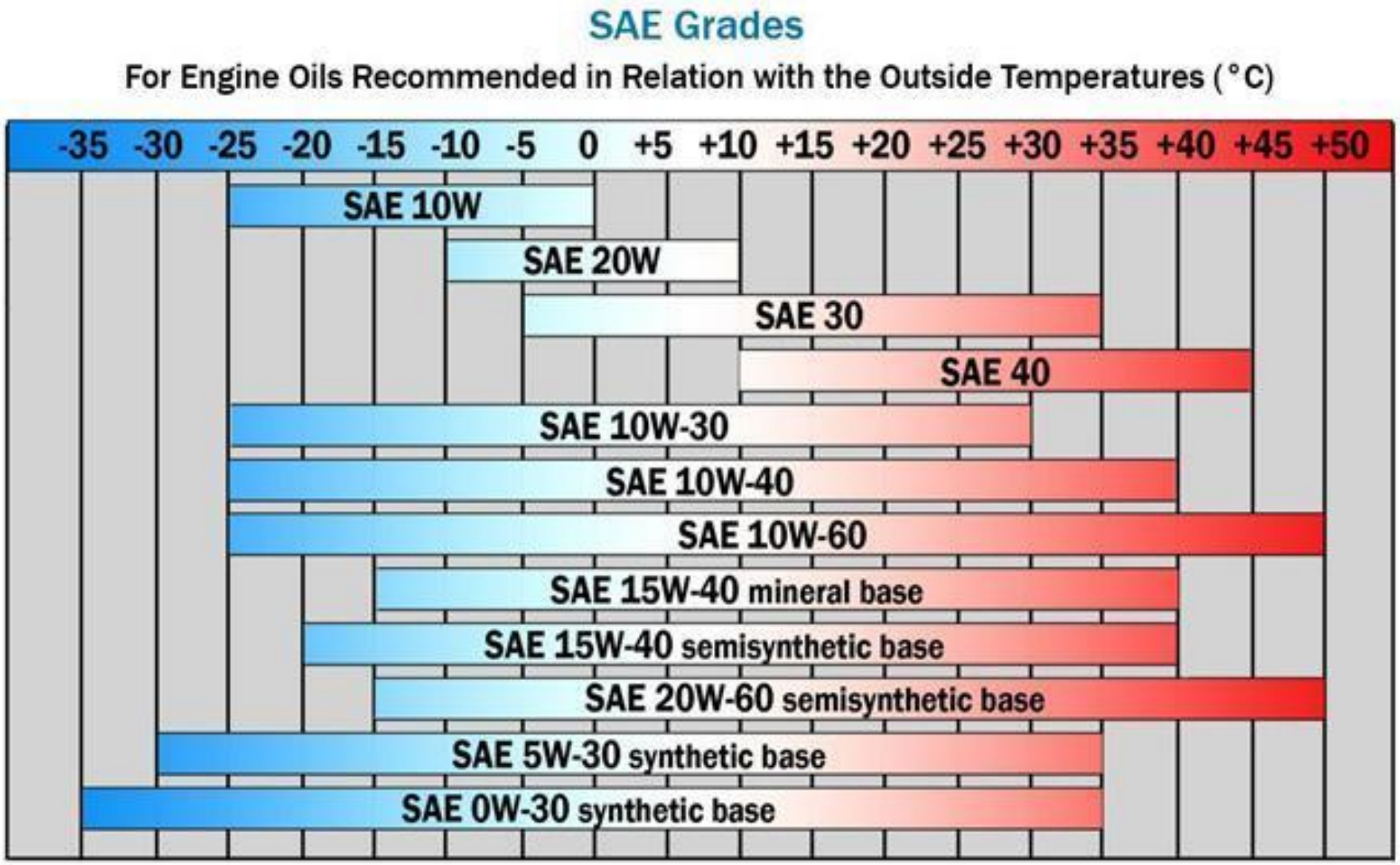
Rated as energy conserving



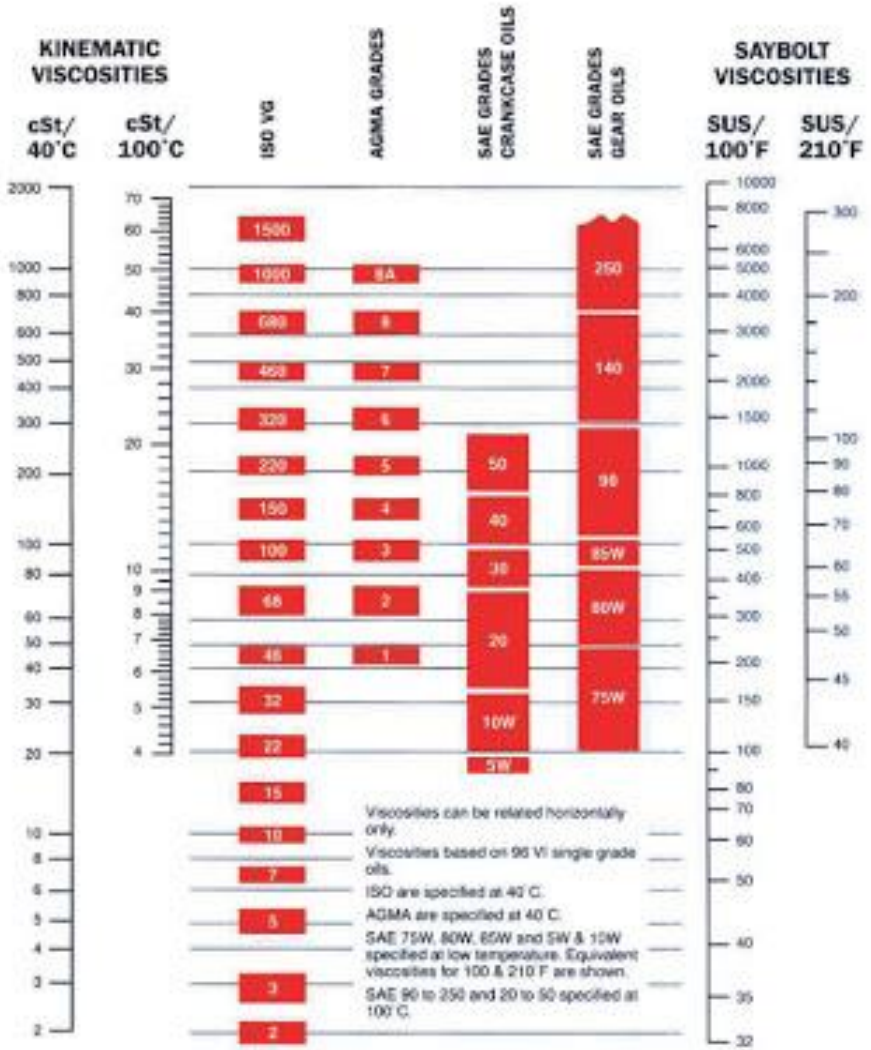
Quality rating of oil - SJ is currently the highest; SL will become the highest during the Summer of 2001

Oil has passed ASTM fuel economy test

SAE VISCOSITY GRADES IN RELATION TO AMBIENT TEMPERATURES



VISCOSITY CLASSIFICATION EQUIVALENTS



Many petroleum products are graded according to the ISO Viscosity Classification System, approved by the International Standards Organization (ISO). Each ISO viscosity grade number corresponds to the mid-point of a viscosity range expressed in centistokes (cSt) at 40° C. For example, a lubricant with an ISO grade of 32 has a viscosity within the range of 28.8 – 35.2, the midpoint of which is 32.

Rule-of-Thumb: The comparable ISO grade of a given product whose viscosity in SUS at 100°F is known can be determined by using the following conversion formula: SUS @ 100°F÷5 ≅ cSt @ 40°C.

Video – Understanding Engine Oil Codes (Specifications)

https://shell-da.kzo-eu.com/player/medium/1456396872821249404

Does Lubricant Brand Really Matter? – Why Choose Shell Helix?

5

WORLD CLASS TECHNOLOGY WORKING FOR YOU

- Continuous lubrication research since 1940.
- 4 world-class lubricant R&D centres in Hamburg, Houston, Shanghai and Tokyo* and technical staff in the UK.
- 9 base oil plants, 50 lubricant plants and 18 grease plants.
- Shell lubricants offers world-class products and services to customers in over 100 countries.

* 35% Shell owned

Shell Helix: A leader in innovation

- Global research and development
  - Over 200 lubricant research specialists work in 6 Shell laboratories around the world, where they perform tests on a variety of engine types and in a range of environments
  - We continuously innovate to find new ways to actively clean and protect engines
  - As a leader in lubricant research, our experience extends over 75 years

14 Years #1

Global Lubricants Supplier

- Shell is the global market leader with more than 12% of market share across all industries and sectors
- This is over 2% better than the next competitor

* 2015 Kline & Company

SHELL PROVIDES A FULL RANGE OF LUBRICANTS INCLUDING SYNTHETIC HIGH-PERFORMANCE PRODUCTS

Shell Helix has a variety of partnerships with OEMs

- Meeting the most demanding car manufacturers' requirements
  - Shell works with car manufacturers to ensure Shell Helix motor oils meet the latest engine specifications
  - Shell Helix is approved and recommended by many leading car manufacturers

MOTORSPORT IS THE MOST DEMANDING TEST OF OUR LUBRICANTS

SCUDERIA FERRARI

- **Long term collaboration:** Over 60 years technical partnership
- **Co-Engineering**: Intimately involved in the development of Scuderia Ferrari's all new powertrain
- **Achievements**: Outstanding performance leads to outstanding achievements

  - 10 Constructor's World Championship title AND 12 Driver's World Championship title

DUCATI

- 7 World Riders titles, 10 Manufacturers titles and over 150 race wins in only 10 years

NASCAR

- Helped our technical partner win the prestigious Daytona 500 in our return to the NASCAR Sprint Cup Series in 2007
- Shell chosen by Penske Racing as their official fuel and motor oil supplier from 2011

* The Shell Helix Ultra products used in Scuderia Ferrari cars are different to the commercially available product due to specific requirements of Formula 1 engines.

Shell HELIX - Proof of Performance

500 lab tests

6,000 hours

200,000 KMs field trial

Shell Helix 200,000 KMs Field Trial

Driving Condition

- 70% city condition (modified AMA cycle for Start-Stop)
- 30% highway condition

Oil Change interval

- 20kkm

100k times stopping during 200kkm

- Formula: Helix Ultra 0W-40
- Test Car:
  - Mercedes Benz GLC 260L

- Engine inspection at EOT – Rating and Photos
- Total Mileage: 200k km; oil change frequency: 20k km; oil test: every 5000km
- Power & Fuel Economy CD tests for new and used oils

Results: Valves

Intake valves after 200k km, 100k stop-start

Exhaust valves after 200k km, 100k stop-start

Standard challenges during high usage:

- High temperatures
- Deposit inhibition

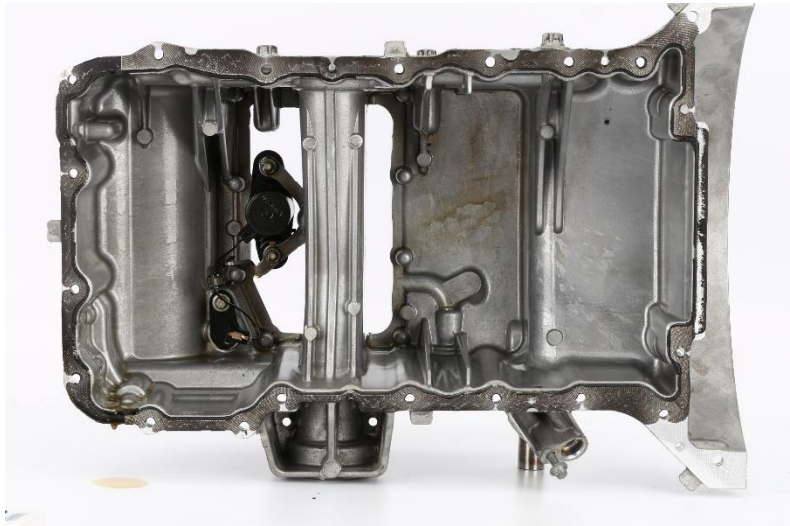
Protection by Shell Helix Ultra:

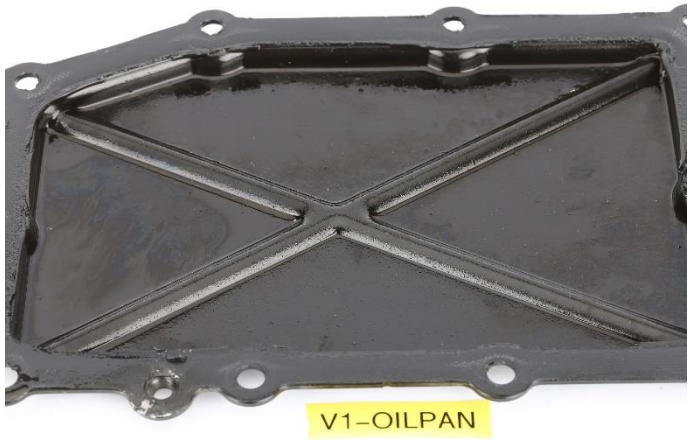
- Superior deposit control

Demonstrated results:

- ✓ Great thermal/oxidation stability
- ✓ Outstanding cleaning ability

Results: Oil Pans





Oil sum pans after 200k km, 100k stop-start

Standard challenges during high usage:

- Sludge control (Water content/ fuel dilution)
- TBN retention at extended oil change interval

Protection by Shell Helix Ultra:

- Almost no sludge at oil sump pans

Demonstrated result:

✓ Outstanding cleaning ability

Results: Main bearing

Main bearing after 200k km, 100k stop-start

Difference due to exposure level

Standard challenges during high usage:

- Wear protection
- Anti-wear retention at extended oil change interval
- Anti-corrosion
- Sufficient cooling

Protection by Shell Helix Ultra:

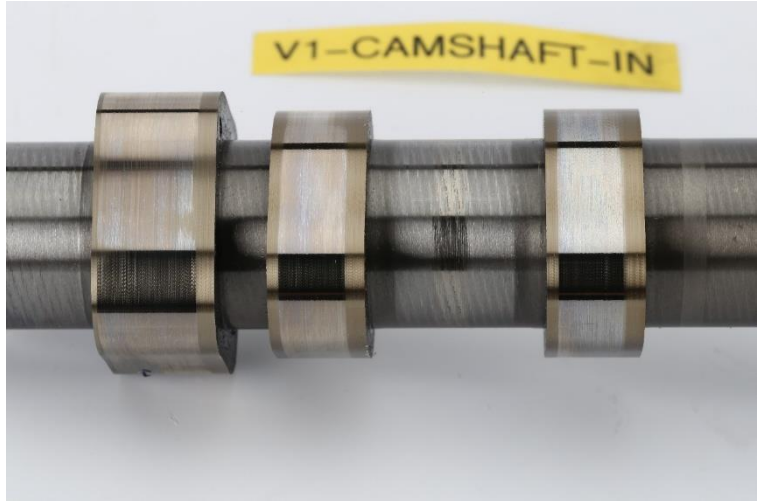
- Only trace wear at bearings (The slightest wear type)
- No corrosion

Demonstrated results:

✓ Ultimate wear protection

✓ Great corrosion inhibition

Results: Camshaft



Camshaft and rocker after 200k km, 100k stop-start

Standard challenges during high usage:

- Wear protection at boundary and mixed lubrication region
- Extreme pressure
- Anti-wear retention at extended oil change interval
- Friction reduction

Protection by Shell Helix Ultra:

- Only trace wear at camshaft (the lightest wear type)
- Greater fuel economy preservation

Demonstrated results:

✓ Ultimate wear protection

✓ Great corrasion inhibition

SHELL HELIX ULTRA WITH SHELL PUREPLUS TECHNOLOGY: A REVOLUTION IN MOTOR OIL

INNOVATION
SHELL PUREPLUS TECHNOLOGY

Shell PUREPLUS TECHNOLOGY

- crystal-clear base oil
- virtually none of the impurities found in crude oil.
- superior lubricants that keep most advanced engines cleaner than conventional engine oils can.

PROVEN EXPERTISE
REJUVENATION TECHNOLOGY

- REJUVENATION TECHNOLOGY
- Continuously rejuvenate anti-wear film and stay stronger for longer to provide protection to today's engines
- 60% lower friction compared with other fully synthetic oil to provide more power to your car.

FACTORY CLEAN
SHELL HELIX ULTRA

SHELL PUREPLUS TECHNOLOGY – FACTORY CLEAN

- meaning that no other motor oil keeps your engine closer to factory clean.*
- Made with a unique combination of Shell PurePlus Technology and Rejuvenation Technology
- It delivers even higher levels of cleanliness, protection and power.
- It maintains the engine in the best condition like the day they come off the production line

* Based on Sequence VG sludge test results using 0W-40.

Video – Shell Helix Ultra – The Choice of Scuderia Ferrari


NAUTILUS PREMIUM
OUTBOARD OIL
Nautilus
Provides The Ultimate in
Protection and Performance
Shell Lubricants
Macro Distributor
Shell Trademarks are used under license by Sol Brands Inc.

Shell Nautilus Premium Outboard TCW-3

- For use in all two-stroke outboard gasoline engines with or without separate oil tanks
- Meets the requirements of all major outboard engine manufacturers and all industry specifications
- Certified by the NMMA (National Marine Manufacturers Association) for service TCW-3 **at the manufacturers recommended fuel-oil ratio** of **up to 100:1**

Q&A

DRIVE ON