

The Effects of Modern Oils and Fuels on Classic Cars

Why these changes affect you!

Presented by Charles Navarro
Founder, LN Engineering

How does oil protect?

- ▶ Boundary Lubrication occurs when insufficient film to prevent surface contact.
- ▶ Hydrodynamic Lubrication occurs when there is a layer of oil between surfaces.
- ▶ Mixed

Wear in your engine

- ▶ Non-corrosive with Boundary Lubrication – i.e. metal to metal contact
- ▶ Corrosive with Hydrodynamic Lubrication – water and fuel in oil

Does reformulation save?

- ▶ Fuel Economy – friction modifiers
- ▶ Longer Drain Intervals – Ca detergent
- ▶ Longer Emissions Warranties – less Zn and P

“The writing is on the wall”

- ▶ The introduction of ash-less and zinc free oils are on the horizon making choosing an oil that much more difficult for older engines.
- ▶ Comment from Shell regarding API oil standard & its development.
- ▶ API SN oils have since become the current standard.

New oils are bad for old engines!

- ▶ Petroleum Quality Institute website that says the current API oils may not be suitable for some engines.
- ▶ Availability of “classic” motor oils designed for the needs of older engines by Porsche and other brands signal the death of “backwards compatibility” of engine oils.

How are modern oils different?

- ▶ New API SN – New P retention ZDDP to protect catalytic converters & GF-5 “Resource Conserving” standards
- ▶ API SN+ provides LSPI protection
- ▶ Increased fuel economy with increased VM – shear leads to increased wear
- ▶ Increased engine “cleanliness”
- ▶ API SM/SN – reduced 0.06-0.08% “Phosphorus Retention” Zn and P (ZDP)

Modern engines are ok with modern oils

- ▶ Modern engines need less Zn and P
- ▶ Even modern high performance engines still need more Zn and P than what current oil standards provide.

A cleaner engine isn't better

- ▶ Increased cleanliness requirements force use of more detergents and those that are more aggressive.
- ▶ This in turn strips anti-wear films off of engine components, leading to more wear.

Detergents and LSPI

- ▶ The discovery of the LSPI phenomenon in direct injected engines has required a new standard.
- ▶ API SN+ eliminates Sodium and reduces Calcium additives.
- ▶ GDI engines have specific requirements.

Oil Additives

- ▶ More Zinc and Phosphorous isn't always better.
- ▶ Quality of oil is as important as the anti-wear additive levels
- ▶ Do not use oil additives to boost Zn and P!

Oil Viscosity

Engine Oils – petroleum based and/or synthetic based

Always use quality oil labeled "API Service SF or SE" which has been approved by Porsche. The terms SF or SE may appear on the oil container singly or in combination with other designations, for example: SE/CC, SF/CC or SF/CD. Engine oils are graded according to their viscosities. The grade to be used depends on existing or anticipated seasonal climates. Refer to the temperature chart when selecting engine oil. If you need to add oil, it is permissible to mix oil of different viscosities. As the temperature ranges for different oil grades overlap, brief outside temperature variations are no cause for alarm. When using SAE 10 or SAE 5 W-20 engine oil, avoid high speed long distance driving if outside temperature rises above the indicated limits.

Single grade oil

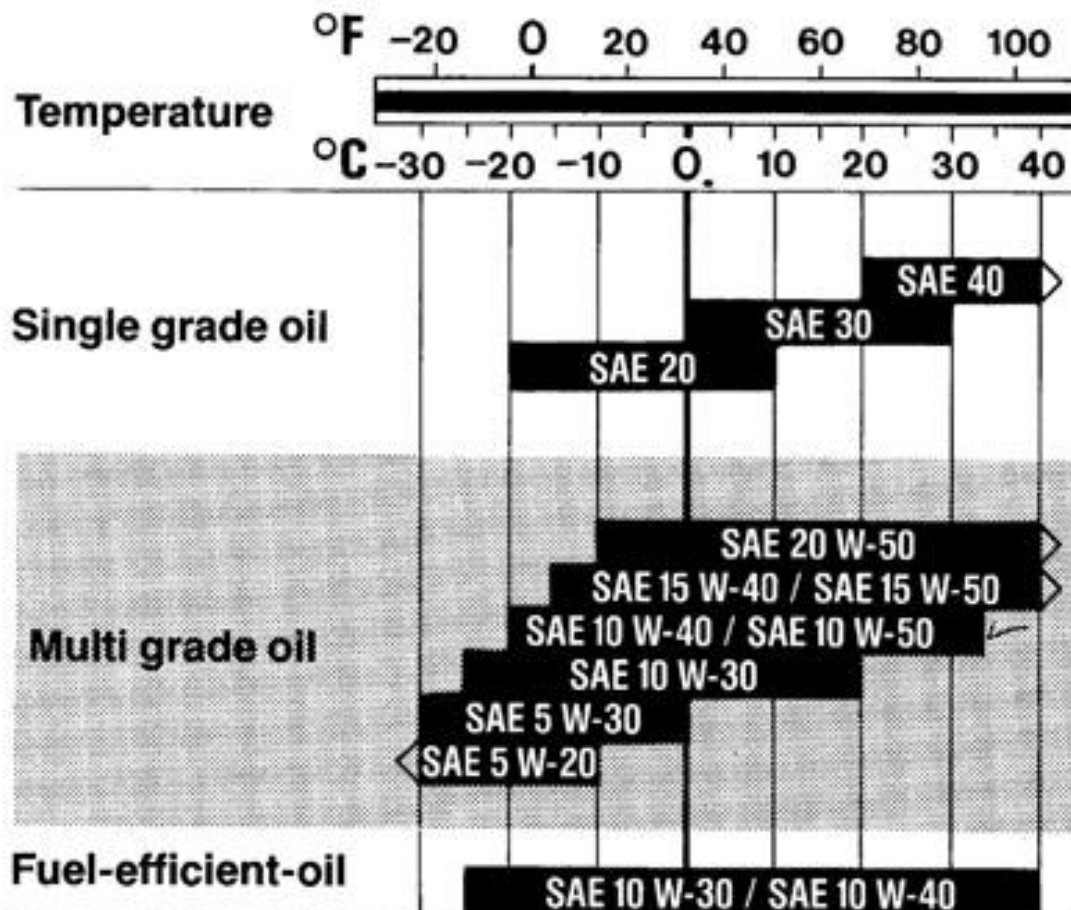
Porsche recommends the use of single grade oils **only** if multi grade oils are not readily available. However, engine oil changes must then be performed according to seasonal temperature changes to guard against engine damage.

Multi grade oil

For all year round driving use multi grade oil. Oil change intervals specified in the Warranty & Maintenance brochure accompanying the vehicle must be adhered to, including intervals for oil filter change.

Fuel-efficient-oil

For all year round driving a top quality "Fuel-efficient"-oil can have a beneficial influence on fuel economy. Before selecting these unconventional oils, consult your Porsche dealer.



Non/Low Detergent Oils

- ▶ Break-in specific oils for new engines have increased Zn and P with low detergency.
- ▶ True race oils are non or low detergent but are not good for break-in.

Engine Break-In

- ▶ Always use break-in specific oils for new engines.
- ▶ Use a conventional “intermediate” oil before switching to a full synthetic.

Drain Intervals

- ▶ Daily drivers
- ▶ Low mileage
- ▶ Racing or weekend track events
- ▶ Severe service
- ▶ Storage

Used Oil Analysis

► Used oil analysis can be used to evaluate:

- Engine health
- Proper oil change intervals
- Trending can identify problems before symptoms manifest

Ethanol in Fuels

- ▶ Methanol and Ethanol is hygroscopic and kills carburetors and damages fuel system components due to corrosion
- ▶ Fuel contamination of the engine oil can lead to internal engine damage
- ▶ Use of corrosion inhibitors and fuel stabilizers regularly and before storage are required to protect your engine.

In Conclusion

- ▶ Oils for modern engines have different formulation constraints than those for older engines.
- ▶ Just because oils are “modern” or synthetic does not mean they will provide adequate protection for your engine.
- ▶ Modern E10 fuels are not compatible with engines equipped with carburetors and ethanol-free fuels should be used or corrosion inhibitors are required to protect these components.