



Protecting Your Investment

Through Preventative Maintenance



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SINCE 2003

Disclaimer

- The recommendations contained herein are provided at your own risk.
- Track use, whether you are racing or not, requires that you maintain your car more frequently, like a race car.



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Driving

Your Porsche was meant to be driven.

Short drives are bad for your engine.

Extended storage is bad for your Porsche.

Drive your Porsche.





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Severe Service

- Daily driven cars in temperate climates on paved roads fall under normal service intervals.
- Cars driven in hotter climates, short distances, stored extended periods, or tracked should be considered severe service.
- Severe service reduces intervals by at least half.



Storage

- Modern ethanol fuels start going bad within weeks – always add fuel stabilizer.
- Products like Storage Defender from Driven® protect fuel system and oil while your car is in storage.



Storage

- Change your oil BEFORE the car goes into storage.
- Do not run your engine unless you plan on driving the car for an extended period to ensure engine oil gets to operating temperature.



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Storage

- Use a battery tender to maintain battery health.
- Increase tire pressure to max inflation pressure (correct before driving of course)
- Cargo container dessicant packs or “Damp Rid” help control moisture.
- Use your preferred choice of mouse control.



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Tires

- Although there is no exact expiration date, various sources state tires should be replaced every 6-10 years, even if the tires do not have any miles on them due to tire aging.
- Performance compound tires should not be exposed to temperatures below freezing.





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Fuel

- Use of a fuel additive containing polyether-amine like Driven Injector Defender at least every other fill up recommended if Top Tier fuels are not available.
- Ethanol-free fuels are best for pre-2000 MY models.
- Always use high-octane premium fuel with min 90 Octane (R+M)/2.





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Ethanol Fuels

- Use of ethanol fuel additives like Driven Carb Defender is recommended to prevent fuel system damage or failures caused by ethanol enriched fuels at every fill up.





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Ethanol Fuels

- Unless labeled as non-ethanol or ethanol-free, most domestic unleaded fuel is E10
- E10 – maximum ethanol content is 10%.
- E15 – 15% ethanol E85 – 85% ethanol
- Most vehicles manufactured after 2000 are compatible with E10.
- Do not use E15 or E85 unless factory specified.



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Fuel Lines

- Older vehicles need modern fuel lines - use only fuel injection hose designed for use with ethanol fuels like E85 for best performance.
- Do not use OR German braided fabric covered unless it explicitly states it is safe for ethanol enriched fuels.
- Griffiths offers ethanol compatible fuel lines.



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Air/Fuel Filter

- Porsche's current recommendation for fuel filters is 60,000 miles and 30,000 miles for air filters.
- Air filter should be replaced with Genuine or equivalent paper filter.
- Washable filters can allow more dirt into your engine if not properly maintained.
- Cold air intakes may reduce performance, sucking in hotter engine bay air rather than cooler, ducted air.



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Belts

- Serpentine drive belts are rated for 60-100,000 miles.
- Check for cracks yearly and replace when installing a new water pump or alternator.
- On air-cooled engines, the alternator/fan belt should be replaced at every valve adjustment service, so around 15k miles. Always carry a spare!
- On 964/993 models, the distributor drive belt should be replaced every 40-60,000 miles.





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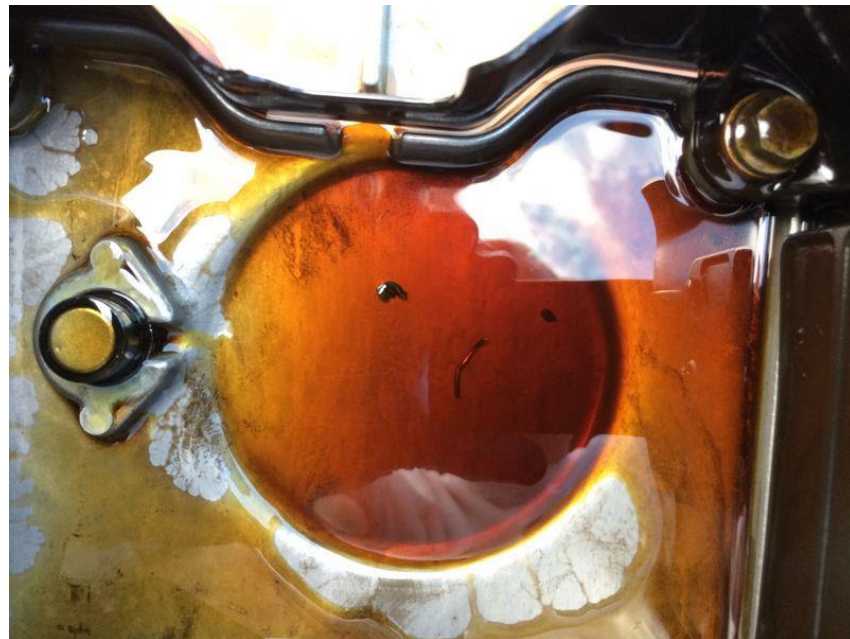
Oil

- Oil is cheap - engines are expensive.
- Street use - 6 months or 5,000 miles
- The factory oil fill is not necessarily the best.
- Track use – use a race oil and change after every track event.
- LN Engineering uses and recommends Driven Oils.



Oil Analysis

- Cut open your oil filter and drop your sump plate at every oil service
- SPEEDiagnostix used oil analysis can detect problems before they become catastrophic.





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SPEEDiagnostix

How To Know You're Good To Go

Results Color Codes

Results outside the normal range are highlighted red

Results with borderline values are highlighted yellow

Results within the normal range are highlighted green

Oil Analysis Report

Name:

Sample Type:

Engine

Unit ID:

TUF918 / 152970 / 1959 356

Condition:

Warning

Sample Information

Previous Samples

Sample ID #:	204		203	243		
Sample Date:	8/19/18		8/19/18	7/19/18		
Oil Brand:	Motul		Motul	Mobil 1		
Viscosity Grade:	15W-50		15W-50	15W-50		
Mileage:	2000		2000	1300		

Oil Health	Test Results	Legend	Previous Sample Results			
Viscosity @ 100C:	15.9	cSt Flow Measurement	15.9	16.4		
Oxidation Value:	9.8	Oil Life	9.8	8.4		
Fuel Dilution:	Negative	Contamination	Negative	Negative		
Water:	Negative	Contamination	Negative	Negative		
Glycol:	Negative	Contamination	Negative	Negative		
Potassium:	2	Contamination	1	1		
Silicon:	24	Anti-Foam, Dirt	20	6		
Additives (ppm):						
Calcium	1923	Detergent	2208	963		
Sodium	12	Detergent	10	21		
Magnesium	125	Detergent	84	530		
Phosphorus	1107	Anti-Wear	1081	1202		
Zinc	962	Anti-Wear	1157	1058		
Molybdenum	0	Friction Reducer	0	63		
Boron	51	Friction Reducer	53	74		

Equipment Health	Test Results	Legend	Previous Sample Results			
Wear Trend: Wear Metals (ppm):						
Iron	75	Valvetrain, Cylinder Bore Wear	36	14		
Chromium	2	Piston Ring Wear	1	0		
Copper	43	Bushing, Bearing Wear	40	11		
Tin	10	Bearing Wear	4	0		
Lead	179	Bearing Wear	177	10		
Aluminum	24	Piston, Aluminum Bore Wear	13	3		
Manganese	4	Valve Guide Wear	2	0		
Titanium	0	Wrist Pin, Retainer Wear	0	0		
Vanadium	0	Gear, Crank Wear	0	0		
Total Metals:	337	Total Wear Metals	273	38		
Wear / 1,000 miles:	168.5	Wear Metals / 1,000 Miles	136.5	29.2		

Comments / Recommendations

Jim, the third set of results are from another 356 sample processed this summer. I thought you might like to see a comparable sample for reference.



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Oil Filters

- Always use the highest quality filter available – Napa Gold/Wix or Genuine Porsche/OEM.
- Many engines have plastic oil filter housings which should be replaced every few oil changes due to weakening of internal bypass spring.



Alternatively, these engines can be fitted with an LN spin on oil filter adapter allowing use of conventional oil filters to eliminate bypass on 97-08 Boxster, Cayman, & 911 inc. 09+ later Boxster & Cayman models inc. 987.2, 981, 718.



Oil Level

- More oil is not always better.
- Do not overfill your Porsche with oil.
- For vehicles that do not require the engine to run to check level, only check your oil when the car has been sitting on a flat surface overnight.





Oil Pressure

- Oil pressure is a measurement of restriction to flow.
- Use of the correct viscosity for each engine and operating temperature is important
- Minimum recommended oil pressure is 10 psi per 1000 rpm





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Cooling System - Watercooled

- Water pump, low temperature thermostat, and coolant should be replaced at every 4 years or 50,000 miles
- Replace expansion tank every 8 years or 100,000 miles
- Only use Genuine Porsche water pumps, coolant reservior caps, and expansion tanks.
- Track cars – use distilled, not tap water and add Driven CSP for added protection



Cooling System

- Turn off your engine immediately if:
- The alternator light or charging system failure indicator comes on
- The low coolant level indicated or red indicator is lit or flashing





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Cooling System

- GT3, Turbo, GT2 - Upgrade cooling system hoses and pin water pipes to prevent hose sleeve retention failure.
- Cayenne S/Turbo - Upgrade cooling pipe hoses on all models 2004-2012 with metal.
- Cars operated in warmer climates or that are tracked should consider adding a center radiator and/or upgrade to CSF radiators.



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Cooling System - Aircooled

- Check tops of heads and cylinders for mice nests after car comes out of storage.
- If the alternator light comes on, stop driving your car – you might have lost your fan belt!
- If your oil temperatures are over 240F, it's too hot! Time to add extra oil cooling.



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Gearbox

- Porsche recommends changing your gear lube every 100-120k or 12 years..
- PDK fluid and filter change is recommended every 60k miles and 90k miles for Tiptronic.
- We recommend cutting these intervals by at least 50%.
- Track use will further shorten these service intervals.



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Suspension

- Check for excessive play in suspension components including ball joints and tie/toe rods.
- All seals and boots should be intact.
- Check for proper plunge on half shaft (axle) as well as for cracks or tears in the boots.
- There should be no looseness in hub and wheel bearing should operate smoothly.
- Have a professional carry out a safety inspection yearly.



Brakes

- Older cars should have new brake lines installed - stainless must be DOT rated.
- Although there is no exact rule for brake lines, brake lines typically deteriorate from the inside out, so a visual inspection may not indicate replacement is necessary, so changing them at least every 6-10 years (like tires) as a safety precaution is recommended.



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Brakes

- New fluid every 2 years or 24,000 miles.
- Track use – flush before every event.
- Consider alternatives such as Motul RBF600/660 or Castrol SRF for better performance where a DOT 3 or DOT 4 fluid is recommended.
- Note some newer non-Porsche models require low viscosity brake fluid, eg. DOT 4 LV and should not be used unless required by the manufacturer.



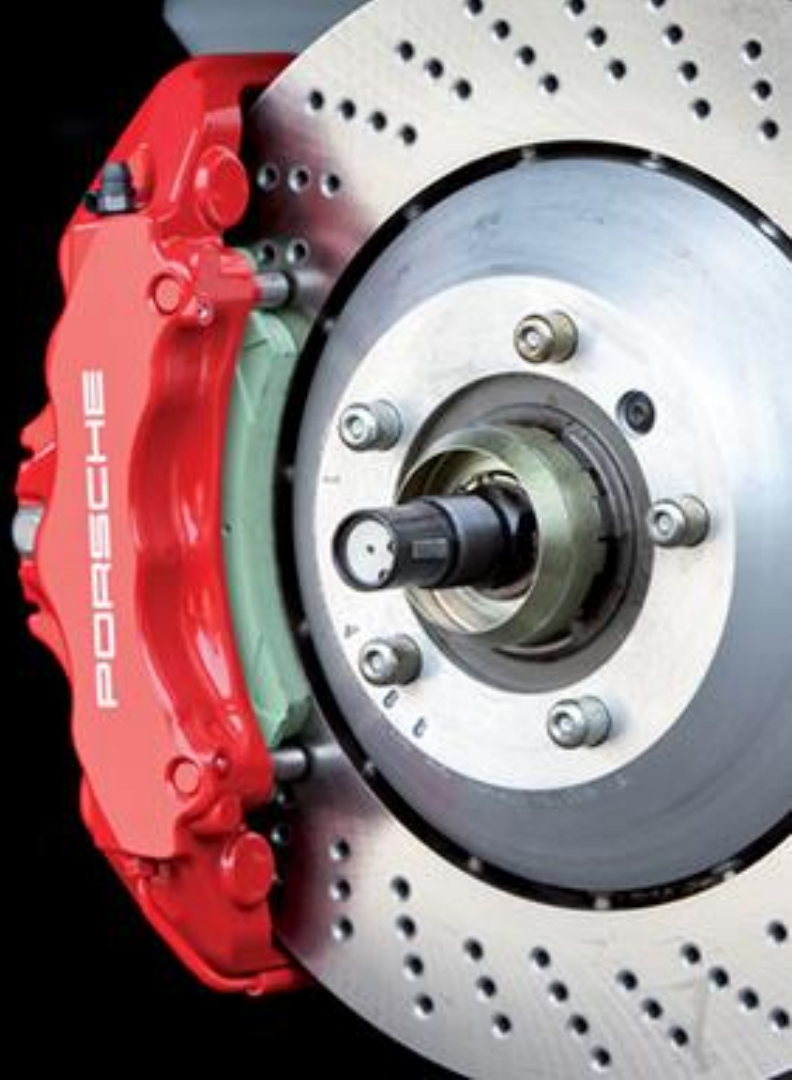
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Brakes

If using cross-drilled rotors, inspect for cracks that link between drilled holes in the rotors, through the cooling vanes, or into the rotor hat.

Slotted rotors or cryo-treated rotors are suitable for performance applications.





Engine - Aircooled

- Valve adjustments and spark plugs every 15k miles
- Visually inspect spark plug cables, cap, and rotor and replace if there are signs of carbon tracking.



Engine – Watercooled – M96/M97

- New spark plugs every 4 years or 50,000 miles.
- Inspect coils for carbon tracking or cracks.
- Do not use engine tunes that raise the rev limit, lock out adaptation, or disable monitors.
- Air oil separators can be tested with a manometer and if weak or timed out every 4 years or 50,000 and should be replaced with Genuine Porsche only.



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Engine – Watercooled – M96/M97

- Fuel trim values must be checked to ensure engine is not running rich due to bad injectors or vacuum leaks.
- Smoke testing can find vacuum leaks.
- Oil fill tube and AOS hoses get brittle and crack, causing vacuum leaks, and should be replaced when doing an AOS.
- Injectors, Mass Air Flow and Oxygen Sensors should also be considered maintenance items.



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Engine – Watercooled – M96/M97

- Variable cam timing actuator wear pads on 5-chain engines (Boxster to 2002, 911 to 2001) are service items.
- If cam timing deviation exceeds 4 degrees, replace wear pads and timing chains.
- Dropping the oil pan at time of oil service will allow you to identify wear debris from chain guides, IMS, or other critical engine components.



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Engine – Watercooled – M96/M97

- Replacement of the IMS bearing is considered a maintenance item.
- 1997-1999 models have a dual row ball bearing.
- 2000 and 2001 models can have either a dual row or single row ball bearing.
- 2002-2005 models have a single row ball bearing.
- 2006-2008 model years are non-serviceable (grease seal can be removed to extend life).
- 2009 and later 9A1-equipped models have no intermediate shaft.



Check engine light (CEL)

- Newer OBD1 and OBD2-equipped cars will indicate engine malfunction with a CEL.
- A Durametric tool is inexpensive and allows DIY diagnostics for your newer Porsche vehicle.
- The source of CEL must be determined as engine damage can occur if problem is serious.



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Track

Know your and your vehicle limitations.

Retain N-Spec Porsche rated tires on unmodified vehicles.

If you take your street car to the track, remember, you must maintain it like a race car.





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Track

- Supplemental engine and transmission cooling is recommended for track use for all models.
- Specifically on M96/M97 engines a deep sump is required to protect from oil starvation on track: Bilt Racing 2 QT w/X51 baffle
- Power steering cooler recommended on 1997-2012 models.





Track

- Track use will shorten component life in all vehicles and will require accelerated parts replacement based on time, not mileage.
- Consult a race shop for information about tracking your Porsche and recommended maintenance.



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Review

- This document covers many of the items on your car that may need servicing as part of normal maintenance and ownership.
- Please refer to manufacturer recommendations or your technician that services your vehicle for their recommendations on these and any other items that may have been omitted from this document.



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Thank you!

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