

Nickies + IMS Program

Total Engine Solution for 1997-2008 Porsche® Boxster®, Cayman®, 911® models
with the M96 and M97 Engine



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MODELS WITH THE M96 AND M97 ENGINE

Why rebuild rather than replace?

- **New complete engines are not available from the factory**
- **OEM short block program is cost prohibitive and do not address cylinder and ims problems**
- **Used engines are expensive and risky**



Nickies



The Solution: Billet Aluminum NSC-Plated Cylinders

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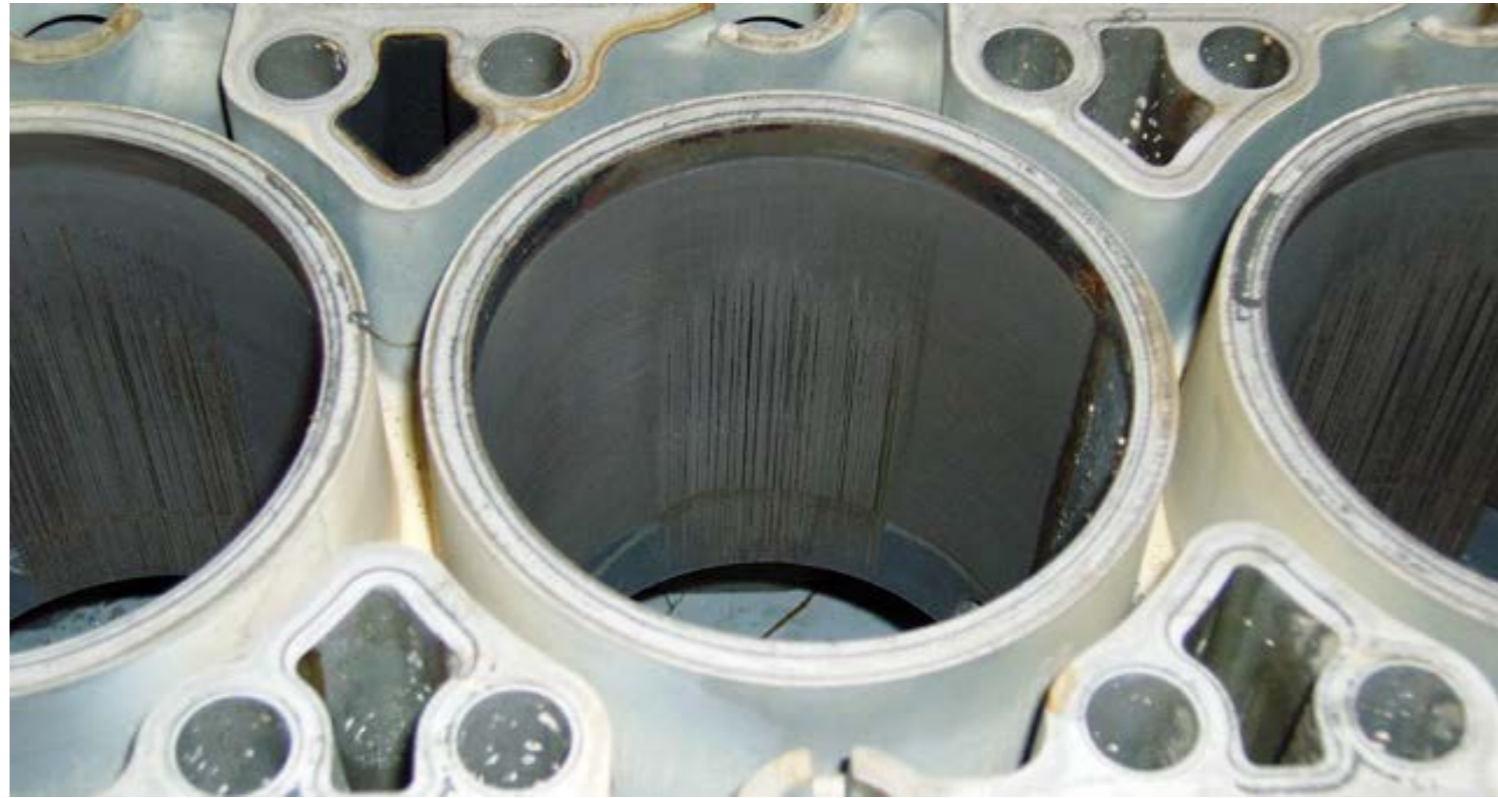
Cylinder Failures

- **Slipped Sleeve: factory sleeve drops in bore - typically results in piston and head damage.**
- **D-Chunk: cylinder forms crack which spreads to bottom of water jacket before returning to the top of the deck, resulting in a D-shaped crack.**
- **Scoring: failure of piston skirt coating typically results in galling of piston skirt and bores. More common with factory forged pistons.**
- **Ovality/Taper: bores with more than .002" taper or ovality cannot be re-ringed even if there is no damage present.**



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The Solution



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Do it right!

- **Even if bores have no visible damage, they are not round.**
- **Just because they haven't scored or cracked, doesn't mean they won't.**
- **Re-ringing isn't an option.**
- **Steel sleeves aren't a permanent solution and often lead to reoccurrence of engine failure.**





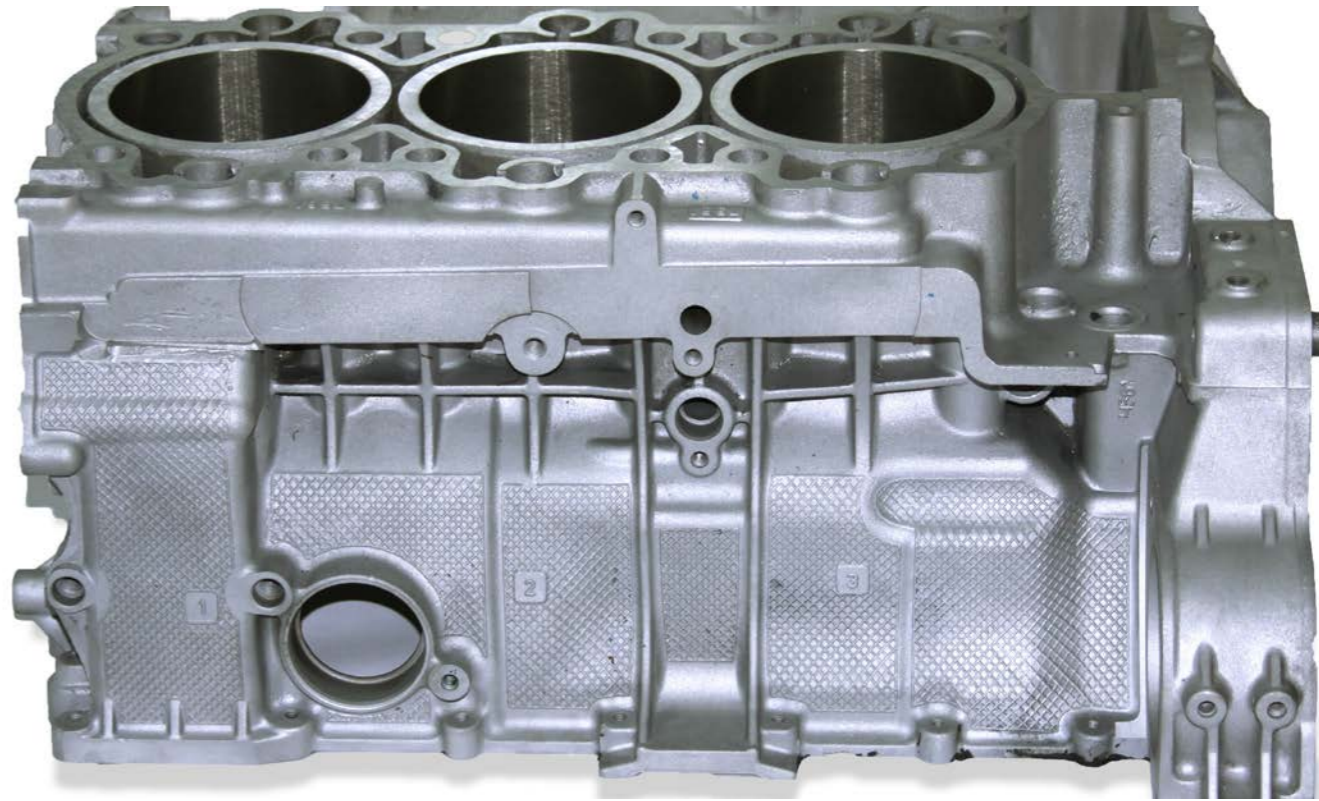
Nickies

- **The original cylinder is completely machined out of the block and remaining parent metal is used only to center the new sleeve.**
- **New sleeve is stepped and rests on the bottom of the water jacket and is sandwiched by the head and is chemically bonded to the block and is incapable of slipping or dropping.**
- **Nickies prevent future d-chunk and slipped sleeve failures as well as reduces the likelihood of scoring and ovality with highly wear resistant coatings.**



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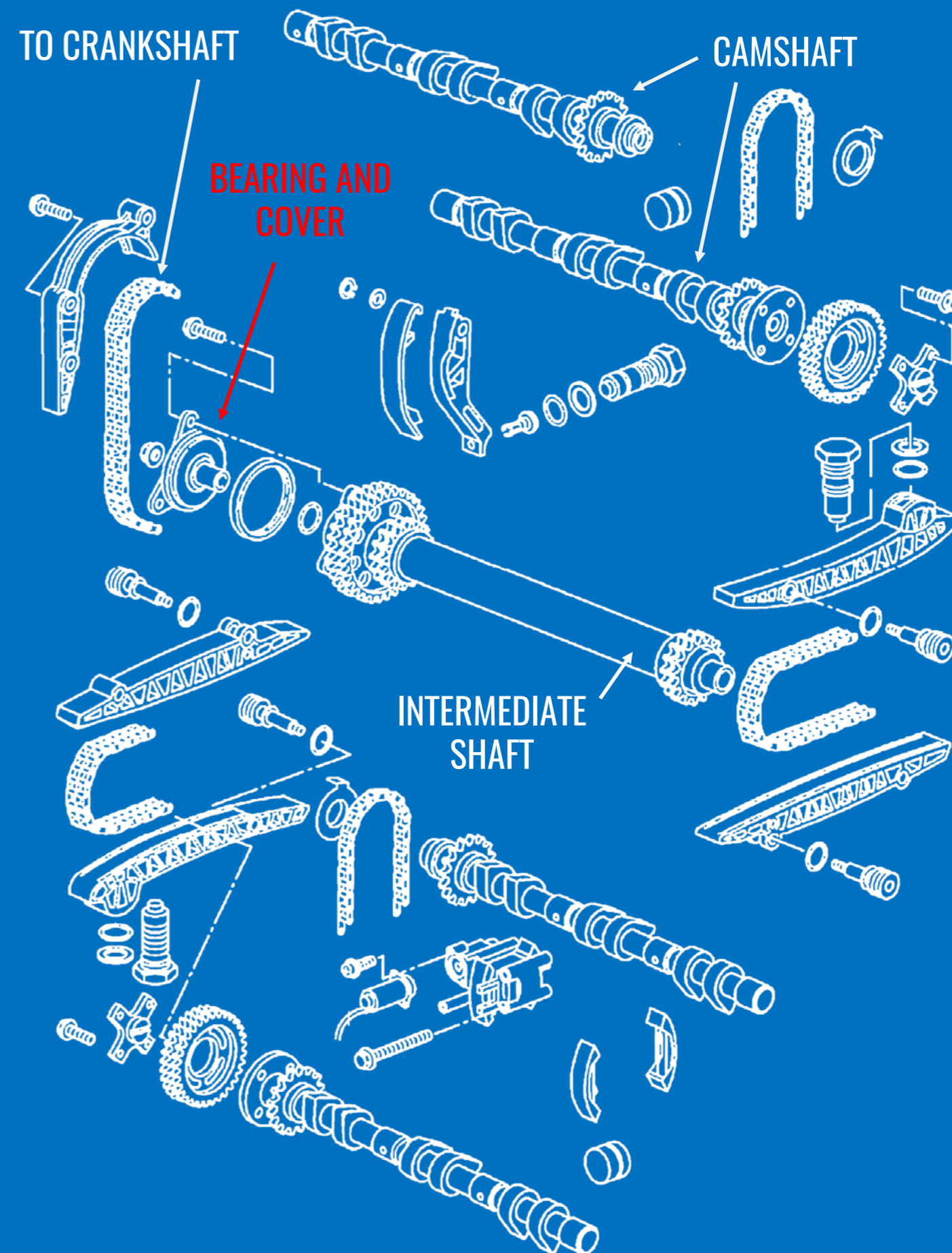
- **Replacement sleeve is billet aluminum and is NSC plated.**
- **Allows for increased displacement without reducing longevity.**
- **Sleeving with aluminum sleeves in an open deck configuration provides superior cooling.**
- **Direct plating of stock cylinders doesn't prevent cracking or d-chunk failures.**
- **Steel sleeves reduce engine cooling and have higher wear.**
- **Scored or cracked cylinders are no problem.**
- **Cylinder deck is resurfaced as part of the Nickies process**
- **Blocks are pressure tested after sleeving**
- **Bores are inspected for ovality, taper, and surface finish as part of our stringent QC process.**
- **Proven process offered over 10 years with 150 blocks done annually by LN Engineering.**



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New to the IMS?

- **There are several versions of the IMS used from 1997 through 2008.**
- **1997-1999: Dual Row**
- **2000-2001: Dual or Single Row**
- **2002-2005: Single Row**
- **2006-2008: Non-Serviceable**





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Why do IMS bearings fail?



- **Lack of lubrication (sealed bearing was used)**
- **Insufficient load capacity (factory single row bearing had high failure rate of 8%)**
- **The factory did not supply a service interval, replacement, or tools for changing the original bearing.**
- **The bearing should have had a service interval!**



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IMS by the Numbers

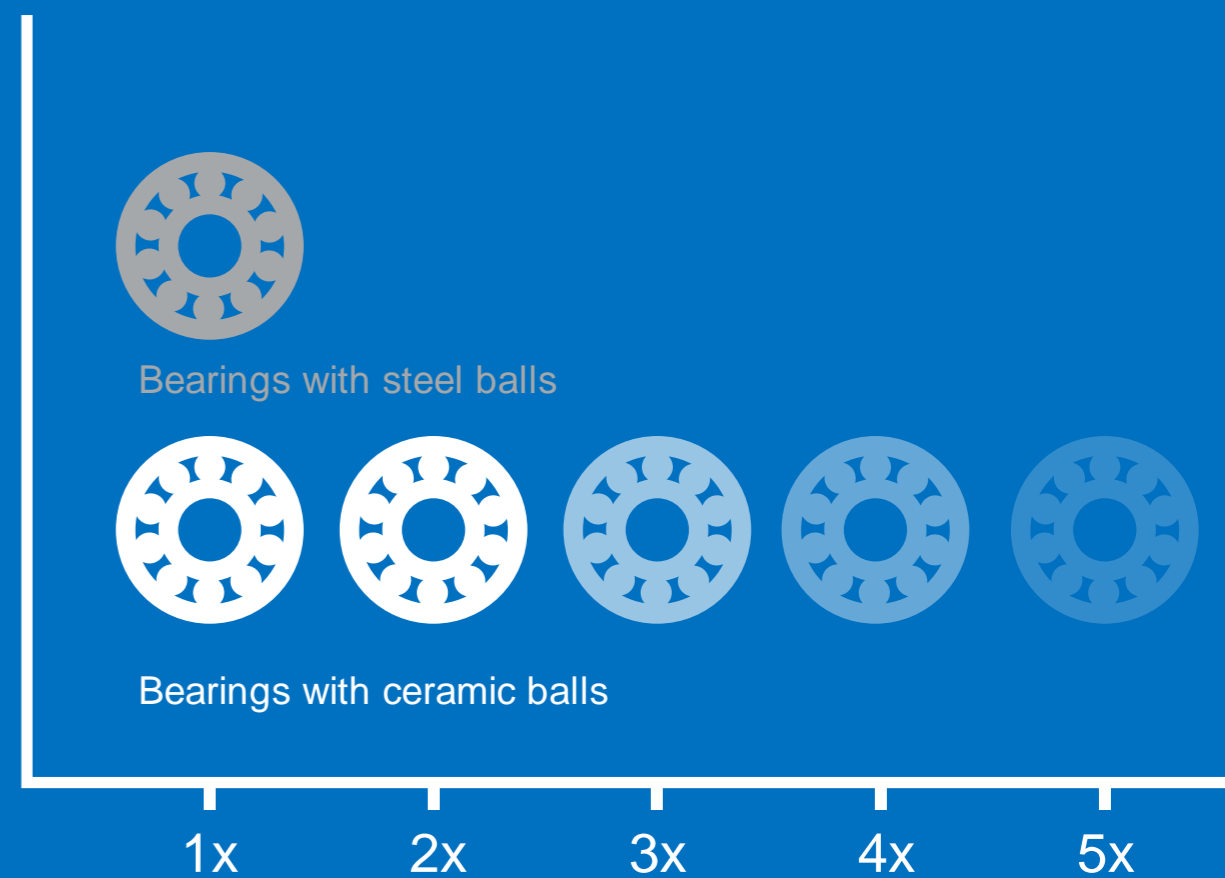
- **According to the figures made public by the “Eisen” class action lawsuit, 1% of original dual row bearings failed under warranty and 8% of original single row bearings failed.**
- **Source: Eisen IMS Settlement**
- **The IMS bearing should always be replaced when rebuilding the engine.**
- **All intermediate shafts should be inspected for runout and have the main timing gear pinned to prevent slippage that can lead to engine damage while the engine is apart.**



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Why LN IMS Service?

- **The ceramic hybrid ball bearings utilized in IMSR kits have longer life over the conventional ball bearings used by the factory.**
- **The replacement bearing lacks a grease seal, allowing for oiling from submersion and oil mist – the replacement bearing only needs 1cc/min of oil for cooling and lube**
- **The dual row ceramic hybrid ball bearing utilized provides 6 years or 75,000 miles of worry free service.**



Service life for ceramic hybrid bearings is at least double that of conventional steel ball bearings and could last up to five times longer, depending upon operating conditions.

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Why LN IMS Service?

- **IMS is checked for runout.**
- **Shafts with more than .005" runout are not serviceable.**
- **Main IMS drive sprocket is pinned to prevent slippage.**
- **Late model 06-08 IMS shafts are modified to allow servicing without requiring engine disassembly.**
- **Upgrade to IMS Solution available.**





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What is recommended?



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Nickies+IMS Program

- **Custom MLS Head Gaskets**
- **Tapered Sleeve Ring Compressor**
- **Forged JE Pistons with coated skirts**
- **Block sleeved with Nickies and deck resurfaced**
- **IMS shaft tested, pinned, reconditioned and upgraded with latest IMS bearing technology**
- **160F Low Temp Thermostat**



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The Process

- **Pre-paid shipping option provides custom packaging shipped to your door to simplify shipping your engine block to us.**
- **Just open the box, remove contents, follow the provided instructions.**
- **In 6-8 weeks you receive your block and IMS back ready to reassemble, along with any other upgraded components required.**



Related document (click to open).



**SHIPPING YOUR BLOCK OR
CYLINDERS TO LN ENGINEERING**

PRE-SHIPMENT CHECKLIST



Why LN Engineering?

- **Proven cylinder and IMS solutions trusted for over the last decade**
- **Improved performance without sacrificing reliability**
- **No software is required**
- **Modifications will not affect emissions testing**
- **Assemble with factory tools and parts**



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MODELS WITH THE M96 AND M97 ENGINE

What are my options?

- **Increase to 99mm bore, allowing for use of stock connecting rods (ARP rod bolts recommended):**
- **Boxster S: 3.2 to 3.6**
- **Cayman S: 3.4 to 3.6**
- **911: 3.4 to 3.6**
- **911: 3.6 to 3.8**



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What are my options?

- **Increase to 101mm bore – upgrade to aftermarket forged rods required:**
- **Boxster S: 3.2 to 3.8**
- **Cayman S: 3.4 to 3.8**
- **911: 3.4 to 3.8**
- **911: 3.6 to 4.0**



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What are my options?

- **Base model increase to 89mm**
- **Boxster: 2.5 to 2.7 (increase to 2.9 is possible with use of a 2.7/3.2/3.4 78mm crankshaft)**
- **Cayman: 2.7 to 2.9**
- **Stock bore sizes also available for those wanting to keep original engine size or use OEM pistons**



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**What else should I do while
I'm in there?**



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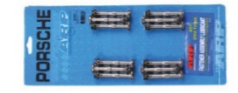
TOTAL ENGINE SOLUTION FOR 1997-2008 PORSCHE MODELS WITH THE M96 AND M97 ENGINE

PARTS AND UPGRADES RECOMMENDED FOR NICKIES™ EQUIPPED REBUILT M96 / 97 ENGINES.




Protect your engine against catastrophic IMS bearing failure. Additionally, the main drive sprocket is pinned to prevent slippage of the gear.

IMS SERVICE



A must when rebuilding any 1997 - 2008 M96 or M97 engine to prevent rod bolt failures.

ARP ROD BOLT KIT




Power increase due to lower friction. Engine protection during start-ups and oil starvation.

COATED MAIN & ROD BEARINGS



Custom Multi-Layered Steel head gaskets for larger than original bore sizes.

CUSTOM MLS HEAD GASKETS



Designed to be fully open 20-25 F earlier than OEM, this thermostat maximizes cooling system potential.

LOW TEMP THERMOSTAT



Make sure engine oil stays around the main oil pickup at all times - during braking, acceleration and in fast turns

X51 OIL PAN BAFFLE KIT



Exclusive full-flow adapter allows for use of a conventional spin on oil filter for superior filtration.

SPIN-ON OIL FILTER ADAPTER



FOR STREET



Reduce a primary source of wear in your engine - iron levels in oil - with up to 14 lbs. of magnetic pull!

MAGNETIC DRAIN PLUG



STRONGER, COOLER, AND LOWER FRICTION BY DESIGN.
Over 1500 engines sleeved - trusted worldwide as the best solution for sleeving.



M96/97 Engine Block upgraded with Nickies™ and JE Piston Set




FOR TRACK




Stronger by design, LN Engineering's Billet Aluminum Paddle also utilizes an upgraded, steel pressure pin.

LN BILLET TENSIONER PADDLE




Dual scavenge oil pumps will increase return flow of the engine oil to the reservoir, preventing oil starvation.

DUAL OIL SCAVENGE PUMPS




Increased sump capacity coupled with anti-slosh tray and X51 baffle reduces engine failures from loss of lubrication.

2 QUART DEEP SUMP KIT



High performance 4340 chromoly Steel and ARP rod bolts prevent rod failures.

FORGED CONNECTING RODS



Stronger than factory ones, ARP bolts prevent shuffling and fretting of the main bearing saddles.

ARP CARRIER THROUGH BOLTS



Protect your engine's oil pan from damage on street and track when using a deep sump.

OIL PAN GUARD PLATE




Full-flow filtration with increased flow for superior oiling system performance on track.

BILLET WASHABLE OIL FILTER



Pro Series, Chromoly head stud kit. Provides 40% more tensile strength than OEM Torque-To-Yield studs.

ARP HEAD STUD KIT



A heat treated, shot-peened, chromoly hex oil pump drive prevents loss of oil pressure.

CHROMOLY OIL PUMP DRIVE

LUBRICANTS AND TOOLS



LN ENGINEERING HIGHLY RECOMMENDS USE OF DRIVEN™ LUBRICANTS AND OILS

Co-developed by LN Engineering, DRIVEN™ mineral, semi- and full synthetic engine oils meet and exceed the highest lubrication demands of modern street and racing engines.
Thoroughly tested with Nickies™ cylinders, IMS Retrofit and IMS Solution, these oils are recommended for entire life of the engine.



STREET 

TRACK 




FAULTLESS TOOLS WRIST PIN CLIP INSTALLATION TOOL



TAPERED SLEEVE RING COMPRESSOR



PCA CLUB RACING LEGAL OPTION AVAILABLE



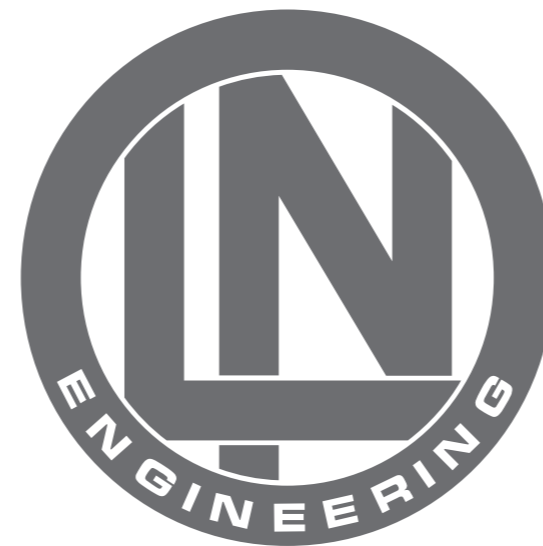
Street or Track?

- **For a street car, addressing cylinder and IMS issues with Nickies and the IMS Retrofit are the primary items to address when rebuilding the M96 or M97 engine.**
- **If you plan on taking your car to the track, be sure to mention this to us so we can discuss additional upgrades required to prevent subsequent engine failures.**



How do I get started?

- To get the process started, contact LN Engineering to speak to one of our engine specialists.
- Call: 815-472-2939
- Email: support@lnengineering.com



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Related Documents

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**1997-2008 PORSCHE®
BOXSTER®, CAYMAN® AND 911®
CARS WITH M96/M97 ENGINES**
WARNINGS AND PRECAUTIONS



**WATER-COOLED ENGINE WITH
NICKIES™ CYLINDER SLEEVES**
BASIC ASSEMBLY AND BREAK-IN INSTRUCTIONS



**TRACKING YOUR CAR
AND THE M96 ENGINE**



**FUEL INJECTORS
IN NEW AND REBUILT ENGINES**
TECHNICAL BULLETIN

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MODELS WITH THE M96 AND M97 ENGINE