

# NORTHSTAR

## *Performance*

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### **SUREGRIP CYLINDER HEAD STUD KIT**

*For 1993-2005 Northstar Engines*

LD8 4.6 Liter (279 cubic inch) VIN Y  
L37 4.6 Liter (279 cubic inch) VIN 9  
L47 4.0 Liter (244 cubic inch) VIN C

*Note: There are three kit variations- 93-99, 00-03, and 04-05.*

#### **SG102 Kit Contains**

- 20 custom CNC machined cylinder head studs
- 20 washers
- 20 high strength nuts
- 1 drill bit with pre-set stop
- 1 threading tap
- 1 ComboJig drill and tap fixture
- 4 Custom machined bolts to secure tap & drill fixture
- bottle of thread locker

#### **You Will Need:**

- WD40 & brake parts cleaner
- 1/2" drive electric drill
- tap handle
- masking tape
- compressed air supply with blower attachment
- locking pliers
- accurate torque wrench with 11/16" deep socket
- lint free towels or rags

**1-888-800-9470**

**[www.northstarperformance.com](http://www.northstarperformance.com)**

### 1. Block Preparation:

Wear safety glasses and proper protective wear at all times. Exercise caution whenever working with power drills and sharp tools. Northstar Performance will not be held liable for any injuries that may occur from the installation of this Stud Kit.

Clean both head and block mating surfaces making sure not to get any debris in any oil or coolant passages. It is best to get the heads checked for cracks and warpage at a machine shop, but you can do this as well with a machinist's straight edge and a careful eye. Also check the engine block for cracks, especially around the top of the cast iron cylinder sleeve.

Using masking tape, tape up the entire block leaving all 20 M11 cylinder head bolt holes exposed.

Remove and discard the 4 cylinder head alignment pins from the engine block. It may be very hard to remove these pins- be extremely careful not to chip or gouge the engine block in any way. For in-depth information on removing these pins, please visit **[www.northstarperformance.com/pinremoval](http://www.northstarperformance.com/pinremoval)**

Bolt down the drilling & tapping fixture plate with the smaller, smooth hole above the hole you wish to drill out, and securing it at the opposite corners with the appropriate smaller fine-thread or larger coarse thread alignment bolts (larger 5/8x11 thread bolts are for holes that you have already been drilled and tapped). Tighten well to make sure the jig will not move when you're drilling. Very carefully drill the hole out until the drill stop collar touches the fixture plate. You may have to cycle the drill bit a few times to remove the chips. Always use both hands on the drill and keep it straight. Do not use any type of cutting lube as you're drilling. Also, do not rely on the fixture plate completely to drill a straight hole- the jig is to be used as a guide to assist in drilling & tapping straight holes. Forcing the drill at the wrong angle can cause the drill bit to snap. If the drill tends to bite too much, use a file and dull the edges of the drill bit. You may need a helper to hold the engine block as you perform the drilling and tapping process.

*As you work your way across the engine you will need to rotate and flip the alignment fixture plate due to the spacing of the cylinder head bolt holes-*

Blow out all chips created from drilling, remove the fixture plate and rotate the plate so the threaded hole is now above the hole you just drilled. Now bolt it down again using the appropriate supplied bolts and start the tapping process. Use WD-40 as a cutting fluid. Tap the hole as far as you can using the supplied tap and a tap wrench (or a 12 point 7/16" or 11mm socket and ratchet). Remove the tap, and the fixture plate. Blow the hole out again with compressed air, and run the tap down again until the black mark on the tap is flush with the block surface. Remove the tap and proceed to repeat this drilling and tapping process on the next hole, until all holes are drilled and tapped. Proper care and time taken will ensure straight, accurate holes. As you go along you will learn tricks to speed this process up without sacrificing quality or accuracy.

Ensure all holes are drilled and tapped to the correct depth. Wash all of the holes out with brake parts cleaner. Cover with a rag as you blow the brake parts cleaner out of the holes. Be sure not to get any of this on your skin or clothing. Again, wear safety glasses at all times, and gloves and protective wear if necessary.

Make sure there are no sharp or raised edges around the holes that could prevent the head gasket from laying flat on the block surface. This is especially critical with Multi-Layer-Steel (MLS) type head gaskets. If there are any raised edges, ream the edge of the hole enough to remove the edge using a reamer tool or slightly larger drill bit (only by hand).

### **Installing the Studs:**

Coat the bottom few threads of the larger diameter of the stud with the supplied thread locker. (One at a time only! Install the studs in the block by hand and counter sink approximately one-sixteenth of an inch below the block surface. Failure to counter-sink the studs may result in engine or head gasket failure. If necessary you can use locking pliers on the smooth part of the studs to help screw them into the block. Two of the supplied nuts tightened together on the small diameter will assist in installation. Wipe off any excess thread locker after the stud is installed.

Note: on 1993-1999 engines all studs are the same length. On 2000-2005 engines the short studs are to be installed in the bottom row of head bolt holes and the longer studs are to be installed in the upper row.

On all years of engines, there are four special studs that take place of the original alignment sleeves. These studs must be installed and tightened until they come to a stop.

### **Assembly:**

Using your old head gaskets (or new ones if the old ones are no longer available) ensure the tips of the studs are perfectly aligned so the gasket will slip over. In the unusual event that one or more studs is out of alignment, you can very carefully ease them into position by installing a nut to protect the threads and giving soft but firm blows to the stud with a rubber mallet. **DO NOT USE A STEEL HAMMER OR YOU MAY CRACK THE ENGINE BLOCK!** This is a common practice and will not damage or crack the engine block if done with the proper rubber mallet.

Once all studs are perfectly aligned, remove the tape and clean all adhesive residue off the block with brake parts cleaner. Make double sure the cylinders are clean, the number one piston is at top dead center, and no aluminum chips are present anywhere on, in, or near the engine. Install the correct gasket (Fel-Pro is highly recommended) and the cylinder head (cylinder head must be clean and degreased as well). If the cylinder head is tight on the studs and won't slide over top, make sure it's going on straight, and if you need to, very gently tap it into position with a rubber mallet, on each end. Do not tap on the camshafts or any other moving parts.

Place one washer on each stud, rounded side face up. Install a nut on each stud. Using the factory specified torque sequence (working from the center two studs outward in an X-pattern) and an

accurate torque wrench, torque each nut to 30 ft. lbs. Make another pass at 60 ft. lbs., and one final pass at 75 ft. Lbs for the dark/black studs. (80 ft. Lbs. For the bright/shiny studs).

Install the three smaller M6 bolts at the end of both heads and torque to 106 In. Lbs. (factory specifications, make sure you use an inch-pound torque wrench).

For in-depth information on how to install the timing chains and set the camshaft timing, please obtain a factory service manual. In the near future, cam timing instructions will be on our website so keep checking back.

**Summary:**

It takes time and care installing the SG102 Head Stud Kit, but once complete, these studs will outlast all other thread repair methods on the market. These one-piece CNC machined studs will never pull out of the block and if properly installed, will never cause the block to crack. Best of all, should the head gaskets ever need replacing again, say 10 or even 15 years down the road, the studs can be re-used. They don't even have to be removed from the engine block. The thread locker not only keeps the studs from turning in the block, it seals the threads and creates a barrier between the dissimilar metals (steel threads in aluminum) to prevent metal-on-metal corrosion.

We do recommend coolant changes every 2 years regardless of mileage accumulated, and we do not recommend the use of long-life coolant such as the OEM coolant these cars came with. Any universal, green, low-silicate coolant with no less than a 50/50 mix (use proper mix for your climatic region) of coolant and distilled water will provide optimum head gasket life.

Thank you for purchasing the SG102 stud kit! We hope you have years and years ahead of happy motoring with your Northstar engine.

Any questions or concerns contact Northstar Performance by email anytime - [studkit@northstarperformance.com](mailto:studkit@northstarperformance.com) or call 1-888-800-9470 during our regular business hours.

***Please Refer all fellow Cadillac owners and inform them about our repair process! You can now say your Northstar is stronger than new! Keep the tooling around for your next Northstar project, we do sell the studs, nuts, and washers separately!***