

**Instruction 51-1016**  
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## Installation Instructions: S&S® Non-Copper Head Gaskets for Harley-Davidson® Evolution® & Twin Cam 88® Engines

**NOTE:** *Cleaning parts prior to and during assembly and keeping parts clean after final assembly are imperative to minimize contaminants that may circulate in oil and shorten engine life. Many parts can be cleaned with soap and water first. Then, reclean all internal parts and gasket mating surfaces using high quality solvent that does not leave any harmful residues. Be sure to read and follow manufacturer's instruction label before use. Use brushes and compressed air to clean all oil passageways of dirt, filings, etc. whenever possible. During final assembly, recoat all internal parts with clean motor oil.*



**Installer is responsible for ensuring parts are clean at assembly. Damage caused by manufacturing chips, dirt and/or other contaminants is not covered under warranty.**



- **Some solvents, degreasers and other chemicals are harmful. Many items are flammable and present a fire hazard. Read the manufacturer's instruction label for proper use. Use in well ventilated area and wear protective clothing to avoid injury.**
- **Compressed air and particles dislodged by compressed air are harmful to eyes and body. Wear protective goggles when using compressed air and always direct air stream away from body parts such as hands and eyes. Never direct compressed air toward other people.**

### Top End Assembly Procedure

- A. Thoroughly clean all top end parts and blow dry with compressed air. Use high grade lacquer thinner on gasket surfaces.
- B. Install base gaskets dry. Be sure gaskets match cylinder base line up dowels and oil return passageways.
- C. Install pistons and rings per instructions, or S&S® piston instruction sheet 51-1028.
- D. Coat piston skirts with engine oil and install cylinders.
- E. Install head gaskets dry with widest side of metal fire ring against cylinder.

**NOTE:** *S&S 3¾" bore head gaskets for 1999-up big twins require o-rings around the cylinder head locating dowels similar to stock head gaskets. S&S 3⅞", 4" and 4⅛" bore head gaskets do not use o-rings around cylinder head locating dowels.*

**NOTE:** *All S&S cylinder head kits are supplied with .045" thick head gaskets. This clearance promotes better combustion chamber turbulence and flame travel.*



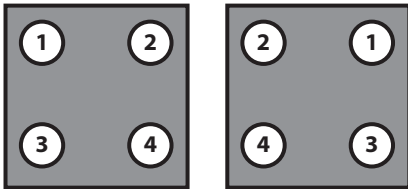
**Insufficient clearance between piston domes and cylinder heads or piston domes and valves will cause damage to pistons, heads and/or valves.**

- F. Before installing heads, check the threads of cylinder studs and head bolts by spinning each head bolt down on its respective stud to be sure threads are clean and undamaged. If binding is encountered, correct before proceeding. Place a drop or two of oil on threads of each head bolt just prior to final assembly.

**NOTE:** Light coating of oil on head bolt threads minimizes friction so torque values will not be distorted. It cannot be emphasized enough how important it is to do these steps carefully. Maintaining a good head gasket seal depends on it.

G. Bolt heads on cylinders using stock washers and head bolts or S&S® washers and head bolts when provided. Tighten head bolts in stages using crossing pattern shown below. Use torque specifications appropriate for crankcase type. Do not exceed specified torque values.

**Top View Driveside**



**Head Bolt Torquing Sequence**

	S&S® Case	Stock Case
Stage 1	8 ft-lbs	7-9 ft-lbs
Stage 2	18 ft-lbs	12-14 ft-lbs
Stage 3	Turn 90° more	Turn 90° more

**NOTE:** Stock head bolt torque specifications must be used with stock crankcases. Stronger material used in S&S crankcases allow the use of higher torque values.

**CAUTION**

**Improper torquing sequence and head bolt torque values may cause head gasket failure. Exceeding specified torque values may cause cylinder studs to pull out of crankcases, resulting in damage to crankcases and loss of head gasket seal.**

H. Finish assembling top end per OEM instructions. Install and adjust pushrods per factory specifications, or manufacturers pushrod instructions.

**Initial Start Up**

- A. Run engine approximately one minute at 1250-1750 rpm. DO NOT crack throttle or subject engine to any loads as head gaskets are susceptible to failure at this time. During this time check to see that oil pressure is normal, that oil is returning to the oil tank, and that no leaks exist.
- B. Shut off engine and thoroughly check for any leaks or other problems. Let engine cool to the touch
- C. After engine has cooled, start up again and allow the motor to build some heat. Engine should be run no longer than three to four minutes. When the cylinders become warm/hot to the touch (approximately 150°) shut the motor down and let it cool to room temp. Follow the same cautions as for the initial start-up, and continue to watch for problems.
- D. Repeat this procedure 3 or 4 times. With a new engine, each successive time should take slightly longer to warm up and you can increase the temp slightly each time (+10°). You can be more liberal each time with the rpm, gently vary rpm continuously from idle up to 2500 rpm in the final cycle. Do not allow engine temperature to become excessive. After the motor has cooled to room temperature for the final time the motorcycle can be ridden normally.
- E. If the engine is new or newly rebuilt, adhere to the break-in procedure specified by the manufacturer of the components installed.

**CAUTION**

- **Improper first time engine start-up and break-in procedure may cause head gasket failure.**
- **Do not allow engine temperature to become excessive as permanent engine damage may result.**