



*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.*

temperature reaches about 250°. Do not crack throttle or subject engine to any heavy load during this period as V<sup>2</sup> head gaskets are susceptible to failure until heat build-up is completed. Heat build-up is necessary to cause heads and cylinders to expand and seal. Improper initial engine start-up and break-in procedure may cause head gasket failure.

### Installation Instructions For S&S 3 1/2" & 3 5/8" Bore V<sup>2</sup> Cylinder Head Gaskets

*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 drills and compressed air to clean all oil passageways of dirt, filings, etc. whenever possible. During actual final assembly, recoat all internal parts with high quality engine oil.*

**CAUTION - Manufacturing chips, dirt and/or other contaminants circulating in engine oil may possibly damage engine components resulting in shorter engine life and possible engine failure.**

#### WARNINGS

● Some solvents, degreasers and other chemicals are harmful to skin, eyes and other body parts. Many items are flammable and present a fire hazard. Read manufacturer's instruction label for proper use. Use in well ventilated area and wear protective clothing when using them to avoid personal 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.

#### V<sup>2</sup> Top End Assembly Procedure

- Thoroughly clean all top end parts and blow dry with compressed air. Use high grade lacquer thinner on gasket surfaces.
- Install base gaskets dry. Be sure gaskets match cylinder base line up dowels and oil return passageways.

- Install pistons and rings per S&S piston instruction sheet #2500.
- Coat piston skirts with engine oil and install cylinders.
- Install head gaskets dry. Place o-ring seals on line up dowel oil return tubes and be sure head gaskets are properly positioned.

*NOTE - Care must be taken to use correct alignment dowel o-rings with V<sup>2</sup> head gaskets. Head gaskets supplied with S&S cylinder heads compress to about .045" thick and require .070" diameter o-rings. Gaskets supplied with SIDEWINDERS for stock heads compress to about .0625" and require .0825" diameter o-rings.*

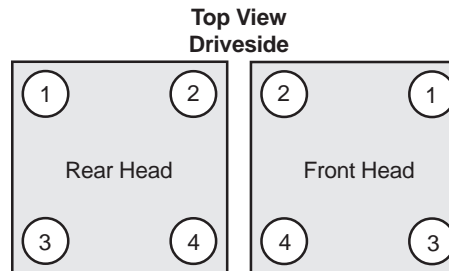
**CAUTION - Using thin o-rings with thick gaskets or thick o-rings with thin gaskets may cause oil leaks or possible ruptured head gaskets around line-up dowels due to incorrect o-ring compression.**

*NOTE - All S&S cylinder head kits are supplied with .045" thick head gaskets, because this clearance promotes better combustion chamber turbulence and flame travel. When other cylinder heads are used S&S supplies .0625" thick gaskets. Using thicker head gaskets with S&S heads reduces design efficiency and performance. If thinner head gaskets are used with other cylinder heads, piston to head and valve to piston clearances must be checked during assembly.*

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

- Before installing heads spin each head bolt down on its respective stud to be sure threads are clean and free of contamination. Place a drop or two of oil on threads of each head bolt just prior to final assembly.

- Bolt heads on cylinders using stock H-D 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.



**Head Bolt Torquing Sequence**

	<b>S&amp;S Crankcases</b>	<b>Stock Crankcases</b>
Stage 1	7-9 ft-lbs.	7-9 ft-lbs
Stage 2	16-18 ft-lbs.	12-14 ft-lbs.
Stage 3	Turn 90° More	Turn 90° More

*NOTE - Stock H-D head bolt torque specifications must be used with stock H-D 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. This will result in damage to crankcases and loss of head gasket seal.**

- Finish assembling top end per H-D specs. Install pushrods and adjust using instructions provided.

#### Engine Break In

- Upon initial start-up, quickly check to make sure oil pressure is normal and no leaks exist. With minimal load on engine, ride motorcycle at low speeds until cylinder head

*NOTE - Proper first time engine start-up and break-in is critical to achieve permanent and lasting head gasket seal. Prior to initial start-up, a .001" to .005" feeler gauge will fit between head gasket and head and cylinder gasket surfaces stopping at fire ring on head gasket. Warming engine as instructed will tightly close this gap producing a good, lasting seal.*

#### CAUTIONS

● **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.**

- First 50 miles are most critical for new rings and piston break-in. Most engine damage will initially occur during this period. Keep heat down by not exceeding 2500 rpm. Vary speed. Do not lug engine.
- Next 500 miles should be spent running engine no faster than 3500 rpm or about 50-55 mph. Do not lug engine and continue to vary speed.

**CAUTION - Lugging or running engine prematurely at high rpms may result in damage to pistons and/or other engine components. S&S voids its guarantee if engine is not broken in properly.**

- For balance of first 1000 miles, speed can be run up to 60 to 70. Continue to run engine at all different speeds including lower 40-45 mph ranges.
- 1000 to 2000 miles—basically same procedures as before. You can be a little more liberal with rpm range. Avoid overheating engine and putting any hard strain on it (drag racing, trailer towing, sidecar operation).
- 2000 miles and up—have fun!