



## Engine Building

The engine building process is an extremely critical part of building a bike. Spears will completely inspect all of the working components of the engine. The transmission will be clearanced in the cases and new transmission carrier bearings will be installed if needed.

The crankshaft will be magnafluxed to ensure that it has no cracks at the time of installation; and this too will be clearanced in the cases for the correct side play clearances. The connecting rods will also be clearanced at this time. If an upgrade is wanted, we suggest the Carrillo connecting rods. The cases will be prepped with new main crankshaft bearings as well. After final inspection, the Spears crank case defuser and the cases will be closed up.

The top end will be torn down and the cylinder heads will be completely inspected. Spears offers several types of head work to match your needs. First there is a standard valve job, which machines the valves and seat area of the head exactly to the manufacturers required specifications. Second there is the competitive valve job; the valve faces and stems are machined, and the intake valves are given a special double cut. The exhaust seats are given a three angle cut. The intake seats receive a blended four angle cut or full radius cut depending on the application. Finally all valves are hand lapped and checked for correct sealing. All of the seat work is done on our state-of-the-art SERDI valve machine.

For those not wishing to radically modify the ports, port irregularities and casting lumps (called flashings) are removed. The critical area of valve-seat-to-port is blended and the junction of the carburetor-adaptor-to-manifold is also matched and blended. The port is not altered dimensionally. We like to think that this makes the port the way the engine designer intended.

For those that want the complete port and combustion chamber reshaping, the area is shaped and contoured to maximum flow and the valve-seats-to-port is blended and the junction of the carburetor-adaptor-to-manifold is also matched and blended, while maintaining flow velocity for power increases throughout the RPM range.

The cylinders will be installed and the proper deck height will be obtained to give the best reliable power and torque. Next are the cylinder heads - a process that only Spears does. The heads are bolted to the cylinders and are CC'd to find out the current compression ratio. After this is completed, the heads are ready for their final assembly to the cylinders.

Camshaft timing is so critical on a sport twin (see our cam timing article), there cannot be any deviation between the front and the back cylinder opening and closing numbers (you're only going to be as strong as the weakest cylinder).



After the final cam timing numbers are obtained, the cams will be pulled for the final time and the sprocket carriers will be welded to the camshaft bodies (to ensure no movement of the holder) and re-installed. The engine will be closed up and be ready to ship.

Thank you for looking,

Spears Racing