

## **CAMSHAFT AND VALVE TRAIN INFORMATION**

### **Reground Cast Factory Single Cylinder Camshafts**

It is not necessary to degree in Vogel reground cast factory Kohler single cylinder cams. Set in cast reground cams per the factory marking on the cam. Grinds with up to .432 lift can be put on most cast camshafts. We have a variety of grinds for different classes.

**Note:** *The customer furnishes the factory cast camshaft that he wants reground.*

### **ALWAYS USE AN ASSEMBLY LUBE WHEN INSTALLING CAMSHAFT!**

**Set end clearance on Kohler type cams to Kohler factory specs.**

**Note:** Some strokes may require cam clearance to get the cam into position.

### **All Steel Aftermarket Single Cylinder Kohler Replacement Camshafts**

We manufacture the all steel two-piece camshaft that has a bolt on steel gear allowing for advancing or retarding the cam. Our steel cam features a ground on point lobe. If your situation requires a fuel pump lobe, we can also grind it on the steel cam. All steel cams require a hardened points pin with a radius tip. The steel cams are available as pin thru styles (for use with stock strokes) or solid in the middle styles (for engines using larger than factory strokes and requiring more clearance.) The solid style cam (designed for stroked engines) is clearanced with a flycut operation between the lobes. Use the Kohler .498 cam pin in the pin thru style cam. The solid style cam requires .500 hardened dowel pins on each end. The solid style cam also requires mounting brackets/retainer bar to mount the camshaft in the block. We have the .500 hardened cam dowel pins and the mounting brackets available. We also have the hardened cam point pins available for the steel cams in lengths for use with the Kohler block and the after market blocks such as Jones PS1 block or Julian block (1.460") and longer cam point pins for use with the Woolam block (1.580").

### **Mounting the Solid Style Steel Camshaft in the Block**

Ream cam pinhole in block approximately .500 - .501 diameter so pin can enter block from outside on PTO end. Using a .500 hardened dowel pin for the cam pin, push the pin into block so end protrudes through inside of block - desired amount - about 1" on gear end. Position the cam pin retainer bar over outside end of pin. Drill and tap ¼ - 20 hole in block to hold bar to block. Bolt bar to block and tack weld to pin.

On flywheel side/end plate, machine or grind flat area outside where cam pin comes through end plate. (Note: Pin does not extend through into block as far on this end.) Drill hole through retainer bar into end plate, to secure the bar. Tack weld to pin. Make sure it does not interfere with the flywheel.

### **Advancing or Retarding the Steel Camshaft**

Adjust at the gear (loosen the (4) four clamping bolts) by moving approximately 5 degrees in either direction. To return to position as ground, line up the ¼" dowel hole in gear with the ¼" dowel hole in cam face and insert ¼" dowel. As a reference point, .020 movement at the cam flange O.D. is 1 degree cam movement or 2 degrees crank movement.

**Remember, degree in a camshaft with zero lash and no installed springs.**

## **Lifters**

**Always install new lifters with a new cam grind!** Polish face of lifter before using with 600 grit paper, then 1000 grit paper, to prevent break-in wear. Make sure you have the correct tappet for the cam. Stock tappets are not compatible with some profiles. Cam lifts that are above .400 require our Large Base Lifter. Our Big Tool Steel Lifter is necessary for cams with lifts starting at .572. In most cases, when using the large base tappets, the top portion of the tappet adjusting screw must be shortened. You may shorten valve train in 3 different ways or all 3 ways. First, you may shorten the lifter adjusting screw by grinding on the head of the adjusting screw. Next, you may shorten the valve stem (see instructions under valves.) Last, shorten valve train by removing the lifter adjusting screw and shorten lifter body by grinding on the threaded end.

**Caution:** *Make sure the tappet mushroom head does not hit bottom of lifter bore in the block and bind at top of lifter head, causing cam breakage or lobe wear.*

**Tappet clearance:** *Intake .008 - .010 Exhaust .010 - .012*

## **Spring/Retainer Assembly and Keepers**

Make sure you have the correct valve spring for the cam grind you are using and make sure springs do not coil bind. The pressure on some springs rise rapidly when approaching bind. Our Single Spring/Retainer assembly (heavier than Kohler) should be used with all cast reground cams. Our Dual Spring/Retainer assembly should be used with steel camshafts that have .500 lift and above. The 5/16" hardened Keepers (split-locks) are recommended especially with the higher lift cams.

## **Stainless Steel Valves - 5/16" Stems**

The overall length of our standard high-grade stainless steel valve is intentionally left .150 longer than factory length and the keeper groove is moved to accommodate our aftermarket springs. You may shorten the length of the valve by grinding on the end of the valve. Leave at least .050 between bottom of split lock and end of valve.

**Note:** If using factory springs and you prefer the factory valve length and keeper groove location, request the factory valve length when ordering your custom made valves.

**Caution:** *Check to make sure valves to not hit the cylinder head.*

## **Ignition Timing**

It is recommended that you degree in flywheel to locate TDC. Mark the flywheel every 5 degrees out to 35 degrees BTDC.

**Note:** With our steel cam and ground on point lobe, do not correlate points gap with engine timing – there is a range from approximately 10 degrees BTDC to 40 degrees BTDC.

Use a continuity tester to set points to desired ignition timing by gapping points.

We recommend Kohler points available at Napa Automotive Stores. These points have a very strong spring! You don't have to worry about your timing moving! However, it is a good idea to check timing periodically.

**Timing:** *Gasoline* – usually 22 to 30 degrees

*Alcohol or Alcohol/Nitro mixture* – usually 25 to 35 degrees

**DO NOT USE SYNTHETIC OIL!**

Synthetic oils lack a sufficient amount of the necessary ingredient – ZINC.

**USE A RACING OIL – NOT A STREET OIL**

Gard-N-Go is a special oil formulated for the Air Cooled Engines made by Cen-Pe-Co (Central Petroleum Company).

It has been extensively tested and used in garden tractor pulling for years.

Do not use additives with this oil.

Gard-N-Go is available in 10 wt., 20 wt., and 30 wt.

You can purchase this oil through your local dealer. To find the dealer nearest you, call 800-553-1891 and ask for Gard-N-Go. VM also stocks this oil for resale.