



## PowerPort® 240 and 270 Aluminum Cylinder Heads for the Big Block Mopar

Thank you for purchasing Trick Flow PowerPort aluminum cylinder heads designed for the Big Block Mopar.

Please follow the steps outlined in this instruction manual to ensure that the installation of your new cylinder heads is done correctly and that they perform according to design.

Please read all of the enclosed information before beginning any work. If you have any questions regarding installation or the written materials supplied with your new heads, contact the Trick Flow technical department at 1-330-630-1555 for assistance, Monday through Friday from 9:00 am to 5:00 pm ET.

### ***Project Overview***

- Review all paperwork included in the installation packet
- Inspect the condition of all components
- Verify the part numbers and quantities of each product received (see Parts Checklist below)
- Mail the warranty card to Trick Flow
- Locate recommended tools
- Purchase any additional parts needed (See the Additional Parts Required section. Do not purchase pushrods until the proper length has been determined)
- Remove existing cylinder heads
- Clean and inspect the engine block
- Check header fitment
- Install new cylinder head locating dowels
- Check piston to valve clearance
- Check pushrod length
- Purchase the appropriate length pushrods
- Install the new cylinder heads
- Adjust the valvetrain
- Make tuning adjustments
- Perform a proper break-in
- Test drive and enjoy!

### ***Parts Checklist***

You should have received the parts listed here. Please verify the part numbers and quantities of each component received.

- (1) Assembled cylinder head
- (1) Instruction packet

If you are missing an item or a part was received in error, please contact Trick Flow at 1-330-630-1555, Monday through Friday from 9:00 am to 5:00 pm ET.

### ***Recommended Tools***

- Shop Manual for your vehicle
- Basic mechanics tool set
- 0-150 ft.-lbs. torque wrench
- Timing light, vacuum gauge, and spark plug gap tool
- 7/16"-14 tap and handle
- Straightedge
- Feeler gauge
- Modeling clay
- Adjustable pushrod
- Solid mock up lifter

### ***Additional Parts Required***

These components are required to complete the installation of your new cylinder heads. Please refer to the Recommended Components chart on the Technical Specifications sheet for specific part numbers.

- Head gaskets
- Intake gaskets
- Exhaust gaskets
- Valley Plate kit (C01)
- Head bolts
- Intake bolts
- Exhaust bolts
- Moly lube
- Spark plugs
- RTV sealer
- Pushrods (Longer than stock may be required)
- Rocker arms
- Rocker arms stud kit/bolts
- Cylinder head locating dowels
- Thread locker
- Thread sealer

## ***Installation Instructions***

### **1) Cylinder Head Removal**

Consult your shop manual for the proper cylinder head removal procedure for your vehicle. Taking notes, pictures, and even making a video of the disassembly will help you greatly when reinstalling brackets and routing vacuum lines.

**NOTE: Be sure cylinder #1 is at TDC on the compression stroke and mark the distributor's rotor position on the firewall before disassembly.**

### **2) Prepping the Block**

With the old cylinder heads removed, inspect the cylinder bores for scratches, ridges, and cracks. If everything appears to be OK, put some paper towels in the cylinders to catch loose debris as the old head gaskets are scraped off the engine block's deck surface. Remove all traces of the gaskets and any oil or grease that may be present by wiping the surface with brake cleaner.

Check the deck surfaces for flatness by laying a straightedge across the deck lengthwise and sticking a .004" feeler gauge under it. If the feeler gauge fits anywhere under the straightedge, the block will need to be decked or head gasket failure will result.

Once the block decks have been cleaned and checked, use the correct size tap to chase the threads in the bolt holes. This will clean out old sealer and debris, which is extremely important for preventing leaks and torquing the heads down evenly on the block.

After cleaning the head bolt hole threads, carefully remove the paper towels from the cylinders and discard. Using new paper towels clean the cylinders and coat the cylinder walls with a thin film of engine oil to protect them from corrosion.

Next, install the new head alignment dowels, and then place the new head gaskets on the engine block.

### **3) Checking Exhaust Manifold/Header Clearance**

Place one of the PowerPort cylinder heads on a suitable work stand and install the recommended spark plugs (refer to the Recommended Components chart for specific part numbers). Bolt the exhaust manifold/headers to the cylinder head and check for any interference. Repeat this procedure on the other cylinder head.

### **4) Installing and Adjusting the Valvetrain and Checking Piston to Valve Clearance**

If you choose to use the stock camshaft in your engine, and it has not been moved from its factory position, you do not have to check piston-to-valve clearance. If you have an aftermarket camshaft or are reinstalling a camshaft (especially with a multi-keyway timing set), you must follow this procedure to assure safe operating clearances between your pistons and valves.

Rotate the crankshaft until the engine is on the compression stroke of the #1 cylinder. Place a solid mock up lifter in the lifter bore of the valve that you will be measuring. Be sure that the mock up lifter is the same height as the lifters that will be installed in the engine later.

Coat the top of the piston with a very thin layer of oil, and then place a few 1/4" thick pieces of modeling clay across the upper half of the piston. Place the head gasket

you will be using on the block and bolt the head on with five or six head bolts.

Your PowerPort cylinder heads use a shaft mounted rocker arm system which mounts directly onto the pedestals on your cylinder heads. Please note that any work performed on your cylinder heads, such as milling the heads, modifying your valve job or camshaft base circle changes can affect the valvetrain geometry.

Next, set the adjustable pushrod tool to the proper length for your combination. Place the pushrod tool into the pushrod hole on Intake #1. Using a Sharpie®, color the tops of your valve tips. This will verify your wear pattern on the valve tip, once you optimize the geometry.

Install the lash adjusters into the rocker arm bodies according to the rocker arm manufacturer's recommendation.

Trick Flow highly recommends using our rocker arm shaft system hold down stud kit. This kit, when used correctly, will prevent pulling the threads out of the cylinder heads when tightening down the rocker arm shaft system. If bolts are to be used, be sure that there is 0.600-0.650" thread engagement when the stand is installed.

Place the rocker arm shaft system on the pedestals and tighten the hold down nuts/bolts. Be sure that the oiling holes in the shaft are properly aligned with the oil gallery in the head. Do not torque the nuts/bolts.

Center the rocker arm over the valve tips and measure the endplay of the rocker arm. Each rocker arm needs between .015"-.030" endplay, which can be accomplished with the use of the shims typically supplied with your rocker arms. Refer to your rocker arm manufacturer's instructions.

Depending on the camshaft/rocker arm combination you are using, it may be necessary to place a shim between the rocker shaft and pedestal in order to center the rocker arm on the valve tip.

Next, adjust the lash according to the camshaft manufacturer's recommendations.

Once you believe that you have the rocker arm centered on the valve tip and your lash is set, rotate the engine a few times, returning to TDC on #1.

Next, repeat this process for Exhaust #1. Remove the rocker arm system and measure the width of wear pattern left on the valve tips. A pattern less than .080" wide is optimal. Make adjustments, as necessary.

Next, remove the cylinder head and gently cut the clay into slices and look for the thinnest section of the valve impression. The impression is a 3D representation of the clearance between the piston and valve. Carefully measure the thickness of the clay with a machinist's scale or calipers. The intake valve side of the clay should have .080" or more of clearance, and the exhaust should have .100" or more of clearance.

When you have completed these procedures, rotate the crankshaft until the #1 piston is at TDC on the compression stroke.

**NOTE: Reference the maximum recommended valve lift for the valve springs in the Technical Specifications sheet before purchasing an aftermarket camshaft.**

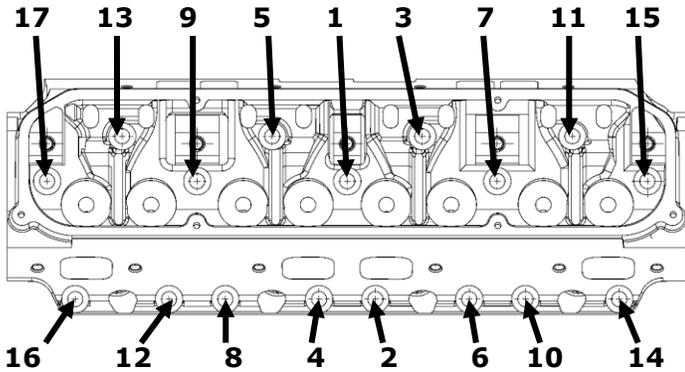
### **5) Installing the PowerPort® Cylinder Heads**

With the block deck surfaces and cylinders clean and all checks completed, position the head gaskets on the block per the manufacturer's markings.

Don't be alarmed if some of the holes in the block are restricted by a smaller hole in the gasket. This is done intentionally to regulate coolant flow.

Position each cylinder head evenly on the block's dowel pins so that each head lies flat against the gasket. Place a small amount of ARP moly lube on the tops of your head bolt washers. Washers are required to prevent galling of the aluminum and to get accurate torque readings.

Torque the bolts in the three stages shown, following the sequence shown in Figure 1.



**Figure 1**

**7/16" Head Bolts:** 40 ft.-lbs., 55 ft.-lbs., 70 ft.-lbs.

A head bolt re-torque is highly recommended after the initial break-in and cool down (allow 2-3 hours for an adequate cool down). For head stud installation, follow the head stud manufacturer's instructions.

## 6) Final Valvetrain Adjustment

Place the rocker arm shaft system on the pedestals and slightly tighten the hold down bolts. Again, be sure that the oiling holes in the shaft are properly aligned with the oil gallery in the head. Do not torque the bolts.

Center the rocker arms over the valve tips, as you did in Step 4, and measure the endplay of each rocker arm individually (.015"-.030" endplay recommended).

Once your geometry has been optimized, bolt the rocker arm system to the cylinder heads. Torque the hold down bolts to 40 ft.-lbs with 30 weight oil.

Adjust the lash according to the camshaft manufacturer's recommendations.

## 7) Reassembling the Rest of the Engine

Install as many items as you can without putting the valve covers on. This will allow you to pre-lube the valvetrain, which is explained in the 'Pre-lubing the Valvetrain' section.

**Exhaust Leak Note: What may sound like a lifter tick is often an exhaust gas leak. Rule out exhaust leaks before tearing the intake off to replace the lifters.**

## 8) Pre-lubing the Valvetrain

The valvetrain is now ready to be pre-lubed. Use an oil pump primer to pre-lube the valvetrain. Next, slowly pour a half quart of motor oil (per head) over the rocker arms, valve springs, and valve stems. Use an oil squirt can to get inside the valve spring and lube the valve stem and seal area. Reinstall the valve covers as soon as possible to keep contaminants out of the engine.

**DO NOT START THE ENGINE IF THE TOP HALF OF THE ENGINE HAS NOT BEEN PRELUBED!**

Finish reassembling all other components, brackets and vacuum lines.

## 9) Break-In and Tuning

To ensure long life and trouble-free use, allow 2-4 hours of normal driving time before running the engine hard; this will break-in the valvetrain properly.

<b>Airflow Results</b>		
<b>PowerPort 240 Cylinder Heads for Big Block Mopar</b>		
Lift Value	Intake Flow CFM	Exhaust Flow CFM
.100"	72	58
.200"	154	130
.300"	230	186
.400"	282	222
.500"	310	243
.600"	326	253
.700"	334	262

Tests conducted at 28" of water (pressure).  
Bore size: 4.350"; exhaust with 2" pipe.

## Specifications

**Head Material:** A-356-T61 Aluminum  
**Comb. Chamber volume:** 78cc CNC profiled  
**Intake port volume:** C00: 240cc CNC Street ported  
C01: 270cc CNC Competition ported  
**Intake port dimensions:** C00: 2.270" x 1.230"  
C01: 2.630" x 1.340"  
**Intake port location:** C00: Stock  
C01: Raised Max Wedge-style  
**Intake valve diameter:** 2.190" (TFS-61600211)  
**Intake valve angle:** 15°  
**Intake valve stem diameter:** 11/32"  
**Exhaust port volume:** C00: 74cc CNC Street ported  
C01: 74cc CNC Competition ported  
**Exhaust port dimensions:** 1.250" x 1.650" oval  
**Exhaust port location:** Stock  
**Exhaust valve diameter:** 1.76" (TFS-61600212)  
**Exhaust valve angle:** 15°  
**Exhaust valve stem diameter:** 11/32"  
**Valve guide material:** Bronze Alloy (Intake: TFS-51600252)  
(Exhaust: TFS-61600251)  
**Valve seal:** Viton® Fluoroelastomer canister (TFS-30400454)  
**Valve seat intake:** Ductile Iron (TFS-53400271)  
**Valve seat exhaust:** Ductile Iron (TFS-61600272)  
**Valve seat angles:** 45° x multi-angle  
**Valve spring pockets:** 1.740"  
**Valve spring I.D. locator:** 1.460/1.550" (TFS-21400440)  
**Valve spring retainers:**  
Chromoly steel 7° x 1.500" O.D. (TFS-31400424)  
Chromoly steel 10° x 1.550" O.D. (TFS-41400423)  
Titanium 10° x 1.550" O.D. (TFS-214T0520)  
**Valve stem locks:** 7° machined steel (TFS-51400444)  
10° machined steel (TFS-52400444)  
**Valve springs: Standard**  
1.460" O.D. dual spring with damper (TFS-16893)  
120 lbs. @ 1.900" installed height  
394 lbs. @ 1.175" open  
390 lbs. per inch rate  
.650" maximum lift  
**Option 1**  
1.550" O.D. dual spring with damper (TFS-16094)  
138 lbs. @ 1.950" installed height  
430 lbs. @ 1.250" open  
420 lbs. per inch rate  
.680" maximum lift  
**Option 2**  
1.560" O.D. dual spring with damper (TFS-16318)  
240 lbs. @ 2.000" installed height  
600 lbs. @ 1.280" open  
500 lbs. per inch rate  
.700" maximum lift  
**Minimum bore diameter:** 4.320"  
**Milling specifications:** NA  
**Push rod length:** Longer than stock may be required,  
Refer to instructions for recommendations  
**Rocker arm type:** Shaft Mount  
**Weight:** 24 lbs. each, bare

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## Replacement Cylinder Heads

**TFS-6161B001-C00,** 78cc CNC chambers, 240cc CNC Street Ported, bare, each  
**TFS-6161B001-C01,** 78cc CNC chambers, 270cc CNC Competition ported, bare, each

## Recommended Components

**Head gasket:** Fel-Pro # 1009  
**Intake gasket:** C00: Fel-Pro # 1216 (gaskets only)  
C01: Fel-Pro # 1218 (gaskets only)  
**Valley Pan:** Trick Flow # TFS-61600820 (383/400)  
Trick Flow # TFS-61600830 (440)  
**Valley Pan Gasket Set:** Fel-Pro # 1214 (B 361-400 c.i.d.)  
Fel Pro # 1215 (RB 413-440 c.i.d.)  
**Exhaust gasket:** Fel-Pro # 1414  
**Head bolts:** Trick Flow # TFS-92025 (7/16")  
ARP # 145-3609  
**Head studs:** Trick Flow # TFS-61604304 (7/16")  
**Head Alignment Dowels:** Mr. Gasket 4375  
**Pistons:** OEM  
**Intake Manifold:** Trick Flow # TFS-61600111 (383/400)  
Trick Flow # TFS-61600113 (440)  
**Rocker arms:** Harland Sharp #S70015KE (1.5 ratio)  
Harland Sharp #S70016KE (1.6 ratio)  
Most COMP Cams and Crane Cams  
**Rocker arm stud kit:** Trick Flow #TFS-61600613  
**Spark plugs:** Autolite # 3924

## Ultimate Bolt-On Performance® Lifetime Warranty

**Trick Flow Specialties cylinder head castings are backed by a lifetime warranty. If a cylinder head casting fails to provide the original purchaser with complete satisfaction, Trick Flow Specialties will repair or replace it free of charge — guaranteed!**

Moreover, the valves, valve guides, valve seats, valve job, valve springs, valve spring retainers, valve locks, rocker arm studs, guideplates, and valve stem seals included on assembled Trick Flow Specialties cylinder heads are warranted to the original purchaser to be free from defects in materials and workmanship for a period of two years from the date of purchase. All other Trick Flow Specialties products are warranted to be free from defects in materials and workmanship for a period of 90 days. There are no mileage limitations.

### Extent of Warranty

Customers who believe they have a defective product should return it to the dealer from which they purchased or ship it freight prepaid to Trick Flow Specialties along with proof of purchase and a complete description of the problem. If a thorough inspection indicates defects in materials or workmanship, our sole obligation is to repair or replace the product.

This warranty is only if the product is properly installed, subjected to normal use and service, did not fail due to owner negligence or misuse, and has not been altered or modified.

Trick Flow Specialties warranties do not cover any installation or removal costs.

Trick Flow Specialties is not liable for consequential damages for breach of contract of any warranty in excess of the purchase price of the product sold.

### PROPOSITION 65 WARNING

This product may contain one or more substances or chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

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