



Power Port® 429/460 Cylinder Heads

Thank you for purchasing Trick Flow Power Port 429/460 aluminum cylinder heads designed for the Ford 429/460!

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.

*****Important Information*****

- You must perform a mockup for piston-to-valve clearance and you will also need to make sure that the intake and exhaust valves clear each other on the CNC ported head. Some camshafts may allow the valves to collide during overlap, so be aware of this before final assembly.
- If you are applying boost or nitrous to your engine, you may need different springs and valves.
 - Consult a reputable valve manufacturer for valve recommendations on high powered, boosted, and nitrous applications.
 - Consult your camshaft manufacturer for the proper spring for your application.

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")
- Gather tools from the "Recommended Tools" section
- Purchase any necessary additional parts. (See "Additional Parts Required." **Do not purchase pushrods** until the proper length has been determined.)
- Remove existing cylinder heads
- Clean and inspect the engine block thoroughly.
- If necessary, install new cylinder head locating dowels.
- Check piston to valve clearance
- Check pushrod length and purchase new ones accordingly.
 - TFS-9502 (7.800-8.800 pushrod length checker)
 - TFS-9503 (8.800-9.800 pushrod length checker)
- Install the new cylinder heads and adjust the valvetrain.
- Make necessary tuning adjustments.
- Perform a proper break-in.
- Test drive and enjoy your new cylinder heads.

Parts Checklist

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

- Assembled cylinder head
- Instruction packet
- (4) Guideplates
- (8) Rocker studs

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
- Torque Wrench (0-150 ft.-lbs.)
- Timing light and spark plug gap tool
- Straightedge
- Feeler gauge
- Modeling clay
- Calipers
- 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
- Head bolts or studs
- Intake bolts
- Exhaust bolts
- Moly lube
- Spark plugs
- RTV sealer
- Pushrods (*Longer than stock may be required*)
- Rocker arms
- Thread sealer
- Cylinder head locating dowels

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.

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.
- 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.

3) Checking Piston-to-Valve Clearance and Valvetrain Geometry

- 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.
- Place a few 1/4" thick strips of modeling clay across the upper half of the piston. Put a light coat of oil on top of the modeling clay and the valves in the cylinder head to keep the clay and valve from sticking. Place the head gasket you will be using on the block and bolt the head on with five or six head bolts.
- Install the rocker arm stud guideplate and the rocker arm for the valve you are checking (intake or exhaust). Next, set your pushrods in and tighten the rocker to zero lash, rotate the crankshaft at least twice, remove the cylinder head.
- This is also a good time to verify proper pushrod length and valvetrain geometry. The procedure can be found in the bulletin titled "How to Optimize Pushrod Length for Better Performance".

- 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.

4) Installing Your New 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. Next, place hardened head bolt washers over each bolt hole. Head bolt washers are required to prevent galling of the aluminum and to get accurate torque readings. Once they are in place, place a small amount of ARP moly lube on the tops of all washers.
- Torque the head studs in the four stages shown, following the sequence shown in Figure 1.

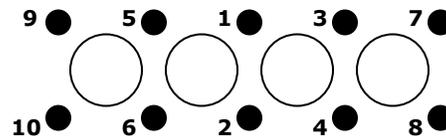


Figure 1

Stage One: 30 ft.-lbs.

Stage Two: 75 ft.-lbs.

Stage Three: 105 ft.-lbs.

Stage Four: 135 ft.-lbs.

- A cold re-torque after the initial break in period is required to maintain head gasket integrity and combustion seal.

5) Installing and Adjusting the Valvetrain

- Place the proper length, hardened pushrods into the pushrod holes. Use oil to coat the base threads of the rocker studs, and then put the guideplates on. If the rocker studs break into the intake ports, use Teflon tape on the threads. With everything installed, torque the rocker arm studs to 55 ft.-lbs. Place the rocker arms on the studs and verify that they are centered side to side.
- Adjust the valvetrain according to the camshaft manufacturer's recommendations. If you are using a hydraulic camshaft and no specifications are available, turn the rocker arm adjusting nuts $\frac{1}{2}$ to $\frac{3}{4}$ of a turn past zero lash. For mechanical camshafts, you must use the correct lash specification determined by the camshaft manufacturer.
- Use the following adjustment order for all types of camshafts:
 - Following the proper firing order for your engine, turn the crankshaft until the first cylinder listed in the firing order is at TDC on the compression stroke. Both valves will be in the closed position.
 - Adjust the valves as described, then rotate the crank exactly $\frac{1}{4}$ turn and repeat for the next cylinder in the firing order.
 - After the valvetrain for all the cylinders has been adjusted, set the #1 piston at TDC on the compression stroke for the rest of the reassembly.

6) 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. Be sure to seal your intake manifold bolts with a thread sealer to avoid any coolant seepage.

7) Pre-lubing the Valvetrain

- Use an oil pump primer to pre-lube the valvetrain.
- Lubricate your valvetrain with motor oil. An excessive amount is not necessary; just enough to lubricate each moving part.
- 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.

8) 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.
- After the engine has cooled down, remove your valve covers. Now you can cold re-torque your head studs as explained at the end of Step 4.

Specifications

Head Material: A-356-T61 Aluminum

Comb. Chamber volume: 01/02/03/04: 74cc
C01: 78cc CNC-profiled

Intake port volume: 01/02/03/04: 290cc Fast As Cast
C01: 325cc CNC Competition Ported

Intake port dimensions: 1.960" x 2.210"
2.030" x 2.540" (C01)

Intake port location: Stock

Intake valve diameter: 01/02/03/04: 2.200" (TFS-53400211)
C01: 2.250" (TFS-53400213)

Intake valve angles: 15°/5°

Intake valve length: 5.271"

Intake valve stem diameter: 11/32"

Exhaust port volume: 01/02/03/04: 130cc Fast As Cast
C01: 145cc CNC Competition Ported

Exhaust valve diameter: 1.760" (TFS-53400212)

Exhaust valve angles: 15.25°/4.5°

Exhaust valve length: 5.060"

Exhaust valve stem diameter: 11/32"

Valve guide material: Bronze Alloy (TFS-51600252)

Valve seal: Viton® .500" I.D. x .700" O.D. (TFS-51400454)

Valve seat intake: Ductile Iron (TFS-53400271)

Valve seat exhaust: Ductile Iron (TFS-53400272)

Valve spring pockets: 1.760"

Valve spring cups: 1.640" OD (TFS-41400434)

Valve Spring ID Locators: 1.460/1.550" (TFS-21400440)

Valve spring retainers: Chromoly 7"x 1.500" O.D. (TFS-51400423)
Chromoly 10"x 1.550" O.D. (TFS-21400425)
Titanium 10° x 1.550" O.D. (TFS-214T0520)
Titanium 10° x 1.625" O.D. (+.050") (TFS-214T0620)

Valve stem locks: 7° machined steel (TFS-51400444)
10° machined steel with lash cap recess (TFS-52400444)

Valve springs: Standard (TFS-16893)
1.460" O.D. dual spring with damper
120 lbs. @ 1.900" installed height
394 lbs. @ 1.175" open
390 lbs. per inch rate
.650" maximum lift

Option 1 (TFS-16094)
1.550" O.D. dual spring with damper
138 lbs. @ 1.950" installed height
430 lbs. @ 1.250" open
420 lbs. per inch rate
.680" maximum lift

Option 2 (TFS-16324)
1.550" O.D. dual spring with damper
215 lbs. @ 1.950" installed height
550 lbs. @ 1.270" open
460 lbs. per inch rate
.680" maximum lift

Option 3 (TFS-16414) (Solid Roller Only)
1.640" O.D. dual spring with damper
250 lbs. @ 2.000" installed height
800 lbs. @ 1.150" open
600 lbs. per inch rate
.850" maximum lift

Guide plates: 3/8" (TFS-53400623)

Push rod length: Longer than stock required,

Rocker studs: ARP 7/16" (TFS-51400614)

Rocker arm type: Stud Mount

Minimum Bore Diameter: 4.360"

Weight each bare: 32 lbs.

Recommended Components

Head gasket: Trick Flow # TFS-53494500-04
Fel Pro #1018

Intake gasket: 01/02/03/04: Fel Pro #1230
C01: TFS-53400921

Exhaust gasket: Fel Pro #1420

Head bolts/studs: ARP # 155-4203 (12pt. studs)
ARP # 155-3603 (12pt. bolts)

Pistons: OEM equivalent

Rocker arms: TFS-53400621 (1.73 Ratio, 7/16" Studs)

Spark plugs: Autolite # 3924

Replacement Cylinder Heads

TFS-5341B001, Bare, each

TFS-5341B000-C01, Bare, each

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Ultimate Bolt-On Performance® Lifetime Warranty

Trick Flow Specialties guarantees original, unmodified cylinder head castings against manufacturing defects. Trick Flow's liability is limited to replacing the casting.

The valves, valve guides, valve seats, valve job, valve springs, valve spring retainers, valve locks, rocker arm studs, guide plates, 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.

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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