



Power Port® A460 Aluminum Cylinder Heads

Thank you for purchasing Trick Flow Power Port A460 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.

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 the shop manual for your specific application, or take your vehicle to a qualified/certified mechanic
- Remove existing cylinder heads
- Clean and inspect the engine block
- Check header fitment
- Install new cylinder head locating dowels
- Modify and plug coolant holes (hybrid applications)
- Verify the head bolt size for your application
- Check piston to valve clearance
- Check pushrod length
- Purchase the appropriate 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
- (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 (SAE / Metric sockets and combination wrenches)
- 0-100 ft.-lbs. torque wrench
- Vacuum gauge, and spark plug gap tool
- Straightedge
- Torque Wrench Extension (18 Bolt)
- Feeler gauge
- Modeling clay
- Adjustable pushrod (TFS-9000)
- 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
- Intake bolts
- Exhaust bolts
- Moly lube
- Spark plugs
- RTV sealer
- Pushrods
- Rocker arms
- Thread sealer



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.

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 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:

- A) 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.
- B) 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.
- C) 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.
- D) 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".

E) 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.

F) 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 the Power Port® A460 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. For the 18 bolt head, use the same four stages, but follow the sequence in Figure 2.

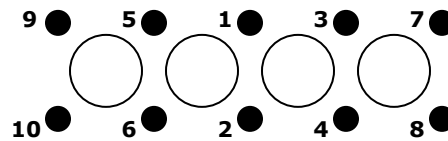


Figure 1

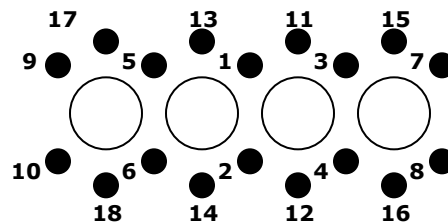


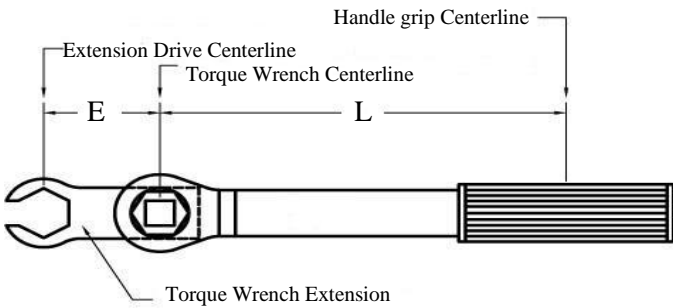
Figure 2

- Stage One:** 30 ft.-lbs. on all headbolts
Stage Two: 75 ft.-lbs. 9/16"; 50 ft./lbs. 7/16"
Stage Three: 105 ft.-lbs. 9/16"
Stage Four: 135 ft.-lbs. on #1 through #10

To torque head bolts 12, 14, 16 and 18, a torque wrench extension or crow foot will need to be used. In order to compensate for the added length in your torque wrench, the following equation will need to be completed to determine the corrected torque value.

$$T(L)/E+L=Y$$

T = Torque Value (65 ft./lbs.)
 Y = Corrected Torque Value (Unknown)
 L = Length of your torque wrench (Wrench Drive Centerline to the Handle grip Centerline)
 E = Extension Length (Wrench Drive Centerline to the Extension Drive Centerline)



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. 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. See Figure 2.

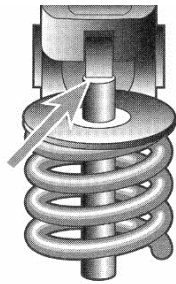


Figure 2

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 1/2 to 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:

- A) 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.
- B) Adjust the valves as described, then rotate the crank exactly 1/4 turn and repeat for the next cylinder in the firing order.
- C) 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.

Firing Order: 1-5-4-2-6-3-7-8

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

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.

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.

Airflow Results PowerPort A460 340 with Standard Bolt Pattern		
Lift Value	Intake Flow CFM	Exhaust Flow CFM
.100"	76	67
.200"	160	120
.300"	246	162
.400"	312	204
.500"	357	237
.600"	392	264
.700"	418	286
.800"	428	303

Tests conducted at 28" of water (pressure).
 Bore size: 4.500"; intake valve: 2.350"; exhaust with 2" pipe.
 To view more airflow charts, go to TrickFlow.com and type the part number you want to see into the Search box and then click "Search."

Airflow Results PowerPort A460 360		
Lift Value	Intake Flow CFM	Exhaust Flow CFM
.100"	79	71
.200"	162	129
.300"	244	175
.400"	308	216
.500"	369	251
.600"	410	280
.700"	437	304
.800"	453	321

Tests conducted at 28" of water (pressure).
 Bore size: 4.600"; intake valve: 2.400"; exhaust with 2" pipe.
 To view more airflow charts, go to TrickFlow.com and type the part number you want to see into the Search box and then click "Search."

Replacement Cylinder Heads

TFS-5441B001-M83, Bare Cylinder Head, Aluminum, 83cc CNC Chamber, 340cc Intake Runner, each

TFS-5441B001-M87, Bare Cylinder Head, Aluminum, 87cc CNC Chamber, 340cc Intake Runner, each

TFS-5451B000-M83, Cylinder Heads, 18 Bolt, Aluminum, 83cc CNC Chamber, 340cc Intake Runner, each

TFS-5451B000-M87, Cylinder Heads, 18 Bolt, Aluminum, 87cc CNC Chamber, 340cc Intake Runner, each

TFS-5451B000-C03, Cylinder Heads, 18 Bolt, Aluminum, 85cc CNC Chamber, 360cc Intake Runner, each

TFS-5451B000-C04, Cylinder Heads, 18 Bolt, Aluminum, 87cc CNC Chamber, 360cc Intake Runner, each

TFS-5451B001-C03, Cylinder Heads, 18 Bolt, Aluminum, 85cc CNC Chamber, 360cc Intake Runner, 5/16" Intake Valves, each

TFS-5451B001-C04, Cylinder Heads, 18 Bolt, Aluminum, 87cc CNC Chamber, 360cc Intake Runner, 5/16" Intake Valves, each

Specifications

Head Material: A-356-T61 Aluminum

Comb. Chamber volume: 83cc (M83), 85cc (C03), 87cc (M87, C04)

Intake port volume: 340cc (M83, M87) (Fast-As-Cast)
360cc (C03, C04) (CNC Competition Ported)

Intake port shape: Rectangular

Intake port location: Raised 1.000" from stock

Intake valve diameter: 2.300" (TFS-54400211)
2.350" (18-bolt) (TFS-54400210)
2.400" (5/16" Stem) (TFS-54503211)ⁱ
2.400" (Titanium) (TFS-5450T211)

Intake valve stem diameter: 11/32", 5/16" (TFS-54503211)

Exhaust port volume: 172cc (Fast-As-Cast)
180cc (CNC Competition Ported)

Exhaust valve diameter: 1.880" (M83/M87) (TFS-54400212)
1.880" (C03/C04) (TFS-54403212)

Exhaust valve stem diameter: 11/32"

Valve guide material: Bronze Alloy

Valve guide length: 2.20" (Intake) 2.45" (Exhaust)

Valve seal: Viton® Fluoroelastomerⁱⁱ

Valve seat intake: Ductile Iron; 2.507"x 2.050"x .375"

Valve seat exhaust: Ductile Iron; 2.000"x 1.600"x .375"

Valve spring pockets: 1.760"

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

Valve spring retainers:

Titanium 10° x 1.625" O.D. (M83/M87)(TFS-214T0620)
Titanium 10° x 1.625" O.D. (C03/C04)(TFS-214T0650)

Valve stem locks:

10° machined steel (M83/M87)(TFS-52400444)
10° machined steel bead lock (C03/C04)(TFS-52400444,5)

Guide plates: 3/8" (TFS-54400623)

7/16" (TFS-54400624)

Valve springs: 340cc (TFS-16414)

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

Valve springs: 360cc (TFS-16948)

1.645" O.D. triple spring with damper
332 lbs. @ 2.100" installed height
950 lbs. @ 1.200" open
688 lbs. per inch rate
.850" maximum lift

Push rod length: Longer than stock required,

Rocker studs: 7/16"

Intake: 3.07" OAL (TFS-B54400614)

Exhaust: 3.55" OAL (TFS-B54400615)

Weight each bare: 36 lbs.

Recommended Components

Head gasket: TFS-53494500-040 (4.500" Bore)
TFS-53494670-040 (4.670" Bore)
TFS-54594600-045 (18 Bolt, 4.600" Bore)

Intake gasket: TFS-2706 (1/16")

Exhaust gasket: Fel Pro #1412

Head bolts/studs: TFS-54504304 (12pt. Nuts)
TFS-54504304A (18-Bolt Conversion kit)

Pistons: A460 Cylinder Head Specific

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

Stud Girdles: TFS-54400700 (7/16" stud)

Spark plugs: Autolite # 3924

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.

Trick Flow Specialties®, Trick Flow®, TFS® and Twisted Wedge® are trademarks of Trick Flow Specialties, registered U.S. Pat. Off. Twisted Wedge heads are patent pending.

Trick Flow Specialties

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Web: Trickflow.com

ⁱ This lightweight intake valve has been optimized for naturally aspirated engines only. Titanium valves are highly recommended for any forced induction applications.

ⁱⁱ Viton® is a registered trademark of DuPont Performance Elastomers.