Installation Instructions

Small Block Chevy Aluminum Cylinder Heads

ATTN: PLEASE READ THROUGH ALL INSTRUCTIONS BEFORE ATTEMPTING CYLINDER HEAD INSTALLATION.

SPRINGS:

It is the customers responsibility to check and make sure that spring pressures are correct for his Cam

VALVE GUIDE CLEARANCE:

Intake & Exhaust guide clearances are .00125. On some severe applications with heavy nitrous, marine or blower usage, looser guides might be required, looser guides isn't an option AFR offers.

IMPORTANT:

Apply anti-seize to all bolts and spark plugs to ensure a long thread life.

WARNING

Piston dome to cylinder head clearance must be checked prior to final assembly of engine.

VALVE TIPS:

Do not grind your valve tips. Some AFR heads have harden stellite tips which cannot be re-ground. If groud the tip will mushroom over causing severe damage. If your valve tips are magnetic you can grind a maximum of .015 from the tip.

CLEANING:

AFR thoroughly cleaned your cylinder heads prior to shipment. Your heads were washed in water soluble chemical agitation tank and blown out with high pressure air 3 to 4 times before they were boxed. However during some machining operations chips are packed and wedged into the water jacketing and occasionally come loose in transit. Keep in mind one chip the size of a dime breaks into hundreds of tiny chips and makes the situation appear much worse than it is in reality. It is not usually if you blow high pressure air into the water jacketing to see additional foreign debris, or chips finding their way out. AFR recommends that you thoroughly blow out your heads prior to installation.

1) ROCKER STUDS ARE INSTALLED FOR SHIPPING PURPOSES ONLY! THESE STUDS MUST BE SEALED AND TORQUED DOWN BEFORE RUNNING ENGINE

2) HEAD GASKETS:

Fel Pro #1003 for all aluminum heads up to 4.100 bore. Fel Pro #1034 should used for 4.100 or larger bore. Applications requiring steam holes should use Fel Pro #1014. Late Model LT-1 reverse cool applications use GM gaskets or Fel-Pro #1074. AFR has removed the cooling passage between cylinders 1 & 3 and 5 & 7 to increase strength of the casting, do not drill these areas out in an attempt to find water jacketing.

3) INTAKE GASKETS:

Important: Do not port match you intake manifold to these below gaskets, as they do not exactly fit AFR cylinder heads. AFR #6820 or Fel Pro #1206 standard gaskets should be used for 210 & 227 heads. Fel Pro #1205 gaskets should be used on the 195cc heads, excluding the 195cc competition package which should run Fel-Pro #1206. Raised runner 215 heads use Fel-Pro #1263. This gasket is a trim to fit style. We recomend AFR #6817 Fel-Pro #1256 for 180cc heads. A small amount of silicone is recommended around the water ports and on the bottom of the intake ports. For late model 180cc LT-1 reverse cool applications use GM gaskets or Fel-Pro #1284, for AFR 195, 210, and 227cc LT-4 use AFR #6860. On some applications it is advisable to eliminate the cork end gaskets and use a bead of silicone instead. Do not port match your intake manifold to these gaskets!!!!

4) EXHAUST GASKETS:

Fel Pro #1404 exhaust gaskets should be used on all street heads (180 & 195). With minor trimming Fel Pro #1406 may be used on the 210 & 227 standard exhaust heads. For spread ports #1409 should be used. Do not under any circumstances port match exhaust ports to match gaskets. Reverse cool applications use GM gaskets only.

5) VALVE COVER GASKETS:

Fel-Pro #1604 double thick cork with steel core is recommended.

6) HEAD BOLTS & WASHERS:

Quality relief ground bolts or studs are preferable. You must use a washer between the head and the fastener to prevent galling.

7) HEAD BOLT TORQUE:

All aluminum cylinder heads should be torqued to 65-70 ft/lbs. This should be done in the proper General Motors sequence in 10 ft/lbs increments beginning at 40 ft/lbs. Moly lube should be applied between fasteners, washers and areas around head bolt to prevent galling and improper torque values. All high compression, supercharged, turbocharged & nitrous motors should receive a retorque after the first run-in and complete cool down. Bolts containing a 12 point head are suggested in 3 areas on each head near the exhaust valve springs where it may be difficult to fit a standard 5/8 hex head socket. In case of head studs, use 12 point nuts. Airflow Research stocks complete and partial head bolt kits, studs and washers for your convenience. Proper ARP #'s for head bolt kit use #134-3701 and head stud kit use #234-4301. Sealer should be applied to all threaded areas that enter into the block water jacketing, Permatex is a good general purpose sealer.

8) ROCKER STUD LOCATION:

Airflow Research cylinder heads feature two rocker arm stud locations, standard G.M. and an offset (for maximum intake port volume). The 180, 195, & 210 heads all use the standard G.M. L98 stud location. The 227 heads use the offset location which will require a matching stud girdle. Airflow Research stocks both standard and offset girdles and adjusting nuts for your convenience.

9) GUIDE PLATES:

USE ONLY THE GUIDE PLATES SUPPLIED BY AIRFLOW RESEARCH! Push rod guide plates are furnished with each set of AFR aluminum cylinder heads and installed correctly as shipped. Studs should be torqued to 60 ft/lbs. Silicone sealer is recommended on applications where the stud hole intersects the intake port. The 180, 195, & 210 heads require the AFR logo and P/N to face up. The 227 heads require the long slot to straddle the intake pushrod. For proper alignment of the rocker arm over the center of the valve, simply loosen the rocker studs and shift the guide plate back and forth until proper alignment is achieved, then torque to 60 ft/lbs.

***IMPORTANT* 5/16 THICK WALL CHROME MOLY HEAT TREATED PUSH RODS SHOULD BE USED TO AVOID WEAR OF THE PUSH ROD FROM CONTACT WITH THE GUIDE PLATE. IF USING A TALL LIFTER/SHORT PUSHROD (6.150 O.L.) COMBINATION THE 227 WILL REQUIRE SOME**

CLEARANCING NEAR THE HEAD DECK SURFACE. DO NOT CLEARANCE ANY HIGHER THAN NEEDED OR YOU'LL BREAK INTO THE INTAKE PORT.

10) ROCKER ARMS:

The Airflow Research 180, 195, & 210 aluminum cylinder heads are designed to use standard push rod location rocker arms. (Offset rockers are not required). For AFR 227cc, some applications require shaft mount rockers or .050 offset rocker arms for durability and reliability of valve train. Clearance between rocker arms and the retainers should be checked. For high RPM stability, the Jessel or T & D shaft systems are recommended. AFR stocks a complete line of standard and shaft rocker arms for your convenience. AFR suggests for the 227cc you use a shaft moutn rocker and offset lifters or at a minimum .050 offset intake rockers. If you are using Comp. Cams 3/8 Pro Magnum rocker arms you will need to use a longer stud (AFR #6409) because of the thicker trunion on this rocker arm.

IMPORTANT NOTE; DO NOT USE LATE MODEL ROCKER ARMS CONTAINING SIDE RAILS AS THEY WILL CONFLICT WITH THE AFR GUIDE PLATE.

11) VALVE SEATS:

Both intake and exhaust valve seals are heat treated and compatible with unleaded fuels.

12) SPARK PLUGS:

(14mm x 3/4" gasket) no tapered seat style. For race applications Champion C59YC Autolite 3910 or 51, A/C R41 CXLS & NGK R5672A-9 is a good starting point. For street applications use AC FR3LS, AC 41629, or Champion RC9YC spark plugs or equivalent. Plug selection is of course dictated by many factors including rpm level, compression ratio and type of fuel. All the above plugs are a starting heat range, blowers or nitrous application usually 1 to 2 heat ranges colder. Spark plug gap should be determined by the ignition manufacturer.

13) 400 BLOCKS:

Steam holes are recommended for all 400 block applications. Use a 400 gasket as a template and drill the three holes nearest the spark plug side of the head straight down, the other three which are very near the head bolt holes should be drilled at a 30 degree angle away from the bolt hole. The center hole will intersect water about 1"

down and the two outboard holes to a depth of 2 1/4". Use a 1/8 drill.

COMPRESSION RATIO AND PISTON TO VALVE CLEARANCE MUST CHECKED BEFORE FINAL ASSEMBLY

14) COOLANT:

It is important to maintain a 50/50 mix of antifreeze in the cooling system to prevent corrosion of aluminum heads. Don't use tap water use distilled water, most supermarkets have purified or distilled water. Check labeling to verify purified through deionization.

15) AIR CONDITIONING & ALTERNATOR BRACKETS:

Late model vehicles with one piece brackets that bolts to the block and cylinder heads, may find it necessary to elongate the holes in the brackets to obtain proper hole alignment. Severe production variances from the O.E.M. as well as block and cylinder head milling will all affect this relationship.

16) PORTING INSTRUCTIONS:

Polishing ports will not improve performance. The center head bolt hole and push rod cross section in intake ports are very thin/maximized from AFR.

17) TORQUING:

We suggest not using a torque wrench on intake and exhaust manifold bolts, accessory bolts, or spark plugs. Inaccurate torque wrench values can easily strip the smaller threads. Just snug up hand tight with a wrench only.

18) INTAKE MANIFOLD FIT:

Pre-Eliminator (2006 and before) AFR 227s have extra material on the intake interface of the heads. This raises the intake manifold approximately 3/16" higher than normal. Make sure that your oil pump rod properly engages the oil pump and that your cam and distributor gear alignment is correct. Also a large gap might be present between the end rails of the block, AFR sells spacers to remedy this.

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