

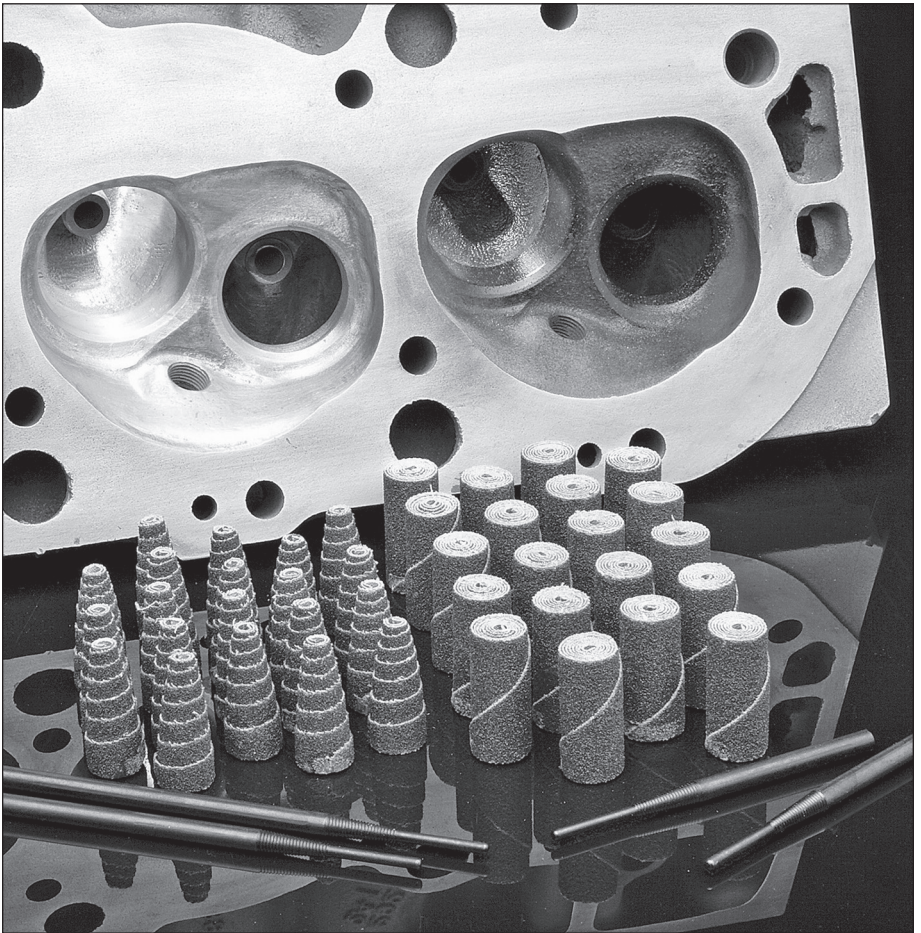
Eastwood[®]

DO THE JOB RIGHT.[®]

Item #46056

CYLINDER HEAD PORTING KIT

INSTRUCTIONS



This **EASTWOOD CYLINDER HEAD PORTING KIT** is designed to allow port-matching on cylinder heads, intake and exhaust manifolds. Also great for light smoothing and polishing of intake and exhaust ports of cylinder heads all with the use of a recommended Rockwood #31825, 1/4" Die Grinder or equivalent (Not Included). For providing more efficient flow of existing engine configurations-not intended for heavy modification or reshaping of combustion chambers and ports.

▲ NOTICE

For heavier material removal such as reshaping ports and valve guide bosses, use Eastwood #46028 Carbide Burrs.

CONTENTS

- (20) Eastwood #13090A - 80-Grit Tapered Abrasive Rolls
- (20) Eastwood #13091A - 80-Grit Cylindrical Abrasive Rolls
- (2) Eastwood #13142 - 4" x 1/4" Shank Mandrels
- (2) Eastwood #13141 - 6" x 1/4" Shank Mandrels

SPECIFICATIONS

Maximum RPM: 22,000

ITEMS REQUIRED

- 22,000 Maximum RPM Die Grinder (Rockwood #31825 or equivalent)
- Eastwood # #10041Z PRE or acetone
- Eastwood #14752Z, CRC Blue Layout Fluid or equivalent
- A good quality Carbide Metal Scribe (available in Eastwood #20257 Metal Layout Kit)
- Removable gasket adhesive
- A high-quality, engine top-end gasket set (intake manifold, cylinder head, exhaust manifold and carburetor or FI)
- Several bolts of a shorter length (1/2"-1") but of the same thread as those used to attach the intake and exhaust manifold to the cylinder head ports
- Washers for the above bolts

SAFETY INFORMATION

The following explanations are displayed in this manual, on the labeling, and on all other information provided with this product:

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ NOTICE

NOTICE is used to address practices not related to personal injury.



⚠ READ INSTRUCTIONS

- Thoroughly read and understand these product instructions before using this tool. Failure to follow all warnings can result in tool damage or serious physical injury.
- Keep these product instructions for future reference.



⚠ WARNING HEALTH HAZARD!

- Dust and fine particles are generated while grinding which can contain hazardous or toxic substances. Breathing this dust can cause many serious respiratory health conditions. Always use NIOSH approved respiratory protection while using this product.



⚠ WARNING EYE INJURY HAZARD!

- Rapidly rotating abrasive surfaces will eject metal particles and dust at high velocity. Always wear ANSI approved eye protection when operating this product.



⚠ WARNING HEARING DAMAGE HAZARD!

- The Eastwood Abrasive Rolls emit elevated sound levels while operating. Use ANSI approved ear protection when operating this product.

SAFETY INFORMATION



⚠ CAUTION INJURY HAZARD!

- These Abrasive Rolls have highly abrasive cutting surfaces which can quickly cause severe injury. Keep fingers and hands away when operating. Wear thick, well-fitting work gloves and keep loose clothing, sleeves, cords, jewelry and hair away from moving parts.
- DO NOT exert excess force on Abrasive Rolls and Mandrels while grinding as they can break and suddenly eject sharp pieces at high velocity.
- Always disconnect grinding tool from electrical or air supply when changing Abrasive Rolls and Mandrels to prevent accidental tool starting and potential severe injury.
- These Abrasive Rolls will eject a trail of sparks at high speed which can ignite flammable materials or injure others nearby. Do not operate near flammable materials and keep all persons and pets away from the work area.
- Always hold the grinding tool with open fingers while grinding as it can suddenly kick back causing hand puncture wounds. Wear thick, well-fitting work gloves.
- Always make sure the selected power tool is securely held to avoid sudden movements which could result in injury.
- Frequently inspect Abrasive Roll and Mandrel condition. If damage develops, discontinue tool use immediately and replace damaged Abrasive Roll and Mandrel. ONLY USE replacement Wheels rated at 40,000 RPM or greater. Severe injury can result in the event of Abrasive Roll or Mandrel failure.



⚠ CAUTION VIBRATION HAZARD!

- Use of these Abrasive Rolls will cause vibration during use! Repeated exposure to vibration may cause physical injury.

⚠ NOTICE

- This process requires an in-depth working knowledge of motor vehicle engine operation and repair. Consult an approved repair manual specific to the subject engine manufacturer for all disassembly, repair and safety procedures.

TIPS FOR OPTIMAL PORTING

Internal combustion engines are complex air pumps that pull in an air/fuel mixture, compress it, ignite it, react to the ignition with explosive force then expel exhaust gasses. The better an engine pumps air, the more efficiently it will operate. This is the main reason there has been a great increase in the production of overhead cam, multi-valve per cylinder engines over the years. More valves mean more air moving through the engine. More air means greater efficiency, producing both more power and better fuel economy.

When an engine is “Ported”, casting imperfections, mis-matching, and restriction between the intake manifold, combustion chamber and exhaust manifold are removed or minimized and therefore, will increase airflow. This is done by:

- “Smoothing” (or grinding) the passages in the intake and exhaust manifold so that they are the same size as the gaskets and cylinder head ports.
- Removing “rough cast” or “flash” imperfections in the “air passages” of cylinder heads, intake and exhaust manifolds.

PREPARATION FOR PORTING

Before any porting work can begin, the intake and exhaust manifolds then the cylinder head(s) must be removed from the engine. Consult an approved repair manual specific to the subject engine manufacturer for all disassembly, repair, and safety procedures. Also, following the same manual, the cylinder head(s) will need to be disassembled with all valve train components removed.

Inspect the cylinder head casting(s) for any cracks, warpage, or other damage. If in doubt, they should be inspected at a reputable engine machine shop.

Never attempt to grind out cracks in the castings. Warped or damaged cylinder heads or manifolds should never be re-installed.

Parts to be ground must also be very clean. Remove all carbon from combustion chambers and exhaust ports. “Hot Tanking” is strongly recommended and is a service that can be performed at most well-equipped engine machine shops. Attempting to do porting work on a uncleaned castings will make it virtually impossible to do an accurate porting job and it will greatly reduce the useful life of the Abrasive Rolls.

GASKET-MATCHING THE PORTS

CYLINDER HEAD INTAKE OR EXHAUST PORTS TO THE INTAKE OR EXHAUST MANIFOLD LAYOUT

This method assures that the contours of the cylinder head intake and exhaust ports match perfectly to the intake and exhaust port openings.

- Thoroughly clean and degrease the cylinder head gasket-mating surfaces with Eastwood #10041Z PRE or acetone.
- Coat the manifold gasket areas with Eastwood #14752Z, CRC Blue Layout Fluid or equivalent. This will make the scribe lines made later, easy to see.
- Place a new intake or exhaust manifold gasket (the same used for engine assembly) in position.
- Add some removable gasket adhesive to “tack” the gasket in place and secure it by placing washers under the heads threading in shorter bolts the same thread as the correct mount bolts for the component. The idea is to “clamp” the gaskets exactly in place.
- Using the gasket as a template, with the point of the Scribe, trace the outline of the intake or exhaust port holes of the gasket onto the cylinder head.
- Remove the previously used gasket or another one for the if required and do the same for the intake manifold.
- Repeat above steps for engines with multiple cylinder heads.

⚠ NOTICE

It is critical that the gaskets being used as templates be placed in the EXACT location as they would be at engine assembly. If not, the intake ports can be ground incorrectly, and the cylinder head or manifold could be ruined and rendered useless.

GRINDING CYLINDER HEAD INTAKE PORTS, INTAKE AND EXHAUST MANIFOLDS

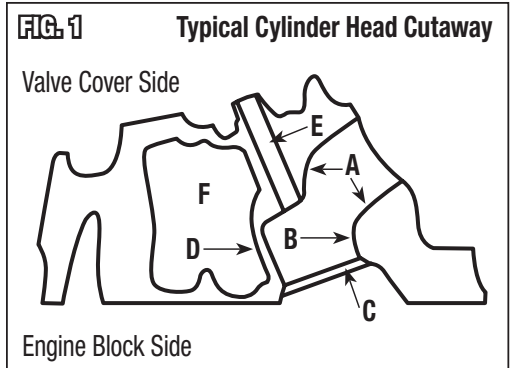
- Attach a Cylindrical Abrasive Roll to a Mandrel (use the 4” length Mandrel for near surface work) by pushing it onto the threads of the Mandrel and twist it on securely.
- Following the Die Grinders’ specific instructions, mount the Mandrel to a maximum 22,000 RPM Die Grinder and grind material from the cylinder head and intake manifold back to the previously scribed gasket trace lines.

PORTING CYLINDER HEADS

After “Gasket Matching” the cylinder heads, remove any rough cast metal or “flash” in the intake and exhaust ports. Do not strive for a “mirror finish” in these areas as an 80 Grit finish has been determined to be ideal for intake ports. Too smooth of a finish will disturb the “turbulence” required for proper fuel atomization.

- Thoroughly clean and degrease the cylinder head port and passage areas with Eastwood #10041Z PRE or acetone.
- Using the 6” Mandrels and Tapered Rolls for deeper work and the smoothing of the rough cast port runners.
- Carefully smooth any casting flash or surface roughness without removing excess metal (**FIG 1**).
- Use extreme care not to damage the features in these areas:

- A. Port Runners
- B. Short Side Radii
- C. Valve Seats
- D. Cylinder Web Walls
- E. Valve Guides
- F. Water Jacket



- Carefully smooth the combustion chambers by smoothing the rough casting areas only!

▲ NOTICE

DO NOT allow the spinning Rolls to contact the valve seats or valve guides or the cylinder head could be permanently ruined! Old valves can be used to help protect valve seats during this step.

- Thoroughly clean the cylinder heads and intake manifold areas with compressed air and Eastwood #10041Z PRE or acetone before putting back into use.

ADDITIONAL ITEMS

- #31825 Rockwood Air Die Grinder
- #46028 Eastwood Tree Shaped Carbide Burr
- #13119 Eastwood Grinder's Grease

If you have any questions about the use of this product, please contact

The Eastwood Technical Assistance Service Department: 800.343.9353 >> email: tech@eastwood.com

PDF version of this manual is available at eastwood.com

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