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- What is Porting or a "Port & Polish" and what does it do?  
A port & polish is a process performed on the engine cylinder head. "Port" refers to the inlet & exhaust ports on either side of the head that channels the fuel/air mix into the combustion chamber and let the exhaust gases escape respectively.

For engines with a modern cylinder head design like Hyundai uses on their engines, porting usually involves a simple cleanup job to remove any burrs and irregularities from the ports. "Casting Shift" is quite noticeable on all Hyundai heads as it seems minimal machining is done to the head after manufacture. Cast shift shows up mainly as two ridges running down either side of the port that vary in size from port to port & head to head. After porting a head, usually some kind of polishing is done to clean up. A "polished" port should not have a mirror finish. This has been shown to be detrimental to flow. A slightly rough surface is best. Apparently the small amount of turbulence created by the port finish "cushions" the rest of the gas flow through the port allowing faster velocities.

For old design engines, porting involves a big enlargement of the actual port diameter and often involves a complete reshaping of particularly the last third of the port closest to the combustion chamber and the valve. When performing this level of work to the cylinder head some kind of "flow bench" is recommended unless you are an absolute expert on the particular head in question. A flow bench simulates gas flow through the head and allows the operator to identify problematic flow characteristics. The flow characteristics vary across the RPM range so often a compromise is the best choice.

Porting should always be accompanied by what is termed "port matching". Port matching is a process that involves matching ports in the exhaust and inlet manifolds to the cylinder head ports and using appropriately sized gaskets. This eliminates the "lip" between the manifold and head that is found in most production engines. This "lip" creates unwanted turbulence in the gas stream and reduces overall velocity. This type of turbulence and slower gas streams generally results in less power.

Expected gains from an otherwise stock engine will only be small. In the range of about 1-5 HP. When used in conjunction with other breathing modifications however, the results are complimentary and additive. In a heavily modified normally aspirated motor (eg: cams, BBTB, exhaust, CAI, AFC etc.), gains with an engine capacity of 2.0L would be in the order of 10-20 HP. Forced induction motors (turbo, blower) don't benefit as much as normally aspirated motors. This is because the nature of forced induction partly overcomes any manifold inefficiencies. It is however advisable considering the cost relative to the price of turbo charging and every bit helps.