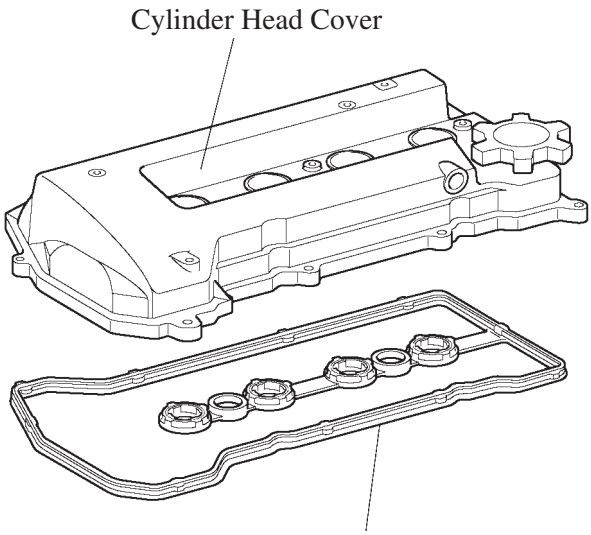
## ■ENGINE PROPER

### 1. Cylinder Head Cover

- Lightweight yet high-strength aluminum die-cast cylinder head cover is used.
- The cylinder head cover gasket and the spark plug gasket have been integrated to reduce the number of parts.
- Acrylic rubber, which excels in heat resistance and reliability, has been adopted for the cylinder head cover gasket.

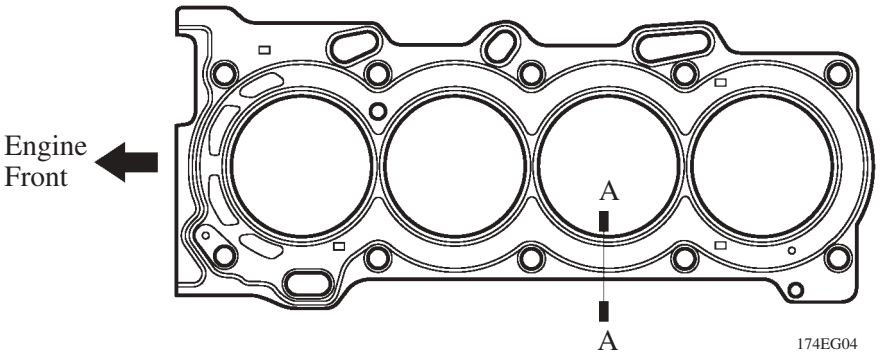



174EG03



### 2. Cylinder Head Gasket

A steel-laminate type cylinder head gasket has been adopted.
A shim has been added around the cylinder bore to increase the sealing surface, thus improving the sealing performance and durability.




174EG04

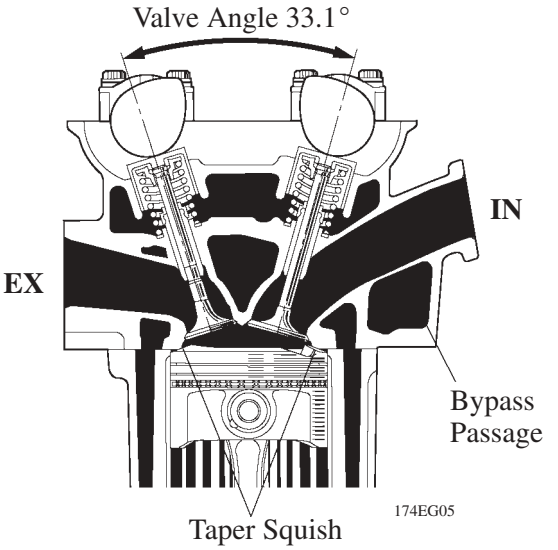


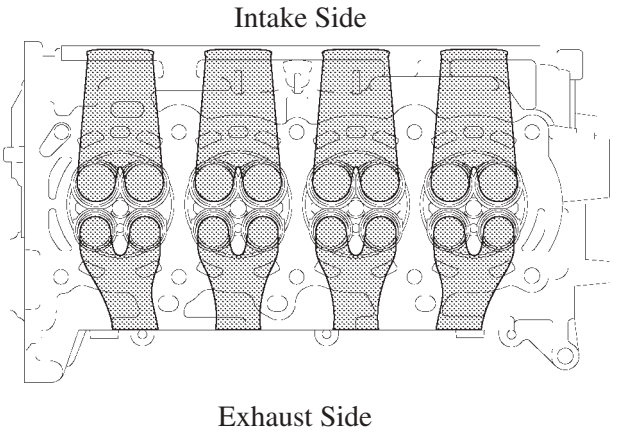

**A – A Cross Section**

148EG32

## 3. Cylinder Head

- Through the adoption of the laser-clad valve seat and the taper squish combustion chamber, the engine's knocking resistane and fuel efficiency have been improved. In addition, the valve diameter has been increased through the adoption of the laser-clad valve seat.
- Upright intake port have been adopted to improve the intake efficiency.
- A compression ratio of 10.0 : 1 has been adopted and the variances in the combustion chamber volume between the cylinders have been minimized to improve the power output.
- The injectors have been installed in the cylinder head to prevent the fuel from adhering onto the intake port walls, thus reducing exhaust emissions.
- The routing of the water jacket in the cylinder head has been optimized to improve the coolilng performance. In addition, a water bypass passage has been provided below the intake ports to reduce the number of parts and to achieve weight reduction.
- The water outlet and the ignition coil bracket have been integrated to reduce the number of parts.
- The angle of the intake and exhaust valves is narrowed and set at 33.1° to permit a compact cylinder head.

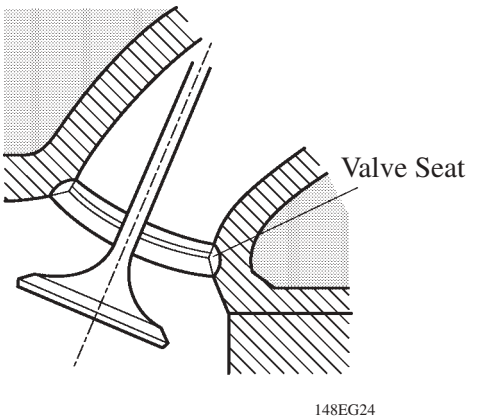


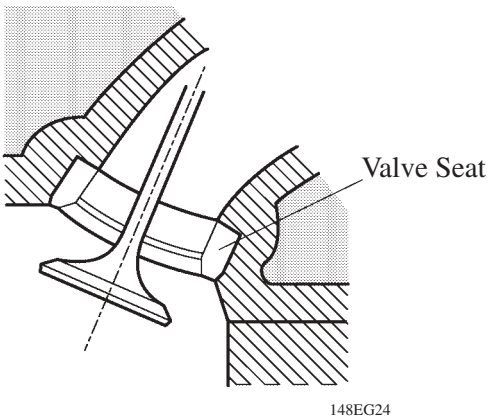

***– REFERENCE –***

*Laser Clad Valve Seat*

Previously, the valve seat consisted of a seat ring pressed into the cylinder head. However, with the laser-clad valve seat, a highly wear-resistant alloy is welded onto the cylinder head, and subsequently machine-cut to form the valve seat.
With this system, the valve seat can be made thinner. As a result, the valve seat diameter has been increased and the cooling performance around the valve seat has been improved.




**Laser Clad Valve Seat**

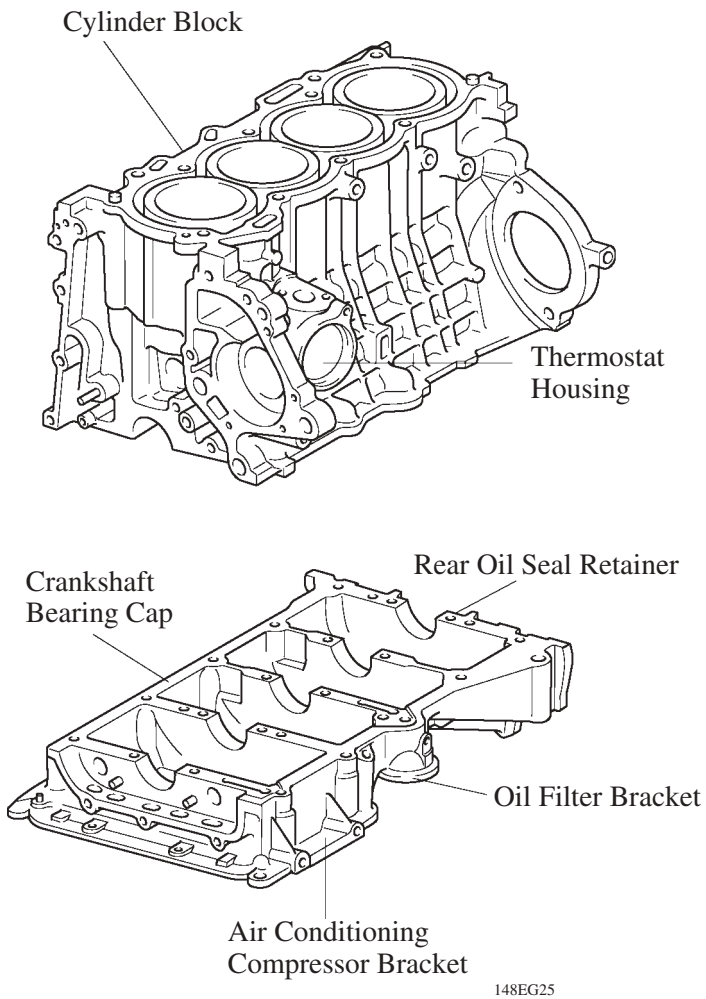



**Shrink Fit Valve Seat**

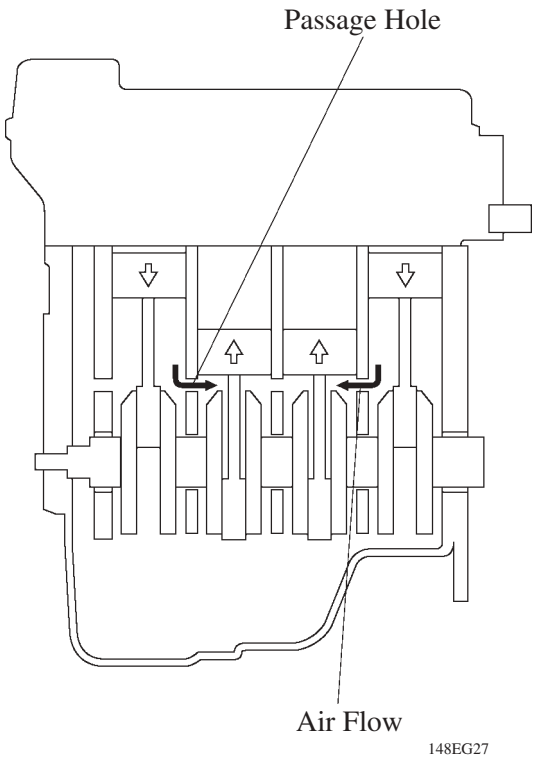
## 4. Cylinder Block

- Lightweight aluminum alloy is used for the cylinder block.
- Thin cast-iron liners are internally chilled inside the cylinder.
- A water pump swirl chamber and an inlet passage to the pump are provided in the cylinder block.
- Passage holes are provided in the crankshaft bearing area of the cylinder block. As a result, the air at the bottom of the cylinder flows smoother, and pumping loss (back pressure at the bottom of the piston generated by the piston's reciprocal movement) is reduced to improve the engine's output.
- The crankshaft bearing caps with ladder-frame construction have been adopted to improve the rigidity, to reduce noise, and to improve the coupling rigidity with the transaxle.
- The crankshaft bearing cap, which consists of cast iron that is internally chilled into the bearing's journal portion, resists heat deformation. In addition, the oil filter bracket, the air conditioning compressor bracket, the thermostat housing and the rear oil seal retainer have been integrated to reduce the number of parts.



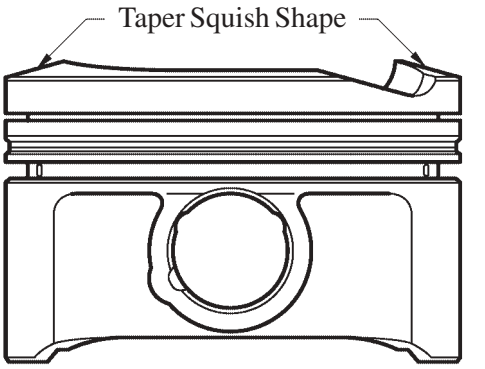



▶ **Air Flow During Engine Revolution** ◀



## 5. Piston

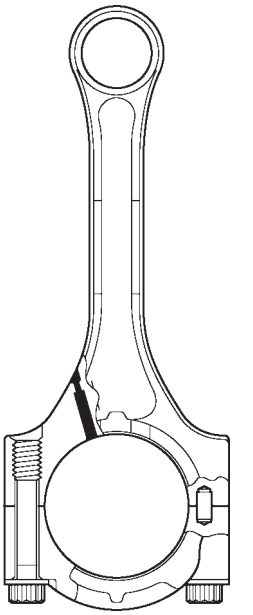
- The piston is made of aluminum alloy and skirt area is made compact and lightweight.
- The piston head portion has adopted a taper squish shape to improve the fuel combustion efficiency.
- Full floating type piston pins are used.




148EG02

## 6. Connecting Rod

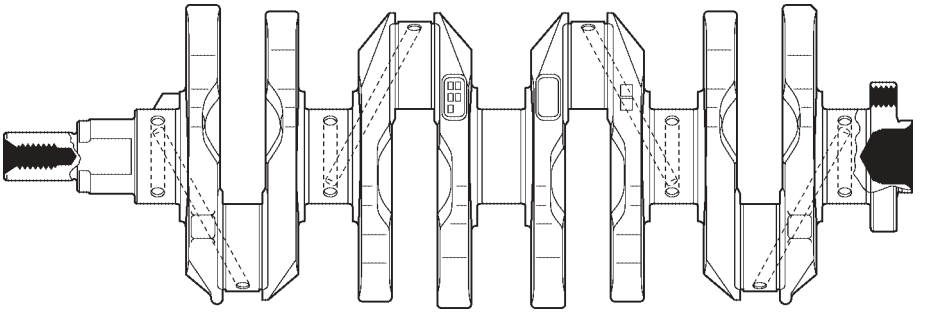
- The connecting rods are made of high-strength material for weight reduction.
- The connecting rod bearings have been reduced in width to reduce friction.



148EG03

## 7. Crankshaft

- The forged crankshaft has 5 journals and 8 balance weights.
- The crankshaft bearings have been reduced in width to reduce friction.
- The precision and surface roughness of the pins and journals have been improved to reduce friction.
- The front and rear overhang of the crankshaft has been reduced in order to reduce the crankshaft's bending vibration.



148EG04