



# FAILURE INFORMATION

## FLANGE SNAP-OFF

### Description of the Failure

The flange of the cylinder liner is snapped off at the bottom with an angle from bottom to top as seen in Figure 1.



Figure 1

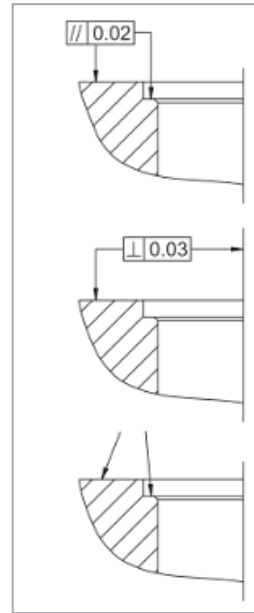


Figure 2

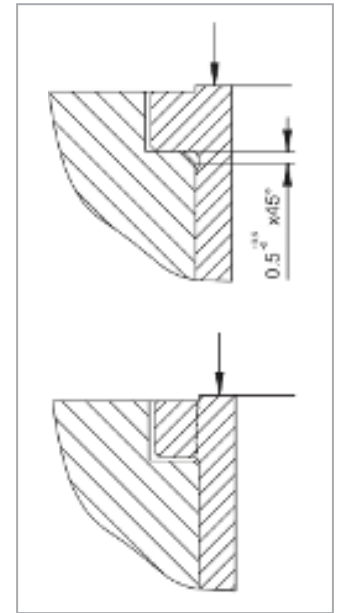


Figure 3

### Causes of the Failure

- One of the most important considerations during assembly of the cylinder block and the cylinder liner is that the seats and the contact surfaces of the flange should be parallel. If the surfaces are not prepared within the given tolerances, the flange is snapped off.
- If there is dirt between the surfaces where the cylinder block and the cylinder liner flange contact each other, force is applied onto the flange upon tightening the cylinder head bolts after assembly of the liner.

- If the cylinder head gaskets recommended by the engine's manufacturer are not used and the sequences and torque values of the cylinder head gaskets are not followed, the cylinder liner flange is snapped off.

- If the height between the surface where the gasket contacts and the cylinder liner flange in the engine block is not appropriate, vibration occurs in the liner with the piston movement due to this gap. The liner flange is snapped off due to the impact of the force caused by the vibration.

### Recommendations

- While performing the assembly, the outer surfaces of the cylinder liner and the surfaces where the liner contacts in the engine block should be cleaned as recommended.
- You should make sure no dirt-burr remains there.
- If the flange seating surfaces are inaccurate, the given measurements should be taken into consideration during correction and there should be a chamfer of 0.5 to 1 mm width under 45° angle at the corners. (Figure 3)
- The importance consideration in assembly of the cylinder liner to the cylinder block is that the contact surfaces of the housing and the flange should be parallel to each other.
- Since it is not possible to observe the changes in

the liner housing visually, necessary tools should be used to carefully check the parallelism.(Figure 2)

- Recommended gaskets should be used.

- The tightening sequence and the torque values should be taken into consideration.

- In order to avoid the oscillation movement of the cylinder liner inside the housing;

1. During rectification of the engine, while processing the cylinder block, adequate number of steel shims should be placed under the cylinder liner flange.

2. Or liners with flanges longer than standard values should be assembled.

The height difference between the block and the top point of the flange should be checked after the liner assembly.

