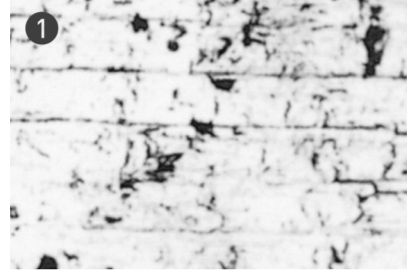


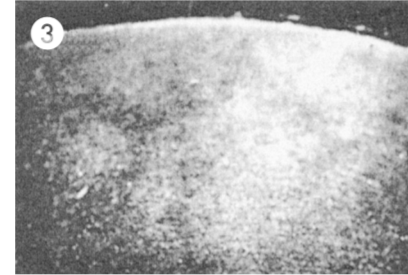
HONING HELPER

1. BORING

- Always torque the main bearing cap into position
- Use correctly sharpened boring tools
- Don't remove too much material. Always leave at least 0.06 mm (0.03 mm per side) for honing



- 1 Screw thread appearance of bored surface
- 2 Rough bored surface showing some "pull cuts"
- 3 Good bored surface, approximately Rz: 18 µm

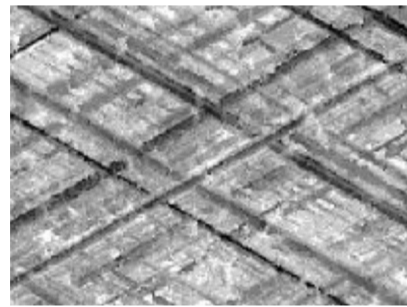


3. FINISH HONING

(WITH NO PLATEAU) - 220 GRIT

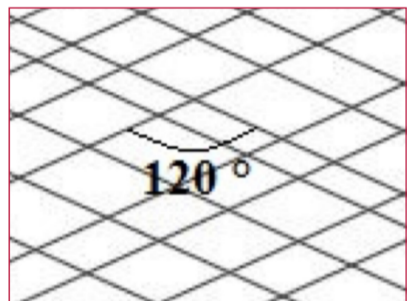
- Hone the bores to finished size with 220 grit stones, removing at least 0.02 mm of bore material
- Keep plenty of clean honing oil flowing
- Keep cross-hatch angle at 120°
- Control bore taper

USE RECOMMENDED STONES AND OILS.



DO NOT:

- Hone with excessive honing pressure
- Hone with emery paper
- Use unsuitable honing stones
- Hone without honing oil



SAMPLE OF HOMMEL TEST CHART

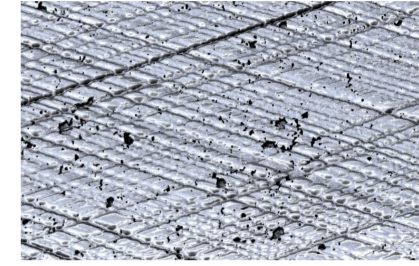


RECOMMENDED VALUES FOR FINE HONING

- Petrol:**
Rz 3-6 µm, Ra 0.6 -1.0 µm
- Diesel:**
Rz 4-8 µm, Ra 0.8-1.2 µm

2. ROUGH HONING

- Rough hone with 70 grit stones
- Remove 0.04 mm material leaving 0.02 mm for finish honing
- Hone to desired cross hatch finish
- Keep plenty of honing oil flowing
- Remove all traces of boring tool marks

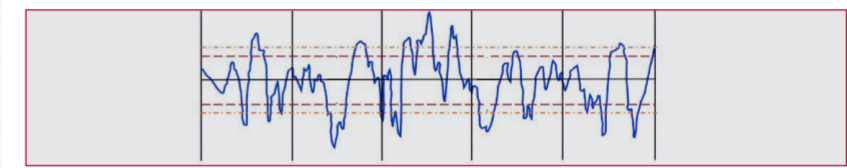


USE RECOMMENDED STONES AND OILS.

DO NOT:

- Rough hone with too smooth grit stones, as smearing of metal will result
- Leave too little metal for removal by honing
- Hone too shallow or too steep a honing angle
- Use blunt or worn honing stones

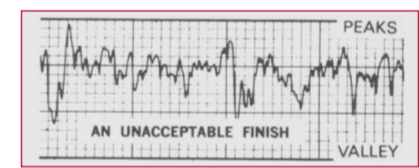
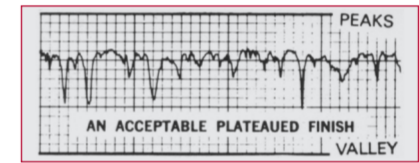
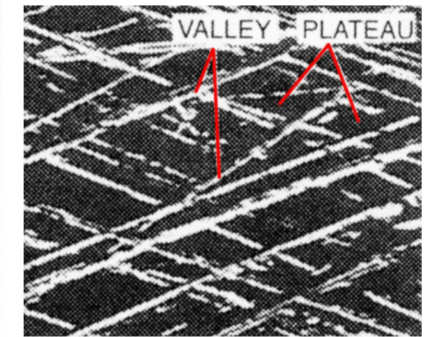
Recommended values for rough honing: Rz: 14.00 µm



4. PLATEAU HONING

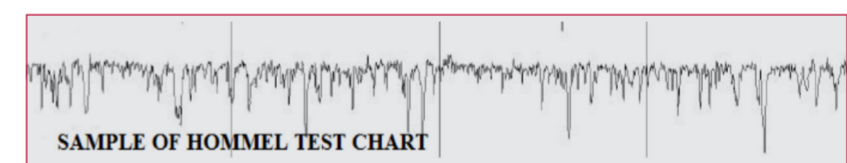
600 GRIT

This final "PLATEAU HONING OPERATION" remove the peaks on the bore surface and provides smooth plateaus on which the rings can bed in and seal quickly. The deeper valleys from the 220 grit honing operation should still be visible after plateau honing. The deeper valleys give the bore surface vital oil retention which reduces rings and piston wear. The plateaus ensure effective oil consumption control through positive ring sealing.



METHOD:

- Apply oil to the cylinder walls before honing
- Plateau hone over the 220 grit honed surface with 600 grit for at least 30 seconds in each bore
- Keep cross-hatch angle at 120°. This can be achieved with the right combination of drill spin speed and stroke speed
- Keep plenty of clean honing oil flowing
- Remove the honing tool all at once while functioning. Avoid to pull out the honing tool dragging the stones against the walls
- Once the operation is done check the bore for a good even pattern
- USE RECOMMENDED STONES, BRUSHES AND OILS



5. CLEANING

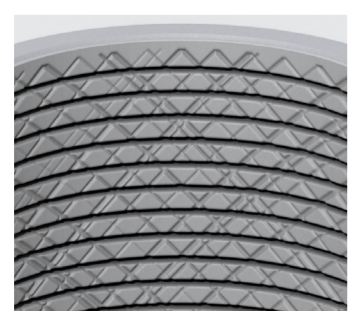
The importance of adequate bore cleaning is often overlooked. This should be done with hot soapy water and a still bristle brush (a toilet brush is ideal) until all dirt and metal particles have been removed. Cleaning with paraffin, solvents, or pressure washers after honing washers is not good enough. Hot soapy water floats out the dirt and metal debris and the brush cleans into the honing valleys. The bore can be considered clean if a white rag remains stain-free when wiped around the cylinder walls. After cleaning, dry the bores and coat with oil. When the engine is assembled, the bores should again be thoroughly cleaned to remove dust and grit which may have accumulated.

6. HONING OILS AND STONES

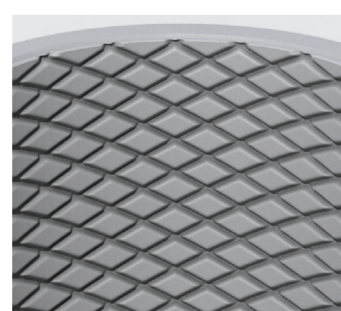
- Use a continuous oil flow. A continuous flow of honing oil is essential to cool the cutting surface, flush away loose debris and keep honing stones sharp and free from clogging
- Use recommended honing oils. A good quality honing oil cause a REACTION during the honing operation which prevents loading of stones, glazing of bores, and intrusions which interfere with surface finish quality and cleanliness of the bore material
- Use filtered honing oil whenever possible. Filtering of the honing oil will remove the grit and metallic debris which would be normally be re-circulated and cause interferences at the cutting surface
- Choose the right honing stones. For a specific material, one type of grain may be recommended for fine finishing and another for stock removal. Also it depends on the shape and size of the work
- Avoid the contact with the cylinder bottom edge. it may shorten the lifetime of the stones

Common causes of high oil consumption and smoking

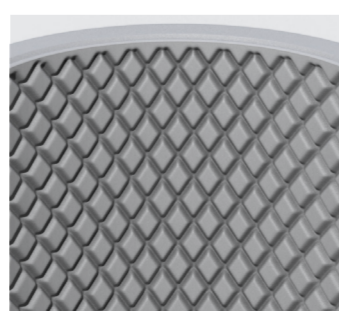
Not enough honing
Not enough material left for honing operation.



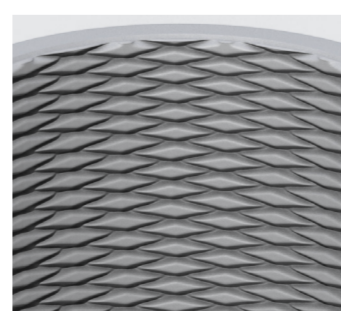
Honing too rough
Stones too coarse. Dirty honing oil. No plateau finish.



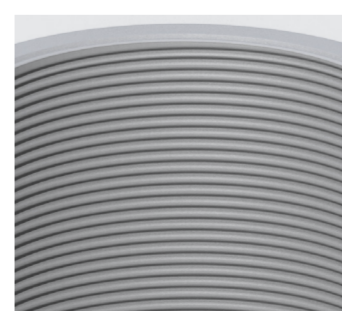
Honing too steep
Honing speed too low. Stroking too fast.



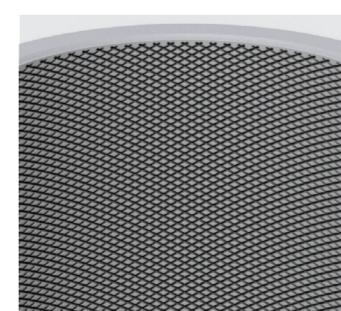
Honing too shallow
Honing speed too high. Stroking too slow.



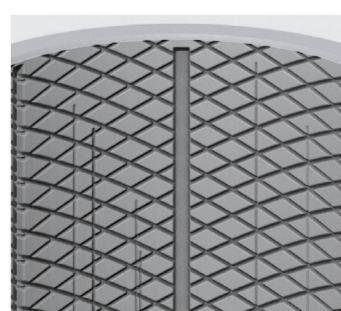
No cross-hatch
Honing speed too high. No stroking.



Honing too fine
Finish honing too long with a stone that is too fine.



Bore surface scratched
Caused by dirty assembly.



ENGINE EXPERTISE

