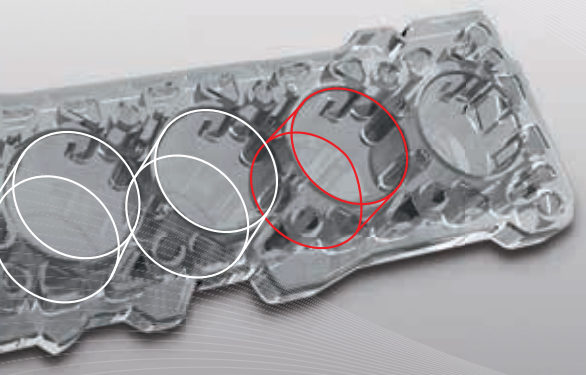
Laser Honing



Rising customer expectations and future exhaust and emission laws place extensive requirements on the oil and fuel consumption of gaseoline and diesel engines. The laser honing developed by Gehring has become an international standard. For both diesel and gaseoline engines, the laser structuring of the cylinder is currently applied in the range of the upper piston reversal point. The combination of laser structuring and honing of cylinder bore surfaces is known as laser honing.

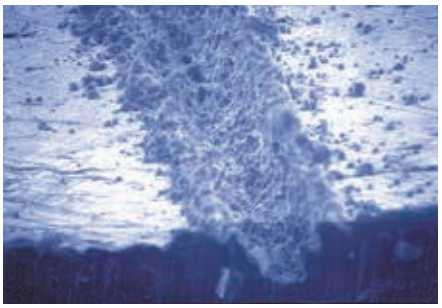
Objective of laser honing

In principle, the frictional forces in the tribological system consiting of piston ring and cylinder bore are to be reduced. As a contribution to the future viability of internal combustion engines, laser honing provides an opportunity to improve exhaust emissions so that the future exhaust limits such as Euro 5 and Euro 6 are easier to achieve.

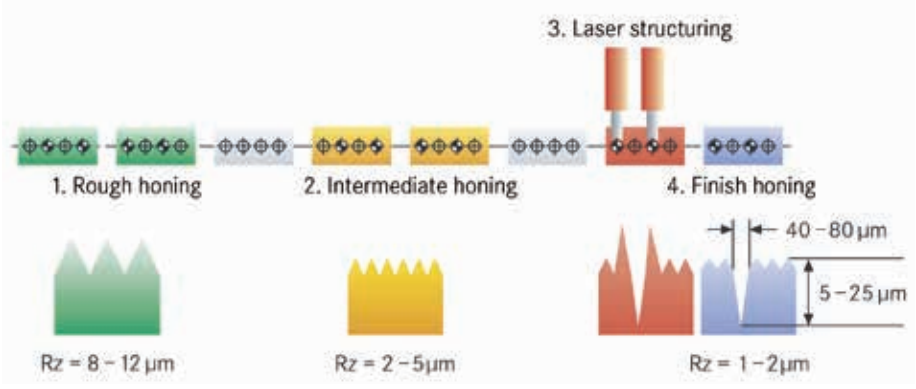
Principles of laser honing

The combined honing and laser structuring of cylinder bore surfaces is considered laser honing. During this process the engine block first undergoes the conventional rough and intermediate honing step in order to achieve the desired base profile for the laser structuring. Microscopic pockets, the enginespecific laser structure, are created into the cylinder bore surface by means of a laser beam. The subsequent final steps, deburring and finish honing, remove the melt protrusions arising from the laser processing to create an extremely fine surface.

Cylinder bore after laser honing



Structure after laser honing



Process sequence for the laser structuring of cylinder bores

Structure after finishing work

Your benefits

The advantages of laser honing have been proven in dynamometer and fleet tests as well as in numerous series applications. Due to the smooth cylinder bore surface and the superimposed micropocket structure the tribological system of piston ring - cylinder bore offers numerous customer advantages:

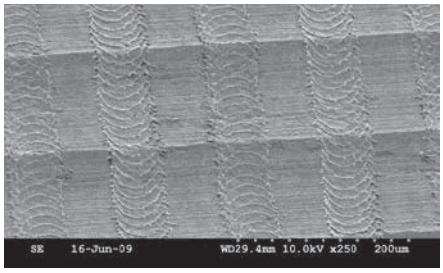
- reduction in oil consumption
- improvement in emissions
- reduction in friction
- reduction in wear

Laser structuring of connecting rod eyes

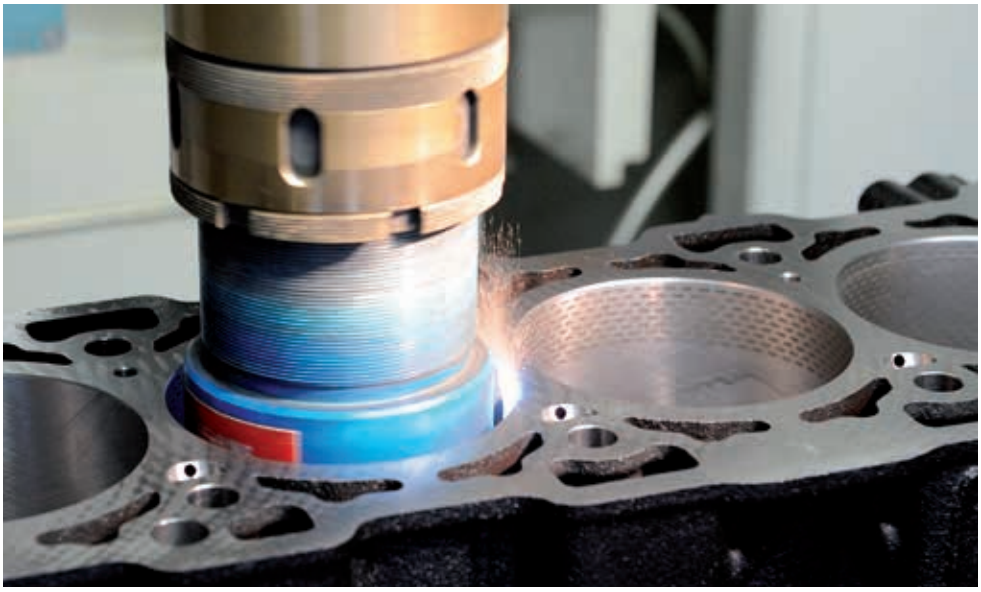
In addition to improving sliding properties, laser structuring can also be used for other areas of application. With connecting rods, for instance, the static friction between the bearing shell and the connecting rod eye needs to be maximized in order to ensure torsional reliability.

Objective of laser structuring

The frictional torque of the connection from the outer surface of the bearing shell and the interior surface of the connecting rod eye needs to be greater than between the inner side of the bearing shell and crank pins of the crankshaft.



Laser structure

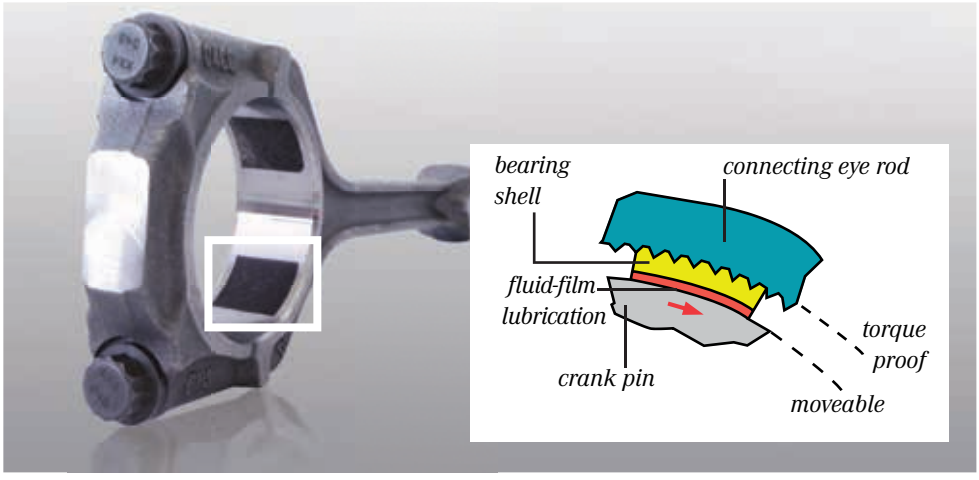


Principles of laser structuring

A connecting rod bearing consists of the large connecting rod eye, the bearing shell and the crank pin of the crankshaft. Whereas the friction between the crank pin and the interior of the bearing shell is minimized, it must be maximized for the torsional reliability on the exterior. A frictional connection is therefore required between the connecting rod eye and bearing shell. After the precision machining (e.g. honing or precision boring) of the connecting rod eye the machined surface is structured with a solid state laser. The torsional reliability of the mounted bearings to be achieved is thus the deciding quality parameter of laser structuring.

Your advantages

- freely selectable, adjustable structuring
- no wear on the tools
- markedly reduced operating costs
- high degree of operational reliability



Structuring on the large connecting rod eye

Trust in the technology leader with many years' experience and global presence!
Innovative technology combined with an economical mindset sets us apart.

Gehring

Gehring L.P. • 24800 Drake Road • Farmington Hills, MI 48335
Phone: +1 (248) 427 3901 • Toll free: +1 (888) 923 9760 • info@gehringlp.com • www.gehringlp.com

www.dege-kommunikation.de 08/2014