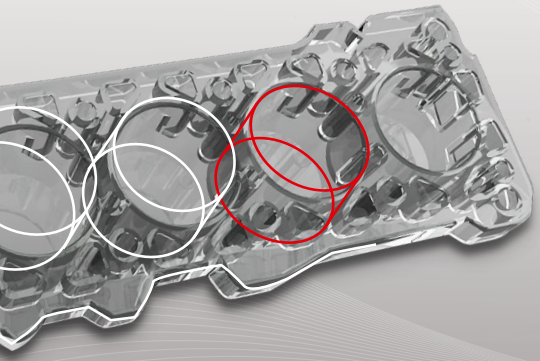
Nano honing®
Roughening – Coating – Honing

Gehring



Thermal spray coatings in cylinder bores of internal combustion engines are the high performance materials of the future. Energy efficient engines with low friction, reduced wear, reduced length and lower weight as well as lower production costs can be achieved as a result of the new process chain for the manufacture of cylinder bores. The process chain includes the following processes:

- Mechanical roughening
- Thermal spray coating
- Overspray jets
- Honing

Objective of Nano honing

The overall result of the application of this process chain is a marked reduction in friction. This factor contributes considerably to lower fuel and oil consumption. The efficiencies achieved with the Nano honing process makes a significant contribution towards ensuring the future viability of the combustion engine by increasing engine efficiency, lowering emissions and extending engine life.

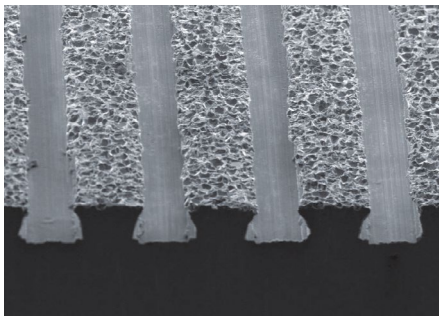
Principle of Nano honing

To achieve a high degree of adhesion when coating, mechanical roughening (pre-treatment) of the surface is necessary. Mechanical roughening is achieved through cutting processes and combined processes consisting of cutting and forming.

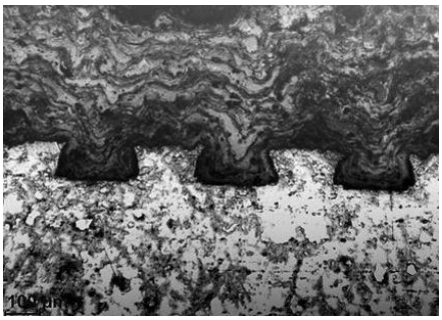
The ensuing thermal spray coating works with an energy rich plasma (RSW method) light arc in which the supply wire is melted and then sprayed onto the cylinder bore.
It creates a hard, wear resistant, ductile and easy to hone cylinder liner coating.

After the thermal spray coating, the overspray jets are applied. The overspray particles are removed by the means of water jets from the casting surfaces below the coated cylinder bore. At the same time, the crankcase is cooled down. Therefore the process chain is ready for serial production.

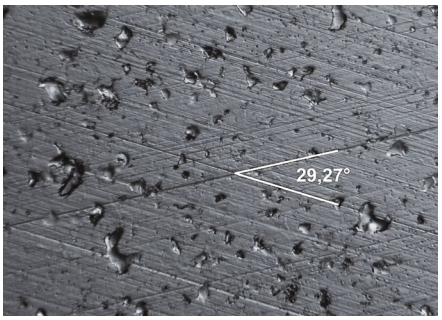
The final honing of the minimized thickness layer consists of rough, semi-finish and finish honing. This creates the needed frictionless surface with a high degree of dimensional and form accuracy in the cylinder liner.



Mechanical roughening of aluminium



Thermal coating of aluminium



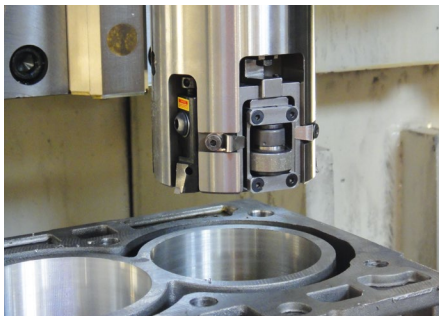
Finished structure after honing

The Sturm Advanced Cylinder Coating System (ACCS) is the efficient and modular solution for producing coated cylinder surfaces in modern crankcases or liners. The thermal spraying process uses a single wire as starting material and allows for a variety of coating properties.

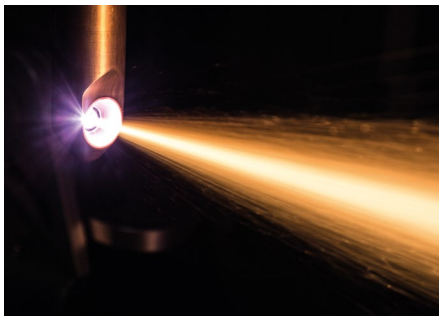
In order to be able to offer the entire process chain „roughening - coating - honing“ Gehring has integrated the ACCS-TWS (Thermal Wire Sprayer) into its technology center. The loading and unloading area of the ACCS-TWS is equipped with the Cylinder Inspector. This enables direct quality control before and after coating as well as an automatic thickness layer adjustment possibility.

In order to further optimize the cylinder shape after the coating process, there is the possibility to exchange the process steps of semi and finish honing with form honing and finishing. The form honing of thermal coatings allows for the holding of cylinder deformations in the internal combustion engine – An operating state is obtained with almost ideal cylindrical geometry, leading to the advantageous effects of reduced CO_2 emissions, reduced oil and fuel consumption, higher performance and wear.

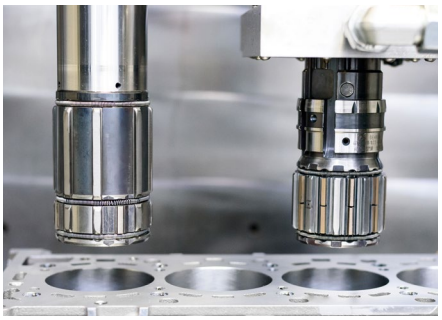
Form honing light of rotationally symmetrical non-cylindrical bores can be easily integrated in conventional machine systems. In addition, we can offer our customers form honing professional which is an innovative technology that allows us to produce freeforms in cylindrical bore shapes.



GRP tool in operation



Overspray jet in operation



Form honing and finishing tool

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

Gehring

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