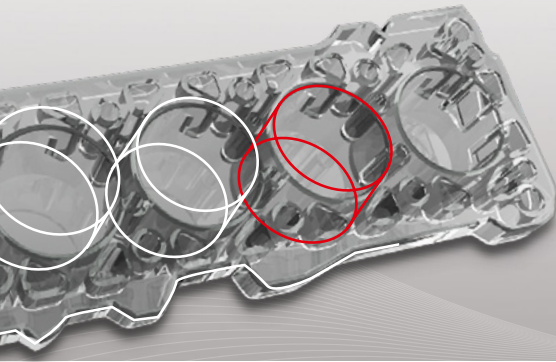


Nanohone®

Roughening – Coating – Honing



Thermal spray coatings are the future of high performance materials in cylinder bores for internal combustion engines.

Energy efficient engines with low friction, reduced wear, length, and reduced weight, including lower production costs, are possible with the new process chain for cylinder bore manufacturing.

The Process Chain Includes:

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

Objectives of Nanohone®:

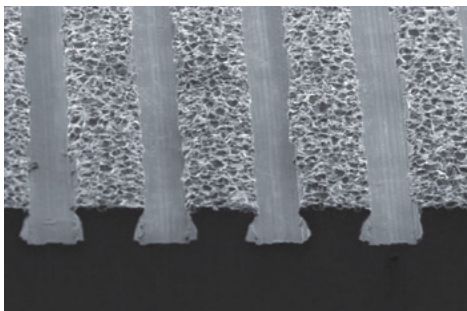
The process chain for the application results in notably reduced friction. This factor significantly contributes to reduced fuel and oil consumption. The efficiencies achieved with Nanohone® contribute directly to the future capabilities of combustion engines, increasing efficiency, lowering emissions and extending the engine's life.

Principles of Nanohone®:

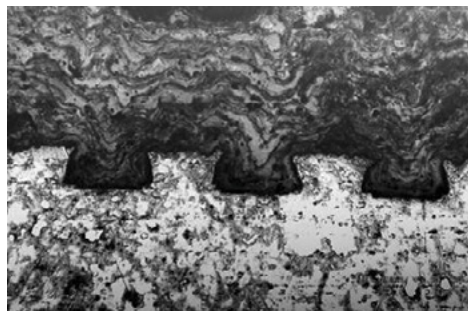
Mechanical roughening (pre-treatment) is necessary to achieve a high degree of adhesion with the surface. This is achieved with the cutting and combined processes consisting of: cutting and forming.

The cutting and forming process ensures the thermal spray coating is compatible with the energy rich plasma (RSW method) light arcs, where the supply wire is melted and then sprayed onto the cylinder bore, creating a hard, wear resistant, ductile and easy to hone cylinder liner coating.

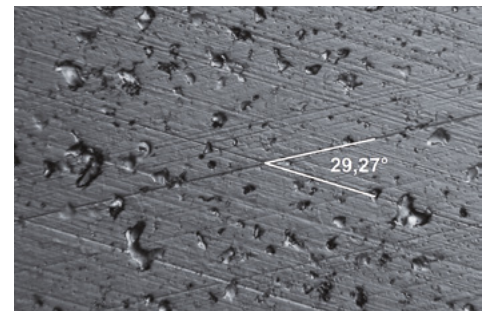
After the thermal spray coating, the overspray jets are applied. The overspray particles are removed by water jets from the casting surfaces below the coated cylinder bore. In parallel, the crankcase is cooled down. The process chain is now ready for production. The final honing step minimizes the layers of thickness, consisting of rough, semi-finish and finished honing. This condition creates the required frictionless surface, with a high level 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 an efficient and modular solution for production of coated cylinder surfaces in crankcases or liners. The thermal spraying process uses a single wire as coating material that allows for a variety of coating properties.

Gehring has integrated the ACCS-TWS (Thermal Wire Sprayer) into its technology center, delivering a complete process chain “Roughening - Coating - Honing.”

The ACCS-TWS’ loading and unloading area is equipped with a Cylinder Inspector. The Cylinder Inspector

guarantees quality control before and after coating, including automatic layer thickness adjustment.

It is feasible to exchange the process steps for semi and finish honing with form honing and finishing to optimize the cylinders’ shape after the coating process.

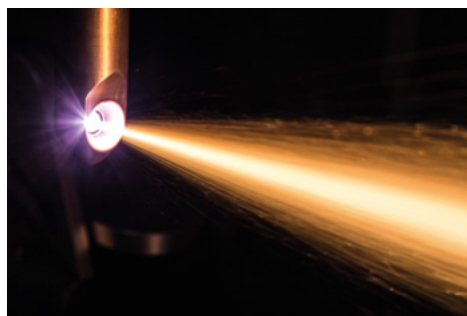
The form honing of thermal coatings allows for the control of cylinder deformations within the internal combustion engine. An operational state, with virtually ideal cylindrical geometry is achieved, promoting reduced CO2 and emissions, lower fuel and oil consumption and higher performance and longevity.

Form honing light, for rotationally symmetrical, non-cylindrical bores, can easily be integrated into conventional machine systems.

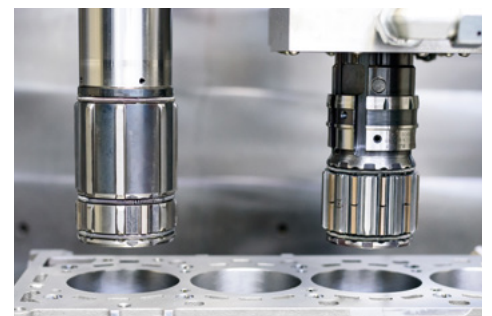
We also offer form honing professional, an innovative technology, enabling the formation of free forms within cylindrical bore shapes.



GRP tool in operation



Overspray jet in operation



Form honing and finishing tool

**A trusted technology leader with extensive experience and global presence!
Innovative technology combined with an environmental focus that sets us apart from the rest.**



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