

Process Development



Customised Peening Processes

Precise control of process and quality parameters ensures reliable peening processes – perfectly tailored to your requirements and part requirements.

Shot peening is a process that is determined by a variety of different parameters. In addition, it is a specialised process, i.e. a manufacturing step the result of which cannot be measured directly, but can only be determined after further testing, often only by destroying the part.

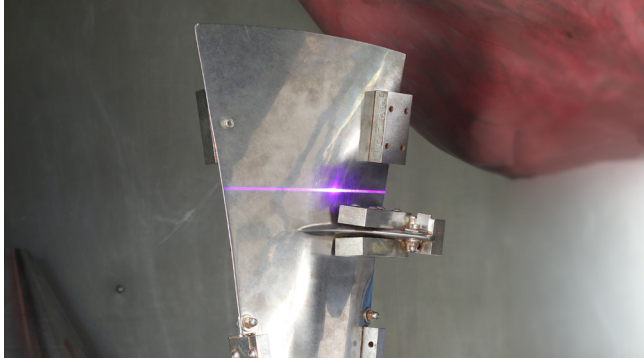
In order to classify the parameters and their influence on the process, it is useful to make a logical subdivision. We distinguish between

- Manipulated Variables (Machine Parameters)
- Shot Stream Variables (Process Parameters)
- Test Variables (Quality Parameters)

This classification reflects the reverse thinking in which a desired peening result can be defined by the test parameters, while specific particle dynamics is required to achieve this result, and this in turn can be set in various ways in a peening machine.

Customer-Specific Specifications

Customer-specific target specifications are different depending on the focus:



In case B, requirements usually relate to **residual stress or residual stress depth profile and surface roughness or topography** as test parameters. In this case, process development is much more complex, as these properties can be achieved with a combination of different peening media, impact velocity and angle and also require the determination of the residual stress state during development.



However, sentenso can help in all cases:

- Innovative and flexible systems engineering in the sentenso technical centre for adaptation of processes to part-specific requirements.
- Measurement equipment ranging from microscopy to X-ray diffraction to verify surface properties.
- A dedicated team of process engineers and technicians with vast experience in peening technology and target-oriented process development.

In addition, 3D component scanning, offline programming of robot paths and process simulations provide innovative opportunities for accelerated and optimised process development at sentenso.

In case A, the **typical shot peening parameters of media, intensity and coverage** are already known as test parameters from previous experience or from specifications, guidelines or similar. In this case, the challenges of process development lie mainly in the optimal processing of the part geometry with specific impact speed and angle as unknown process parameters.



In case C, the requirements relate purely to **functional performance in terms of lifetime or fatigue strength**. This means that neither the test parameters nor the shot peening parameters are relevant at this stage. However, extensive process expertise is required to apply suitable parameters for the peening process and keep the efforts and required development time as low as possible.



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