FINE AND POLISH GRINDING

in serial production of gear boxes

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With the demands for higher flank load capacity of gears and efficiency increases of gear boxes, fine and polish grinding has become more and more established in recent years, especially for applications in the passenger car and commercial vehicle sector.

By integrating these downstream processes, surface qualities of Rz < 1 µm or Ra < 0.2 µm can be achieved on conventional gear grinding machines.

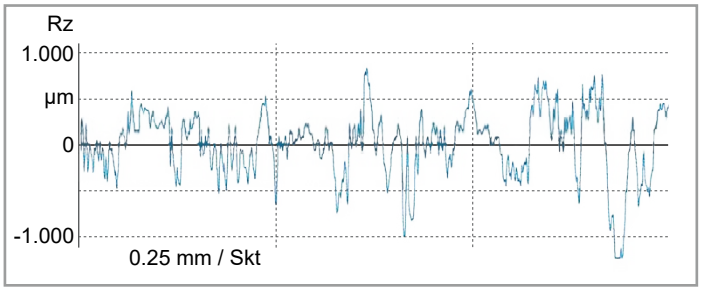
Due to the excellent productivity, continuous generating grinding nowadays is the preferred process for series production of gears. Thanks to the application of combined tools, consisting of a conventional as well as a fine grinding or polish grinding tool, it is possible to achieve a surface finish Rz < 1 µm in a single set-up. As a rule, the additional processing time amounts to less than 50 % of the processing time in conventional grinding processes.

For those applications where the gear manufacturing process requires shot-peening after conventional generating grinding, a downstream pure polish grinding can be realised. This process is carried out using a one-piece polyurethane polishing tool and is based on the input quality of the peened components.

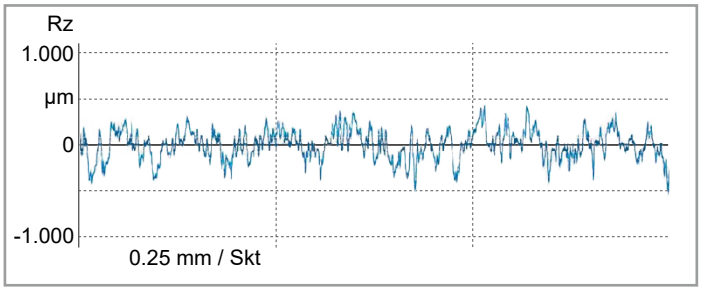
The achievable surface qualities by the usage of different generating gear grinding technologies can be specified as follows:

Generating grinding technology	Achievable surface quality	
Conventional generating grinding	Rz > 3 µm	Ra > 0.6 µm
Fine grinding	Rz 1-3 µm	Ra 0.2 - 0.6 µm
Polish grinding	Rz < 1 µm	Ra < 0.2 µm

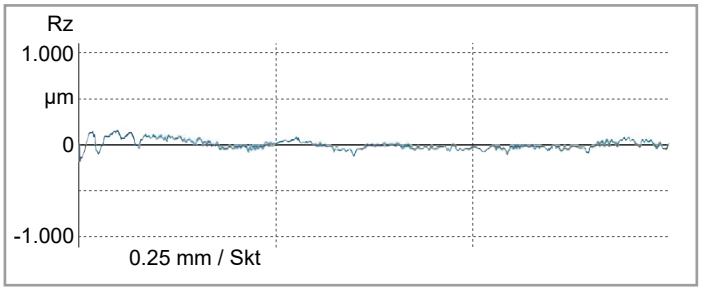
It should be considered that from certain surface qualities onwards, other values such as material ratios are better for characterising the surface than Rz and Ra.



Surface measurement after conventional generating grinding



Surface measurement after additional fine grinding process



Surface measurement after additional polish grinding process

Conventional generating grinding and fine grinding with combined tool

Left: gear after conventional generating grinding process
Right: after polish grinding process

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