

# Clearance angle grinding, face grinding, and web thinning

## What does clearance angle grinding/face grinding mean?

By grinding clearance angles and tool flanks on a tool cutter, you reduce the contact area between the tool and the workpiece later on during the drilling or milling process.

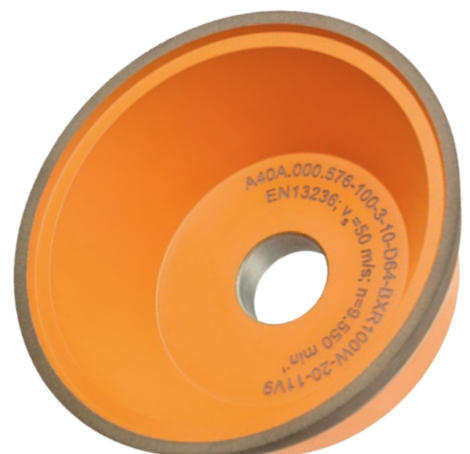
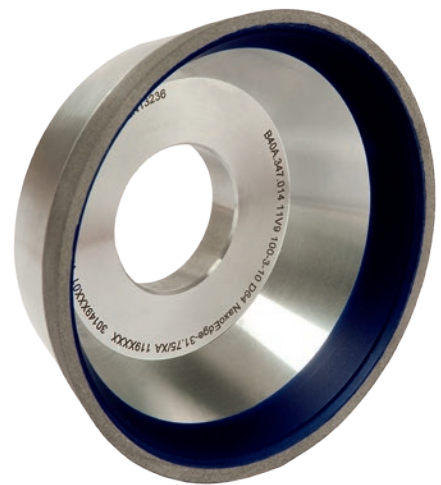
## How are clearance angles produced on a tool?

The clearance angles on the face and circumferential surface of a tool are referred to as the axial and radial clearance angles. These clearance angles provide the tool with a free-cutting property and simultaneously reduce the feed forces when drilling and milling.

- One to two clearance angles are often ground on the face.
- Up to three clearance angles can be produced on the circumference. With some tools, these angles are also ground as radial reliefs.

## Special features of clearance grinding:

- Before grinding the face clearance angle or the face surface itself, it is necessary to thin the web.
- The width of the chisel edge on a drilling or milling tool is reduced in order to reduce the forces exerted on the tool when used later on.
- Depending on the shape of the web, very sharply pointed grinding wheels of type 1V1, 14V1, or 12V9 are used.
- The advantage of the 1V1 wheel over the 12V9 wheel is its stiffer body.
- The 1A1 and 11V9 wheels are also used occasionally.



# Our products:

Our grinding wheel program containing the 3M 6CHN and 3M 6CBB types rounds off our portfolio of highly innovative grinding wheels for grinding shaft tools on CNC machines:

## 3M™ Metal-hybrid bonded diamond grinding wheels 6CHN

With their unique properties, the 3M 6CHN rounds off our portfolio for grinding shaft tools. Specially developed and adapted for the web thinning, clearance angle grinding, and relief grinding operation, these wheels enable fast grinding and optimal surface quality due to their high material removal capacity and extremely high profile retention.

## 3M™ Resin bonded diamond grinding wheels 6CBB

Special resins and the addition of innovative additives lend these grinding wheels great flexibility with simultaneously high edge stability. These wheels are therefore suitable for web thinning, clearance angle grinding, and relief grinding when manufacturing tools as well as when sharpening them. They are especially suitable for sharpening worn tools on high performance machines.

lower	Profile retention		higher
	3M™ 6CBB	3M™ 6CHN	
	Synthetic resin bonding	Hybrid metal bonding	
	Good removal performance	High removal rates	
	Good edge stability	High profile retention	
	Suitable for grinding operations with low feed and removal rates	Suitable for grinding operations with higher feed and removal rates	
	Suitable for oils and emulsions	Suitable for oils and emulsions	
	Ideal for sharpening operations	Ideal for automated production	



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