

Material

Tools from Gühring are manufactured of the following materials.

High speed steel (HSS). Standard material for universal usage.

High speed steel with increased cobalt content (HSCo and M42). Gives tools with high thermal strength for demands on high performance and productivity.

High speed steel with increased Vanadium content(HSS-E). Gives tools with high cutting edge stability, which is important with precision processing and sensitive processing, e.g. reaming.

Powder-metallurgical steel grades (PM). High speed steel with good characteristics when processing medium hard and hard difficult to process materials.

Material		Material No	Analysis in %						Comparable steel types			
			C	Cr	Mo	V	W	Co	Sweden	USA	France	England
HSS	S 6-5-2 (DMo5)	1.3343	0.9	4.2	5.0	2.0	6.5	–	2722	M2	Z 90 WDCV	BM 2
HSCo	S 6-5-2-5 (EMo5Co5)	1.3243	0.9	4.2	5.0	2.0	6.5	4.8	2723	M35	Z 90 WDKCV 06-05-05-04-02	–
HSS-E	S 6-5-3 (EMo5V3)	1.3344	1.2	4.2	5.0	3.0	6.5	–	–	M3	Z 120 WDCV 06-05-04-03	–
M42	S 2-10-1-8 (M42)	1.3247	1.1	4.2	10.0	1.2	1.8	8.0	2746	M42	Z 110 DKCWV 09-08-04-02-01	BM42
HSS-E												
PM HSS-E	S 6-5-3-9		1.3	4.2	5.0	3.1	6.4	8.5	2726 (ASP 30)	CPM M45	–	–

Surface treatment

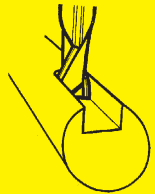
High speed steel has good basic characteristics without special surface treatment, i.e. in bright design. However, immense advantages can be obtained with different surface treatments, e.g. longer wear times and reduced swarf build-up.

Vapour treatment. Retains the lubricant and counteracts swarf build-up.

TIN-coating. The coating forms an effective thermal block, the heat is forced out into the swarf instead of the tool. Gives longer wear times and the possibility of higher cutting data. For all materials.

FIRE-coating is a multi-layer coating that unites the advantages of TiN, TiCN and TiAlN. The coating gives tools with a hard surface layer and low friction coefficient and which are insensitive to impact loads. For all materials.

Application area and design



2- and 3-flute slot milling cutters

These slot milling cutters are specially designed for milling keyways.

The end flute is designed so that the cutter has a good boring function.



Multi-flute end mill with chip breaking cutter

Chip breaking affects the cutting process positively, reduces chatter, gives lower lateral forces on the tool and allows greater cutting through increased feed rates and/or increased cutting depth. There are two different types of chip breakers, with a round top or with a flat top. The chip breaker with round top is only used for rough milling will cutters with a flat chip breaker can also be used for milling finished surfaces.



Multi-flute end mill with smooth flutes

The multi-flute end mill's application area is more comprehensive than for 2 and 3-flute slot mills. It is usually used for slab and end face milling as it, at the same feed per tooth, give a higher cutting effect than the slot mills. The multi-flute end mill can also be used for slot milling by the cutter diameter's tolerance, does not make it suitable for milling keyways.



End mill with radius

End mills with radius are in function the same as the end mills previously described. Their application area is primarily milling of profile components and grooves where you require a radius at the bottom. End mills with radius are often called profile cutters, as they are the standard tool in profilers. All end mills with radius are manufactured with two end flutes to the centre and are boring.



Shell end mills

Shell end mills are mainly used for face milling. The usually occur in dimensions that belong to application areas for tungsten carbide mills. Shell end mills of high speed steel are however a very common tool in milling machines and boring mills, where the effect and stability do not usually permit the application of tungsten carbide mills.