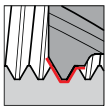
Cutting insert for internal threading, full profile - metric standard threads

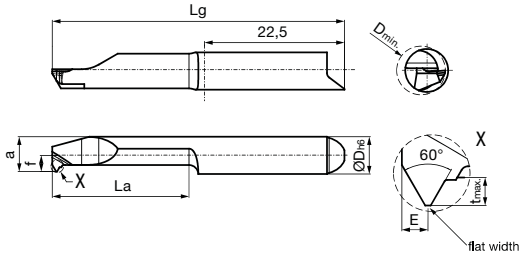


- **pitch P = 1.50-1.75**
- **Dh6 = 8.00 mm**

for tool holders type GB108/GH108 see from page 134

Series no.	**27136**	**27138**
Tool material	Solid carbide	
Type	GG 108	GG 108
Coating	a	○
	nano-A	uncoated

Cutting data page 214



Right hand version shown
Left hand version mirror image

Cutting direction: R R

Code no.	Description	G	P	D min	f	E	a	flat width	t max	La	Lg
			mm	mm	mm	mm	mm	mm	mm	mm	mm
8.001	GG108.VM10.150.17.85.R	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	17.00	42.00
8.002	GG108.VM10.150.27.85.R	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	27.00	52.00
8.003	GG108.VM10.150.17.85.R	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	37.00	62.00
8.004	GG108.VM12.175.17.00.R	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	17.00	42.00
8.005	GG108.VM12.175.27.00.R	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	27.00	52.00
8.006	GG108.VM12.175.37.00.R	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	37.00	62.00

Series no.	**27137**	**27139**
Cutting direction	L	L

Code no.	Description	G	P	D min	f	E	a	flat width	t max	La	Lg
			mm	mm	mm	mm	mm	mm	mm	mm	mm
8.001	GG108.VM10.150.17.85.L	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	17.00	42.00
8.002	GG108.VM10.150.27.85.L	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	27.00	52.00
8.003	GG108.VM10.150.17.85.L	M10	1.50	8.50	2.95	0.90	7.95	0.178	0.90	37.00	62.00
8.004	GG108.VM12.175.17.00.L	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	17.00	42.00
8.005	GG108.VM12.175.27.00.L	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	27.00	52.00
8.006	GG108.VM12.175.37.00.L	M12	1.75	10.20	2.95	1.00	7.95	0.209	1.05	37.00	62.00

SYSTEM 108

MICRO-PRECISION TOOLS

Tool holder

Round shank holder

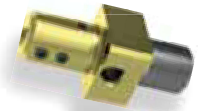
from page 134

Square shank holder

from page 140

Modular holder

from page 142

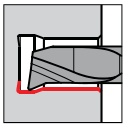


Star holder

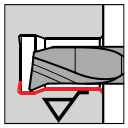
page 145

Round shank holder
Broaching
page 170

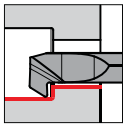
Cutting inserts from hole-Ø 7 mm



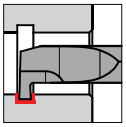
Boring out
and profiling, Type GT
from page 146



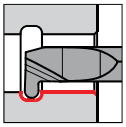
Boring out,
with Wiper, Type GJ
page 152



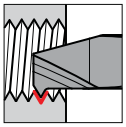
Back boring
and profiling, Type GT
page 154



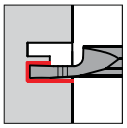
Internal grooving,
straight slots, Type GE
from page 156



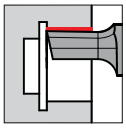
Internal grooving,
full radius slots, Type GE
from page 160



Internal threading,
Type GG
from page 164

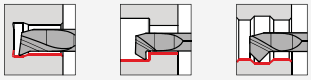
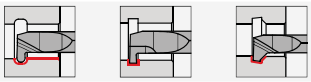
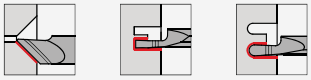


Axial grooving bores,
Type GA
from page 166



Broaching,
Type GN
page 171

SYSTEM 104/106/108/110

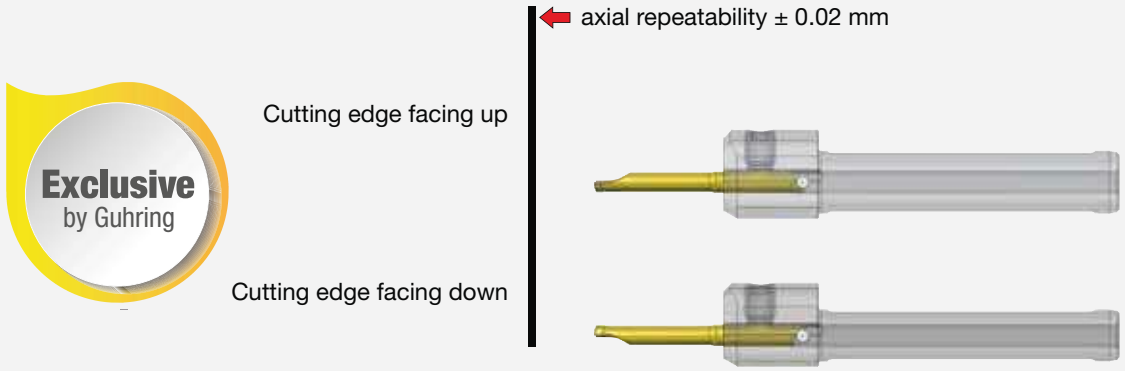
Machining	Feed range f (IPR)	Point radius R (mm)	Cutting depth a_p (in)	General formulas
	0.0008 - 0.0031	R 0.05 (0.002in) R 0.10 (0.004in) R 0.15 (0.006in) R 0.20 (0.008in) R 0.25 (0.010in) R 0.30 (0.012in)	0.0008 - 0.0028 0.0020 - 0.0059 0.0031 - 0.0079 0.0047 - 0.0098 0.0051 - 0.0110 0.0067 - 0.0138	Cutting speed (SFM) RPM x Dia. / 3.82 = SFM
	0.0004 - 0.0012			Revolutions per minute (RPM) SFM x 3.82 / Dia. = RPM
	0.0004 - 0.0020		Rule of thumb: ap ~ r	Feed rate (IPM) IPR x RPM = IPM

Guide values for feed and cutting depths

ISO	Material		Material examples/ material number	Tensile strength (N/mm²)	Brinell hardness (HB)	Cutting speed SFM (surface feet / min) TiN (S)	nano-A (a)	uncoated
P	Carbon steel	C < = 0.15 %	11SMn30+C / 1.0715 C15 / 1.0401	500 600	150 180	65-525	165-655	50-295
		C ≥ 0.15 - 0.45 %	S235JR (ST37-2) / 1.0037 Ck22 / 1.1151	400 600	120 180			
		C > 0.45 %	S355JO (St52-3) / 1.0553 C60 / 1.0601	600 900	180 270	65-295	165-525	-
	Low-alloyed steel (alloy content ≤5%)	annealed	16MnCr5 / 1.7131 18CrNi8 / 1.5920	650 650	200 200	65-525	165-590	50-230
		heat-treatable	25CrMoV4 / 1.7218 42CrMo4V / 1.7225	900 1100	270 320	-	100-395	-
	High-alloyed steel (alloy content >5%)	annealed	X37CrMoV5-1 / 1.2343 X153CrMoV12 / 1.2379	750 850	220 250	80-295	130-460	-
		heat-treatable	55NiCrMoV7 / 1.2714	1200	350	-	100-330	
	Cast steel	un-alloyed, low-alloyed	GS52 / 1.0552	600	180	65-395	100-590	-
		high-alloyed	GX40CrNiSi22-10 / 1.4826	750	220	-	100-295	
M	Stainless steel	martensitic, ferritic, tempered	X14CrMoS17 / 1.4104 X4CrNiMo16-5-1 / 1.4418	800 1000	240 300	65-230	100-295	-
		austenitic, Ni > 8%	X5CrNi18-10 / 1.4301 X2CrNiMo17-12-2 / 1.4404	650	200	65-300	100-360	-
		austenitic, ferritic (Duplex)	X2CrNiMoCuN25-6-3 / 1.4507 X2CrNiMoN25-7-4 / 1.4410	850	250	-	100-330	-
K	Grey cast iron	low tensile strength	EN-GJL-200 (GG20) / 0.6020		180	100-490	100-590	100-295
		high tensile strength	EN-GJL-400 (GG40) / 0.6040		260	100-395	100-490	100-230
	Spheroidal graphite iron	low tensile strength	EN-GJS-400-15 (GGG40) / 0.7040		160	100-425	100-525	-
		high tensile strength	EN-GJS-700-2 (GGG70) / 0.7070		260	100-360	100-460	
	Malleable cast iron	low tensile strength	EN-GJMW-350-4 (GTW35) / 0.8035		125	100-425	100-525	-
		high tensile strength	EN-GJMB-550-4 (GTS55) / 0.8155		250	100-360	100-460	
N	Al-alloys	non-heat-treatable <12% Si	EN-AW-2017 (AlCuMg1) / 3.1325		60	100-1805	100-1805	100-820
		heat-treatable <12% Si	EN-AW-6082 (AlMgSi1) / 3.2315		100	100-1310	100-1310	100-590
	Al-cast-alloys	non-heat-treatable <12% Si	AlSi9Cu3 / 3.2163		80	100-1805	100-1805	100-820
		heat-treatable <12% Si	AlSi10Mg / 3.2383		100	100-1310	100-1310	100-590
	Copper alloys	brass, lead alloy	CuZn39Pb2 (MS58) / 2.0380	400	120	100-1310	100-1310	100-590
		bronze	CuSn6 / 2.1020	500	150	100-240	100-240	100-590
S	Heat resistant alloys, super alloys	NiFe-base, annealed	NiCr15Fe (Alloy600) / 2.4816	700		-	50-230	-
		NiFe-base, hardened		950		-	50-165	
		NiCo-base, annealed	NiMo16Cr15W (Alloy C-276) / 2.4819	800		-	50-165	
		NiCo-base, cast		1100		-	30-130	
		NiCo-base, hardened	NiCr19NbMo (Alloy718) / 2.4668	1200		-	30-115	
	Titanium-alloys	annealed	Ti6Al4V / 3.7164	900		-	15-165	
		hardened		1200		-	30-115	
H	Hardened steels		Heat-treatable steel		> 52 HRC	-	65-130	-
			Heat-treatable/case hardened steel		> 59 HRC	-	30-100	-
			Heat-treatable/case hardened steel		> 62 HRC	-	(CBN)	-

The specified values must be adapted to the machine and machining conditions.

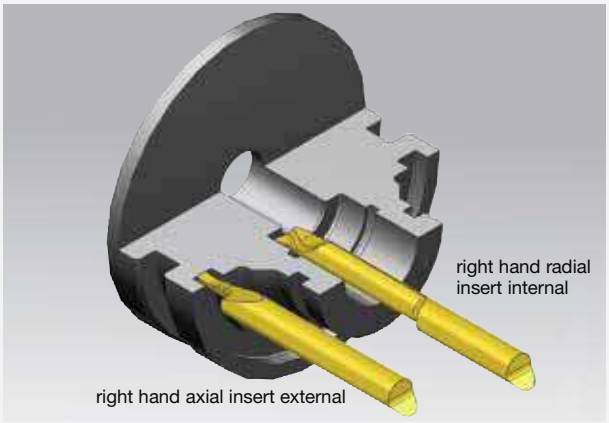
System 104/106/108/110
Positioning and clamping



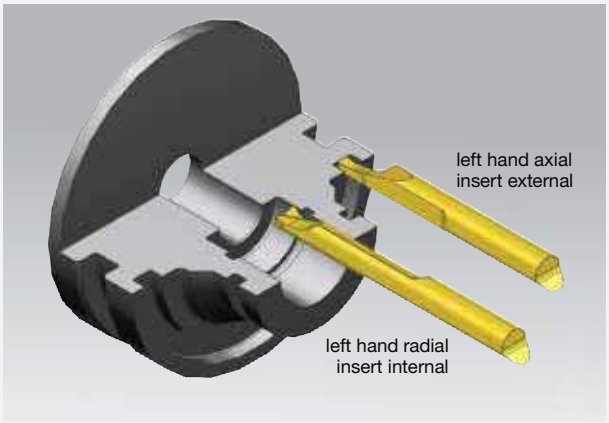
Guhring´s system 104/106/108/110 is unique in terms of insert positioning and clamping: The position between cutting edge facing up and cutting edge facing down can be changed by keeping the same length position without loosening the holder.

Definition of the cutting edge position

Main spindle clockwise



Main spindle counterclockwise



Troubleshooting

Subject		Solution											
		Feed	Feed at centre	Cutting speed	RH/LH edge orientation	Corner radius	Wiper	Width of groove	Tool clamping	Workpiece clamping	Tool overhang	Centre height of cutting edge	Coolant
Related to wear	Edge chipping	⬇	⬇			⬆			🔍	🔍	🔍	🔍	
	Build up edge			⬆									👍
	Flank wear	🔍	⇩	⬇		⬆						🔍	👍
	Plastic deformation	⇩	⇧	⬇		⬆							👍
Related to the component	Vibrations	⇧		⇩		⇩		⬇	🔍	🔍	⇩	🔍	
	Burrs		⬇		👍	⬇						🔍	👍
	Surface	⬇	⇩	⇧		⇧	👍	⇧	🔍	🔍	⇩	🔍	👍
	Long chips (no chip breakage)	⬆		⇧									👍
	(too) short chips, compressed chips	⬇											

⬇ decrease values (large impact)

⬆ increase values (large impact)

⇩ decrease values (low impact)

⇧ increase values (low impact)

🔍 check

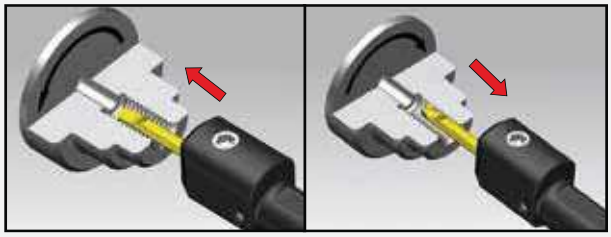
👍 apply

Internal threading
System GG 104/106/108

		Recommended number of cuts with internal threading						
Pitch/P		Steel materials (tensile strength in N/mm²)			Stainless steel	Cast iron	Heat-resistant alloys	Aluminium
mm	TPI	400-700	700-1150	> 1150				
0.3		3	4	5	5	3	5	3
0.5	48	5	6	8	8	5	8	5
0.8	32	7	8	9	9	7	9	7
1	24	8	9	10	10	8	10	8
1.25	20	10	11	12	12	10	12	10
1.5	16	12	13	15	15	12	15	12
1.75	14	14	15	18	18	14	18	14
2	12	16	17	20	20	16	20	16
3	8	22	24	30	30	22	30	22

Feed direction internal threading

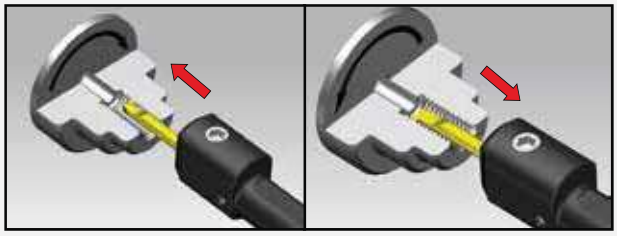
Right-hand thread



Insert: Right-hand design
Direction of rotation: Clockwise M3 turning from outside in

Insert: Left-hand design
Direction of rotation: Counter-clock-wise M4 turning from inside out

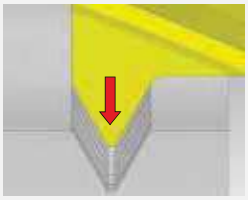
Left-hand thread



Insert: Left-hand design
Direction of rotation: Counterclock-wise M4 turning from outside in

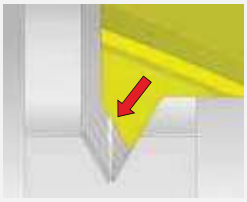
Insert: Right-hand design
Direction of rotation: Clockwise M3 turning from inside out

Feed process



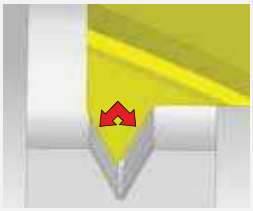
Radial feed

- Both cutting edges engaged at the same time
- High cutting pressure and thermal load
- Especially suitable for the machining of short-chipping materials
- For the production of threads with a small pitch and small thread depth as well as multiple start depths to prevent pitch errors



One-sided flank in-feed

- Only one cutting edge engaged
- Lower cutting pressure and thermal load
- Especially suitable for the machining of long-chipping materials
- Achieve a higher surface finish quality at the respective thread flank



Reciprocal flank in-feed

- Both cutting edges alternately engaged
- Lower cutting pressure and thermal load
- Especially suitable for the machining of long-chipping materials
- Achieve a higher surface finish quality at the flanks

Internal threading
System GG 104/106/108

Pre-drill diameters for metric threads						
Standard pitch thread				Fine pitch thread		
Nominal Ø	Pitch mm	Pre-drill Ø* full profile mm	Pre-drill Ø partial profile mm	Nominal Ø	Pitch mm	Pre-drill Ø partial profile mm
M 2	0.40	1.50	1.60	M 2	0.20	1.80
M 2.5	0.45	1.85	2.05	M 2.5	0.35	2.15
M 3	0.50	2.40	2.50	M 3	0.35	2.65
M 4	0.7	3.10	3.30	M 3.5	0.35	3.15
M 4.5	0.75		3.75	M 4	0.50	3.50
M 5	0.80	4.00	4.20	M 4.5	0.50	4.00
M 6	1.00		5.00	M 5	0.50	4.50
M 8	1.25		6.80	M 5.5	0.50	5.00
M 10	1.5		8.5	M 6	0.75	5.25
M 12	1.75		10.25			

*max. allowance (ap) in core diameter = 0.2 mm

Conversion table - pitch (in.) to pitch (mm)

TPI	Pitch, in	Pitch, mm	TPI	Pitch, in	Pitch, mm	TPI	Pitch, in	Pitch, mm	TPI	Pitch, in	Pitch, mm
127	0.00787	0.200	**44**	0.02273	0.577	**20**	0.05000	1.270	**7**	0.14286	3.629
120	0.00833	0.212	**42.33**	0.02362	0.600	**19**	0.05263	1.337	**6.35**	0.15748	4.000
112	0.00893	0.227	**40**	0.02500	0.635	**18**	0.05556	1.411	**6**	0.16667	4.233
101.6	0.00984	0.250	**36.29**	0.02756	0.700	**16.93**	0.05907	1.500	**5.64**	0.17730	4.504
100	0.01000	0.254	**36**	0.02778	0.706	**16**	0.06250	1.588	**5.08**	0.19685	5.000
96	0.01042	0.265	**34**	0.02941	0.747	**14.51**	0.06892	1.751	**5**	0.20000	5.080
90	0.01111	0.282	**33.87**	0.02952	0.750	**14**	0.07143	1.814	**4.62**	0.21645	5.498
84.67	0.01181	0.300	**32**	0.03125	0.794	**13**	0.07692	1.954	**4.5**	0.22222	5.644
80	0.01250	0.318	**31.75**	0.03150	0.800	**12.7**	0.07874	2.000	**4.23**	0.23641	6.005
72.57	0.01378	0.350	**30**	0.03333	0.847	**12**	0.08333	2.117	**4**	0.25000	6.350
72	0.01389	0.353	**28.22**	0.03544	0.900	**11.5**	0.08696	2.209	**3**	0.33333	8.467
64	0.01563	0.397	**28**	0.03571	0.907	**11**	0.09091	2.309	**2**	0.50000	1.270
63.5	0.01575	0.400	**27**	0.03704	0.941	**10.16**	0.09843	2.500			
60	0.01667	0.423	**26**	0.03846	0.977	**10**	0.10000	2.540			
56.44	0.01772	0.450	**25.4**	0.03937	1.000	**9**	0.11111	2.822			
56	0.01786	0.454	**24**	0.04167	1.058	**8.47**	0.11806	2.999			
50.8	0.01969	0.500	**22**	0.04545	1.155	**8**	0.12500	3.175			
48	0.02083	0.529	**20.32**	0.04921	1.250	**7.26**	0.13774	3.499			