Info

Overview of VHM universal milling cutters (I)

Brand	HHW	HHW	HHW	HHW	ATORN	HHW	HHW	HHW	ATORN	ATORN	HHW	ATORN	ATORN
Article number	16500	16502	16505	16507	16603	16517	16522	16524	16605	16607	16532	16606	16612
	NEW	NEW											
Number of cutting edges	3	3	2	2	2	2	3	3	3	3	3	3	3
Diameter range mm	2 - 18	1.5 - 12	2 - 20	2 - 20	0.25 - 20	3 - 20	2 - 20	2 - 20	2 - 20	2 - 20	3 - 20	2.8 - 20	3.5 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	-	TiAlN	–	TiAlN	TiAlN-Ultra	TiAlN	–	TiAlN	TiAlN-Ultra	TiAlN-Ultra	TiAlN	TiAlN-Ultra	TiAlN-Ultra
Version	Mini	Mini	Short	Short	Short	Short	Short	Short	Extra short	Short	Short	Short	Long
Type / Profile	N	N	N	N	N	N	N	N	N	N	N	N	N
Catalogue page	16.37	16.37	16.37	16.37	16.38	16.38	16.39	16.39	16.39	16.40	16.40	16.41	16.42
Recommended application	● = well-suited ○ = limited suitability												
Aluminium < 8% Si	○	○	○	○	○				○	○		○	○
Aluminium > 8% Si	○	○	○	○	●				●	●		●	●
Copper	○	○	○	○	●				●	●		●	●
Plastics	●	○	○	○									
Graphite													
Steel < 520 N	●	●	●	●	●	●	●	●	●	●		●	●
Steel < 750 N	●	●	●	●	●	●	●	●	●	●		●	●
Steel < 900 N	●	●	●	●	●	●	●	●	●	●		●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	●	●		●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	●	●		●	●
Steel < 1400 N	●	●	●	●		●	●	●			●		
Hardox													
< 50 HRC													
< 60 HRC													
< 67 HRC													
GG	●	●	●	●	●	●	●	●	●	●	●	●	●
GGG	●	●	●	●	●	●	●	●	●	●	●	●	●
VA < 900 N	○	●	○	●	●	●		●	●	●	●	●	●
VA > 900 N	○	●	○	●	○	●		●	○	○	●	○	○
Titanium					○				○	○		○	○
Titanium alloy					○				○	○		○	○
Nickel base					○				○	○		○	○

Brand	ATORN	HHW	HHW	HHW	HHW	HHW	ATORN	HHW	HHW	HHW	HHW
Article number	16618	16552	16537	16539	16542	16543	16610	16545	16547	16548	16549
Number of cutting edges	4	4	4	4	4	4	4	4	4	4	4
Diameter range mm	2 - 20	5.7 - 20	2 - 20	2 - 20	4 - 16	4 - 20	2 - 20	3 - 20	3 - 20	3 - 12	3 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN-Ultra	AlCrN	–	TiAlN	–	TiAlN	TiAlN-Ultra	–	TiAlN	–	TiAlN
Version	Short	Short	Short	Short	Short	Short	Short	Short	Short	Overlong	Overlong
Type / Profile	N	HPC	N	N	N	N	HPC	N	N	N	N
Catalogue page	16.43	16.43	16.44	16.44	16.44	16.44	16.45	16.45	16.45	16.46	16.46
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 8% Si	○		○	○	○	○	○	○	○	○	○
Aluminium > 8% Si	●		○	○	○	○	●	○	○	○	○
Copper	●		○	○	○	○	●	○	○	○	○
Plastics			○	○	○	○		○	○	○	○
Graphite											
Steel < 520 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 750 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 900 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1400 N		●		●		●			●		●
Hardox											
< 50 HRC											
< 60 HRC											
< 67 HRC											
GG	●	●	●	●	●	●	●	●	●	●	●
GGG	●	●	●	●	●	●	●	●	●	●	●
VA < 900 N	●	●	○	○	○	○	●	○	○	○	○
VA > 900 N	○	●	○	○	○	○	○	○	○	○	○
Titanium	○	●					○				
Titanium alloy	○	●					○				
Nickel base	○	●					○				

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Info

Overview of VHM universal milling cutters (II)

Brand	ATORN	ATORN	HHW	HHW	HHW	HHW	HHW	HHW	ATORN	HHW	HHW
Article number	16527 1..	16527 2..	16592 NEW	16593 NEW	16594 NEW	16534 1..	16534 3..	16536	16627	16538	16540
Number of cutting edges	4	4	4	4	4	4	4	4	4	4	4
Diameter range mm	1 - 20	1 - 20	3 - 20	3 - 20	6 - 20	3 - 20	4 - 20	4 - 20	3 - 20	6 - 20	4 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	TiAlN	Varocon	Varocon	Varocon	TiAlN	TiAlN	TiAlN	TiAlN Ultra	TiAlN	TiAlN
Version	Short	Short	Short	Long	Overlong	Long	Long	Long/released	Short	Long m. IK	Long
Type / Profile	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC
Catalogue page	16.46	16.46	16.47	16.47	16.47	16.48	16.48	16.49	16.49	16.50	16.50
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 8% Si											
Aluminium > 8% Si											
Copper											
Plastics											
Graphite											
Steel < 520 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 750 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 900 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1400 N	●	●	●	●	●	●	●	●	●	●	●
Hardox											
< 50 HRC											
< 60 HRC											
< 67 HRC											
GG	●	●	●	●	●	●	●	●	●	●	
GGG	●	●	●	●	●	●	●	●	●	●	
VA < 900 N						○	○	○		○	○
VA > 900 N						○	○	○		○	○
Titanium											
Titanium alloy											
Nickel base											

Brand	HHW	HHW	ATORN	ATORN	ATORN	ATORN	HHW	HHW	ATORN	ATORN	ATORN
Article number	16554	16555	16640	16616 2..	16616 3..	16616 4..	16551	16553	16642	16643	16646 1..
Number of cutting edges	4	4	4	6 - 8	6 - 8	6 - 8	6 - 8	6 - 8	2	4	4
Diameter range mm	5 - 20	5 - 25	3 - 20	4 - 20	6 - 20	6 - 20	6 - 20	6 - 20	3 - 20	6 - 16	6 - 16
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	TiAlN	TiAlN-Ultra	TiAlN-Ultra	TiAlN-Ultra	TiAlN-Ultra	TiAlN	TiAlN	TiAlN-Ultra	TiAlN-Ultra	TiAlN-Ultra
Version	Long	Overlong	Short	Short	Long	Overlong	Short	Long	Long	Short	Long
Type / Profile	HPC	HPC	HSC	N	N	N	N	N	N	NR	N
Catalogue page	16.51	16.51	16.52	16.53	16.53	16.53	16.53	16.54	16.54	16.54	16.55
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 10% Si	○	○		○	○	○			○		
Aluminium > 10% Si	○	○	●	●	●	●			●		●
Copper	○	○	●	●	●	●			●		●
Plastics									●		●
Graphite											
Steel < 520 N	●	●	●	●	●	●	●	●	○	●	●
Steel < 750 N	●	●	●	●	●	●	●	●	○	●	●
Steel < 900 N	●	●	●	●	●	●	●	●	○	●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	○	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	○	●	●
Steel < 1400 N	●	●	●				●	●	○		
Hardox											
< 50 HRC											
< 60 HRC											
< 67 HRC											
GG	●	●	●	●	●	●	●	●	●	●	●
GGG	●	●	●	●	●	●	●	●	●	●	●
VA < 900N	○	○	●	●	●	●	○	○	●		●
VA > 900N	○	○	●	○	○	○	○	○	●		○
Titanium	○	○	●	○	○	○			○		○
Titanium alloy	○	○	●	○	○	○			○		○
Nickel base	○	○	●	○	○	○			○		○

Info

Overview of VHM universal milling cutters (III)

Brand	ATORN	HW	HW	HW	HW	ATORN	HW	HW	HW	HW	HW	HW
Article number	16646 2..	16557	16559 201	16559 202-208	16561	16628	16565	16567	16569	16650	16651	16629
												
Number of cutting edges	4	2	2	2	4	3 - 4	4	4	4	3 - 6	3 - 6	3 - 4
Diameter range mm	6 - 12	3 - 20	2	3 - 20	3 - 20	4 - 20	5 - 20	3 - 16	6 - 20	4 - 25	4 - 25	6 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN-Ultra	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN-Ultra	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Version	Overlong	Short	Long	Long	Short	Short	Short	Long	Long m. IK	Short	Short	Long
Type / Profile	N	-	-	-	-	NR	NF	HR	HR	HR	HR	HR
Catalogue page	16.55	16.55	16.55	16.55	16.56	16.56	16.57	16.57	16.57	16.58	16.58	16.58
Recommended application	● = well-suited ○ = limited suitability											
Aluminium < 8% Si						●						
Aluminium > 8% Si	●					●						
Copper	●					●						
Plastics	●											
Graphite												
Steel < 520 N	●	●	●	●	●	○	●	●	●	●	●	●
Steel < 750 N	●	●	●	●	●	○	●	●	●	●	●	●
Steel < 900 N	●	●	●	●	●	●	●	●	●	●	●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	●	●	●	●
Steel < 1400 N		●	●	●	●	●	●	●	●	●	●	●
Hardox												
< 50 HRC										●	●	
< 60 HRC												
< 67 HRC												
GG	●	●	●	●	●	○	●	●	●	●	●	●
GGG	●	●	●	●	●	○	●	●	●	●	●	●
VA < 900 N	●	○	○	○	○	●	○	○	○	○	○	○
VA > 900 N	○	○	○	○	○	●	○	○	○	○	○	○
Titanium	○					●						
Titanium alloy	○					●						
Nickel base	○					●						

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Overview of special milling cutters (I)

Brand	HHW	HHW	ATORN	ATORN	ATORN	HHW	HHW	HHW	HHW	HHW	HHW
Article number	16580	16575	16570	16571	16573	16583	16660	16661	16662 1..	16662 2..	16662 3..
											
Number of cutting edges	2	1	4 - 6	4 - 6	4 - 6	4	6 - 10	6	6 - 9	6 - 9	6 - 9
Diameter range mm	3 - 20	3 - 6	4 - 20	4 - 20	4 - 16	4 - 16	10.5 - 45.5	12.5 - 32	16 - 38	16 - 38	16 - 38
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	–	TiAlN	–	TiAlN	TiAlN	TiAlN	Alcrona	Alcrona	Alcrona	Alcrona	Alcrona
Version	Short	Short	Short	Short	Short	Long	–	–	–	60°	45°
Type / Profile	N	N	90° deburrer	90° deburrer	60° deburrer	Deburrer	Slotted	N/NF	Angle	DIN 1833C	DIN 1833D
Catalogue page	16.85	16.86	16.86	16.86	16.86	16.87	16.87	16.88	16.88	16.88	16.88
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 8% Si	●	●	●	○	○	○					
Aluminium > 8% Si	●	●	●	○	○	○					
Copper	●	●	●	○	○	○					
Plastics	●	●	●	○	○	○					
Graphite											
Steel < 520 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 750 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 900 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1100 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●	●	●	●
Steel < 1400 N				●	●	●					
Hardox											
< 50 HRC											
< 60 HRC											
< 67 HRC											
GG	●	●	●	●	●	●	●	●	●	●	●
GGG	●	●	●	●	●	●	●	●	●	●	●
VA < 900 N	○	○	○	○	○	○	○	○	○	○	○
VA > 900 N	○	○	○	○	○	○					
Titanium		○	○	○	○						
Titanium alloy		○	○	○	○						
Nickel base		○	○	○	○						

Brand	HHW	HHW
Article number	16662 4..	16658
		
Number of cutting edges	6 - 9	4
Diameter range mm	16 - 38	R 0.2 - 6.0
Cutting material	VHM	VHM
Coating	Alcrona	TiAlN
Version	60°	Short
Type / Profile	DIN 1833D	-
Catalogue page	16.88	16.89
Recommended application	● = well-suited ○ = limited suitability	
Aluminium < 8% Si		●
Aluminium > 8% Si		●
Copper		●
Plastics		●
Graphite		
Steel < 520 N	●	●
Steel < 750 N	●	●
Steel < 900 N	●	●
Steel < 1100 N	●	●
Steel < 1200 N	●	●
Steel < 1400 N		
Hardox		
< 50 HRC		
< 60 HRC		
< 67 HRC		
GG	●	●
GGG	●	●
VA < 900 N	○	○
VA > 900 N		○
Titanium		
Titanium alloy		
Nickel base		

Overview of solid carbide milling cutters (I)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16800	16801	16802	16805	16806	16810	16812	16813	16626	16816	16817
											
Number of cutting edges	2	2	2	2	2	4	4	4	4	4	4
Diameter range mm	0.1 - 0.9	0.2 - 3	0.2 - 3	0.2 - 0.9	0.2 - 3	3 - 20	3 - 20	3 - 25	4 - 20	3 - 20	3 - 16
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
RockTec coating	52/65	52/65	52/65	52/65	52/65	52/65	52/65	52/65	65	52/65	52/65
Version	Short	Long	Long	Short	Long	Short	Long	Overlong	Short	Short	Short
Type / Profile	Mini shank	Mini shank	Mini torus	Mini radius	Mini radius	Shank	Shank	Shank	Shank	Torus	Torus
Catalogue page	16.59	16.60	16.61	16.62	16.63	16.64	16.66	16.67	16.68	16.69	16.70
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 8% Si											
Aluminium > 8% Si											
Copper											
Plastics											
Graphite											
Steel < 520 N											
Steel < 750 N	●		●		●		●		●		●		●		●		●		●		●		●	
Steel < 900 N	●		●		●		●		●		●		●		●		●		●		●		●	
Steel < 1100 N	●		●		●		●		●		●		●		●		●		●		●		●	
Steel < 1200 N	●		●		●		●		●		●		●		●		●		●		●		●	
Steel < 1400 N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Hardox																								
< 50 HRC		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
< 60 HRC		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
< 67 HRC		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
GG																								
GGG																								
VA < 900 N																								
VA > 900 N																								
Titanium																								
Titanium alloy																								
Nickel base																								

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16818	16819	16824	16825	16827	16828	16829	16830	16831	16832
										
Number of cutting edges	4	4	6 - 8	6 - 8	2	2	2	4	4	4 - 6
Diameter range mm	3 - 16	3 - 16	3 - 20	3 - 20	2 - 20	2 - 20	2 - 20	3 - 20	3 - 20	4 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
RockTec coating	52/65	52/65	52/65	52/65	52/65	52/65	52/65	52/65	52/65	65
Version	Long	Overlong	Short	Long	Short	Long	Overlong	Short	Long	Extra short
Type / Profile	Torus	Torus	Multi-tooth	Multi-tooth	Radius	Radius	Radius	Radius	Radius	High feed
Catalogue page	16.71	16.71	16.72	16.72	16.73	16.73	16.74	16.76	16.76	16.77
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si										
Aluminium > 8% Si										
Copper										
Plastics										
Graphite										
Steel < 520 N										
Steel < 750 N	●		●		●		●		●		●		●		●		●		●		●	
Steel < 900 N	●		●		●		●		●		●		●		●		●		●			
Steel < 1100 N	●		●		●		●		●		●		●		●		●		●			
Steel < 1200 N	●		●		●		●		●		●		●		●		●					
Steel < 1400 N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Hardox																						
< 50 HRC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
< 60 HRC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
< 67 HRC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
GG																						
GGG																						
VA < 900 N																						
VA > 900 N																						
Titanium																						
Titanium alloy																						
Nickel base																						

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Info

Overview of solid carbide milling cutters (II)

Brand								
Article number	16601	16604	16609	16613	16619	16621	16625	16637
								
Number of cutting edges	2	2	4	4	6	2	4	4
Diameter range mm	3 - 25	3 - 25	3 - 25	3 - 20	6 - 25	2 - 20	2 - 20	6 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Version	Short	Long	Short	Long	Overlong	Long	Long	Long
Type / Profile	HSC	HSC	HSC	HSC	HSC	HSC	HSC	HSC
Catalogue page	16.64	16.64	16.65	16.65	16.66	16.74	16.75	16.70
Recommended application	● = well-suited ○ = limited suitability							
Aluminium < 8% Si								
Aluminium > 8% Si								
Copper								
Plastics								
Graphite								
Steel < 520 N								
Steel < 750 N	●							
Steel < 900 N	●							
Steel < 1100 N	●	●	●	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●	●	●	●
Steel < 1400 N	●	●	●	●	●	●	●	●
Hardox								
< 50 HRC	●	●	●	●	●	●	●	●
< 60 HRC	●	●	●	●	●	●	●	●
< 67 HRC								
GG								
GGG								
VA < 900 N								
VA > 900 N								
Titanium								
Titanium alloy								
Nickel base								

Info

Overview of MS milling cutters (I)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16400	16401	16402	16403 1..	16403 2..	16405 1..	16405 2..	16407 1..	16407 2..	16544 1..	16544 2..
											
Number of cutting edges	2	2	2	3	3	2	2	2	2	4	4
Diameter range mm	0.5 - 4	0.5 - 4	0.5 - 4	3 - 20	3 - 20	3 - 20	3 - 20	3 - 20	3 - 20	4 - 20	4 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN
Version	Mini	Mini	Mini	Short	Short	Short	Short	Long	Long	Short	Short
Type / Profile	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC	HPC
Catalogue page	16.78	16.79	16.80	16.80	16.80	16.81	16.81	16.81	16.81	16.82	16.82
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 8% Si											
Aluminium > 8% Si											
Copper											
Plastic											
Graphite											
Steel < 520 N											
Steel < 750 N											
Steel < 900 N	○	○	○	○	○	○	○	○	○	○	○
Steel < 1100 N	○	○	○	○	○	○	○	○	○	○	○
Steel < 1200 N	○	○	○	○	○	○	○	○	○	○	○
Steel < 1400 N	○	○	○	○	○	○	○	○	○	○	○
Hardox											
< 50 HRC											
< 60 HRC											
< 67 HRC											
GG											
GGG											
VA < 900 N	●	●	●	●	●	●	●	●	●	●	●
VA > 900 N	●	●	●	●	●	●	●	●	●	●	●
Titanium	●	●	●	●	●	●	●	●	●	●	●
Titanium alloy	●	●	●	●	●	●	●	●	●	●	●
Nickel base	●	●	●	●	●	●	●	●	●	●	●

Brand	ATORN	ATORN	HHW	HHW
Article number	16550 3..	16550 4..	16525	16526
			NEW	NEW
Number of cutting edges	4	4	4	4
Diameter range mm	4 - 20	4 - 20	3 - 20	3 - 20
Cutting material	VHM	VHM	VHM	VHM
Coating	AlCrN	AlCrN	Duocon	Duocon
Version	Short	Short	Short	Long
Type / Profile	HPC	HPC	HPC	HPC
Catalogue page	16.82	16.82	16.84	16.84
Recommended application	● = well-suited ○ = limited suitability			
Aluminium < 8% Si				
Aluminium > 8% Si				
Copper				
Plastic				
Graphite				
Steel < 520 N				
Steel < 750 N				
Steel < 900 N	○	○		
Steel < 1100 N	○	○		
Steel < 1200 N	○	○		
Steel < 1400 N	○	○		
Hardox				
< 50 HRC				
< 60 HRC				
< 67 HRC				
GG				
GGG				
VA < 900 N	●	●	●	●
VA > 900 N	●	●	●	●
Titanium	●	●		
Titanium alloy	●	●		
Nickel base	●	●		

Overview of VHM aluminium milling cutters (I)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16710	16711	16712	16715	16717	16718	16719	16722	16724	16725
										
Number of cutting edges	2	2	2	1	2	2	2	3	3	3
Diameter range mm	0.5 - 2.5	0.5 - 2.5	0.5 - 2.5	1.5 - 16	3 - 20	3 - 16	3 - 16	3 - 20	3 - 20	3 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	Polished	Polished	ZrCN Ultra-N	ZrCN Ultra-N	Polished	Polished	Polished
Version	Mini	Mini	Mini	Short	Short	Short	Short	Short	Short	Short
Type / Profile	HSC	HSC	HSC	HSC	HSC	HSC	HSC	HSC	HSC	HSC
Catalogue page	16.89	16.90	16.90	16.90	16.91	16.91	16.91	16.91	16.91	16.92
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si	●	●	●	●	●	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●	●	●	●	●	●
Copper	●	●	●	●	●	●	●	●	●	●
Plastic	○	○	○	●	●	○	○	●	●	●
Graphite										
Steel < 520 N										
Steel < 750 N										
Steel < 900 N										
Steel < 1100 N										
Steel < 1200 N										
Steel < 1400 N										
Hardox										
< 50 HRC										
< 60 HRC										
< 67 HRC										
GG										
GGG										
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	HHW	ATORN	ATORN	ATORN
Article number	16726	16727	16728	16729	16730	16731	16758	16732	16734	16735
										
Number of cutting edges	3	3	3	3	3	3	3	3	3	3
Diameter range mm	3 - 20	3 - 20	3 - 20	3 - 20	3 - 20	3 - 20	3 - 25	6 - 20	6 - 20	6 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	Polished	ZrCN Ultra-N	ZrCN Ultra-N	ZrN	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N
Version	Short	Short	Short	Long	Long	Long	Short/long	Short	Short	Short
Type / Profile	HPC	HPC	HPC	HSC	HPC	HPC	HPC	HPC	HPC	HPC
Catalogue page	16.92	16.92	16.92	16.93	16.93	16.93	16.94	16.94	16.94	16.95
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si	●	●	●	●	●	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●	●	●	●	●	●
Copper	●	●	●	●	●	●	●	●	●	●
Plastic	○	○	○	●	○	●	○	○	○	○
Graphite										
Steel < 520 N										
Steel < 750 N										
Steel < 900 N										
Steel < 1100 N										
Steel < 1200 N										
Steel < 1400 N										
Hardox										
< 50 HRC										
< 60 HRC										
< 67 HRC										
GG										
GGG										
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

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Overview of VHM aluminium milling cutters (II)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16564	16737	16738	16739	16740	16741	16742	16745	16746	16747
Number of cutting edges	3	4	4	4	4	4	4	2	2	2
Diameter range mm	6 - 20	3 - 20	3 - 20	4 - 16	6 - 16	3 - 20	4 - 20	3 - 16	3 - 16	6 - 16
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	CALIDAZ	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N
Version	Short	Short	Short	Long	Overlong	Short	Long	Short	Long	Overlong
Type / Profile	HPC	HPC	HPC	HPC	HPC	HPC	HPC	-	-	-
Catalogue page	16.95	16.95	16.95	16.96	16.96	16.96	16.96	16.97	16.97	16.98
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si	●	●	●	●	●	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●	●	●	●	●	●
Copper	●	●	●	●	●	●	●	●	●	●
Plastic		○	○	○	○	○	○	○	○	○
Graphite										
Steel < 520 N										
Steel < 750 N										
Steel < 900 N										
Steel < 1100 N										
Steel < 1200 N										
Steel < 1400 N										
Hardox										
< 50 HRC										
< 60 HRC										
< 67 HRC										
GG										
GGG	●									
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

Brand	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16748	16749	16755	16756	16757
Number of cutting edges	3	3	2	2	2
Diameter range mm	5 - 20	5 - 20	3 - 16	3 - 16	3 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM
Coating	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N	ZrCN Ultra-N
Version	Short	Short	Short	Long	Overlong
Type / Profile	HPC	HPC	-	-	HPC
Catalogue page	16.98	16.98	16.99	16.99	16.99
Recommended application	● = well-suited ○ = limited suitability				
Aluminium < 8% Si	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●
Copper	●	●	●	●	●
Plastic	○	○	○	○	○
Graphite					
Steel < 520 N					
Steel < 750 N					
Steel < 900 N					
Steel < 1100 N					
Steel < 1200 N					
Steel < 1400 N					
Hardox					
< 50 HRC					
< 60 HRC					
< 67 HRC					
GG					
GGG					
VA < 900 N					
VA > 900 N					
Titanium					
Titanium alloy					
Nickel base					

Overview of VHM-NE milling cutters (I)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16886	16887	16888	16889	16890	16891	16892	16893	16894	16895
	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW
										
Number of cutting edges	1	2 - 4	2	3	3	3	4	2	2	3
Diameter range mm	1 - 12	3 - 20	3 - 20	4 - 20	6 - 20	3 - 20	3 - 20	3 - 16	3 - 16	6 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro
Version	Medium	Medium	Medium	Long	Long	Short	Medium	Short	Long	Long
Type / Profile	WF	WF	WF	WF	WF	WF	WF	WF	WF	T
Catalogue page	16.100	16.100	16.101	16.102	16.102	16.101	16.104	16.104	16.105	16.105
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si	●	●	●	●	●	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●	●	●	●	●	●
Copper alloy Bronze	●	●	●	●	●	●	●	●	●	●
Copper alloy Brass	●	●	●	●	●	●	●	●	●	●
Graphite										
Duro										
Thermo	○	○	○	○	○	○	○	○	○	○
GFK	○	○	○	○	○	○		○	○	○
CFK	○	○	○	○	○	○		○	○	○
Aramid										
Composite ceramic										
Fibre plast										
Honeycomb										
< 60 HRC										
< 67 HRC										
GG										
GGG										
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

Brand	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16896	16897	16898 1..	16898 2..	16899
	NEW	NEW	NEW	NEW	NEW
					
Number of cutting edges	2	2	3	3	3
Diameter range mm	3 - 16	3 - 16	6 - 20	6 - 20	6 -20
Cutting material	VHM	VHM	VHM	VHM	VHM
Coating	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro	Ultra Npro
Version	Medium	Long	Medium	Medium	Long
Type / Profile	WF	WF	WR	WR	T
Catalogue page	16.106	16.106	16.103	16.103	16.103
Recommended application	● = well-suited ○ = limited suitability				
Aluminium < 8% Si	●	●	●	●	●
Aluminium > 8% Si	●	●	●	●	●
Copper alloy Bronze	●	●	●	●	●
Copper alloy Brass	●	●	●	●	●
Graphite					
Duro					
Thermo	○	○	○	○	○
GFK					○
CFK					○
Aramid					
Composite ceramic					
Fibre plast					
Honeycomb					
< 60 HRC					
< 67 HRC					
GG					
GGG					
VA < 900 N					
VA > 900 N					
Titanium					
Titanium alloy					
Nickel base					

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Overview of VHM-NE milling cutters (II)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16909 101-104	16909 105-108	16909 109-112	16911 103-108	16911 111-118	16912	16913	16914	16915	16916
	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW
										
Number of cutting edges	-	-	-	5	6	-	-	-	-	2
Diameter range mm	6 - 12	6 - 12	6 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	6 - 20	4 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	Dia. HC	Dia. HC	Dia. HC	Dia. HC	Dia. HC	-	-	-	-	-
Version	Short	Medium	Long	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Type / Profile	W	W	W	W	W	WF	WN	WR	WN	WF
Catalogue page	16.110	16.110	16.110	16.110	16.110	16.111	16.111	16.111	16.111	16.112
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si										
Aluminium > 8% Si										
Copper alloy Bronze										
Copper alloy Brass										
Graphite										
Duro										
Thermo										
GFK	●	●	●	●	●	●	●	●		●
CFK	●	●	●	●	●	●	●	●		●
Aramid				●	●	●	●	●		●
Composite ceramic										
Fibre plast	○	○	○	○	○	○	○	○		○
Honeycomb									●	
< 60 HRC										
< 67 HRC										
GG										
GGG										
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16917	16918	16919	16920	16921	16925	16926	16927	16928	16933
	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW
										
Number of cutting edges	2	2	2	2	2	-	-	-	-	-
Diameter range mm	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12	4 - 12
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	-	-	Dia. HC	Dia. HC	Dia. HC	Dia. HC	-	-	-	-
Version	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Type / Profile	WN	WR	WF	WN	WR	WN	WF	WN	WR	WN
Catalogue page	16.112	16.112	16.112	16.112	16.112	16.112	16.113	16.113	16.113	16.113
Recommended application	● = well-suited ○ = limited suitability									
Aluminium < 8% Si										
Aluminium > 8% Si										
Copper alloy Bronze										
Copper alloy Brass										
Graphite										
Duro										
Thermo										
GFK	●	●	●	●	●	●	●	●	●	
CFK	●	●	●	●	●	●	●	●	●	
Aramid	●	●	●	●	●	●	●	●	●	●
Composite ceramic										
Fibre plast	○	○	○	○	○	○	○	○	○	
Honeycomb							○	○	○	
< 60 HRC										
< 67 HRC										
GG										
GGG										
VA < 900 N										
VA > 900 N										
Titanium										
Titanium alloy										
Nickel base										

Overview of graphite milling cutters (I)

Brand	HHW	ATORN	ATORN	ATORN
Article number	16702	16703	16704	16705
				
Number of cutting edges	2 - 3	4	2	2
Diameter range mm	2 - 12	4 - 16	0.2 - 12	0.2 - 12
Cutting material	VHM	VHM	VHM	VHM
Coating	Diamond	Diamond	Diamond	Diamond
Version	Long/overlong	Short/long	Short/long	Short/long
Type / Profile	GFK	GFK	GFK	GFK
Catalogue page	16.107	16.107	16.108	16.109

Recommended application

Aluminium < 8% Si					
Aluminium > 8% Si					
Copper					
Plastic	●	●	●	●	
Graphite	●	●	●	●	
Steel < 520 N					
Steel < 750 N					
Steel < 900 N					
Steel < 1100 N					
Steel < 1200 N					
Steel < 1400 N					
Hardox					
< 50 HRC					
< 60 HRC					
< 67 HRC					
GG					
GGG					
VA < 900 N					
VA > 900 N					
Titanium					
Titanium alloy					
Nickel base					

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Overview of screw-in milling cutters (I)

Brand	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16763	16764	16765	16766	16767	16768	16769	16770	16771	16772	16773
											
Number of cutting edges	4	4 - 6	4 - 5	3	2	3	4	6 - 8	4	2	2
Diameter range mm	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	AlTiN	AlTiN	ZrN	TiAlN	TiAlN	TiAlN	TiAlN	Naco-blue	AlTiN	Naco-blue
Version	–	–	–	–	–	–	–	–	–	–	–
Type / Profile	HPC	NRf-MTC	NR-MTC	HPC	–	–	–	–	HPC/HSC	HSC	HPC/HSC
Catalogue page	16.115	16.115	16.115	16.116	16.116	16.116	16.116	16.117	16.117	16.117	16.118
Recommended application	● = well-suited ○ = limited suitability										
Aluminium < 10% Si				●	●	●	●				
Aluminium > 10% Si				●	●	●	●				
Copper				●	●	●	●	○			
Plastic				●	●	●					
Graphite											
Steel < 520 N	●	●	●		●	●	●	●	●	●	●
Steel < 750 N	●	●	●		●	●	●	●	●	●	●
Steel < 900 N	●	●	●		●	●	●	●	●	●	●
Steel < 1100 N	●	●	●		●	●	●	●	●	●	●
Steel < 1200 N	●	●	●		●	●	●	●	●	●	●
Steel < 1400 N	●	●	●		●	●	●	●	●	●	●
Hardox											
< 50 HRC										●	●
< 60 HRC										●	●
< 67HRC											
GG	●	○	●		●	●	●	●			
GGG	●	○	●		●	●	●	●			
VA < 900 N	○	●	●		●	●	●	●			
VA > 900 N		○									
Titanium											
Titanium alloy											
Nickel base											

Brand	ATORN	ATORN	ATORN	ATORN	ATORN
Article number	16774	16775	16776	16777	16778
					
Number of cutting edges	4	2	2	6	4
Diameter range mm	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	AlTiN	TiAlN	TiAlN	TiAlN
Version	–	–	–	–	–
Type / Profile	–	HSC	–	–	–
Catalogue page	16.118	16.118	16.118	16.119	16.119
Recommended application	● = well-suited ○ = limited suitability				
Aluminium < 10% Si			●	●	●
Aluminium > 10% Si			●	●	●
Copper	○		●	●	●
Plastic					
Graphite					
Steel < 520 N	●	●	●	●	●
Steel < 750 N	●	●	●	●	●
Steel < 900 N	●	●	●	●	●
Steel < 110 N	●	●	●	●	●
Steel < 1200 N	●	●	●	●	●
Steel < 1400 N	●	●	●	●	●
Hardox					
< 50 HRC		●			
< 60 HRC		●			
< 67 HRC					
GG	●		●		
GGG	●		●		
VA < 900 N	●		●	●	●
VA > 900 N				●	●
Titanium					
Titanium alloy					
Nickel base					

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

Overview

Brand	HHW	HHW	ATORN	ATORN	ATORN	HHW	HHW	HHW	HHW	ATORN	ATORN
Article number	16655	16664	16556 1..	16556 2..	16556 3..	16591 1..	16591 2..	16533	16534 2..	16535 2..	16535 3..
											
Number of cutting edges	2	5	4	4	4	4	4	4	4	3	3
Diameter range mm	3 - 12	6 - 20	4 - 20	4 - 20	4 - 20	3 - 25	3 - 25	3 - 20	4 - 20	3 - 20	3 - 20
Cutting material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	TiAlN	AlCrN	TiAlN	TiAlN	TiAlN	Multilay HPC[3]	Multilay HPC[3]	TiAlN	Nacro	TiAlN	TiAlN
Version	Overlong	Extra long	Short	Short	Short	Short	Short	Short	Long	Short	Short
Type / Profile	H	Trochoidal	HPC	HPC	HPC	HPC	HPC	HPC	HPC/VA	HPC	HPC
Catalogue page	16.75	16.77	16.83	16.83	16.83	16.52	16.52	16.48	16.48	16.42	16.42
Recommended application	● = well-suited	○ = limited suitability									
Aluminium < 10% Si			○	○	○				○		
Aluminium > 10% Si									○		
Copper			○	○	○				○		
Plastic											
Graphite											
Steel < 520 N	●	●				●	●	●		●	●
Steel < 750 N	●	●				●	●	●		●	●
Steel < 900 N	●	●				●	●	●		●	●
Steel < 1100 N	●	●				●	●	●	●	●	●
Steel < 1200 N	●	●				●	●	●	●	●	●
Steel < 1400 N	●	●				●	●	●		●	●
Hardox											
< 50 HRC	○	●									
< 60 HRC	●	●									
< 67 HRC	○										
GG						●	●	●			
GGG						●	●	●			
VA < 900 N	●		●	●	●	○	○	○	●	○	○
VA > 900 N	●		●	●	●			○	●	○	○
Titanium			○	○	○				○		
Titanium alloy			○	○	○				○		
Nickel base			○	○	○				○		

Brand	HHW	ATORN
Article number	16665	16630
		
Number of cutting edges	5	4 - 6
Diameter range mm	6 - 20	6 - 20
Cutting material	VHM	VHM
Coating	AlCrN	TiAlN-Ultra
Version	Overlong	Short
Type / Profile	Trochoidal	NR
Catalogue page	16.78	16.85
Recommended application	● = well-suited	○ = limited suitability
Aluminium < 10% Si		●
Aluminium > 10% Si		●
Copper		●
Plastic		
Graphite		
Steel < 520 N		○
Steel < 750 N		○
Steel < 900 N		●
Steel < 1100 N		●
Steel < 1200 N		●
Steel < 1400 N		●
Hardox		
< 50 HRC		
< 60 HRC		
< 67 HRC		
GG		○
GGG		○
VA < 900 N	●	●
VA > 900 N	●	●
Titanium	●	●
Titanium alloy	●	●
Nickel base	●	●

16500 - 16502 Solid carbide mini cutter

N | Z 3 | ≈ 30° | DIN 6535 HB | Uni

Design
- **Short**
- Right cutting
- **3 cutting edges**
- Right-hand twist approx. 30°
- **Centre cutting**
- Eccentric relief grinding
- Straight shank with driving surface similar to DIN 6535 HB

16500
Quality
Universal carbide ultra-fine grain (P20 - K40).

16502
Quality
Universal carbide ultra-fine grain (P20 - K40) TiAlN-coated.

VHM

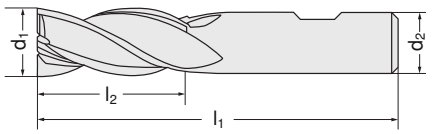
16500

VHM TiAlN

16502

Note:
Re-grinding of cutters with a small cutting-edge diameter is uneconomical.
It is therefore more economical to use cutters up to the wear limit and then throw them away.
You repeatedly use brand-new cutters and reduce the risk of having to scrap finished pieces.

NEW



				Solid carbide		Solid carbide/TiAlN	
d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16500	...	16502	...
1.5	4	35	6				**100**
2.0	4	35	6		**101**		**101**
2.5	4	35	6		**113**		**113**
3.0	5	36	6		**102**		**102**
3.5	5	36	6		**114**		**114**
4.0	7	38	6		**103**		**103**
4.5	7	38	6				**115**
5.0	8	39	6		**104**		**104**

				Solid carbide		Solid carbide/TiAlN	
d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16500	...	16502	...
5.5	8	39	6				**116**
6.0	8	39	6		**105**		**105**
8.0	11	43	8		**106**		**106**
10.0	13	50	10		**107**		**107**
12.0	15	55	12		**108**		**108**
16.0	18	62	16		**110**		
18.0	20	70	18		**111**		

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16500																	
200–300	160–240	140–200	70–100	75–90	60–75	55–70	50–60	-	-	-	-	-	40–60	30–40	-	70–120	-
16502																	
250–280	220–250	220–250	150–180	140–170	120–130	80–100	80–90	70–80	-	-	-	-	50–60	40–50	-	90–150	200–220

16505 - 16507 Solid carbide square end mill

N | Z 2 | ≈ 30° | DIN 6535 HA | Uni

Design
- **Short**
- Right cutting
- **2 cutting edges**
- Right-hand twist approx. 30°
- **Centre cutting**
- With smooth straight shank in accordance with DIN 6535 HA

16505
Quality
Universal carbide ultra-fine grain (P 20 - K 40).

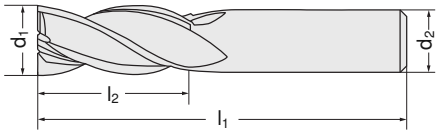
16507
Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.

VHM

16505

VHM TiAlN

16507



				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16505	...	16507	...
2.0	8	32	2.0		**101**		**101**
2.5	8	32	2.5		**102**		**102**
3.0	12	32	3.0		**103**		**103**
3.5	12	32	3.5		**104**		**104**
4.0	12	40	4.0		**105**		**105**
4.5	14	50	4.5		**106**		**106**
5.0	14	50	5.0		**107**		**107**
5.5	16	50	5.5		**108**		**108**
6.0	16	50	6.0		**109**		**109**

				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16505	...	16507	...
7.0	20	60	7.0		**110**		**110**
8.0	20	60	8.0		**111**		**111**
9.0	20	60	9.0		**112**		**112**
10.0	22	70	10.0		**113**		**113**
12.0	22	70	12.0		**114**		**114**
14.0	25	75	14.0		**115**		**115**
16.0	25	75	16.0		**116**		**116**
20.0	32	100	20.0		**117**		**117**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16505																	
180	160	140	120	100	90	80	70	60	-	-	-	-	80	60	-	85	-
16507																	
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	-	110	-

16603 Solid carbide long hole milling cutter

TiAlN Ultra | N | Z 2 | ≈ 30° | DIN 6535 HA | DIN 6535 HB | 45° | Uni

ATORN®

Design
- 2 cutting edges
- With centre cutting
- Radial relief
- With edge protection chamfer and clearance

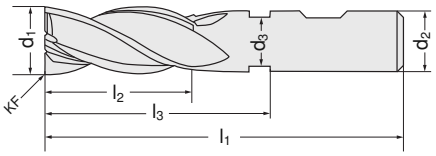
Applications
Universal use for plunge and groove milling.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16603 099-116
Design
With smooth straight shank in accordance with DIN 6535 HA.

16603 117-144
Design
With clamping surface in accordance with DIN 6535 HB.

16603 117-144



d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	16603 ...
0.25	3	-	38	-	0.5	0.1	099
0.35	3	-	38	-	1.0	0.1	100
0.3	3	-	38	-	1.0	0.1	101
0.5	3	-	38	-	1.5	0.1	103
0.8	3	-	38	-	2.0	0.1	106
1.0	3	-	50	-	3.0	0.1	108
1.2	3	-	50	-	4.0	0.1	110
1.4	3	-	50	-	4.0	0.1	111
1.5	3	-	50	-	4.0	0.1	112
1.6	3	-	50	-	4.0	0.1	113
2.0	3	-	50	-	5.0	0.1	115
2.5	3	-	50	-	6.0	0.1	116
2.8	6	2.6	57	15	8.0	0.1	117
3.0	6	2.8	57	15	8.0	0.1	118
3.8	6	3.6	57	15	11.0	0.1	119
4.0	6	3.8	57	15	11.0	0.1	120
4.8	6	4.6	57	21	13	0.1	121
5.0	6	4.8	57	21	13	0.1	122

d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	16603 ...
5.8	6	5.6	57	21	13	0.1	123
6.0	6	5.8	57	21	13	0.1	124
6.8	8	6.6	63	27	16	0.1	125
7.0	8	6.8	63	27	16	0.1	126
7.8	8	7.5	63	27	19	0.1	127
8.0	8	7.7	63	27	19	0.1	128
9.0	10	8.8	72	32	19	0.1	130
9.7	10	9.5	72	32	22	0.1	131
10.0	10	9.8	72	32	22	0.1	132
11.0	12	10.8	83	38	26	0.1	134
11.7	12	11.5	83	38	26	0.1	135
12.0	12	11.8	83	38	26	0.1	136
13.7	14	13.5	83	38	26	0.1	137
14.0	14	13.8	83	38	26	0.1	138
16.0	16	15.7	92	44	32	0.1	140
18.0	18	17.7	92	44	32	0.1	142
20.0	20	19.7	104	54	38	0.1	144

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16517 Solid carbide square end mill

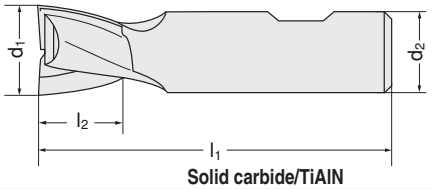
VHM TiAlN | N | Z 2 | ≈ 30° | DIN 6535 HB | Uni

HHW

Design
- **Long**
- Right cutting
- **2 cutting edges**
- Right-hand twist approx. 30°
- Spiral-fluted
- **Centre cutting**
- With clamping surface in accordance with DIN 6535 HB

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16517



Solid carbide/TiAlN

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16517 ...
3.0	7	57	6	101
3.5	7	57	6	102
4.0	8	57	6	103
4.5	8	57	6	104
5.0	10	57	6	105
6.0	10	57	6	106

Solid carbide/TiAlN

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16517 ...
8.0	16	63	8	108
10.0	19	72	10	110
12.0	22	83	12	111
16.0	26	92	16	113
20.0	32	104	20	115

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	100	80	80	65	50	50	-	-	-	-	65	50	-	-	-

16522 - 16524 Solid carbide square end mill

HW

Design
- **Short**
- Right cutting
- **3 cutting edges**
- Right-hand twist approx. 30°
- Spiral-fluted
- **Centre cutting**
- With smooth straight shank in accordance with DIN 6535 HA

16522
Quality
Universal carbide ultra-fine grain (P 20 - K 40)

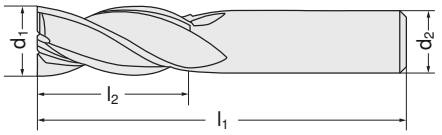
16524
Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.

VHM

16522

VHM TiAlN

16524

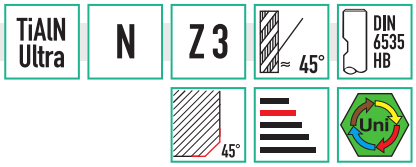


				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16522	...	16524	...
2.0	8	32	2		101		101
3.0	12	32	3		102		102
4.0	12	40	4		103		103
5.0	14	50	5		104		104
6.0	16	50	6		105		105
7.0	20	60	7		106		106
8.0	20	60	8		107		107

				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16522	...	16524	...
9.0	20	60	9		108		108
10.0	22	70	10		109		109
12.0	22	70	12		110		110
14.0	25	75	14		111		111
16.0	25	75	16		112		112
20.0	32	100	20		113		113

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16522																	
-	-	-	120	100	90	80	70	60	-	-	-	-	-	-	-	85	-
16524																	
-	-	-	150	130	120	100	90	80	-	-	-	-	105	80	-	110	-

16605 Solid carbide square end mill

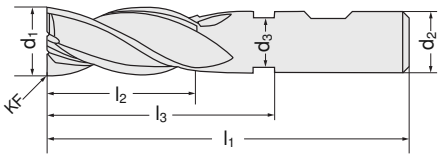


ATORN®

Design
- With clearance and edge protection chamfer
- With centre cutting
- 3 cutting edges

Applications
Universal application for plunge and groove milling, as well as for face and circumferential milling.
Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16605



d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16605	...
2.0	6	-	50	-	5	0.05	3		100
3.0	6	2.9	50	12	5	0.1	3		101
3.5	6	3.4	50	13	6	0.1	3		102
4.0	6	3.9	50	15	8	0.1	3		103
4.5	6	4.4	54	15	8	0.1	3		104
5.0	6	4.9	54	16	9	0.1	3		105
5.5	6	5.4	54	17	10	0.1	3		106
6.0	6	5.9	54	17	10	0.1	3		107
6.5	8	6.3	54	19	11	0.1	3		108
7.0	8	6.8	58	19	11	0.1	3		109
8.0	8	7.8	58	20	12	0.2	3		110
9.0	10	8.8	66	23	13	0.2	3		111
10.0	10	9.7	66	24	14	0.2	3		112
12.0	12	11.7	73	26	16	0.2	3		113
14.0	14	13.7	75	28	18	0.2	3		114
16.0	16	15.5	82	32	22	0.2	3		115
18.0	18	17.5	84	34	24	0.2	3		116
20.0	20	19.5	92	40	26	0.2	3		117

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

Solid carbide square end mill

16607 Solid carbide square end mill

TiAlN Ultra | N | Z 3 | ≈ 45° | DIN 6535 HB | 45° | Uni

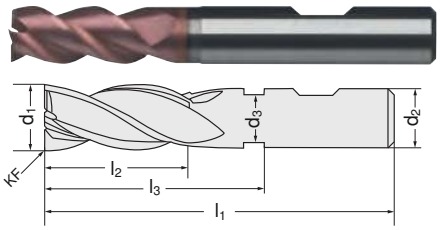
ATORN®

Design
- With centre cutting
- With edge protection chamfer and clearance

Applications
Universal application for plunge and groove cutters, as well as for face and circumferential milling.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16607



d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	16607	...
2.0	6	-	57	-	8	0.05		100
3.0	6	2.8	57	15	8	0.05		101
3.5	6	3.3	57	15	11	0.05		102
4.0	6	3.8	57	15	11	0.1		103
4.5	6	4.3	57	21	13	0.1		104
5.0	6	4.8	57	21	13	0.1		105
5.5	6	5.3	57	21	13	0.1		106
6.0	6	5.8	57	21	13	0.1		107
6.5	8	6.3	63	27	16	0.1		108
7.0	8	6.8	63	27	16	0.1		109
7.5	8	7.3	63	27	19	0.2		110

d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	16607	...
8.0	8	7.7	63	27	19	0.2		111
8.5	10	8.3	72	32	19	0.2		112
9.0	10	8.8	72	32	19	0.2		113
9.5	10	9.3	72	32	22	0.2		114
10.0	10	9.8	72	32	22	0.2		115
11.0	12	10.8	83	32	26	0.2		116
12.0	12	11.8	83	38	26	0.2		117
14.0	14	13.8	83	38	26	0.2		118
16.0	16	15.7	92	44	32	0.2		119
18.0	18	17.7	92	44	32	0.2		120
20.0	20	19.7	104	54	38	0.2		121

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16532 Solid carbide square end mill

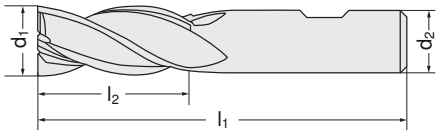
VHM TiAlN | N | Z 3 | ≈ 45° | DIN 6535 HB | Uni

HHW

Design
- **Long**
- Right cutting
- **3 cutting edges**
- Right-hand twist approx. 45°
- Spiral-fluted
- **Centre cutting**
- Straight shank with driving surface in accordance with DIN 6535 HB

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16532



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16532	...
3.0	7	57	6		101
3.5	7	57	6		102
4.0	8	57	6		103
4.5	8	57	6		104
5.0	10	57	6		105
6.0	10	57	6		106
7.0	13	63	8		107
8.0	16	63	8		108

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16532	...
9.0	16	72	10		109
10.0	19	72	10		110
12.0	22	83	12		111
14.0	22	83	14		112
16.0	26	92	16		113
18.0	26	92	18		114
20.0	32	104	20		115

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16606 Solid carbide square end mill

TiAlN Ultra | N | Z 3 | ≈ 30° | DIN 6535 HB | 45° | Uni

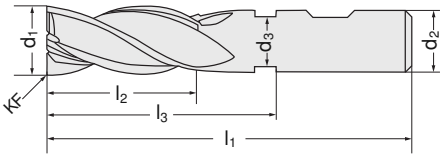
ATORN®

Design
- With clearance and edge protection chamfer
- With centre cutting
- 3 cutting edges

Applications
Universal application for plunge and groove milling, as well as for face and circumferential milling.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16606



d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16606	...
2.8	6	2.6	57	15	8	0.05	3		**101**
3.0	6	2.8	57	15	8	0.1	3		**102**
3.8	6	3.6	57	15	11	0.1	3		**103**
4.0	6	3.8	57	15	11	0.1	3		**104**
4.8	6	4.6	57	19	13	0.1	3		**105**
5.0	6	4.8	57	19	13	0.1	3		**106**
5.8	6	5.6	57	29	13	0.1	3		**107**
6.0	6	5.8	57	19	13	0.1	3		**108**
6.8	8	6.6	63	25	16	0.1	3		**109**
7.0	8	6.8	63	25	16	0.1	3		**110**
7.8	8	7.6	63	25	19	0.1	3		**111**
8.0	8	7.8	63	30	19	0.1	3		**112**
8.7	10	8.5	72	30	19	0.1	3		**113**
9.0	10	8.8	72	30	19	0.1	3		**114**
9.7	10	9.5	72	30	22	0.1	3		**115**
10.0	10	9.8	72	30	23	0.1	3		**116**
10.7	10	10.5	83	36	26	0.1	3		**117**
11.0	12	10.8	83	36	26	0.1	3		**118**
11.7	12	11.5	83	36	26	0.1	3		**119**
12.0	12	11.8	83	36	26	0.1	3		**120**
13.7	14	13.5	83	36	26	0.1	3		**121**
14.0	14	13.8	83	36	26	0.1	3		**122**
15.7	16	15.4	92	42	32	0.1	3		**123**
16.0	16	15.7	92	42	32	0.1	3		**124**
17.7	18	17.4	92	42	32	0.1	3		**125**
18.0	18	17.7	92	42	32	0.1	3		**126**
19.7	20	19.4	104	52	38	0.1	3		**127**
20.0	20	19.7	104	52	38	0.1	3		**128**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16612 Solid carbide square end mill

TiAlN Ultra | N | Z 3 | ≈ 45° | DIN 6535 HB | 45° | Uni

ATORN®

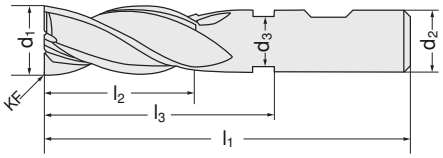
Design
- With clearance and edge protection chamfer
- With centre cutting
- 3 cutting edges

Applications
Universal application for plunge and groove milling, as well as for face and circumferential milling.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16612

d_1 h9 mm	d_2 mm	l_1 mm	l_2 mm	KF mm	Z	16612	...
3.5	6	59	15	0.05	3		**101**
4.0	6	63	19	0.1	3		**102**
4.5	6	63	19	0.1	3		**103**
5.0	6	68	24	0.1	3		**104**
5.5	6	68	24	0.1	3		**105**
6.0	6	68	24	0.1	3		**106**
6.5	8	80	30	0.1	3		**107**
7.0	8	80	30	0.1	3		**108**
7.5	8	80	30	0.1	3		**109**
8.0	8	88	38	0.2	3		**110**
8.5	10	88	38	0.2	3		**111**
9.0	10	88	38	0.2	3		**112**
9.5	10	88	38	0.2	3		**113**
10.0	10	95	45	0.2	3		**114**
11.0	12	102	45	0.2	3		**115**
12.0	12	110	53	0.2	3		**116**
14.0	14	110	53	0.2	3		**117**
16.0	16	123	63	0.2	3		**118**
18.0	18	123	63	0.2	3		**119**
20.0	20	141	75	0.2	3		**120**



Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16535 Solid carbide high-performance end mill HPC 41/43/45°

VHM TiAlN | HPC | Z 3 | 41°/ 43°/45° | Uni

ATORN®

Design
- With micro corner protection

Advantage:
- Optimised chip removal
- Up to 60% higher feeds
- Up to 4 times the service life
- Best surface quality

Applications
For roughing and finishing.

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.

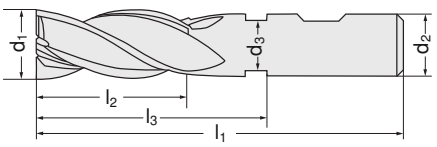
DIN 6535 HA

16535 203-220

DIN 6535 HB

16535 303-320

d_1 e8 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	DIN 6535 HA 16535	...	DIN 6535 HB 16535	...
3.0	8	15	57	6	2.7		**203**		**303**
4.0	11	18	57	6	3.7		**204**		**304**
5.0	13	18	57	6	4.7		**205**		**305**
6.0	13	21	57	6	5.7		**206**		**306**
8.0	19	27	63	8	7.5		**208**		**308**
10.0	22	32	72	10	9.2		**210**		**310**
12.0	26	38	83	12	11.0		**212**		**312**
16.0	32	44	92	16	15.0		**216**		**316**
20.0	38	54	104	20	19.0		**220**		**320**



Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
Roughing																	
-	-	-	180–200	180–200	160–180	160–180	140–160	140–160	-	-	-	-	120–140	100–120	45–55	140–160	-
Finishing																	
-	-	-	260–280	260–280	200–220	200–220	180–200	180–200	-	-	-	-	130–160	100–130	55–70	160–180	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16618 Solid carbide end mill

TiAlN Ultra | N | Z 4 | ≈ 45° | DIN 6535 HB | 90° | Uni

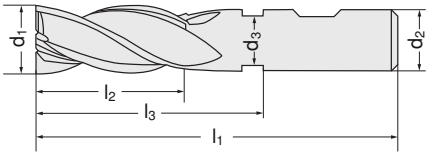
ATORN®

Design
- With clearance and radial relief
- With centre cutting
- 4 cutting edges

Applications
Universal application for finishing.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16618



d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	Z	16618	...
2.0	6	-	57	-	8	4		102
3.0	6	-	57	-	8	4		103
4.0	6	3.9	57	18	11	4		104
5.0	6	4.9	57	19	13	4		105
6.0	6	5.9	57	19	13	4		106
8.0	8	7.7	63	25	19	4		108
10.0	10	9.7	72	30	22	4		110
12.0	12	11.7	83	36	26	4		112
16.0	16	15.5	92	42	32	4		116
20.0	20	19.5	104	52	38	4		120

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16552 Solid carbide drill and plunge mill

VHM AlTiN | HPC | Z 4 | 36°/38° | 90° | Uni

HHW

Design
- Face geometry for drilling and ramping with clearance

Advantage:
- High feeds even when ramping and drilling
- Plunge angle up to 45°

Applications
Uneven pitch and uneven twist angle angle to prevent vibrations.

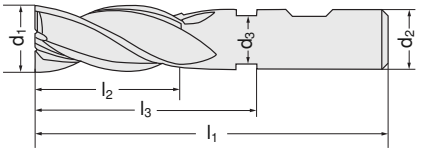
Note:
Undersized tools for precise fitting.

DIN 1835 HA

16552 101-114

DIN 1835 HB

16552 201-214



						DIN 1835 HA		DIN 1835 HB	
d_1 (h10) mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	16552	...	16552	...
5.7	13	19	57	6	5.4		101		201
6.0	13	19	57	6	5.7		102		202
7.7	19	25	63	8	7.3		103		203
8.0	19	25	63	8	7.6		104		204
9.7	22	30	72	10	9.2		105		205
10.0	22	30	72	10	9.5		106		206
11.7	26	36	83	12	11.2		107		207
12.0	26	36	83	12	11.5		108		208
13.7	26	36	83	14	13.2		109		209
14.0	26	36	83	14	13.5		110		210
15.6	32	42	92	16	15.1		111		211
16.0	32	42	92	16	15.5		112		212
19.5	38	52	104	20	19.0		113		213
20.0	38	52	104	20	19.5		114		214

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	210	200	180	150	120	100	-	-	-	-	120	90	70	150	-

16537 - 16539 Solid carbide square end mill

N | Z 4 | ≈ 30° | DIN 6535 HA | Uni

HW

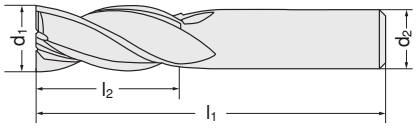
Design
- **Short**
- Right cutting
- **4 cutting edges**
- Right-hand twist approx. 30°
- **Centre cutting**
- With smooth shank in accordance with DIN 6535 HA

16537

VHM

16539

VHM TiAlN



				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16537	...	16539	...
2.0	8	32	2.0		101		101
3.0	12	32	3.0		102		102
4.0	12	40	4.0		103		103
5.0	14	50	5.0		104		104
6.0	16	50	6.0		105		105
7.0	20	60	7.0		106		106

				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16537	...	16539	...
8.0	20	60	8.0		107		107
10.0	22	70	10.0		109		109
12.0	22	70	12.0		110		110
14.0	25	75	14.0		111		111
16.0	25	75	16.0		112		112
20.0	32	100	20.0		113		113

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16537																	
180	160	140	120	100	90	80	70	60	-	-	-	-	80	60	30	85	-
16539																	
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

16542 - 16543 Solid carbide square end mill

N | Z 4 | ≈ 30° | DIN 6535 HA | Uni

HW

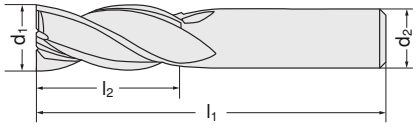
Design
- **Long**
- Right cutting
- **4 cutting edges**
- Right-hand twist approx. 30°
- **Centre cutting**
- With smooth shank in accordance with DIN 6535 HA

16542

VHM

16543

VHM TiAlN



				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16542	...	16543	...
4.0	10	50	4		102		102
5.0	13	50	5		104		104
6.0	13	57	6		106		106
8.0	19	63	8		110		110
10.0	22	72	10		114		114

				Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16542	...	16543	...
12.0	26	83	12		116		116
14.0	26	83	14				118
16.0	32	92	16		120		120
18.0	32	92	18				121
20.0	38	104	20				122

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16542																	
180	160	140	120	100	90	80	70	60	-	-	-	-	80	60	30	85	-
16543																	
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

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16610 Solid carbide HPC end mill

TiAlN Ultra | HPC | Z 4 | ≈ 30° | DIN 6535 HA | DIN 6535 HB | Uni

ATORN®

Design
- Short
- With centre cutting
- 4 cutting edges
- 2 cutting edges for centre cutting
- Optimum chip removal thanks to an extremely smooth surface

Applications
Universal application for finishing.

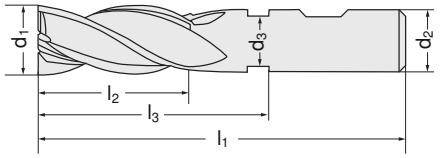
Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16610 102-104
Design
- **Without clearance**
- With smooth straight shank in accordance with DIN 6535 HA

16610 105
Design
- **With clearance**
- With smooth straight shank in accordance with DIN 6535 HA

16610 106-120
Design
- **With clearance**
- With clamping surface in accordance with DIN 6535 HB

16610



d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	16610 ...
2.0	2	-	32	-	8	102
3.0	3	-	38	-	12	103
4.0	4	-	40	-	12	104
5.0	5	4.8	50	20	15	105
6.0	6	5.8	58	20	16	106
8.0	8	7.7	70	32	22	108
10.0	10	9.7	73	31	25	110
12.0	12	9.6	84	37	28	112
16.0	16	15.5	93	43	35	116
20.0	20	19.5	104	52	40	120

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16545 - 16547 Solid carbide square end mill

N | Z 4 | ≈ 30° | DIN 6535 HB | Uni

HW

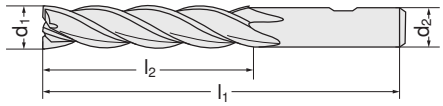
Design
- **Long**
- Right cutting
- **4 cutting edges**
- Right-hand twist approx. 30°
- Spiral-fluted
- **Centre cutting**
- Straight shank with driving surface in accordance with DIN 6535 HB

16545

VHM

16547

VHM TiAlN



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	Solid carbide 16545 ...	Solid carbide/TiAlN 16547 ...
3.0	8	57	6	101	101
3.5	10	57	6	102	102
4.0	11	57	6	103	103
4.5	11	57	6		104
5.0	13	57	6	105	105
6.0	13	57	6	106	106
7.0	16	63	8		107

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	Solid carbide 16545 ...	Solid carbide/TiAlN 16547 ...
8.0	19	63	8	108	108
9.0	19	72	10		109
10.0	22	72	10	110	110
12.0	26	83	12	111	111
16.0	32	92	16	113	113
18.0	32	92	18		114
20.0	38	104	20	115	115

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16545																	
180	160	140	120	100	90	80	70	60	-	-	-	-	80	60	30	85	-
16547																	
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

16548 - 16549 Solid carbide square end mill

N | Z 4 | ≈ 30° | DIN 6535 HA | Uni

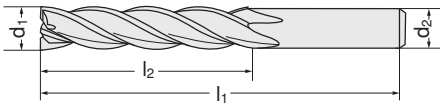
Design
- **Extra-long**
- Right cutting
- **4 cutting edges**
- Right-hand twist approx. 30°
- Spiral-fluted
- **Centre cutting**
- With smooth shank DIN 6535 HA

VHM

16548

VHM TiAlN

16549



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	Solid carbide 16548	...	Solid carbide/TiAlN 16549	...
3.0	30	75	3		101		101
4.0	30	75	4		102		102
5.0	40	100	5		103		103
6.0	50	150	6		104		104
8.0	50	150	8		105		105
10.0	60	150	10		106		106
12.0	75	150	12		107		107

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16548																	
100	80	70	80	60	60	50	40	40	-	-	-	-	50	40	30	60	-
16549																	
130	100	90	100	80	80	65	50	50	-	-	-	-	65	50	40	80	-

16527 Solid carbide end mill 35/38° HPC Power Uni

VHM TiAlN | HPC | Z 4 | 35°/38° | 45° | Uni

ATORN®

Design
- High-performance tool for roughing/finishing machining tasks with an uneven twist angle
- Face side for centre cutting
- With edge protection chamfer

Advantage:
- Highest level of machining

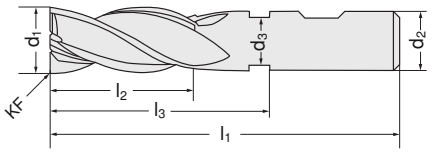
Applications
For machining steel and cast iron and for universal use.

DIN 6535 HA

16527 101-120

DIN 6535 HB

16527 204-220



d_1 (h10) mm	d_3 (h6) mm	l_2 mm	l_3 mm	l_1 mm	KF mm	DIN 6535 HA 16527	...	DIN 6535 HB 16527	...
1.0	4	2.5	3	40	0.025		101		
2.0	4	4.0	6	40	0.05		102		
3.0	4	6.0	9	40	0.075		103		
4.0	6	8.0	12	54	0.1		104		204
5.0	6	10.0	15	54	0.15		105		205
6.0	6	13.0	21	57	0.2		106		206
8.0	8	19.0	27	63	0.2		108		208
10.0	10	22.0	32	72	0.2		110		210
12.0	12	26.0	38	83	0.2		112		212
14.0	14	26.0	38	83	0.3		114		214
16.0	16	32.0	44	92	0.3		116		216
18.0	18	32.0	44	92	0.3		118		218
20.0	20	38.0	54	104	0.3		120		220

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	230–275	200–275	200–240	140–180	110–140	100–120	-	-	-	-	-	-	-	150–220	

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

Solid carbide premium end mill HPC Steel

VHM Varocon | HPC | Z 4 | 45° | ≠ | 35°/38° | Norm | DIN 6535 HA | DIN 6535 HB | ≤ 1400 N/mm²

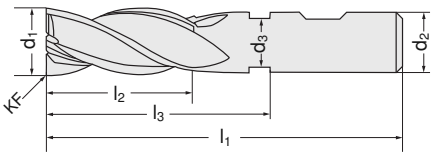
Design
- Specially edge-treated solid carbide HPC end mill with **Varocon Plus coating**
- High machining volumes possible
- Additional special feature of the HHW HPC Premium cutter is the face specially optimised for ramping
- Micro-geometry and defined cutting edge preparation
- Polished chip chambers

Applications
High-performance tool for steel machining.
For roughing and finishing.

Quality
Solid carbide ultra-fine grain.

NEW

Note:
This tool is not suitable for steels with high chromium content.
Make sure the tool and workpiece are strongly clamped.



Short without clearance

16592 103-120

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	KF x 45° mm	DIN 6535 HA 16592	...	DIN 6535 HB 16592	...
3.0	6	54	6	0.06		103		203
4.0	8	54	6	0.08		104		204
5.0	9	54	6	0.10		105		205
6.0	10	54	6	0.13		106		206
8.0	12	58	8	0.15		108		208
10.0	14	66	10	0.20		110		210
12.0	16	73	12	0.25		112		212
16.0	22	82	16	0.35		116		216
20.0	26	92	20	0.40		120		220

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	280	270	260	250	190	180	-	-	-	-	-	-	-	220	-

Long with clearance

16593 103-120

d_1 h10 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16593	...	DIN 6535 HB 16593	...
3.0	8	18	57	6	2.8	0.06		103		203
4.0	11	21	57	6	3.6	0.08		104		204
5.0	13	21	57	6	4.6	0.10		105		205
6.0	13	21	57	6	5.5	0.13		106		206
8.0	19	27	63	8	7.5	0.15		108		208
10.0	22	32	72	10	9.5	0.20		110		210
12.0	26	38	83	12	11.5	0.25		112		212
16.0	32	44	92	16	15.5	0.35		116		216
20.0	38	54	104	20	19.5	0.40		120		220

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	280	270	260	250	190	180	-	-	-	-	-	-	-	220	-

Extra-long with clearance

16594 106-120

d_1 h10 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16594	...	DIN 6535 HB 16594	...
6.0	22	42	80	6	5.5	0.13		106		206
8.0	28	62	100	8	7.5	0.15		108		208
10.0	33	58	100	10	9.5	0.20		110		210
12.0	42	73	120	12	11.5	0.25		112		212
16.0	53	100	150	16	15.5	0.35		116		216
20.0	68	98	150	20	19.5	0.40		120		220

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	220	210	200	190	150	140	-	-	-	-	-	-	-	200	-

16533 - 16534 Solid carbide end mill 35/38° G2

HPC | Z 4 | 35°/38° | DIN 6535 HB

VHM TiAlN | DIN 6535 HB

16533

VHM TiAlN | DIN 6535 HB | Uni

16534 103-120

VHM Nacro | DIN 6535 HB | VA | Ti/Ni

16534 204-220

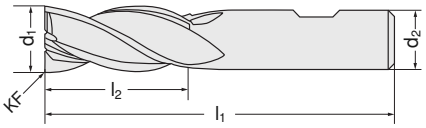
VHM TiAlN | DIN 6535 HA | Uni

16534 304-320

Design
- **4 cutting edges**
- **Centre cutting**
- Right-hand twist with uneven **pitch 35/38°**
- Optimised chip chamber
- Up to 80% longer service life
- Up to 60% more feed
- Roughing and finishing with just one tool
- No vibration

Applications
Uneven twist angles produce smooth, **vibration-free running** and good surface quality. **High machining performance.**

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.
Type VA: Nacro-coated.



Short					Short/6535HB	
d_1 mm	l_2 mm	l_1 mm	d_2 mm	KF mm	16533	...
3.0	6	54	6	0.10		103
4.0	8	54	6	0.13		104
5.0	9	54	6	0.18		105
6.0	10	54	6	0.20		106
7.0	12	58	8	0.20		107
8.0	12	58	8	0.20		108
9.0	14	66	10	0.30		109
10.0	14	66	10	0.30		110
11.0	16	73	12	0.30		111
12.0	16	73	12	0.30		112
14.0	18	75	14	0.30		114
16.0	22	82	16	0.40		116
18.0	24	84	18	0.40		118
20.0	26	92	20	0.50		120

Long					Long/6535HB		VA/6535HB		Long/6535HA	
d_1 mm	l_2 mm	l_1 mm	d_2 mm	KF mm	16534	...	16534	...	16534	...
3.0	8	57	6	0.10		103				
4.0	11	57	6	0.13		104		204		304
5.0	13	57	6	0.18		105		205		305
6.0	13	57	6	0.20		106		206		306
7.0	19	63	8	0.20		107				307
8.0	19	63	8	0.20		108		208		308
9.0	22	72	10	0.30		109				309
10.0	22	72	10	0.30		110		210		310
11.0	26	83	12	0.30		111				311
12.0	26	83	12	0.30		112		212		312
14.0	26	83	14	0.30		114				314
16.0	32	92	16	0.40		116		216		316
18.0	32	92	18	0.40		118				318
20.0	38	104	20	0.50		120		220		320

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
Roughing																	
450	250	80–160	180–230	180–190	170–180	165–170	150–160	40–60	-	-	-	-	105–130	70–75	105–160	145–160	-
Finishing																	
600	400	140–250	300	220–235	210–220	190–210	180–190	50–80	-	-	-	-	130–160	80–90	130–200	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16536 Solid carbide end mill 35/38° HPC G2 with released shank

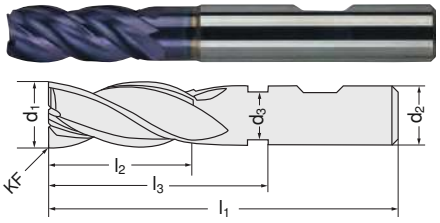
VHM TiAlN | HPC | Z 4 | 35°/38° | DIN 6535 HB | | | Uni

Design
- **Long**
- With released straight shank with driving surface in accordance with DIN 6535 HB
- **4 cutting edges**
- **Centre cutting**
- Right-hand twist with uneven **pitch 35/38°**
- Optimised chip chamber
- Up to 80% longer service life
- Up to 60% more feed
- Roughing and finishing with just one tool

Applications
For materials up to HRC 52.
Uneven twist angles produce smooth, **vibration-free running** and good surface quality.
High machining performance.

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.

16536



d1 mm	d3 mm	l2 mm	l1 mm	d2 mm	l3 mm	KF mm	16536	...
4.0	3.6	11	57	6	21	0.13		101
5.0	4.6	13	57	6	21	0.18		102
6.0	5.5	13	57	6	21	0.2		103
7.0	6.5	19	63	8	27	0.2		104
8.0	7.5	19	63	8	27	0.2		105
9.0	8.5	22	72	10	32	0.3		106
10.0	9.5	22	72	10	32	0.3		107

d1 mm	d3 mm	l2 mm	l1 mm	d2 mm	l3 mm	KF mm	16536	...
11.0	10.5	26	83	12	38	0.3		108
12.0	11.5	26	83	12	38	0.3		109
13.0	12.5	26	83	14	42	0.3		110
14.0	13.5	26	83	14	42	0.3		111
16.0	15.5	32	92	16	44	0.4		112
18.0	17.5	32	92	18	50	0.4		113
20.0	19.5	38	104	20	54	0.5		114

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
Roughing																	
450	250	80–160	180–230	180–190	170–180	165–170	150–160	40–60	-	-	-	-	105–130	70–75	105–160	145–160	-
Finishing																	
600	400	140–250	300	220–235	210–220	190–210	180–190	50–80	-	-	-	-	130–160	80–90	130–200	-	-

16627 Solid carbide HPC end mill

TiAlN Ultra | HPC | N | Z 4 | 35°/38° | DIN 6535 HB | 45° | | Uni

ATORN®

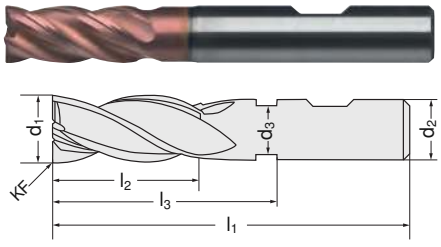
Design
- With clearance and edge protection chamfer
- With centre cutting
- 4 cutting edges

Advantage:
- Maximum smoothness

Applications
For roughing and finishing with the highest feed values of up to 1x5xD.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16627



d1 h9 mm	d2 mm	d3 mm	l1 mm	l3 mm	l2 mm	KF mm	Z	16627	...
3.0	6	2.7	50	10	5	0.05	4		101
3.0	6	2.7	57	13	8	0.05	4		102
4.0	6	3.7	54	17	8	0.1	4		103
4.0	6	3.7	57	17	11	0.1	4		104
5.0	6	4.7	54	14	9	0.1	4		105
5.0	6	4.7	57	17	13	0.1	4		106
6.0	6	5.5	54	17	10	0.1	4		107
6.0	6	5.5	57	19	13	0.1	4		108
8.0	8	7.4	58	22	12	0.2	4		109
8.0	8	7.4	63	25	21	0.2	4		110
10.0	10	9.2	66	26	14	0.2	4		111
10.0	10	9.2	72	30	22	0.2	4		112
12.0	12	11.0	73	28	16	0.2	4		113
12.0	12	11.0	83	36	26	0.2	4		114
14.0	14	13.0	83	36	26	0.2	4		115
16.0	16	15.0	82	34	22	0.2	4		116
16.0	16	15.0	92	42	36	0.2	4		117
20.0	20	19.0	92	42	26	0.2	4		118
20.0	20	19.0	104	52	41	0.2	4		119

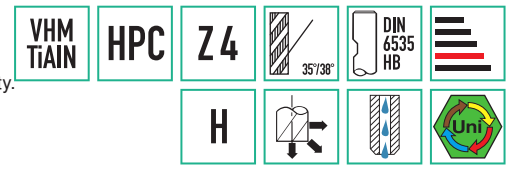
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	240–250	230–240	150–200	150–190	150–190	150–170	-	-	-	-	-	-	-	140–200	-

16538 Solid carbide end mill 35/38° HPC with internal cooling supply

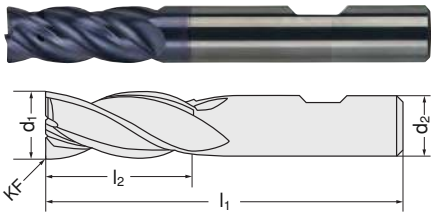
Design
- **Type H, long**
- Straight shank with driving surface in accordance with DIN 6535 HB
- **4 cutting edges**
- **Centre cutting**
- Right-hand twist with uneven **pitch 35/38°**
- Optimised chip chamber
- Up to 80% longer service life
- Up to 60% more feed
- Roughing and finishing with just one tool

Applications
For materials up to HRC 52.
Uneven twist angles produce smooth, **vibration-free running** and good surface quality.
High machining performance.

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.



16538



d_1 mm	l_2 mm	l_1 mm	d_2 mm	KF mm	16538	...
6.0	13	57	6	0.2		106
8.0	19	63	8	0.2		108
10.0	22	72	10	0.3		110

d_1 mm	l_2 mm	l_1 mm	d_2 mm	KF mm	16538	...
12.0	26	83	12	0.3		112
16.0	32	92	16	0.4		116
20.0	38	104	20	0.5		120

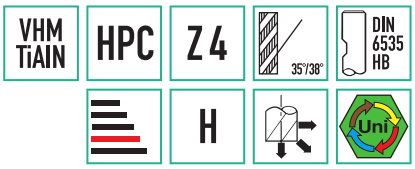
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
Roughing																	
450	250	80–160	180–230	180–190	170–180	165–170	150–160	40–60	-	-	-	-	105–130	70–75	105–160	145–160	-
Finishing																	
600	400	140–250	300	220–235	210–220	190–210	180–190	50–80	-	-	-	-	130–160	80–90	130–200	-	-

16540 Solid carbide end mill 35/38° HPC G2 with corner radius

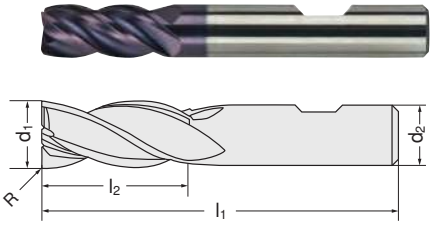
Design
- **Type H, long**
- Straight shank with driving surface in accordance with DIN 6535 HB
- **4 cutting edges**
- **Centre cutting**
- Right-hand twist with uneven **pitch 35/38°**
- Optimised chip chamber
- Up to 80% longer service life
- Up to 60% more feed
- Roughing and finishing with just one tool

Applications
For materials up to HRC 52.
Uneven twist angles produce smooth, **vibration-free running** and good surface quality.
High machining performance.

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.



16540



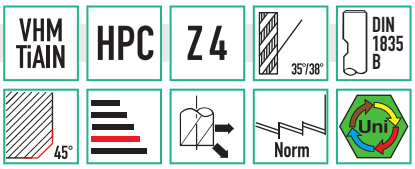
d_1 mm	l_2 mm	l_1 mm	d_2 mm	Corner radius mm	16540	...
4.0	11	57	6	0.50		102
4.0	11	57	6	1.00		103
5.0	13	57	6	0.50		104
5.0	13	57	6	1.00		105
6.0	13	57	6	0.50		107
6.0	13	57	6	1.50		109
6.0	13	57	6	2.00		110
8.0	19	63	8	0.50		111
8.0	19	63	8	1.00		112
8.0	19	63	8	2.00		114

d_1 mm	l_2 mm	l_1 mm	d_2 mm	Corner radius mm	16540	...
10.0	22	72	10	0.50		115
10.0	22	72	10	1.00		116
10.0	22	72	10	1.50		117
12.0	26	83	12	0.50		119
12.0	26	83	12	1.00		120
12.0	26	83	12	1.50		121
12.0	26	83	12	2.00		122
16.0	32	92	16	1.00		125
16.0	32	92	16	2.00		127
16.0	32	92	16	2.50		128
20.0	38	104	20	1.00		131
20.0	38	104	20	2.00		133

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
Roughing																	
450	250	80–160	180–230	180–190	170–180	165–170	150–160	40–60	-	-	-	-	105–130	70–75	105–160	145–160	-
Finishing																	
600	400	140–250	300	220–235	210–220	190–210	180–190	50–80	-	-	-	-	130–160	80–90	130–200	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

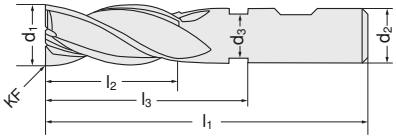
16554 Solid carbide end mill G2 medium long



Design
- Uneven twist 35/38°
- Optimised chip chamber
- Up to 80% longer service life and up to 60% more feed
- Roughing and finishing with just one tool
- Low-vibration running

Advantage:
- Maximum machining performance

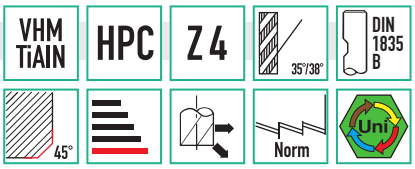
16554



d_1 mm	d_3 mm	l_2 mm	l_1 mm	d_2 mm	l_3 mm	KF mm	16554	...
5.0	4.7	18	62	6	24	0.18		101
6.0	5.6	21	62	6	25	0.2		102
8.0	7.6	26	68	8	30	0.2		103
10.0	9.6	31	80	10	38	0.3		104
12.0	11.4	41	93	12	46	0.3		105
16.0	15.4	52	108	16	58	0.4		106
20.0	19.4	62	126	20	74	0.5		107

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	140–160	130–135	120–130	105–120	85–105	60–85	-	-	-	-	65–80	-	-	110–160	-

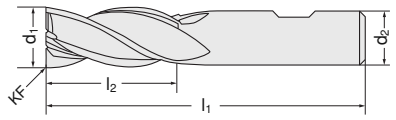
16555 Solid carbide end mill G2 extra long



Design
- Uneven twist 35/38°
- Optimised chip chamber
- Up to 80% longer service life up to 60% more feed
- Roughing and finishing with just one tool
- Low-vibration running

Advantage:
- Maximum machining performance

16555



d_1 mm	l_2 mm	l_1 mm	KF mm	d_2 mm	16555	...
5.0	21	63	0.18	6		101
6.0	22	63	0.2	6		102
8.0	28	80	0.2	8		103
10.0	33	100	0.3	10		104
12.0	42	100	0.3	12		105
14.0	48	100	0.3	14		106
16.0	53	150	0.4	16		107
20.0	68	150	0.5	20		108
25.0	85	165	0.5	25		109

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	110-120	100-110	90-100	80-90	65-80	45-65	-	-	-	-	50-60	-	-	85-120	-

16591 Solid carbide end mill Premium Gold Edition

VHM Multilay HPC³ | Z 4 | 35°/38° | ≤ 1200 N/mm² | Norm

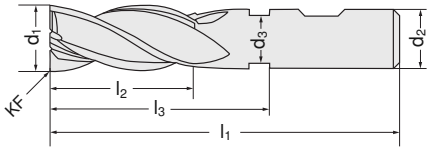
Design
- High-performance tool with improved substrate
- With increasing core size
- Large shaped groove
- Defined support chamfer
- Roughened clamping shank
- Uneven pitch
- New multi-layer smooth layer
- With clearance

Advantage:
- **Extremely long service life**
- **Maximum smoothness**
- **Maximum process reliability**

Applications
For universal use with all steel materials. HPC cutter for roughing and finishing.

DIN 6535 HA — 16591 103-125

DIN 6535 HB — 16591 203-225



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	KF mm	DIN 6535 HA 16591	...	DIN 6535 HB 16591	...
3.0	8	18	57	6	2.8	0.13		103		203
4.0	11	21	57	6	3.6	0.18		104		204
5.0	13	21	57	6	4.6	0.20		105		205
6.0	13	21	57	6	5.5	0.20		106		206
8.0	19	27	63	8	7.5	0.20		108		208
10.0	22	32	72	10	9.5	0.30		110		210
12.0	26	38	83	12	11.5	0.30		112		212
16.0	32	44	92	16	15.5	0.40		116		216
20.0	38	54	104	20	19.5	0.50		120		220
25.0	42	65	121	25	24.0	0.50		125		225

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	170-238	160-228	140-222	125-175	110–105	78-109	-	-	-	-	78-109	-	-	140-238	-

16640 Solid carbide HSC torus milling cutter

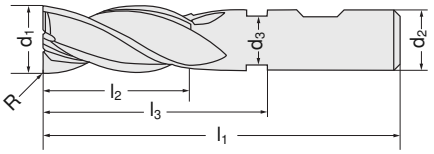
TiAlN Ultra | HSC | N | Z 4 | ≈ 30° | DIN 6535 HB | R | Uni

Design
- With clearance and edge protection chamfer
- With centre cutting
- With uneven cutting edge pitch
- 4 cutting edges

Applications
For circumferential machining and finishing.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16640



d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	R mm	Z	16640	...
3.0	6	2.7	57	13	8	0.1	4		101
3.0	6	2.7	57	13	8	0.4	4		102
3.0	6	2.7	57	13	8	0.5	4		103
3.0	6	2.7	57	13	8	1.0	4		104
4.0	6	3.7	57	17	11	0.1	4		105
4.0	6	3.7	57	17	11	0.4	4		106
4.0	6	3.7	57	17	11	0.5	4		107
4.0	6	3.7	57	17	11	1.0	4		108
5.0	6	4.7	57	19	13	0.1	4		109
5.0	6	4.7	57	19	13	0.5	4		110
5.0	6	4.7	57	19	13	1.0	4		111
6.0	6	5.5	57	19	13	0.1	4		112
6.0	6	5.5	57	19	13	0.5	4		113
6.0	6	5.5	57	19	13	1.0	4		114
6.0	6	5.5	57	19	13	1.5	4		115
8.0	8	7.4	63	25	21	0.15	4		116
8.0	8	7.4	63	25	21	0.5	4		117
8.0	8	7.4	63	25	21	1.0	4		118
8.0	8	7.4	63	25	21	1.5	4		119

d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	R mm	Z	16640	...
8.0	8	7.4	63	25	21	2.0	4		120
10.0	10	9.2	72	30	22	0.15	4		121
10.0	10	9.2	72	30	22	0.5	4		122
10.0	10	9.2	72	30	22	1.0	4		123
10.0	10	9.2	72	30	22	1.5	4		124
10.0	10	9.2	72	36	26	2.0	4		125
12.0	12	11.0	83	36	26	0.2	4		126
12.0	12	11.0	83	36	26	0.5	4		127
12.0	12	11.0	83	36	26	1.0	4		128
12.0	12	11.0	83	36	26	1.5	4		129
12.0	12	11.0	83	36	26	2.0	4		130
16.0	16	15.0	92	42	36	0.3	4		131
16.0	16	15.0	92	42	36	1.0	4		132
16.0	16	15.0	92	42	36	2.0	4		133
16.0	16	15.0	92	42	36	4.0	4		134
20.0	20	19.0	104	52	41	1.0	4		135
20.0	20	19.0	104	52	41	2.0	4		136
20.0	20	19.0	104	52	41	4.0	4		137

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	330–400	220–250	220–250	220–230	180–220	150–180	130–140	130–140	-	-	-	-	120–130	120–130	100–160	120–180	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16616 Solid carbide multi-tooth mills

TiAlN Ultra | N | Z 6–8 | ≈ 45° | DIN 6535 HB | 45° | VA | Uni

ATORN®

Design
- With clearance and edge protection chamfer
- With centre cutting
- 6–8 cutting edges
- 2 cutting edges for centre cutting

Advantage:
- Optimum surface quality

Applications
For circumferential machining and finishing.

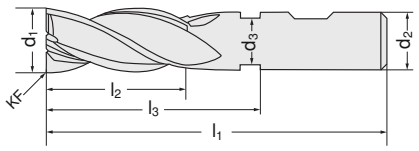
Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

Note:
- Face cut only with shallow feed depth.

16616

Short

d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16616	...
4.0	6	3.7	57	19	11	0.1	6		**201**
5.0	6	4.7	57	19	13	0.1	6		**202**
6.0	6	5.7	57	19	13	0.1	6		**203**
8.0	8	7.6	63	25	19	0.1	6		**204**
10.0	10	9.6	72	30	22	0.1	6		**205**
12.0	12	11.5	83	36	26	0.2	6		**206**
16.0	16	15.5	92	42	32	0.2	6		**208**
18.0	18	17.5	92	42	32	0.2	8		**209**
20.0	20	19.5	104	52	38	0.2	8		**210**



Long

d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16616	...
6.0	6	5.7	62	24	18	0.1	6		**303**
8.0	8	7.6	68	30	24	0.1	6		**304**
10.0	10	9.6	80	38	30	0.1	6		**305**
12.0	12	11.5	93	46	36	0.2	6		**306**
16.0	16	15.5	108	58	48	0.2	8		**308**
20.0	20	19.5	126	74	60	0.2	8		**310**

Extra long

d_1 e8 mm	d_2 h5 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16616	...
6.0	6	5.8	80	40	16	0.1	6		**403**
8.0	8	7.7	100	50	19	0.1	6		**404**
10.0	10	9.7	100	60	25	0.1	6		**405**
12.0	12	11.6	120	60	30	0.2	6		**406**
16.0	16	15.6	150	100	40	0.2	6		**408**
16.0	16	15.5	150	100	75	0.2	6		**409**
20.0	20	19.6	150	100	50	0.2	8		**410**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

16551 Solid carbide end mill

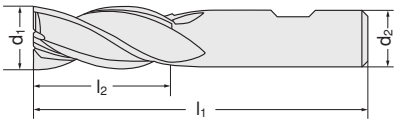
VHM TiAlN | N | Z 6–8 | ≈ 45° | DIN 6535 HB | Uni

HHW

Design
- Right cutting
- Straight shank with driving surface in accordance with DIN 6535 HB
- Right-hand twist approx. 45°
- **6-8 cutting edges**

Applications
For circumferential milling as a finishing operation to achieve optimum surface quality (face cut only with low cutting depths).

16551



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	Z	16551	...
6.0	13	57	6	6		**101**
8.0	19	63	8	6		**103**
10.0	22	72	10	6		**105**
12.0	26	83	12	6		**106**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	Z	16551	...
14.0	26	83	14	6		**107**
16.0	32	92	16	6		**108**
18.0	32	92	18	8		**109**
20.0	38	104	20	8		**110**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	180	140	130	120	110	100	-	-	-	-	100	80	-	180	-

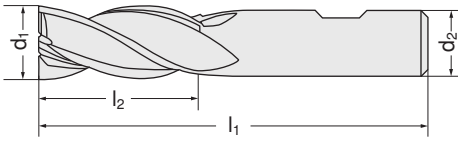
16553 Solid carbide end mill

VHM TiAlN | N | Z 6–8 | ≈ 45° | DIN 6535 HB | Uni

Design
- Right cutting
- Straight shank with driving surface in accordance with DIN 6535 HB
- Right-hand twist approx. 45°
- Eccentric relief grinding for more stable cutting edges
- **6-8 cutting edges**

Applications
For circumferential milling as finishing operation to achieve optimum surface quality.
Especially for working in low-lying and hard-to-reach places.

16553



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	Z	16553 ...
6.0	18	62	6	6	**201**
8.0	24	68	8	6	**203**
10.0	30	80	10	6	**205**
12.0	36	93	12	6	**206**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	Z	16553 ...
14.0	42	99	14	6	**207**
16.0	48	108	16	6	**208**
18.0	54	114	18	8	**209**
20.0	60	126	20	8	**210**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	180	140	130	120	110	100	-	-	-	-	100	80	-	180	-

16642 Solid carbide radius cutter

TiAlN Ultra | N | Z 2 | ≈ 30° | DIN 6535 HA | DIN 6535 HB | Uni

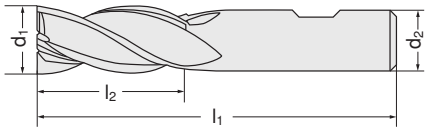
Design
- 2 cutting edges

Applications
Universal use for copy milling and in die and mould making.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

Note:
Up to Ø 5 mm with shank DIN 6535 HA.

16642



d_1 h9 mm	l_2 mm	l_1 mm	d_2 mm	Z	16642 ...
3.0	20	60	3	2	**103**
4.0	30	75	4	2	**104**
5.0	30	75	5	2	**105**
6.0	40	100	6	2	**106**
8.0	40	100	8	2	**108**
10.0	40	100	10	2	**110**
12.0	45	100	12	2	**112**
16.0	65	150	16	2	**116**
20.0	75	150	20	2	**120**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400–500	400–500	120–140	70–100	70–90	70–90	60–70	55–70	55–70	-	-	-	-	40–50	40–50	20–50	80–120	-

16643 Solid carbide radius roughing cutter

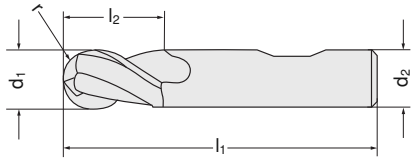
TiAlN Ultra | NR | Z 4 | ≈ 30° | DIN 6535 HB | Uni

Design
- 4 cutting edges

Applications
Universal use for copy milling and in die and mould making.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16643



d_1 h9 mm	l_2 mm	l_1 mm	d_2 mm	Z	16643 ...
6.0	13	57	6	4	**106**
8.0	19	63	8	4	**108**
10.0	22	72	10	4	**110**
12.0	26	83	12	4	**112**
16.0	32	92	16	4	**116**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	70–100	75–95	55–70	55–70	55–70	-	-	-	-	-	-	-	-	70–120	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16646 Solid carbide HSC radius cutter

TiAlN Ultra | HSC | Z 4 | N | ≈ 30° | DIN 6535 HB | Uni

ATORN®

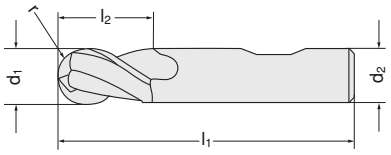
Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

Design
- 4 cutting edges

Applications
Universal use.

16646 206-212

16646 106-116



d_1 h9 mm	l_2 mm	l_1 mm	d_2 mm	Z	Long 16646 ...	Extra long 16646 ...
6.0	13	57	6	4	106	
6.0	40	100	6	4		206
8.0	19	63	8	4	108	
8.0	40	100	8	4		208
10.0	22	72	10	4	110	
10.0	40	100	10	4		210
12.0	26	83	12	4	112	
12.0	45	100	12	4		212

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	150–200	100–130	70–100	70–100	70–80	40–50	30–60	-	-	-	-	-	50–60	40–50	35–50	80–120	-

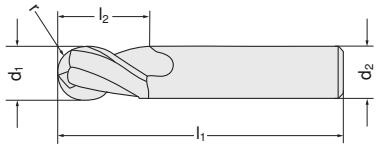
16557 Solid carbide radius cutter

VHM TiAlN | Z 2 | ≈ 30° | DIN 6535 HA | Uni

HW

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

Design
- **Short**
- 2 cutting edges
- **Centre cutting**
- Right-hand spiral approx. 30°
- With smooth shank in accordance with DIN 6535 HA



16557

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16557 ...
3.0	4	48	6	101
4.0	6	50	6	102
5.0	7	51	6	103
6.0	7	51	6	104
8.0	9	59	8	105

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16557 ...
10.0	10	60	10	106
12.0	14	71	12	107
16.0	16	76	16	109
20.0	20	82	20	111

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

16559 Solid carbide radius cutter

VHM TiAlN | Z 2 | ≈ 30° | Uni

HW

Design
- **Long**
- 2 cutting edges
- **Centre cutting**
- Right-hand spiral approx. 30°

16559 201
Design
- With smooth straight shank in accordance with DIN 6535 HA

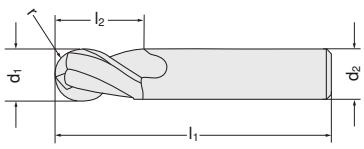
16559 202-212
Design
- With cylindrical shank with driving surface in accordance with DIN 6535 HB

DIN 6535 HA

16559 201

DIN 6535 HB

16559 202-212



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16559 ...
2.0	6	38	3	201
3.0	7	57	6	202
4.0	8	57	6	203
5.0	10	57	6	204
6.0	10	57	6	205

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16559 ...
8.0	16	63	8	206
10.0	19	72	10	207
12.0	22	83	12	208
16.0	26	92	16	210
20.0	32	104	20	212

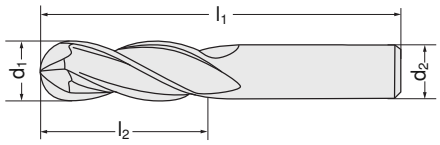
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
230	200	180	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

16561 Solid carbide radius cutter

VHM TiAlN | Z 4 | ≈ 30° | DIN 6535 HA | Uni

Design
- **Short**
- **4 cutting edges**
- **Centre cutting**
- Right-hand spiral 30°
- With smooth shank in accordance with DIN 6535 HA

16561



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16561	...
3.0	4	48	6		**101**
4.0	6	50	6		**102**
5.0	7	51	6		**103**
6.0	7	51	6		**104**
8.0	9	59	8		**105**
10.0	10	60	10		**106**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16561	...
12.0	14	71	12		**107**
14.0	14	71	14		**108**
16.0	16	76	16		**109**
18.0	18	76	18		**110**
20.0	20	82	20		**111**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	150	130	120	100	90	80	-	-	-	-	105	80	40	110	-

16628 Solid carbide roughing cutter

TiAlN Ultra | Z 3–4 | NR | ≈ 45° | DIN 6535 HB | 45° | Uni

ATORN®

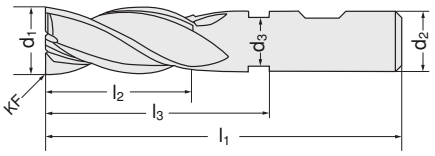
Design
- With clearance and edge protection chamfer
- With centre cutting
- 3-4 cutting edges

Advantage:
- Maximum machining performance

Applications
For roughing. Ideal for dry machining.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16628



d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16628	...
4.0	6	3.8	57	18	8	0.1	3		**101**
4.0	6	3.8	57	18	11	0.1	3		**102**
5.0	6	4.8	57	20	9	0.1	3		**103**
5.0	6	4.8	57	20	13	0.1	3		**104**
6.0	6	5.8	57	20	10	0.1	4		**105**
6.0	6	5.8	57	20	13	0.1	4		**106**
8.0	8	7.7	63	25	12	0.2	4		**107**
8.0	8	7.7	63	25	19	0.2	4		**108**
10.0	10	9.5	72	30	15	0.2	4		**109**
10.0	10	9.5	72	30	22	0.2	4		**110**
12.0	12	11.5	83	35	18	0.3	4		**111**
12.0	12	11.5	83	35	26	0.3	4		**112**
16.0	16	15.5	92	40	24	0.3	4		**113**
16.0	16	15.5	92	40	32	0.3	4		**114**
20.0	20	19.5	104	50	30	0.3	4		**115**
20.0	20	19.5	104	50	38	0.3	4		**116**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300–400	85–180	110–180	135–180	135–155	100–120	70–100	70–100	70–100	-	-	-	-	100–120	100–120	60–80	120–180	-

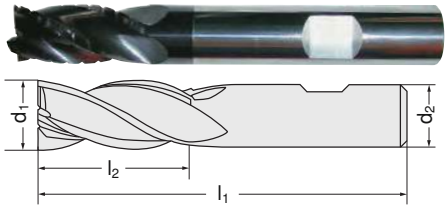
16565 Solid carbide roughing and finishing cutter

VHM TiAlN | Z 4 | ≈ 30° | DIN 6535 HB | NF | Uni

Design
- **With ground chip breakers**
- **Centre cutting**
- 30° spiral for high roughing performance
- With straight shank with driving surface in accordance with DIN 6535 HB.

Applications
For roughing and finishing with extreme feeds in steel. Excellent smoothness as the cutting pressure is reduced by the special chip breakers.

16565



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16565 ...
5.0	15	57	6	101
6.0	16	57	6	102
8.0	22	63	8	103
10.0	25	72	10	104

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16565 ...
12.0	28	83	12	105
16.0	35	92	16	106
20.0	40	104	20	107

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	120	105	90	70	40–60	-	-	-	-	-	95	70	-	-	-

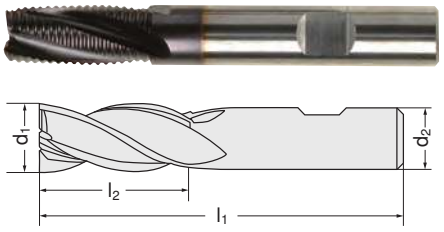
16567 Solid carbide roughing cutter

VHM TiAlN | Z 4 | ≈ 25° | DIN 6535 HB | HR | Uni

Design
- **Long**
- **4 cutting edges**
- **Centre cutting**
- Right-hand twist 25°
- Fine cord profile
- Straight shank with driving surface in accordance with DIN 6535 HB.

Applications
For materials up to HRC 45. Excellent machining performance thanks to roughing teeth. Universal use, including for stainless steel, aluminium, non-ferrous metals and cast materials.

16567



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16567 ...
3.0	6	57	6	101
4.0	8	57	6	102
5.0	10	57	6	103
6.0	13	57	6	104

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16567 ...
8.0	16	63	8	105
10.0	22	72	10	106
12.0	26	83	12	107
16.0	32	92	16	108

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	220	-	120	105	90	70	40–60	-	-	-	-	-	70–90	50–70	30–60	80–100	-

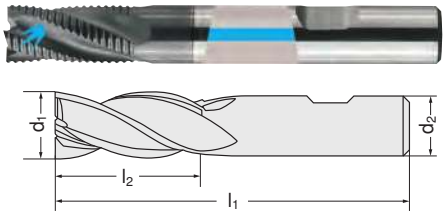
16569 Solid carbide roughing cutter with internal cooling supply

VHM TiAlN | Z 4 | ≈ 25° | DIN 6535 HB | HR | Uni

Design
- **Long**
- **Centre cutting**
- Right-hand twist 25°
- With internal cooling in the flute
- Fine cord profile
- Straight shank with driving surface in accordance with DIN 6535 HB

Use
For materials up to HRC 45. Universal use.
The coolant is guided directly to the cutting edges. This results in a long service life and the chips are completely removed. Especially important when milling in solids and when milling out pockets.

16569



d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16569 ...
6.0	13	57	6	101
8.0	16	63	8	102
10.0	22	72	10	103

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	16569 ...
12.0	26	83	12	104
16.0	32	92	16	105
20.0	38	104	20	106

Al<10%Si	Al >10% Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	220	-	120	105	90	70	40–60	-	-	-	-	-	70–90	50–70	30–60	80–100	-

16650 - 16651 Solid carbide roughing cutter Quickmax

VHM TiAlN | HSC | Z 3-6 | HR | 50 HRC | VA | Uni

Design
Short, 3-6 cutting edges, centre cutting. Right-hand twist 45°. High chipping performance. With protective chamfer, special roughing profile. Long service life. Quick chip removal. Extremely stable cutting edges. Great stability.
Applications
Alloyed steels, stainless steel, titanium, Inconel.

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16650
With smooth straight shank in accordance with DIN 6535 HA.

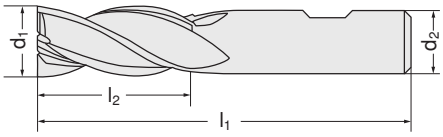
16651
With clamping surface in accordance with DIN 6535 HB.

DIN 6535 HA

16650

DIN 6535 HB

16651



d_1 mm	l_2 mm	l_1 mm	d_2 mm	Z	DIN 6535 HA 16650 ...	DIN 6535 HB 16651 ...
4.0	11	57	6	3	101	101
6.0	16	57	6	4	102	102
8.0	16	63	8	4	103	103
10.0	22	72	10	4	104	104
12.0	26	83	12	4	105	105
16.0	32	92	16	5	106	106
20.0	38	104	20	6	107	107
25.0	45	121	25	6	108	108

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	140–160	100–140	90–120	90	80	60	60	50	-	-	100	90	70	80	-

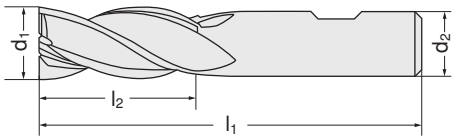
16629 Solid carbide roughing cutter

VHM TiAlN | HSC | Z 3-4 | DIN 6535 HB | HR | 60 HRC | Uni

Design
Long, relief ground, fine cord profile, right cutting with **centre cutting. 3–4 cutting edges.** With clamping surface in accordance with DIN 6535 HB.

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16629



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	Z	16629 ...
6.0	16	57	6	3	101
8.0	16	63	8	3	103
10.0	22	72	10	4	105
12.0	26	83	12	4	106
14.0	26	83	14	4	107
16.0	32	92	16	4	108
20.0	38	104	20	4	110

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400	300	250	300	250	200	180	160	140	80	60	40	-	120	100	60	180	-

Info — Hard milling

Hard machining is the machining of hardened materials with a hardness of 52 to 65 HRC. Hard milling offers decisive advantages thanks to time and money savings. Special HSC milling strategies, high surface quality as well as doing away with the hardening distortion make this process interesting to an even wider market. Furthermore, work processes such as multiple clamping and time-consuming polishing are also removed, resulting in enormous savings **– a cost benefit for your production!**

We have compiled the **ATORN range** for all of these processing and use cases. This range, which meets your every need in terms of assortment breadth and depth as well as cutting material and geometry, is designed for extremely high requirements.

The **ATORN hard milling tools** offer you the best conditions for efficient hard machining. The different geometries are optimally matched to the different milling operations. The cemented carbide used has a high level of hardness and is extremely tough.

Thanks to the special edge treatment as well as the new coatings **RockTec 52** and **RockTec 65**, the **ATORN tools have an extremely long service life.**

RockTec 52

Universal use:	Up to 52 HRC
Tolerance radius correction:	+/- 0.01 mm
Coating type:	Monolayer
Micro hardness:	3300 HV
Max. application temperature:	< 900 °C
For wet and dry milling	

RockTec 65

For HPC and HSC milling:	Up to 65 HRC
Tolerance radius correction:	+/- 0.01 mm
Type of coating:	New multi-layer
Micro hardness:	3600 HV
Max. application temperature:	< 1200 °C
Longest possible service life when dry milling	

The complete range for the most demanding applications

16800 — Solid carbide mini end mills

ATORN®

Design
- **Short**
- Right cutting
- 2 cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

16800 101-109

16800 301-309

				RockTec 52		RockTec 65	
d_1 mm	l_2 mm	l_1 mm	d_2 (h6) mm	16800	...	16800	...
0.1	0.2	40	4		101		301
0.2	0.4	40	4		102		302
0.3	0.6	40	4		103		303
0.4	0.8	40	4		104		304
0.5	1.0	40	4		105		305
0.6	1.2	40	4		106		306
0.7	1.4	40	4		107		307
0.8	1.6	40	4		108		308
0.9	1.8	40	4		109		309

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	60–90	60–90	60–90	60–90	60–90	30–60	30–60	30–60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	60-90	60-90	50-80	45-60	40-55	-	-	-	-	-

16801 Solid carbide mini end mills

VHM RockTec | Z 2 | ≈ 40° | DIN 6535 HA

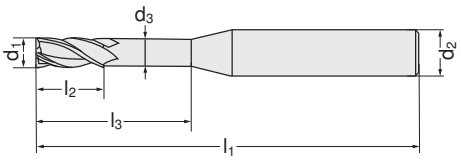
ATORN®

Design
- **Long**
- Right cutting

- 2 cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC — 16801 101-154

65 HRC — 16801 301-354



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16801 ...	RockTec 65 16801 ...
0.2	0.3	0.5	50	0.16	4	101	301
0.2	0.3	1.0	50	0.16	4	102	302
0.2	0.3	1.5	50	0.16	4	103	303
0.3	0.4	1.0	50	0.26	4	104	304
0.3	0.4	2.0	50	0.26	4	105	305
0.3	0.4	3.0	50	0.26	4	106	306
0.4	0.6	2.0	50	0.37	4	107	307
0.4	0.6	3.0	50	0.37	4	108	308
0.4	0.6	4.0	50	0.37	4	109	309
0.4	0.6	5.0	50	0.37	4	110	310
0.5	0.7	2.0	50	0.45	4	111	311
0.5	0.7	4.0	50	0.45	4	112	312
0.5	0.7	6.0	50	0.45	4	113	313
0.5	0.7	8.0	50	0.45	4	114	314
0.6	0.9	2.0	50	0.55	4	115	315
0.6	0.9	4.0	50	0.55	4	116	316
0.6	0.9	6.0	50	0.55	4	117	317
0.6	0.9	8.0	50	0.55	4	118	318
0.6	0.9	10.0	50	0.55	4	119	319
0.8	1.2	4.0	50	0.75	4	120	320
0.8	1.2	6.0	50	0.75	4	121	321
0.8	1.2	8.0	50	0.75	4	122	322
0.8	1.2	10.0	50	0.75	4	123	323
0.8	1.2	12.0	50	0.75	4	124	324
1.0	1.5	6.0	50	0.95	4	125	325
1.0	1.5	8.0	50	0.95	4	126	326
1.0	1.5	10.0	50	0.95	4	127	327
1.0	1.5	12.0	50	0.95	4	128	328
1.0	1.5	14.0	50	0.95	4	129	329
1.0	1.5	16.0	50	0.95	4	130	330
1.2	1.8	6.0	50	1.15	4	131	331
1.2	1.8	10.0	50	1.15	4	132	332
1.5	2.3	8.0	50	1.45	4	133	333
1.5	2.3	12.0	50	1.45	4	134	334
1.5	2.3	16.0	50	1.45	4	135	335
1.5	2.3	20.0	60	1.45	4	136	336
2.0	3.0	6.0	50	1.95	4	137	337
2.0	3.0	8.0	50	1.95	4	138	338
2.0	3.0	12.0	50	1.95	4	139	339
2.0	3.0	16.0	50	1.95	4	140	340
2.0	3.0	20.0	60	1.95	4	141	341
2.0	3.0	25.0	75	1.95	4	142	342
2.5	3.7	8.0	50	2.40	4	143	343
2.5	3.7	10.0	50	2.40	4	144	344
2.5	3.7	12.0	50	2.40	4	145	345
2.5	3.7	16.0	50	2.40	4	146	346
2.5	3.7	20.0	60	2.40	4	147	347
2.5	3.7	25.0	75	2.40	4	148	348
3.0	4.5	8.0	50	2.85	6	149	349
3.0	4.5	10.0	50	2.85	6	150	350
3.0	4.5	12.0	50	2.85	6	151	351
3.0	4.5	16.0	60	2.85	6	152	352
3.0	4.5	20.0	60	2.85	6	153	353
3.0	4.5	25.0	75	2.85	6	154	354

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	60–90	60–90	60–90	60–90	60–90	30–60	30–60	30–60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	60-90	60-90	50-80	45-60	40-55	-	-	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16802 Solid carbide mini torus milling cutter

ATORN®

Design
- **Long**
- **With corner radius**
- Right cutting

- 2 cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

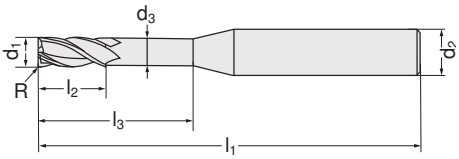
VHM RockTec | Z 2 | ≈ 40° | DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16802 101-154

65 HRC

16802 301-354



							RockTec 52		RockTec 65	
d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	16802	...	16802	...
0.2	0.02	0.3	0.5	50	0.16	4		101		301
0.2	0.02	0.3	1.0	50	0.16	4		102		302
0.2	0.02	0.3	1.5	50	0.16	4		103		303
0.3	0.03	0.4	1.0	50	0.26	4		104		304
0.3	0.03	0.4	2.0	50	0.26	4		105		305
0.3	0.03	0.4	3.0	50	0.26	4		106		306
0.4	0.03	0.6	2.0	50	0.37	4		107		307
0.4	0.03	0.6	3.0	50	0.37	4		108		308
0.4	0.03	0.6	4.0	50	0.37	4		109		309
0.4	0.03	0.6	5.0	50	0.37	4		110		310
0.5	0.05	0.7	2.0	50	0.45	4		111		311
0.5	0.05	0.7	4.0	50	0.45	4		112		312
0.5	0.05	0.7	6.0	50	0.45	4		113		313
0.5	0.05	0.7	8.0	50	0.45	4		114		314
0.6	0.05	0.9	2.0	50	0.55	4		115		315
0.6	0.05	0.9	4.0	50	0.55	4		116		316
0.6	0.05	0.9	6.0	50	0.55	4		117		317
0.6	0.05	0.9	8.0	50	0.55	4		118		318
0.6	0.05	0.9	10.0	50	0.55	4		119		319
0.8	0.08	1.2	4.0	50	0.75	4		120		320
0.8	0.08	1.2	6.0	50	0.75	4		121		321
0.8	0.08	1.2	8.0	50	0.75	4		122		322
0.8	0.08	1.2	10.0	50	0.75	4		123		323
0.8	0.08	1.2	12.0	50	0.75	4		124		324
1.0	0.10	1.5	6.0	50	0.95	4		125		325
1.0	0.10	1.5	8.0	50	0.95	4		126		326
1.0	0.10	1.5	10.0	50	0.95	4		127		327
1.0	0.10	1.5	12.0	50	0.95	4		128		328
1.0	0.10	1.5	14.0	50	0.95	4		129		329
1.0	0.10	1.5	16.0	50	0.95	4		130		330
1.2	0.10	1.8	6.0	50	1.15	4		131		331
1.2	0.10	1.8	10.0	50	1.15	4		132		332
1.5	0.15	2.3	8.0	50	1.45	4		133		333
1.5	0.15	2.3	12.0	50	1.45	4		134		334
1.5	0.15	2.3	16.0	50	1.45	4		135		335
1.5	0.15	2.3	20.0	60	1.45	4		136		336
2.0	0.20	3.0	6.0	50	1.95	4		137		337
2.0	0.20	3.0	8.0	50	1.95	4		138		338
2.0	0.20	3.0	12.0	50	1.95	4		139		339
2.0	0.20	3.0	16.0	50	1.95	4		140		340
2.0	0.20	3.0	20.0	60	1.95	4		141		341
2.0	0.20	3.0	25.0	75	1.95	4		142		342
2.5	0.30	3.7	8.0	50	2.40	4		143		343
2.5	0.30	3.7	10.0	50	2.40	4		144		344
2.5	0.30	3.7	12.0	50	2.40	4		145		345
2.5	0.30	3.7	16.0	50	2.40	4		146		346
2.5	0.30	3.7	20.0	60	2.40	4		147		347
2.5	0.30	3.7	25.0	75	2.40	4		148		348
3.0	0.30	4.5	8.0	50	2.85	6		149		349
3.0	0.30	4.5	10.0	50	2.85	6		150		350
3.0	0.30	4.5	12.0	50	2.85	6		151		351
3.0	0.30	4.5	16.0	60	2.85	6		152		352
3.0	0.30	4.5	20.0	60	2.85	6		153		353
3.0	0.30	4.5	25.0	75	2.85	6		154		354

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	60–90	60–90	60–90	60–90	60–90	30–60	30–60	30–60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	60-90	60-90	50-80	45-60	40-55	-	-	-	-	-

( ) = Items with prices in brackets partly available from stock.

16805 Solid carbide mini radius cutters

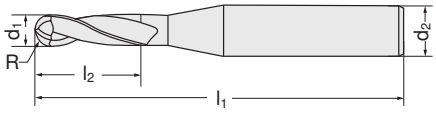
VHM RockTec | Z 2 | ≈ 30° | DIN 6535 HA

ATORN®

Design
- **Short**
- Right cutting
- 2 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

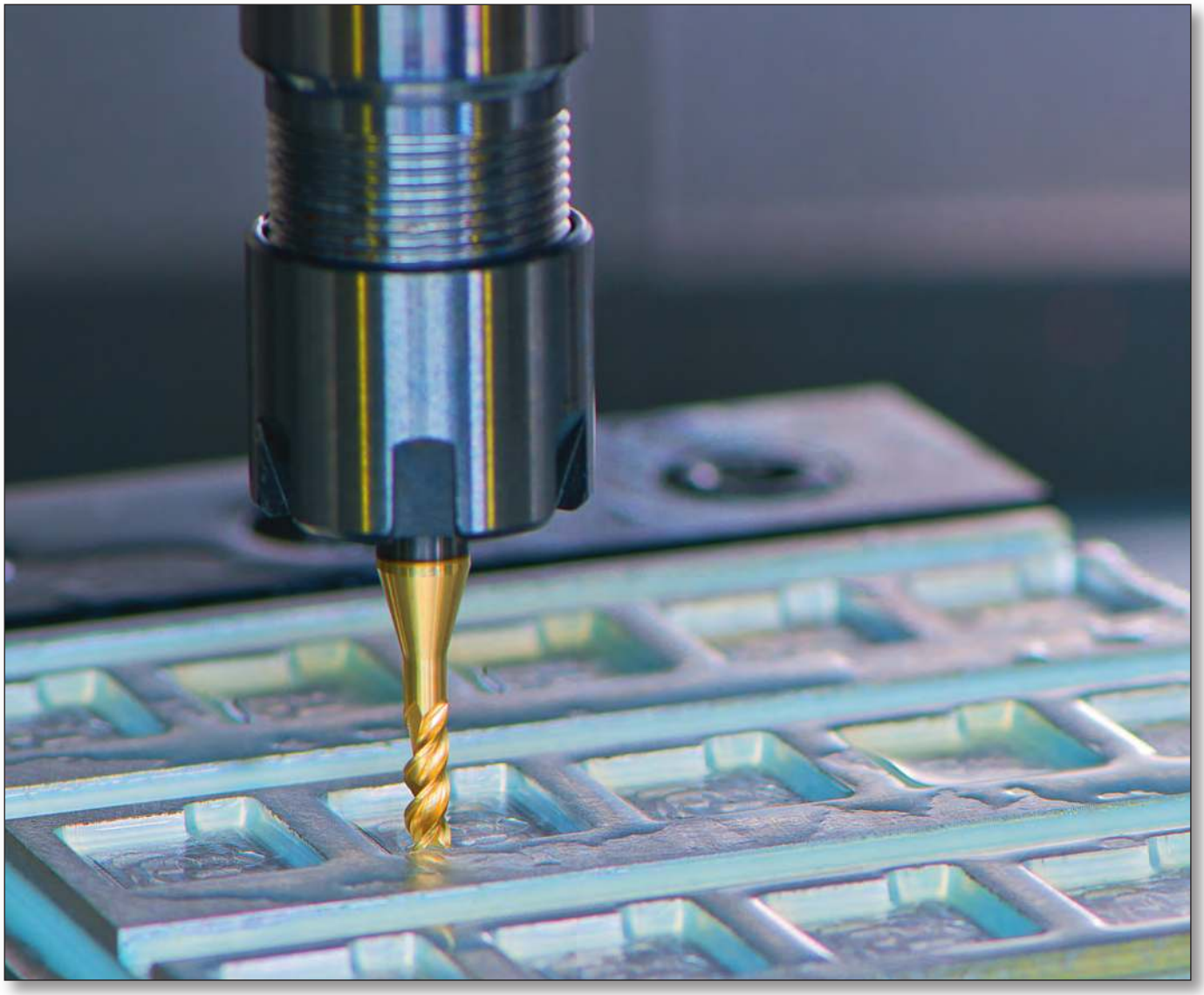
≤ 1600 N/mm² | 52 HRC — 16805 101-108

65 HRC — 16805 301-308



d_1 mm	R mm	l_2 mm	l_1 mm	d_2 (h6) mm	RockTec 52 16805 ...	RockTec 65 16805 ...
0.2	0.10	0.4	40	4	101	301
0.3	0.15	0.6	40	4	102	302
0.4	0.20	0.8	40	4	103	303
0.5	0.25	1.2	40	4	104	304
0.6	0.30	1.4	40	4	105	305
0.7	0.35	1.6	40	4	106	306
0.8	0.40	1.8	40	4	107	307
0.9	0.45	2.0	40	4	108	308

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	60–90	60–90	60–90	60–90	60–90	30–60	30–60	30–60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	60-90	60-90	50-80	45-60	40-55	-	-	-	-	-



= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16806 Solid carbide mini radius cutters

VHM RockTec | Z 2 | ≈ 30° | DIN 6535 HA

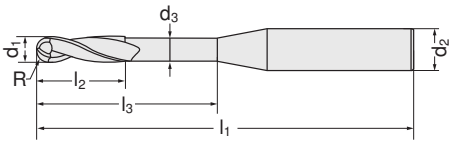
ATORN®

Design
- **Long**
- Right cutting

- 2 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

< 1600 N/mm² | 52 HRC — 16806 101-153

65 HRC — 16806 301-353



							RockTec 52		RockTec 65	
d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	16806	...	16806	...
0.2	0.10	0.2	0.5	50	0.15	4		101		301
0.2	0.10	0.2	1.0	50	0.15	4		102		302
0.2	0.10	0.2	1.5	50	0.15	4		103		303
0.3	0.15	0.3	1.0	50	0.25	4		104		304
0.3	0.15	0.3	2.0	50	0.25	4		105		305
0.3	0.15	0.3	3.0	50	0.25	4		106		306
0.4	0.20	0.4	1.0	50	0.35	4		107		307
0.4	0.20	0.4	2.0	50	0.35	4		108		308
0.4	0.20	0.4	3.0	50	0.35	4		109		309
0.4	0.20	0.4	4.0	50	0.35	4		110		310
0.4	0.20	0.4	5.0	50	0.35	4		111		311
0.5	0.25	0.4	2.0	50	0.45	4		112		312
0.5	0.25	0.4	3.0	50	0.45	4		113		313
0.5	0.25	0.4	4.0	50	0.45	4		114		314
0.5	0.25	0.4	5.0	50	0.45	4		115		315
0.5	0.25	0.4	6.0	50	0.45	4		116		316
0.5	0.25	0.4	8.0	50	0.45	4		117		317
0.6	0.30	0.5	2.0	50	0.55	4		118		318
0.6	0.30	0.5	3.0	50	0.55	4		119		319
0.6	0.30	0.5	4.0	50	0.55	4		120		320
0.6	0.30	0.5	5.0	50	0.55	4		121		321
0.6	0.30	0.5	6.0	50	0.55	4		122		322
0.6	0.30	0.5	8.0	50	0.55	4		123		323
0.8	0.40	0.6	2.0	50	0.75	4		124		324
0.8	0.40	0.6	4.0	50	0.75	4		125		325
0.8	0.40	0.6	5.0	50	0.75	4		126		326
0.8	0.40	0.6	6.0	50	0.75	4		127		327
0.8	0.40	0.6	7.0	50	0.75	4		128		328
0.8	0.40	0.6	8.0	50	0.75	4		129		329
0.8	0.40	0.6	10.0	50	0.75	4		130		330
1.0	0.50	0.8	3.0	50	0.95	4		131		331
1.0	0.50	0.8	6.0	50	0.95	4		132		332
1.0	0.50	0.8	8.0	50	0.95	4		133		333
1.0	0.50	0.8	10.0	50	0.95	4		134		334
1.0	0.50	0.8	16.0	50	0.95	4		135		335
1.0	0.50	0.8	20.0	60	0.95	4		136		336
1.2	0.60	1.0	6.0	50	1.15	4		137		337
1.2	0.60	1.0	10.0	50	1.15	4		138		338
1.5	0.75	1.2	8.0	50	1.45	4		139		339
1.5	0.75	1.2	12.0	50	1.45	4		140		340
1.5	0.75	1.2	16.0	50	1.45	4		141		341
1.5	0.75	1.2	18.0	60	1.45	4		142		342
2.0	1.00	1.6	4.0	50	1.95	4		143		343
2.0	1.00	1.6	8.0	50	1.95	4		144		344
2.0	1.00	1.6	12.0	50	1.95	4		145		345
2.0	1.00	1.6	16.0	50	1.95	4		146		346
2.0	1.00	1.6	20.0	60	1.95	4		147		347
2.0	1.00	1.6	25.0	75	1.95	4		148		348
3.0	1.50	2.4	8.0	50	2.85	6		149		349
3.0	1.50	2.4	10.0	50	2.85	6		150		350
3.0	1.50	2.4	16.0	60	2.85	6		151		351
3.0	1.50	2.4	20.0	60	2.85	6		152		352
3.0	1.50	2.4	25.0	75	2.85	6		153		353

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	60-100	60-100	60-100	60-100	60-100	30-70	30-70	30-70	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	60-100	60-100	50-90	45-70	40-65	-	-	-	-	-

( ) = Items with prices in brackets partly available from stock.

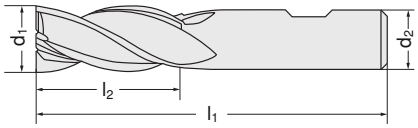
16601 Solid carbide end mill

VHM TiAlN | HSC | Z 2 | ≈ 30° | DIN 6535 HB | 60 HRC

HW

Design
- **Short**
- Right cutting
- **2 cutting edges**
- Right-hand twist
- **Centre cutting**
- With clamping surface in accordance with DIN 6535 HB

16601



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16601 ...
3.0	8	45	6	**101**
4.0	11	45	6	**103**
5.0	13	50	6	**105**
6.0	13	50	6	**107**
8.0	19	60	8	**111**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16601 ...
10.0	22	70	10	**115**
12.0	26	75	12	**119**
16.0	32	100	16	**121**
20.0	38	105	20	**123**
25.0	45	120	25	**124**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	150–190	140–170	130–160	100–120	90–110	60–90	55–65	50–55	40–55	-	-	-	-	-	-

16604 Solid carbide end mill

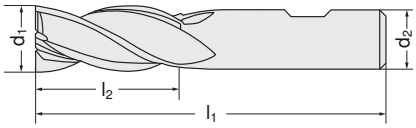
VHM TiAlN | HSC | Z 2 | ≈ 30° | DIN 6535 HB | 60 HRC

HW

Design
- **Long**
- Right cutting
- **2 cutting edges**
- Right-hand twist
- **Centre cutting**

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16604



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16604 ...
3.0	12	50	6	**101**
4.0	15	50	6	**102**
5.0	20	60	6	**103**
6.0	20	60	6	**104**
8.0	25	70	8	**105**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16604 ...
10.0	30	90	10	**106**
12.0	30	90	12	**107**
16.0	50	110	16	**108**
20.0	55	110	20	**109**
25.0	75	140	25	**110**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	150–190	140–170	130–160	100–120	90–110	60–90	55–65	50–55	40–55	-	-	-	-	-	-

16810 Solid carbide end mill

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

ATORN®

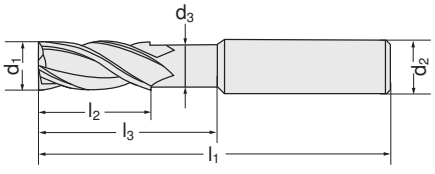
Design
- **Short**
- With clearance
- Right cutting
- 4 cutting edges

- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

16810 101-109

65 HRC

16810 301-309



d_1 (e8) mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16810 ...	RockTec 65 16810 ...
3.0	9	15	50	2.8	6	**101**	**301**
4.0	12	20	50	3.7	6	**102**	**302**
5.0	15	20	50	4.6	6	**103**	**303**
6.0	16	20	50	5.5	6	**104**	**304**
8.0	20	30	64	7.4	8	**105**	**305**
10.0	22	32	70	9.2	10	**106**	**306**
12.0	25	37	75	11.0	12	**107**	**307**
16.0	32	46	90	15.0	16	**108**	**308**
20.0	38	58	100	19.0	20	**109**	**309**

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	140–160	140–160	140–160	130–150	120–140	100–130	60–80	60–80	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	160–200	120–140	100–130	90–100	80–90	-	-	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

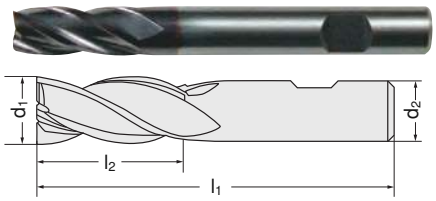
16609 Solid carbide end mill

VHM TiAlN | HSC | Z 4 | ≈ 30° | DIN 6535 HB | 60 HRC

Design
- **Short**
- Right cutting
- **4 cutting edges**
- Right-hand twist
- **Centre cutting**
- With clamping surface in accordance with DIN 6535 HB

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16609



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16609	...
3.0	8	45	6		103
3.5	10	45	6		104
4.0	11	45	6		105
4.5	11	45	6		106
5.0	13	50	6		107
5.5	13	50	6		108
6.0	13	50	6		109
8.0	19	60	8		113

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16609	...
9.0	19	70	10		115
10.0	22	70	10		117
12.0	26	75	12		121
14.0	26	85	14		122
16.0	32	100	16		123
20.0	38	105	20		125
25.0	45	120	25		126

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400	300	250	300	250	200	180	160	140	80	60	40	-	120	100	60	180	-

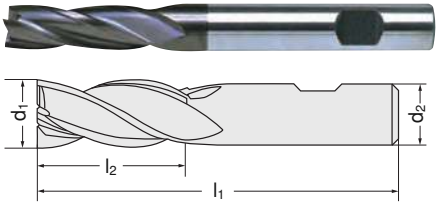
16613 Solid carbide end mill

VHM TiAlN | HSC | Z 4 | ≈ 30° | DIN 6535 HB | 60 HRC

Design
- **Long**
- **Centre cutting**

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16613



d_1 mm	l_2 mm	l_1 mm	d_2 mm	16613	...
3.0	12	50	6		201
4.0	15	50	6		202
5.0	20	60	6		203
6.0	20	60	6		204
8.0	25	70	8		205

d_1 mm	l_2 mm	l_1 mm	d_2 mm	16613	...
10.0	30	90	10		206
12.0	30	90	12		207
16.0	50	110	16		208
20.0	55	110	20		209
25.0	75	140	25		210

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	300	250	200	180	160	140	80	60	40	-	-	-	-	-	-

16812 Solid carbide end mill

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA | < 1600 N/mm² | 52 HRC

ATORN®

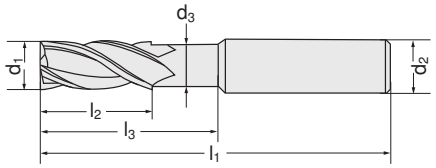
Design
- **Long**
- With clearance
- Right cutting
- 4 short cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

16812 101-109

65 HRC

16812 301-309

d_1 (e8) mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16812 ...	RockTec 65 16812 ...
3.0	5	30	75	2.8	6	101	301
4.0	8	32	75	3.7	6	102	302
5.0	9	32	75	4.6	6	103	303
6.0	10	40	75	5.5	6	104	304
8.0	12	40	75	7.4	8	105	305
10.0	14	60	100	9.2	10	106	306
12.0	16	60	100	11.0	12	107	307
16.0	22	85	125	15.0	16	108	308
20.0	26	85	125	19.0	20	109	309



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	120–140	120–140	120–140	110–130	100–120	80–100	50–70	50–70	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	140-160	100-130	90-100	80-90	70-80	-	-	-	-	-

16619 Solid carbide end mill

VHM TiAlN | HSC | Z 6 | ≈ 45° | DIN 6535 HB | 60 HRC

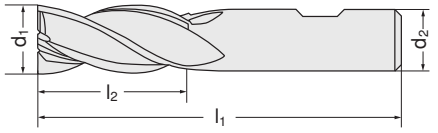
HW

Design
Extra long, right cutting, **6 cutting edges.** Right-hand twist, approx. 45°. With clamping surface in accordance with DIN 6535 HB.

Applications
For circumferential milling as a finishing operation to achieve optimum surface quality (face cut only with low cutting depths).

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16619



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16619 ...
6.0	26	70	6	201
8.0	36	90	8	202
10.0	46	100	10	203
12.0	56	110	12	204

d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16619 ...
16.0	66	130	16	205
20.0	76	140	20	206
25.0	92	180	25	207

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	300	250	200	180	160	140	80	60	40	-	-	-	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16813 Solid carbide end mill

ATORN®

Design
- **Extra long**
- With clearance
- Right cutting
- 4 short cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA

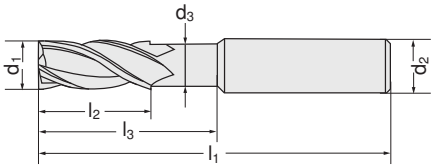
≤ 1600 N/mm² | 52 HRC

16813 101-109

65 HRC

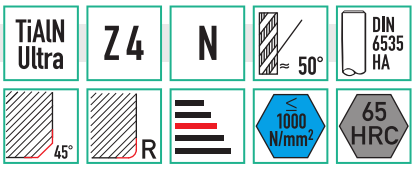
16813 301-309

d_1 (e8) mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16813 ...	RockTec 65 16813 ...
3.0	5	60	100	2.8	6	**101**	**301**
4.0	8	60	100	3.7	6	**102**	**302**
5.0	9	60	100	4.6	6	**103**	**303**
6.0	10	60	100	5.5	6	**104**	**304**
8.0	12	60	100	7.4	8	**105**	**305**
10.0	14	85	125	9.2	10	**106**	**306**
12.0	16	110	150	11.0	12	**107**	**307**
16.0	22	110	150	15.0	16	**108**	**308**
20.0	26	110	150	19.0	20	**109**	**309**



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	100-120	100-120	90-110	90-110	80-100	60-80	60-80	40-60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	120-140	80-110	70-80	60-70	50-50	-	-	-	-	-

16626 Solid carbide end mill



ATORN®

Design
- With clearance and edge protection chamfer/ edge radius
- With centre cutting
- 4 cutting edges
- Right-hand twist 50°

Applications
Universal application for finishing.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

Note:
Extra-long design without clearance.

16626

RockTec 65

d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 mm	KF mm	R mm	Z	16626	...
4.0	11	18	57	3.9	6	0.1	-	4		**040**
4.0	16	-	62	-	6	0.1	-	4		**041**
4.0	11	18	57	3.9	6	-	0.5	4		**042**
4.0	16	-	62	-	6	-	0.5	4		**043**
5.0	13	19	57	4.9	6	0.1	-	4		**050**
5.0	17	-	62	-	6	0.1	-	4		**051**
5.0	13	19	57	4.9	6	-	0.5	4		**052**
5.0	17	-	62	-	6	-	0.5	4		**053**
6.0	13	19	57	5.9	6	0.1	-	4		**060**
6.0	18	-	62	-	6	0.1	-	4		**061**
6.0	13	19	57	5.9	6	-	0.5	4		**062**
6.0	18	-	62	-	6	-	0.5	4		**063**
8.0	19	25	63	7.7	8	0.1	-	4		**080**
8.0	24	-	68	-	8	0.1	-	4		**081**
8.0	19	25	63	7.7	8	-	1.0	4		**082**
8.0	24	-	68	-	8	-	1.0	4		**083**
10.0	22	30	72	-	10	0.1	-	4		**100**
10.0	30	-	80	9.7	10	0.1	-	4		**101**
10.0	30	-	80	-	10	-	1.0	4		**102**
12.0	26	36	83	11.7	12	0.1	-	4		**103**
12.0	36	-	93	-	12	0.1	-	4		**120**
12.0	36	-	93	-	12	-	1.5	4		**121**
16.0	32	42	92	15.5	16	0.1	-	4		**160**
16.0	48	-	108	-	16	0.1	-	4		**161**
20.0	38	52	104	19.5	20	0.1	-	4		**200**
20.0	60	-	126	-	20	0.1	-	4		**201**
20.0	60	-	126	-	20	-	2.0	4		**202**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	-	-	-	50–70	40–60	30–35	30–35	30–35	30–35	30–35	-	-	-	-	-

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA | R

ATORN®

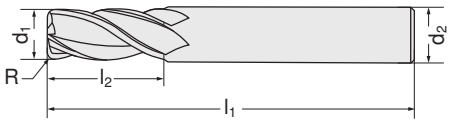
Design
- **Short**
- Right cutting
- 4 cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16816 101-128

65 HRC

16816 301-328



d_1 (e8) mm	R mm	l_2 mm	l_1 mm	d_2 (h6) mm	RockTec 52 16816 ...	RockTec 65 16816 ...
3.0	0.3	9	50	6	101	301
3.0	0.5	9	50	6	102	302
4.0	0.3	12	50	6	103	303
4.0	0.5	12	50	6	104	304
4.0	1.0	12	50	6	105	305
5.0	0.3	15	50	6	127	327
5.0	0.5	15	50	6	106	306
5.0	1.0	15	50	6	107	307
6.0	0.3	20	60	6	108	308
6.0	0.5	20	60	6	109	309
6.0	1.0	20	60	6	110	310
8.0	0.5	20	64	8	111	311
8.0	1.0	20	64	8	112	312
8.0	1.5	20	64	8	113	313
8.0	2.0	20	64	8	126	326
10.0	0.5	22	75	10	114	314
10.0	1.0	22	75	10	128	328
10.0	1.5	22	75	10	115	315
10.0	2.0	22	75	10	116	316
12.0	1.0	25	75	12	117	317
12.0	2.0	25	75	12	118	318
12.0	3.0	25	75	12	119	319
16.0	1.0	32	90	16	120	320
16.0	2.0	32	90	16	121	321
16.0	3.0	32	90	16	122	322
20.0	1.0	38	100	20	123	323
20.0	2.0	38	100	20	124	324
20.0	3.0	38	100	20	125	325

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	140–160	140–160	130–150	130–150	120–140	100–120	80–100	60–80	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	160–200	120–140	100-120	90–100	80–90	-	-	-	-	-

16817 Solid carbide torus milling cutters

VHM RockTec | Z 4 | ≈ 45° | DIN 6535 HA | R

ATORN®

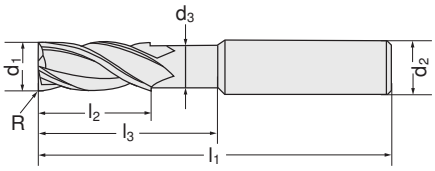
Design
- **Short**
- With clearance
- Right cutting
- 4 short cutting edges
- Right-hand twist 45°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16817 101-116

65 HRC

16817 301-316



d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16817 ...	RockTec 65 16817 ...
3.0	0.3	4	14	60	2.8	6	101	301
3.0	0.5	4	14	60	2.8	6	102	302
4.0	0.3	5	16	60	3.7	6	103	303
4.0	0.5	5	16	60	3.7	6	104	304
5.0	0.3	6	18	60	4.6	6	105	305
5.0	0.5	6	18	60	4.6	6	106	306
6.0	0.5	7	20	60	5.5	6	107	307
6.0	1.0	7	20	60	5.5	6	108	308
8.0	0.5	9	26	64	7.4	8	109	309
8.0	1.0	9	26	64	7.4	8	110	310
10.0	1.0	11	31	70	9.2	10	111	311
10.0	2.0	11	31	70	9.2	10	112	312
12.0	1.0	13	37	75	11.0	12	113	313
12.0	2.0	13	37	75	11.0	12	114	314
16.0	1.0	17	43	90	15.0	16	115	315
16.0	2.0	17	43	90	15.0	16	116	316

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	140–160	140–160	130–150	130–150	120–140	100–120	80–100	60–80	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	160–200	120–140	100-120	90–100	80–90	-	-	-	-	-

16637 Solid carbide torus milling cutters

VHM TiAlN | HSC | Z 4 | DIN 6535 HB | 65 HRC

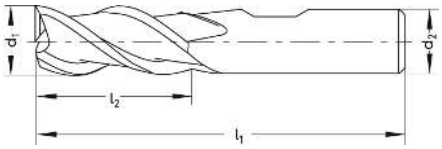
HW

Design
- **Long**
- With clamping surface in accordance with DIN 6535 HB
- Right cutting
- **4 cutting edges**
- **With corner radius (1)**

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

(1)

16637



d_1 e8 mm	l_2 mm	l_1 mm	d_2 mm	16637 ...
6 x R 0.5	20	60	6	101
6 x R 1	20	60	6	102
8 x R 0.5	25	70	8	103
8 x R 1	25	70	8	104
8 x R 2	25	70	8	106
10 x R 0.5	30	90	10	107

d_1 e8 mm	l_2 mm	l_1 mm	d_2 mm	16637 ...
10 x R 1	30	90	10	108
10 x R 2	30	90	10	110
12 x R 0.5	30	90	12	111
12 x R 1	30	90	12	112
12 x R 2	30	90	12	114

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400	300	250	300	250	200	180	160	140	80	60	40	-	120	100	60	180	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16818 Solid carbide torus milling cutters

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA | R

ATORN®

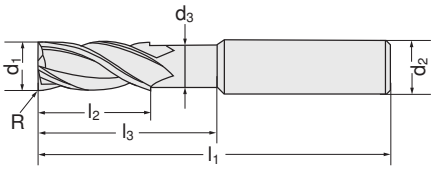
Design
- **Long**
- With clearance
- Right cutting
- 4 short cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC | 65 HRC

16818 101-116

16818 301-316

d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16818 ...	RockTec 65 16818 ...
3.0	0.3	5	30	75	2.8	6	**101**	**301**
3.0	0.5	5	30	75	2.8	6	**102**	**302**
4.0	0.3	8	32	75	3.7	6	**103**	**303**
4.0	0.5	8	32	75	3.7	6	**104**	**304**
5.0	0.3	9	32	75	4.6	6	**105**	**305**
5.0	0.5	9	32	75	4.6	6	**106**	**306**
6.0	0.5	10	40	75	5.5	6	**107**	**307**
6.0	1.0	10	40	75	5.5	6	**108**	**308**
8.0	0.5	12	40	75	7.4	8	**109**	**309**
8.0	1.0	12	40	75	7.4	8	**110**	**310**
10.0	1.0	14	60	100	9.2	10	**111**	**311**
10.0	2.0	14	60	100	9.2	10	**112**	**312**
12.0	1.0	16	60	100	11.0	12	**113**	**313**
12.0	2.0	16	60	100	11.0	12	**114**	**314**
16.0	1.0	22	85	125	15.0	16	**115**	**315**
16.0	2.0	22	85	125	15.0	16	**116**	**316**



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	120-140	120-140	110-130	110-130	100-120	80-100	70-90	50-70	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	140–160	100–130	90–100	80–90	70.80	-	-	-	-	-

16819 Solid carbide torus milling cutters

VHM RockTec | Z 4 | ≈ 40° | DIN 6535 HA | R

ATORN®

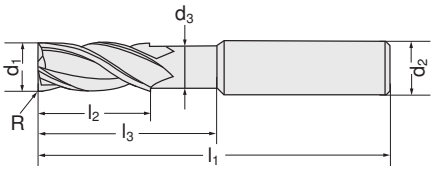
Design
- **Extra long**
- With clearance
- Right cutting
- 4 short cutting edges
- Right-hand twist 40°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC | 65 HRC

16819 101-116

16819 301-316

d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16819 ...	RockTec 65 16819 ...
3.0	0.3	5	60	100	2.8	6	**101**	**301**
3.0	0.5	5	60	100	2.8	6	**102**	**302**
4.0	0.3	8	60	100	3.7	6	**103**	**303**
4.0	0.5	8	60	100	3.7	6	**104**	**304**
5.0	0.3	9	60	100	4.6	6	**105**	**305**
5.0	0.5	9	60	100	4.6	6	**106**	**306**
6.0	0.5	10	60	100	5.5	6	**107**	**307**
6.0	1.0	10	60	100	5.5	6	**108**	**308**
8.0	0.5	12	60	100	7.4	8	**109**	**309**
8.0	1.0	12	60	100	7.4	8	**110**	**310**
10.0	1.0	14	85	125	9.2	10	**111**	**311**
10.0	2.0	14	85	125	9.2	10	**112**	**312**
12.0	1.0	16	110	150	11.0	12	**113**	**313**
12.0	2.0	16	110	150	11.0	12	**114**	**314**
16.0	1.0	22	110	150	15.0	16	**115**	**315**
16.0	2.0	22	110	150	15.0	16	**116**	**316**



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	100-120	100-120	90-110	90-110	80-100	70-80	60-70	40-60	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	120-140	80-110	70-80	60-70	50-60	-	-	-	-	-

16824 Solid carbide multi-tooth mills

VHM RockTec | Z 6–8 | ≈ 50° | DIN 6535 HA

ATORN®

Design
- **Short**
- With clearance
- Right cutting
- 6–8 cutting edges
- Right-hand twist 50°
- With smooth straight shank in accordance with DIN 6535 HA

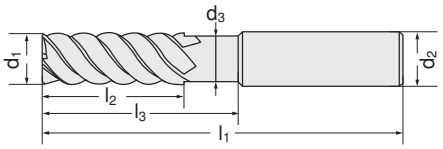
≤ 1600 N/mm² | 52 HRC

16824 101-109

65 HRC

16824 301-309

d_1 (e8) mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	Z	RockTec 52 16824 ...	RockTec 65 16824 ...
3.0	8	20	50	2.8	6	6	**101**	**301**
4.0	11	20	50	3.7	6	6	**102**	**302**
5.0	13	20	50	4.6	6	6	**103**	**303**
6.0	15	20	50	5.5	6	6	**104**	**304**
8.0	20	30	64	7.4	8	6	**105**	**305**
10.0	22	32	70	9.2	10	6	**106**	**306**
12.0	25	37	75	11.0	12	6	**107**	**307**
16.0	30	46	90	15.0	16	8	**108**	**308**
20.0	38	58	100	19.0	20	8	**109**	**309**



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	140–160	140–160	130–150	130–150	120–140	100–120	80–100	60–80	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	160–200	120–140	100-120	80–100	80–90	-	-	-	-	-

16825 Solid carbide multi-tooth mills

VHM RockTec | Z 6–8 | ≈ 50° | DIN 6535 HA

ATORN®

Design
- **Long**
- With clearance
- Right cutting
- 6–8 cutting edges
- Right-hand twist 50°
- With smooth straight shank in accordance with DIN 6535 HA

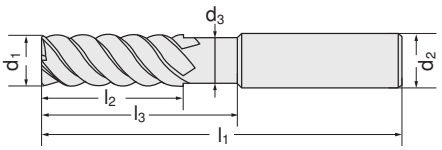
≤ 1600 N/mm² | 52 HRC

16825 101-109

65 HRC

16825 301-309

d_1 (e8) mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	Z	RockTec 52 16825 ...	RockTec 65 16825 ...
3.0	19	30	75	2.8	6	6	**101**	**301**
4.0	19	32	75	3.7	6	6	**102**	**302**
5.0	19	32	75	4.6	6	6	**103**	**303**
6.0	31	40	75	5.5	6	6	**104**	**304**
8.0	31	40	75	7.4	8	6	**105**	**305**
10.0	45	60	100	9.2	10	6	**106**	**306**
12.0	50	60	100	11.0	12	6	**107**	**307**
16.0	57	85	125	15.0	16	8	**108**	**308**
20.0	57	85	125	19.0	20	8	**109**	**309**



Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	120-140	120-140	110-130	110-130	100-120	80-100	70-80	50-70	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	140-160	100-130	90-100	80-90	70-80	-	-	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16827 Solid carbide radius cutter

VHM RockTec | Z 2 | ≈ 30° | DIN 6535 HA

ATORN®

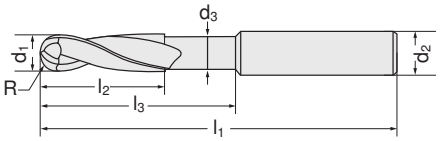
Design
- **Short**
- With clearance
- Right cutting
- 2 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16827 101-111

65 HRC

16827 301-311



							RockTec 52		RockTec 65	
d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	16827	...	16827	...
2.0	1.00	4	8	40	1.95	4		101		301
2.5	1.25	4	10	40	2.4	4		102		302
3.0	1.50	5	14	50	2.8	4		103		303
4.0	2.00	8	20	50	3.7	4		104		304
5.0	2.50	9	20	50	4.6	6		105		305
6.0	3.00	10	20	50	5.5	6		106		306
8.0	4.00	12	30	64	7.4	8		107		307
10.0	5.00	14	32	70	9.2	10		108		308
12.0	6.00	16	38	75	11.0	12		109		309
16.0	8.00	32	46	90	15.0	16		110		310
20.0	10.00	38	58	100	19.0	20		111		311

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	180–370	180–370	180–350	180–350	150–300	140–270	130–260	120–240	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	180-370	100-220	80-150	60-80	50-70	-	-	-	-	-

16828 Solid carbide radius cutter

VHM RockTec | Z 2 | ≈ 30° | DIN 6535 HA

ATORN®

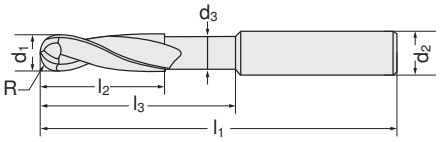
Design
- **Long**
- With clearance
- Right cutting
- 2 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16828 101-111

65 HRC

16828 301-311



							RockTec 52		RockTec 65	
d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	16828	...	16828	...
2.0	1.00	4	14	75	1.95	6		101		301
2.5	1.25	4	18	75	2.4	6		102		302
3.0	1.50	5	21	75	2.8	6		103		303
4.0	2.00	8	28	75	3.7	6		104		304
5.0	2.50	9	32	75	4.6	6		105		305
6.0	3.00	10	40	75	5.5	6		106		306
8.0	4.00	12	40	75	7.4	8		107		307
10.0	5.00	14	60	100	9.2	10		108		308
12.0	6.00	16	60	100	11.0	12		109		309
16.0	8.00	32	80	125	15.0	16		110		310
20.0	10.00	38	80	125	19.0	20		111		311

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	160–320	160–320	160–300	160–300	160–300	130–250	120–180	110–200	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	130-320	100-150	80-100	50-65	40-55	-	-	-	-	-

( ) = Items with prices in brackets partly available from stock.

16829 Solid carbide radius cutter

VHM RockTec | Z 2 | ≈ 30° | DIN 6535 HA

ATORN®

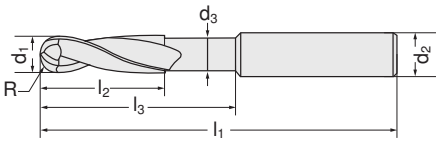
Design
- **Extra long**
- With clearance
- Right cutting
- 2 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

< 1600 N/mm² | 52 HRC

16829 101-111

65 HRC

16829 301-311



d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16829	...	RockTec 65 16829	...
2.0	1.00	4	20	100	1.95	6		101		301
2.5	1.25	4	25	100	2.4	6		102		302
3.0	1.50	5	30	100	2.8	6		103		303
4.0	2.00	8	40	100	3.7	6		104		304
5.0	2.50	9	50	100	4.6	6		105		305
6.0	3.00	10	60	150	5.5	6		106		306
8.0	4.00	12	80	150	7.4	8		107		307
10.0	5.00	14	100	150	9.2	10		108		308
12.0	6.00	16	110	150	11.0	12		109		309
16.0	8.00	32	150	200	15.0	16		110		310
20.0	10.00	38	150	200	19.0	20		111		311

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	90–190	90–190	90–190	90–190	90–190	100–130	80–150	60–130	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	90-190	60-130	40-45	30-40	25-35	-	-	-	-	-

16621 Solid carbide radius cutter

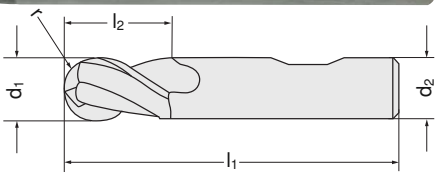
VHM TiAlN | HSC | Z 2 | ≈ 30° | DIN 6535 HB | 60 HRC

HHW

Design
- **Long**
- Right cutting
- **2 cutting edges**
- Right-hand twist
- **Centre cutting**
- Radius tolerance +/- 0.02 mm
- With clamping surface in accordance with DIN 6535 HB

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16621



d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16621	...	d_1 e8 mm	l_2 mm	l_1 mm	d_2 h6 mm	16621	...
2.0	5	50	6		203	**8.0**	14	100	8		209
3.0	8	60	6		204	**10.0**	18	100	10		211
4.0	8	70	6		205	**12.0**	22	110	12		212
5.0	10	80	6		206	**16.0**	30	140	16		214
6.0	12	90	6		207	**20.0**	38	160	20		216

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	300	250	200	180	160	140	80	60	40	-	120	100	60	180	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

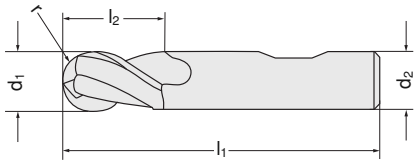
16625 Solid carbide radius cutter

VHM TiAlN | HSC | Z 4 | ≈ 30° | DIN 6535 HB | 60 HRC

Design
- **Long**
- Right cutting
- **4 cutting edges**
- Right-hand twist
- **Centre cutting**
- Radius tolerance +/– 0.02 mm
- With clamping surface in accordance with DIN 6535 HB

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16625



d_1 e8 mm	l_2 mm	l_1 mm	d_2 mm	16625 ...
2.0	5	50	6	**103**
3.0	8	60	6	**104**
4.0	8	70	6	**105**
5.0	10	80	6	**106**
6.0	12	90	6	**107**
8.0	14	100	8	**109**

d_1 e8 mm	l_2 mm	l_1 mm	d_2 mm	16625 ...
10.0	18	100	10	**111**
12.0	22	110	12	**112**
14.0	26	110	14	**113**
16.0	30	140	16	**114**
18.0	34	140	18	**115**
20.0	38	160	20	**116**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	300	250	200	180	160	140	80	60	40	-	-	-	-	-	-

16655 Solid carbide ball milling cutter

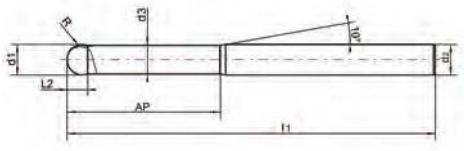
VHM TiAlN | Z 2 | DIN 6535 HA | H | 65 HRC

Design
- **Extra long**
- **2 cutting edges**
- **Centre cutting**
- Ball up to 220°
- Increased concentricity
- With smooth straight shank in accordance with DIN 6535 HA

Applications
For hard machining for 3D copy milling of high-strength materials as well as for milling of hardened steels up to HRC 65.

Quality
Universal carbide ultra-fine grain (P 20 - K 40)
TiAlN-coated.

16655



d_1 mm	d_2 mm	d_3 mm	AP mm	l_1 mm	16655 ...
3.0	6	2.8	15	80	**103**
4.0	6	3.8	20	80	**104**
5.0	6	4.7	25	90	**105**
6.0	6	5.7	30	100	**106**

d_1 mm	d_2 mm	d_3 mm	AP mm	l_1 mm	16655 ...
8.0	8	7.5	40	100	**107**
10.0	10	9.4	50	120	**108**
12.0	12	11.2	50	120	**109**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	140–160	120–140	100–120	70–80	60–70	70	65	50	30	30	-	-	-	-	-

16830 Solid carbide radius cutter

VHM RockTec | Z 4 | ≈ 30° | DIN 6535 HA

ATORN®

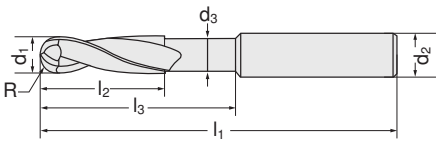
Design
- **Short**
- With clearance
- Right cutting
- 4 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16830 103-111

65 HRC

16830 303-311



d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16830 ...	RockTec 65 16830 ...
3.0	1.50	5	14	50	2.8	6	103	303
4.0	2.00	8	20	50	3.7	6	104	304
5.0	2.50	9	20	50	4.6	6	105	305
6.0	3.00	10	20	50	5.5	6	106	306
8.0	4.00	12	30	64	7.4	8	107	307
10.0	5.00	14	32	70	9.2	10	108	308
12.0	6.00	16	38	75	11.0	12	109	309
16.0	8.00	32	46	90	15.0	16	110	310
20.0	10.00	38	58	100	19.0	20	111	311

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	160–320	160–320	160–300	160–300	160–300	140-220	130–180	110–200	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	130-320	70-130	60-70	50-65	40-55	-	-	-	-	-

16831 Solid carbide radius cutter

VHM RockTec | Z 4 | ≈ 30° | DIN 6535 HA

ATORN®

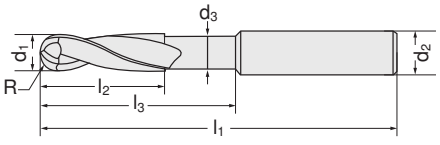
Design
- **Long**
- With clearance
- Right cutting
- 4 cutting edges
- Right-hand twist 30°
- With smooth straight shank in accordance with DIN 6535 HA

≤ 1600 N/mm² | 52 HRC

16831 103-111

65 HRC

16831 303-311



d_1 (e8) mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h6) mm	RockTec 52 16831 ...	RockTec 65 16831 ...
3.0	1.50	5	21	75	2.8	6	103	303
4.0	2.00	8	28	75	3.7	6	104	304
5.0	2.50	9	32	75	4.6	6	105	305
6.0	3.00	10	40	75	5.5	6	106	306
8.0	4.00	12	40	75	7.4	8	107	307
10.0	5.00	14	60	100	9.2	10	108	308
12.0	6.00	16	60	100	11.0	12	109	309
16.0	8.00	32	80	125	15.0	16	110	310
20.0	10.00	38	80	125	19.0	20	111	311

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
Rocktec 52																	
-	-	-	90–190	90–190	90–190	90–190	90–190	100–130	80–150	60–130	-	-	-	-	-	-	-
Rocktec 65																	
-	-	-	-	-	-	-	-	90-190	60-130	40-45	30-40	25-35	-	-	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16832 Solid carbide high-feed milling cutter

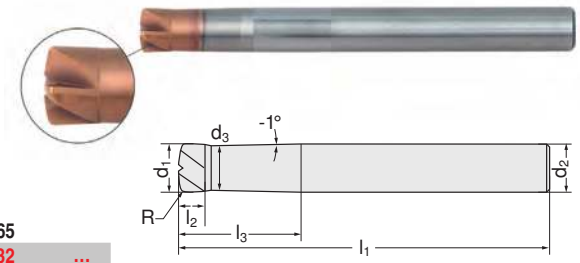
VHM RockTec | Z 4–6 | DIN 6535 HA | R | 65 HRC

ATORN®

Design
- 4 or 6-edged high-feed milling cutter with a TiSi-based PVD coating
- Short cutting edges for increased stability, longer service life, greater removal rate and higher feed

Applications
For roughing in tool and mould making and in general mechanical engineering, also for dry milling or with air cooling.

16832



d1 (e8) mm	R mm	l2 mm	l3 mm	l1 mm	d3 mm	d2 (h6) mm	Z	RockTec 65 16832	...
4.0	0.4	1.5	8	57	3.7	6	4		**101**
4.0	0.4	1.5	15	57	3.7	6	4		**102**
5.0	0.5	2.0	10	57	4.6	6	4		**103**
5.0	0.5	2.0	21	57	4.6	6	4		**104**
6.0	0.6	2.5	12	57	5.5	6	4		**105**
6.0	0.6	2.5	26	57	5.5	6	4		**106**
8.0	0.8	3.0	16	63	7.4	8	6		**107**
8.0	0.8	3.0	31	63	7.4	8	6		**108**
10.0	1.0	3.5	20	72	9.2	10	6		**109**
10.0	1.0	3.5	36	72	9.2	10	6		**110**
12.0	1.2	4.0	24	83	11.0	12	6		**111**
12.0	1.2	4.0	41	83	11.0	12	6		**112**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti	GG(G)	Plastic
-	-	-	-	-	-	-	-	160	160	150	140	120	-	-	-	-	-

16664 Trochoidal milling cutter (steel)

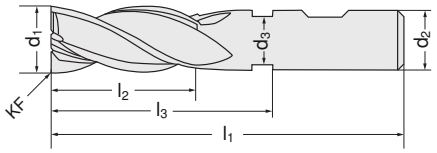
VHM AlCrN | Z 5 | 37°/38° | DIN 6535 HB | 45° | ≤ 1400 N/mm² | DIN 6535 HA

HHW

Design
- Extra long
- Uneven pitch
- With variable 37–38° twist angle for carbon steel
- With clearance
- Edge chamfer 45°

- 5 short cutting edges
- 3xD cutting length
- With chip breaker

16664



d1 e8 mm	l2 mm	l3 mm	l1 mm	d3 mm	d2 mm	KF mm	DIN 6535 HA 16664	...	DIN 6535 HB 16664	...
6.0	18	24	62	5.7	6	0.12		**106**		**206**
8.0	24	30	68	7.6	8	0.16		**108**		**208**
10.0	30	38	80	9.5	10	0.20		**110**		**210**
12.0	36	46	93	11.5	12	0.24		**112**		**212**
16.0	48	58	108	15.5	16	0.32		**116**		**216**
20.0	60	74	126	19.5	20	0.40		**120**		**220**

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 50HRC	< 55HRC	< 60HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
-	-	-	300	250	220	190	190	180	100	70	50	-	-	-	-	-	-

16665 Trochoidal milling cutter (VA)

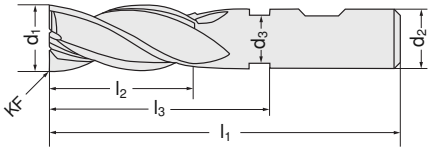
VHM AlCrN | Z 5 | 41°/42° | DIN 6535 HB | 45° | max. | Ni/Co | Ti/Ni | VA

HW

Design
- Extra long
- Uneven pitch
- With variable 41–42° twist angle for stainless steels and heat-resistant alloys
- With clearance
- Edge chamfer 45°
- 5 short cutting edges
- 3xD cutting length

16665

DIN 6535 HA



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 mm	KF mm	DIN 6535 HA 16665 ...	DIN 6535 HB 16665 ...
6.0	18	24	62	5.7	6	0.12	106	206
8.0	24	30	68	7.6	8	0.16	108	208
10.0	30	38	80	9.5	10	0.20	110	210
12.0	36	46	93	11.5	12	0.24	112	212
16.0	48	58	108	15.5	16	0.32	116	216
20.0	60	74	126	19.5	20	0.40	120	220

Al <10%Si	Al> 10%Si	Cu	St <520N	St <750N	St <900N	St <1100N	St <1200N	St >1400N	> 45HRC	< 52HRC	< 58HRC	< 65HRC	VA <900N	VA >900N	Ti	GG(G)	Plastic
-	-	-	-	-	-	-	-	-	-	-	-	-	190	170	130	-	-

16400 Mini end mill Ultra MS

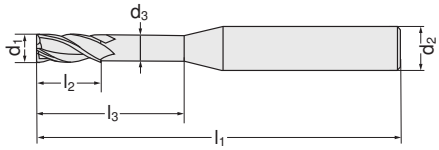
VHM AlCrN | HPC | Z 2 | 90° | DIN 6535 HA | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide end mill with AlCrN coating.
Advantage:
Maximum machining performance.

Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².

16400



d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	16400 ...
0.5	0.7	50	2.0	0.45	4	101
0.5	0.7	50	4.0	0.45	4	102
0.5	0.7	50	6.0	0.45	4	103
0.5	0.7	50	8.0	0.45	4	104
0.8	1.2	50	4.0	0.75	4	105
0.8	1.2	50	6.0	0.75	4	106
0.8	1.2	50	8.0	0.75	4	107
0.8	1.2	50	10.0	0.75	4	108
0.8	1.2	50	12.0	0.75	4	109
1.0	1.5	50	6.0	0.95	4	110
1.0	1.5	50	8.0	0.95	4	111
1.0	1.5	50	10.0	0.95	4	112
1.0	1.5	50	12.0	0.95	4	113
1.0	1.5	50	16.0	0.95	4	114
1.2	1.8	50	6.0	1.15	4	115
1.2	1.8	50	8.0	1.15	4	116
1.2	1.8	50	10.0	1.15	4	117
1.2	1.8	50	12.0	1.15	4	118
1.5	2.3	50	6.0	1.45	4	119
1.5	2.3	50	8.0	1.45	4	120
1.5	2.3	50	10.0	1.45	4	121
1.5	2.3	50	12.0	1.45	4	122
1.5	2.3	50	16.0	1.45	4	123
1.5	2.3	60	20.0	1.45	4	124

d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	16400 ...
2.0	3.0	50	6.0	1.95	4	125
2.0	3.0	50	8.0	1.95	4	126
2.0	3.0	50	10.0	1.95	4	127
2.0	3.0	50	12.0	1.95	4	128
2.0	3.0	50	16.0	1.95	4	129
2.0	3.0	60	20.0	1.95	4	130
2.0	3.0	75	25.0	1.95	4	131
2.5	3.7	50	8.0	2.40	4	132
2.5	3.7	50	10.0	2.40	4	133
2.5	3.7	50	12.0	2.40	4	134
2.5	3.7	50	16.0	2.40	4	135
2.5	3.7	50	20.0	2.40	4	136
2.5	3.7	60	25.0	2.40	4	137
3.0	4.5	50	8.0	2.85	6	138
3.0	4.5	50	10.0	2.85	6	139
3.0	4.5	50	12.0	2.85	6	140
3.0	4.5	60	16.0	2.85	6	141
3.0	4.5	60	20.0	2.85	6	142
3.0	4.5	75	25.0	2.85	6	143
4.0	4.5	60	20.0	3.85	6	144
4.0	4.5	75	25.0	3.85	6	145
4.0	4.5	75	30.0	3.85	6	146
4.0	4.5	75	40.0	3.85	6	147

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	40–130	40–130	40–130	40–80	20–60	20–60	25–80	20–40	25–80	20–40	20–30

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16401 Mini torus milling cutter Ultra MS

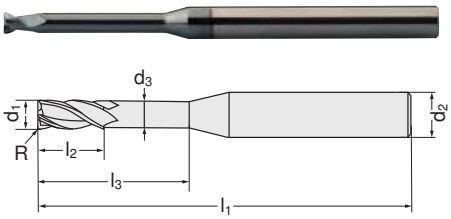
VHM AlCrN | HPC | Z 2 | R | DIN 6535 HA | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide torus milling cutter with AlCrN coating.
Advantage:
Maximum machining performance.

Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².

16401



d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16401	...
0.5	0.7	50	2.0	0.45	4	0.05		**101**
0.5	0.7	50	4.0	0.45	4	0.05		**102**
0.5	0.7	50	6.0	0.45	4	0.05		**103**
0.5	0.7	50	8.0	0.45	4	0.05		**104**
0.8	1.2	50	4.0	0.75	4	0.10		**105**
0.8	1.2	50	6.0	0.75	4	0.10		**106**
0.8	1.2	50	8.0	0.75	4	0.10		**107**
0.8	1.2	50	10.0	0.75	4	0.10		**108**
0.8	1.2	50	12.0	0.75	4	0.10		**109**
1.0	1.5	50	6.0	0.95	4	0.10		**110**
1.0	1.5	50	8.0	0.95	4	0.10		**111**
1.0	1.5	50	10.0	0.95	4	0.10		**112**
1.0	1.5	50	12.0	0.95	4	0.10		**113**
1.0	1.5	50	16.0	0.95	4	0.10		**114**
1.2	1.8	50	6.0	1.15	4	0.10		**115**
1.2	1.8	50	8.0	1.15	4	0.10		**116**
1.2	1.8	50	10.0	1.15	4	0.10		**117**
1.2	1.8	50	12.0	1.15	4	0.10		**118**
1.5	2.3	50	6.0	1.45	4	0.20		**119**
1.5	2.3	50	8.0	1.45	4	0.20		**120**
1.5	2.3	50	10.0	1.45	4	0.20		**121**
1.5	2.3	50	12.0	1.45	4	0.20		**122**
1.5	2.3	50	16.0	1.45	4	0.20		**123**

d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16401	...
1.5	2.3	60	20.0	1.45	4	0.20		**124**
2.0	3.0	50	6.0	1.95	4	0.20		**125**
2.0	3.0	50	8.0	1.95	4	0.20		**126**
2.0	3.0	50	10.0	1.95	4	0.20		**127**
2.0	3.0	50	12.0	1.95	4	0.20		**128**
2.0	3.0	60	20.0	1.95	4	0.20		**130**
2.0	3.0	75	25.0	1.95	4	0.20		**131**
2.5	3.7	50	8.0	2.40	4	0.30		**132**
2.5	3.7	50	10.0	2.40	4	0.30		**133**
2.5	3.7	50	12.0	2.40	4	0.30		**134**
2.5	3.7	50	16.0	2.40	4	0.30		**135**
2.5	3.7	50	20.0	2.40	4	0.30		**136**
2.5	3.7	60	25.0	2.40	4	0.30		**137**
3.0	4.5	50	8.0	2.85	6	0.30		**138**
3.0	4.5	50	10.0	2.85	6	0.30		**139**
3.0	4.5	50	12.0	2.85	6	0.30		**140**
3.0	4.5	60	16.0	2.85	6	0.30		**141**
3.0	4.5	60	20.0	2.85	6	0.30		**142**
3.0	4.5	75	25.0	2.85	6	0.30		**143**
4.0	4.5	60	20.0	3.85	6	0.40		**144**
4.0	4.5	75	25.0	3.85	6	0.40		**145**
4.0	4.5	75	30.0	3.85	6	0.40		**146**
4.0	4.5	75	40.0	3.85	6	0.40		**147**

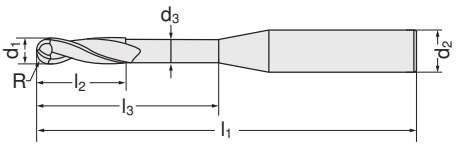
Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	40–130	40–130	40–130	40–80	20–60	20–60	25–80	20–40	25–80	20–40	20–30

16402 Mini radius cutter Ultra MS

VHM AlCrN | HPC | Z 2 | DIN 6535 HA | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide radius cutter with AlCrN coating.
Advantage:
Maximum machining performance.
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².



16402

d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16402	...
0.5	0.4	50	2.0	0.45	4	0.25		101
0.5	0.4	50	4.0	0.45	4	0.25		102
0.5	0.4	50	6.0	0.45	4	0.25		103
0.5	0.4	50	8.0	0.45	4	0.25		104
0.8	0.6	50	2.0	0.75	4	0.40		105
0.8	0.6	50	4.0	0.75	4	0.40		106
0.8	0.6	50	6.0	0.75	4	0.40		107
0.8	0.6	50	8.0	0.75	4	0.40		108
0.8	0.6	50	10.0	0.75	4	0.40		109
1.0	0.8	50	3.0	0.95	4	0.50		110
1.0	0.8	50	4.0	0.95	4	0.50		111
1.0	0.8	50	6.0	0.95	4	0.50		112
1.0	0.8	50	8.0	0.95	4	0.50		113
1.0	0.8	50	10.0	0.95	4	0.50		114
1.0	0.8	50	12.0	0.5	4	0.50		115
1.0	0.8	50	20.0	0.95	4	0.50		116
1.5	1.2	50	8.0	1.45	4	0.75		117
1.5	1.2	50	12.0	1.45	4	0.75		118
1.5	1.2	50	16.0	1.45	4	0.75		119
2.0	1.6	50	6.0	1.95	4	1.00		120

d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16402	...
2.0	1.6	50	8.0	1.95	4	1.00		121
2.0	1.6	50	10.0	1.95	4	1.00		122
2.0	1.6	50	12.0	1.95	4	1.00		123
2.0	1.6	50	16.0	1.95	4	1.00		124
2.0	1.6	60	20.0	1.95	4	1.00		125
2.0	1.6	75	25.0	1.95	4	1.00		126
3.0	2.4	50	8.0	2.85	6	1.50		127
3.0	2.4	50	10.0	2.85	6	1.50		128
3.0	2.4	60	16.0	2.85	6	1.50		129
3.0	2.4	60	20.0	2.85	6	1.50		130
3.0	2.4	75	25.0	2.85	6	1.50		131
3.0	2.4	75	30.0	2.85	6	1.50		132
4.0	3.2	50	10.0	3.85	6	2.00		133
4.0	3.2	60	16.0	3.85	6	2.00		134
4.0	3.2	60	20.0	3.85	6	2.00		135
4.0	3.2	75	25.0	3.85	6	2.00		136
4.0	3.2	75	30.0	3.85	6	2.00		137
4.0	3.2	75	35.0	3.85	6	2.00		138
4.0	3.2	100	40.0	3.85	6	2.00		139
4.0	3.2	100	50.0	3.85	6	2.00		140

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	40–130	40–130	40–130	40–80	20–60	20–60	25–80	20–40	25–80	20–40	20–30

16403 Solid carbide square end mill Ultra MS

VHM AlCrN | Z 3 | 90° | HPC | max. | VA | Ti/Ni

ATORN®

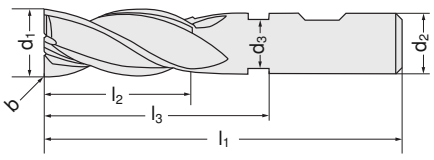
Design
Solid carbide square end mill with clearance and AlCrN coating.
Advantage:
Maximum machining performance.
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².

DIN 6535 HA

16403 101-109

DIN 6535 HB

16403 201-209



						DIN 6535 HA		DIN 6535 HB	
d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	16403	...	16403	...
3.0	6	2.8	50	15	9		101		201
4.0	6	3.7	50	20	12		102		202
5.0	6	4.6	50	20	15		103		203
6.0	6	5.5	50	20	16		104		204
8.0	8	7.4	64	30	20		105		205
10.0	10	9.2	70	32	22		106		206
12.0	12	11.0	75	37	25		107		207
16.0	16	15.0	90	46	32		108		208
20.0	20	19.0	100	58	38		109		209

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	120–140	120–140	120–140	50–70	50–70	50–70	70–80	50–60	70–80	60–70	20–30

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16405 Solid carbide radius cutter short Ultra MS

VHM AlCrN | Z 2 | HPC | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide radius cutter with AlCrN coating.
Advantage:
Maximum machining performance.

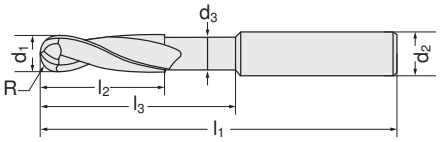
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².

16405 101-109

DIN 6535 HA

16405 201-209

DIN 6535 HB



							DIN 6535 HA		DIN 6535 HB	
d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16405	...	16405	...
3.0	5	57	20	2.8	6	1.5		101		201
4.0	6	57	20	3.7	6	2.0		102		202
5.0	7	57	20	4.6	6	2.5		103		203
6.0	8	57	20	5.5	6	3.0		104		204
8.0	10	64	25	7.4	8	4.0		105		205
10.0	12	75	35	9.2	10	5.0		106		206
12.0	14	75	35	11.0	12	6.0		107		207
16.0	18	90	45	15.0	16	8.0		108		208
20.0	20	100	50	19.0	20	10.0		109		209

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	120–140	120–140	120–140	50–70	50–70	50–70	70–80	50–60	70–80	60–70	20–30

16407 Solid carbide radius cutter long Ultra MS

VHM AlCrN | HPC | Z 2 | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide radius cutter with AlCrN coating.
Advantage:
Maximum machining performance.

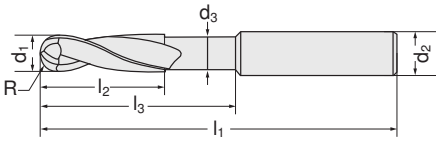
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steel up to 1300 N/mm².

16407 101-109

DIN 6535 HA

16407 201-209

DIN 6535 HB



							DIN 6535 HA		DIN 6535 HB	
d_1 mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 mm	R mm	16407	...	16407	...
3.0	5.0	75	21	2.8	6	1.5		101		201
4.0	8.0	75	28	3.7	6	2.0		102		202
5.0	9.0	75	32	4.6	6	2.5		103		203
6.0	10.0	75	40	5.5	6	3.0		104		204
8.0	12.0	75	40	7.4	8	4.0		105		205
10.0	14.0	100	60	9.2	10	5.0		106		206
12.0	16.0	100	60	11.0	12	6.0		107		207
16.0	32.0	125	80	15.0	16	8.0		108		208
20.0	38.0	125	80	19.0	20	10.0		109		209

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	120–140	120–140	120–140	50–70	50–70	50–70	70–80	50–60	70–80	60–70	20–30

16544 Solid carbide end mill Ultra MS

VHM AlCrN | HPC | 35°/38° | Z 4 | 45° | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide cutter with clearance for roughing and finishing with variable pitch and uneven twist.
Advantage:
Maximum machining performance with unbeatable smoothness.

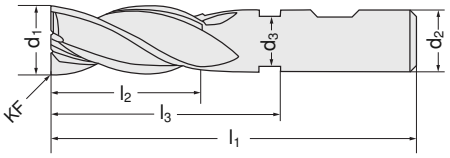
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steels up to 1300 N/mm².

DIN 6535 HA

16544 101-108

DIN 6535 HB

16544 201-208



							DIN 6535 HA		DIN 6535 HB	
d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	16544	...	16544	...
4	6	3.7	57	20	11	0.1		101		201
5	6	4.6	57	20	13	0.1		102		202
6	6	5.5	57	20	13	0.1		103		203
8	8	7.4	64	30	20	0.2		104		204
10	10	9.2	72	32	22	0.2		105		205
12	12	11.0	83	37	26	0.2		106		206
16	16	15.0	92	46	32	0.3		107		207
20	20	19.0	104	58	38	0.4		108		208

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	120–140	120–140	120–140	50–70	50–70	50–70	70–80	50–60	70–80	60–70	20–30

16550 Solid carbide torus milling cutter Ultra MS

VHM AlCrN | HPC | Z 4 | 35°/38° | R | max. | VA | Ti/Ni

ATORN®

Design
Solid carbide torus milling cutter with clearance, variable pitch and uneven twist.
Advantage:
Maximum machining performance with unbeatable smoothness.

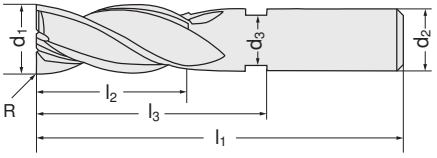
Applications
Especially suitable for processing stainless and acid-resistant steels, titanium and nickel alloys, bronze, brass and steels up to 1300 N/mm².

DIN 6535 HA

16550 301-321

DIN 6535 HB

16550 401-421



							DIN 6535 HA		DIN 6535 HB	
d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	R mm	16550	...	16550	...
4.0	6	3.7	57	20	11	0.3		301		401
4.0	6	3.7	57	20	11	0.5		302		402
5.0	6	4.6	57	20	13	0.3		303		403
5.0	6	4.6	57	20	13	0.5		304		404
6.0	6	5.5	57	20	13	0.3		305		405
6.0	6	5.5	57	20	13	0.5		306		406
6.0	6	5.5	57	20	13	1.0		307		407
8.0	8	7.4	64	30	20	0.5		308		408
8.0	8	7.4	64	30	20	1.0		309		409
10.0	10	9.2	72	32	22	0.5		310		410
10.0	10	9.2	72	32	22	1.0		311		411
12.0	12	11.0	83	37	26	0.5		312		412
12.0	12	11.0	83	37	26	1.0		313		413
12.0	12	11.0	83	37	26	2.0		314		414
12.0	12	11.0	83	37	26	3.0		315		415
16.0	16	15.0	92	46	32	1.0		316		416
16.0	16	15.0	92	46	32	2.0		317		417
16.0	16	15.0	92	46	32	3.0		318		418
20.0	20	19.0	104	58	38	1.0		319		419
20.0	20	19.0	104	58	38	2.0		320		420
20.0	20	19.0	104	58	38	3.0		321		421

Al<14%Si	Brass	Bronze	St<700N	St<900N	St<1000N	St<1300N	VA<900N	VA>900N	Ti<700N	Ti>700N	Ni-Co<700N	Ni-Co<1200N	Ni-based alloy
-	-	-	120–140	120–140	120–140	50–70	50–70	50–70	70–80	50–60	70–80	60–70	20–30

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16556 Solid carbide end mill HPC Power INOX

ATORN®

Design
- High-performance tool for roughing/finishing machining tasks with an uneven twist angle
- Face side for centre cutting
- With edge protection chamfer

Advantage:
- Maximum machining

Applications
For machining VA and materials that are difficult to machine.

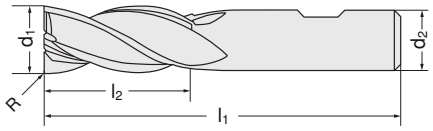
VHM TiAlN | HPC | Z 4 | 45° | 41°/43°/45° | VA | Ti/Ni

16556 104-120

DIN 6535 HA

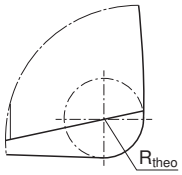
16556 204-220

DIN 6535 HB



16556 306-320

DIN 6535 HB



						DIN 6535 HA		DIN 6535 HB		DIN 6535 HB with internal cooling	
d_1 (h10) mm	l_2 mm	l_3 mm	l_1 mm	R theo (+0.05) mm	d_3 (h6) mm	16556	...	16556	...	16556	...
4.0	8	12	54	0.15	6		104		204		
5.0	10	15	54	0.2	6		105		205		
6.0	13	21	57	0.3	6		106		206		306
8.0	19	27	63	0.3	8		108		208		308
10.0	22	32	72	0.3	10		110		210		310
12.0	26	38	83	0.3	12		112		212		312
16.0	32	44	92	0.4	16		116		216		316
20.0	38	54	104	0.4	20		120		220		320

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300–330	-	250–275	-	-	-	-	-	-	-	-	-	-	100–130	100–130	30–45	-	-

16525 - 16526 Solid carbide premium end mill HPC INOX

VHM Duocon | HPC | Z 4 | 45° | ≠ | 35°/38° | Norm | DIN 6535 HA | DIN 6535 HB | VA

HHW

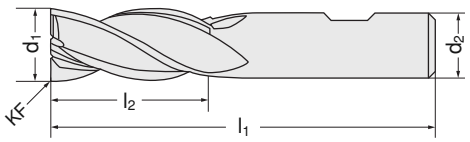
Design
- Specially edge-treated solid carbide HPC end mill with **Duocon coating**
- Uneven twist, uneven pitch
- With **the latest micro-geometry** for INOX processing
- High machining volumes possible
- Additional special feature of the HHW HPC Premium cutter is the face specially optimised for ramping

Note:
Make sure the tool and workpiece are strongly clamped.

Applications
High-performance tool especially for machining stainless steels. For roughing and finishing.

NEW

16525 103-120



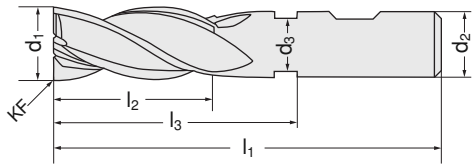
Short without clearance

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	KF x 45° mm	DIN 6535 HA 16525 ...	DIN 6535 HB 16525 ...
3.0	6	54	6	0.06	**103**	**203**
4.0	8	54	6	0.08	**104**	**204**
5.0	9	54	6	0.10	**105**	**205**
6.0	10	54	6	0.13	**106**	**206**
8.0	12	58	8	0.15	**108**	**208**
10.0	14	66	10	0.20	**110**	**210**
12.0	16	73	12	0.25	**112**	**212**
16.0	22	82	16	0.35	**116**	**216**
20.0	26	92	20	0.40	**120**	**220**

Long with clearance

NEW

16526 203-220



d_1 h10 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16526 ...	DIN 6535 HB 16526 ...
3.0	8	18	57	6	2.8	0.06	**103**	**203**
4.0	11	21	57	6	3.6	0.08	**104**	**204**
5.0	13	21	57	6	4.6	0.10	**105**	**205**
6.0	13	21	57	6	5.5	0.13	**106**	**206**
8.0	19	27	63	8	7.5	0.15	**108**	**208**
10.0	22	32	72	10	9.5	0.20	**110**	**210**
12.0	26	38	83	12	11.5	0.25	**112**	**212**
16.0	32	44	92	16	15.5	0.35	**116**	**216**
20.0	38	54	104	20	19.5	0.40	**120**	**220**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16525																	
-	-	-	-	-	-	-	-	-	-	-	-	-	120	100	-	-	-
16526																	
-	-	-	-	-	-	-	-	-	-	-	-	-	110	80	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16630 Solid carbide roughing cutter

TiAlN Ultra | HSC | Z 4-6 | NR | ≈ 45° | 45° | VA | Uni | DIN 6535 HB

ATORN®

Design
- With clearance and edge protection chamfer
- With centre cutting
- 4-6 cutting edges

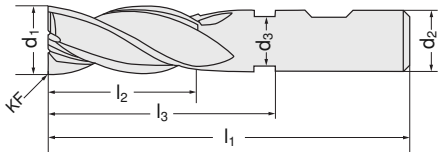
Advantage:
- Maximum machining performance

Applications
For roughing.

Quality
Solid carbide ultra-fine grain/TiAlN ultra-coated.

16630

DIN 6535 HA



							DIN 6535 HA		DIN 6535 HB	
d_1 h9 mm	d_2 mm	d_3 mm	l_1 mm	l_3 mm	l_2 mm	KF mm	Z	16630	...	16630	...
6.0	6	5.8	54	16	8	0.1	4		101		201
6.0	6	5.8	57	19	13	0.1	4		102		202
8.0	8	7.7	58	20	11	0.2	4		103		203
8.0	8	7.7	63	25	19	0.2	4		104		204
10.0	10	9.8	66	24	13	0.2	4		105		205
10.0	10	9.8	72	30	22	0.2	4		106		206
12.0	12	11.8	73	26	16	0.2	4		107		207
12.0	12	11.8	83	36	26	0.2	4		108		208
16.0	16	15.7	82	32	19	0.3	5		109		209
16.0	16	15.7	92	42	32	0.3	5		110		210
20.0	20	19.7	92	40	19	0.3	6		111		211
20.0	20	19.7	104	52	38	0.3	6		112		212

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1300N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300–400	300–400	120–150	135–180	135–155	135–155	120–135	70–100	70–100	-	-	-	-	40–60	40–60	30–40	100–140	-

16580 Solid carbide universal cutters

VHM | Z 2 | ≈ 25° | DIN 6535 HA | N | Uni

HW

Design
Short, 2 cutting edges, tip angle 90°(+/– 1°),
25° right-hand spiral, straight shank shape A.

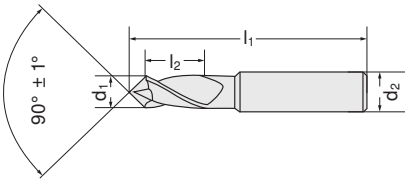
Applications
A new concept for shank tools with a focus on versatility. It allows up to 8 machining operations with just one tool.

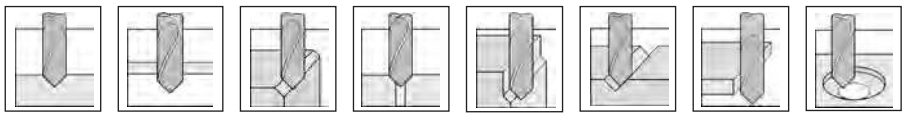
Quality
Solid carbide.

Note:
d_1 3–10 mm = h9,
d_1 12–20 mm = d9.

(1) = centring,
(2) = drilling,
(3) = combined milling/chamfering,
(4) = countersinking,
(5) = chamfering,
(6) = V-groove milling,
(7) = circumferential milling,
(8) = face/circular milling

16580





(1) (2) (3) (4) (5) (6) (7) (8)

				VHM	
d_1 mm	l_1 mm	l_2 mm	d_2 h6 mm	16580	...
3.0	50	7.5	4		101
4.0	50	10	5		102
5.0	50	12.5	6		103
6.0	58	15	8		104
8.0	72	20	10		105

				VHM	
d_1 mm	l_1 mm	l_2 mm	d_2 h6 mm	16580	...
10.0	90	23	12		106
12.0	90	26	12		107
16.0	92	34	16		108
20.0	100	42	20		109

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
120–150	120–150	50–120	70–75	50–60	40–50	-	30–40	25–30	-	-	-	-	30–35	30–35	25–30	30–40	100–150

16575 Solid carbide engraver's milling cutter 60°

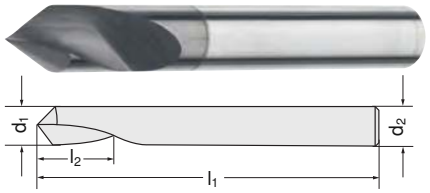
VHM TiAlN | Z 1 | 60° | DIN 6535 HA | N | Norm | Uni

HW

Design
- **1 cutting edge**
- With smooth straight shank in accordance with DIN 6535 HA

Applications
For engraving contours.

16575



d_1 h6 mm	l_2 mm	l_1 mm	d_2 h6 mm	16575 ...
3.0	10	40	3	**101**
4.0	10	40	4	**102**
6.0	10	50	6	**103**

Al<10%Si	Al>10% Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
220–240	170–200	140–160	120–140	100–120	80–100	70–80	60–70	50–60	-	-	-	-	60–70	60–70	-	120–140	200–240

16570 - 16571 Solid carbide 90° deburring tool

Z 4-6 | 90° | DIN 6535 HA | DIN 6535 HB | Uni

ATORN®

Design
- **Short**
- **4-6 cutting edges**
- With reinforced straight shank with driving surfaces in accordance with DIN 6535 HB (with Weldon)
- Ø 4 mm with smooth straight shank in accordance with DIN 6535 HA

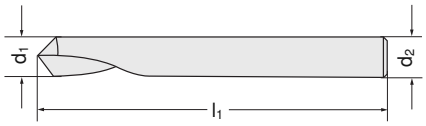
Note:
Tolerance 90° +/- 2°.

VHM

16570

VHM TiAlN

16571



			Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_1 mm	d_2 h6 mm	Z	16570 ...		16571 ...
4.0	51	4	4	**101**		**101**
6.0	64	6	4	**102**		**102**
8.0	64	8	5	**103**		**103**
10.0	70	10	6	**104**		**104**

			Solid carbide		Solid carbide/TiAlN	
d_1 h10 mm	l_1 mm	d_2 h6 mm	Z	16570 ...		16571 ...
12.0	78	12	6	**105**		**105**
16.0	89	16	6	**106**		**106**
20.0	104	20	6	**107**		**107**

Al<10%Si	Al >10% Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
16570																	
140–160	100–120	100–120	90–120	60–80	55–60	50–55	40–50	-	-	-	-	-	50–60	40–50	30–60	60–80	-
16571																	
280–350	200–250	150–180	120–140	110–120	100–110	70–80	60–70	-	-	-	-	-	80–120	60–90	30–60	80–120	-

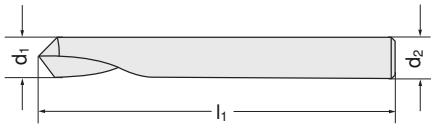
16573 VHM-Entgrater 60°

VHM TiAlN | Z 4-6 | 60° | DIN 6535 HA | DIN 6535 HB | Uni

ATORN®

Design
- **Short**
- **4-6 cutting edges**
- With reinforced straight shank with driving surfaces in accordance with DIN 6535 HB (with Weldon)
- Ø 4 mm with smooth straight shank in accordance with DIN 6535 HA

16573



			Solid carbide/TiAlN	
d_1 h10 mm	l_1 mm	d_2 h6 mm	Z	16573 ...
4.0	51	4	4	**101**
6.0	64	6	4	**102**
8.0	64	8	5	**103**

			Solid carbide/TiAlN	
d_1 h10 mm	l_1 mm	d_2 h6 mm	Z	16573 ...
10.0	70	10	6	**104**
12.0	78	12	6	**105**
16.0	89	16	6	**106**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
280–350	200–250	150–180	120–140	110–120	100–110	70–80	60–70	-	-	-	-	-	80–120	60–90	30–60	80–120	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16583 Solid carbide forward/reverse deburring tool

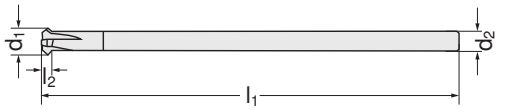
VHM TiAlN | Z 4 | DIN 6535 HA | Uni

Design
- **4 cutting edges, 45°**
- With smooth straight shank in accordance with DIN 6535 HA

Applications
For forward/reverse deburring and chamfering.

16583 101-102

16583 103-106



DIN 6535 HA

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	AP mm	16583	...
4.0	2	100	6	10		101
6.0	2	100	6	15		102
8.0	2	100	6	-		103

DIN 6535 HA

d_1 h10 mm	l_2 mm	l_1 mm	d_2 h6 mm	AP mm	16583	...
10.0	4	100	6	-		104
12.0	4	100	6	-		105
16.0	5	100	10	-		106

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	250	250	90–120	80–120	80–100	50–80	40–70	30–35	-	-	-	-	80–120	60–90	30–60	50–100	-

16660 Solid carbide keyway cutter

VHM Alcrona | Z 6-10 | ähnl. DIN 1835B | DIN 850 | Uni

Design
- 6-10 cutting edges
- Right cutting
- Cross-toothed
- For cutting on periphery

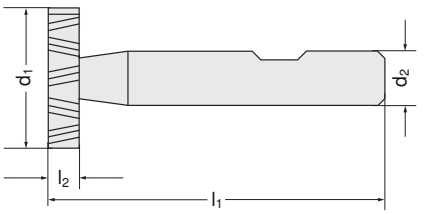
Advantage:
- High machining performance

Applications
For cutting grooves for disc springs in accordance with DIN 6888.

Note:
f_z for a_p = 0.25xD

16660

d_1 (h11) x l_2 mm	l_1 mm	d_2 (h6) mm	Z	16660	...
10.5 x 2.0	50	6	6		101
10.5 x 3.0	50	6	6		102
13.5 x 2.0	56	10	8		103
13.5 x 3.0	56	10	8		104
13.5 x 4.0	56	10	8		115
16.5 x 3.0	56	10	10		105
16.5 x 4.0	56	10	10		106
19.5 x 3.0	63	10	10		107
19.5 x 4.0	63	10	10		108
22.5 x 4.0	63	10	10		109
25.5 x 5.0	63	10	10		110
28.5 x 5.0	63	10	10		111
32.5 x 5.0	71	12	10		112
38.5 x 10.0	71	12	10		113
45.5 x 10.0	71	12	10		114



Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	120	100	90	80	70	-	-	-	-	-	80	-	-	120	-

16661 Solid carbide T-slot cutter

VHM Alcrona | N | NF | Z 6 | DIN 6535 HB | DIN 851 | Uni

Design
- 6 cutting edges
- Right cutting
- Cross-toothed
- For cutting on periphery and end face
- Straight shank with driving surface in accordance with DIN 1835 B

Advantage:
- High machining performance

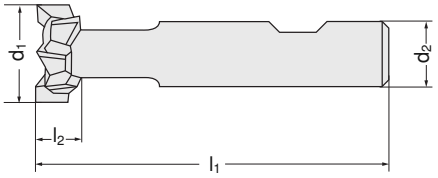
Applications
For milling T-slots.

Note:
Drive up to full engagement f_z with 50%.

16661 101-107
Design
- Type N

16661 201-207
Design
- Type NF

16661



d_1 (h11) mm	l_2 (h11) mm	l_1 mm	d_2 (h6) mm	d_3 mm	t_{max} mm	Type N 16661	...	Type NF 16661	...
12.5	6	57	10	5	3.75		101		201
16.0	8	62	10	7	4.50		102		202
18.0	8	70	12	8	5.00		103		203
21.0	9	74	12	10	5.50		104		204
25.0	11	82	16	12	6.50		105		205
28.0	12	85	16	13	7.50		106		206
32.0	14	90	16	15	8.50		107		207

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	120	100	90	80	70	-	-	-	-	-	80	-	-	120	-

16662 Solid carbide angle cutter

VHM Alcrona | Z 6–9 | DIN 6535 HB | Uni

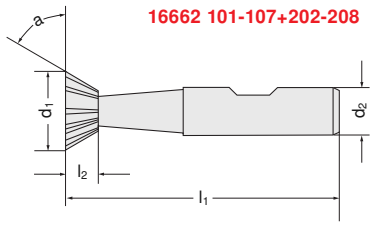
Design
- 6-9 cutting edges
- Right cutting
- Straight shank with driving surface in accordance with DIN 1835 B

Applications
For cutting angle grooves
(slide guideways etc.).

Note:
Drive up to full engagement fz with 50%.

16662 101-107
Design
- **Shape C**
- Cutting edge tapering in the direction of the shank
- For cutting on periphery and end face
- **a = 45°**

16662 101-107+202-208



16662 202-208
Design
- **Shape C**
- Cutting edge tapering in the direction of the shank
- For cutting on periphery and end face
- **a = 60°**

DIN 1833C

16662 101-107

16662 202-208

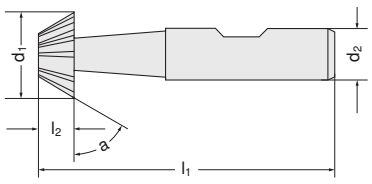
16662 301-307
Design
- **Shape D**
- Cutting edge tapering in the direction of the end face
- Only cuts on periphery
- **a = 45°**

DIN 1833D

16662 301-307

16662 401-407
Design
- **Shape D**
- Cutting edge tapering in the direction of the end face
- Only cuts on periphery
- **a = 60°**

16662 301–307+401–407



DIN 1833D

16662 401-407

d_1 (js16) mm	45° l_2 mm	60° l_2 mm	l_1 mm	d_2 (h6) mm	Z	45° / C 16662	...	60° / C 16662	...	45° / D 16662	...	60° / D 16662	...
16	4.0	6.3	60	10	6		101		202		301		401
20	5,0	8,0	63	12	8		102		203		302		402
22	6,0	9,0	67	12	8		103		204		303		403
25	6.3	10.0	67	12	8		104		205		304		404
28	7.5	11.0	80	16	9		105		206		305		405
32	8.0	12.5	71	16	9		106		207		306		406
38	10.0	16.0	80	16	9		107		208		307		407

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	120	100	90	80	70	-	-	-	-	-	80	-	-	120	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16658 Solid carbide quarter circle cutter

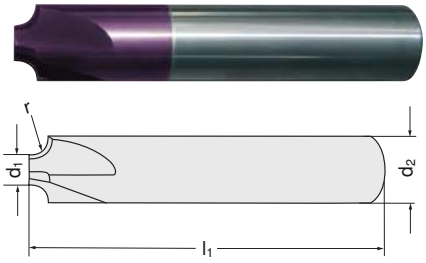
VHM TiAlN | Z 4 | DIN 6535 HA | Norm | 45 HRC | Uni

Design
- **4 cutting edges**
- Straight-grooved
- With smooth straight shank in accordance with DIN 6535 HA
- Radius tolerance +/- 0.01 mm

Applications
For materials up to HRC 45. For rounding and deburring of edges and contours. For high-strength materials as well as for aluminium and non-ferrous metals.

Quality
Universal carbide ultra-fine grain (P 20 - K 40) TiAlN-coated.

16658



Radius	d_1 mm	l_1 mm	d_2 mm	16658	...
0.2	5.6	58	6		102
0.3	5.4	58	6		103
0.5	7.0	70	8		105
1.0	6.0	70	8		110
1.5	7.0	75	10		115
2.0	6.0	75	10		120
2.5	7.0	75	12		125
3.0	6.0	75	12		130
3.5	9.0	80	16		135
4.0	8.0	80	16		140
4.5	7.0	80	16		145
5.0	10.0	80	20		150
6.0	8.0	80	20		160

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
120–600	100–400	80–250	60–150	50–120	50–100	40–90	40–80	30–70	55–75	-	-	-	30–80	20–70	20–60	60–130	-

16710 Solid carbide mini end mills

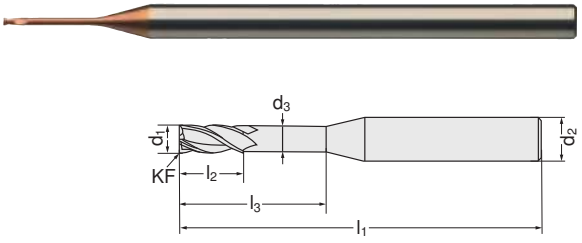
ATORN®

VHM ZrCN Ultra-N | HSC | Z 2 | ≈ 30° | DIN 6535 HA | 45° | max. | ALU | CU | MS | Kunststoffe

Design
- With edge chamfer

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16710	...
0.5	0.9	55	4	0.48	4	0.05		101
0.5	0.9	65	6	0.48	4	0.05		102
0.5	0.9	65	10	0.48	4	0.05		103
1.0	1.5	55	5	0.95	4	0.10		104
1.0	1.5	65	10	0.95	4	0.10		105
1.0	1.5	65	15	0.95	4	0.10		106
1.5	1.8	55	8	1.44	4	0.10		107
1.5	1.8	65	15	1.44	4	0.10		108
1.5	1.8	65	20	1.44	4	0.10		109
2.0	2.0	55	10	1.92	4	0.10		110
2.0	2.0	65	20	1.92	4	0.10		111
2.5	2.5	55	12	2.40	4	0.10		112
2.5	2.5	65	20	2.40	4	0.10		113

16710



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
400–450	180–320	250–420	180–320	300–450	400–550	250–420

16711 Solid carbide mini torus milling cutter

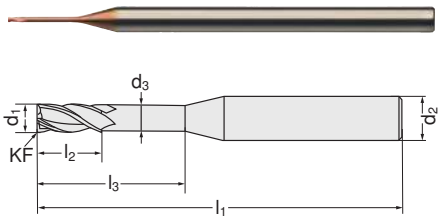
VHM ZrCN Ultra-N | HSC | Z 2 | ≈ 30° | DIN 6535 HA | R | max. | ALU | CU | MS | Kunst-stoffe

ATORN®

Design
Radius tolerance 0/-0.015

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16711	...
0.5	0.9	55	4	0.48	4	0.05		101
0.5	0.9	65	6	0.48	4	0.05		102
0.5	0.9	65	10	0.48	4	0.08		103
1.0	1.5	55	5	0.95	4	0.08		104
1.0	1.5	65	10	0.95	4	0.10		105
1.0	1.5	65	15	0.95	4	0.10		106
1.5	1.8	55	8	1.44	4	0.12		107
1.5	1.8	65	15	1.44	4	0.15		108
1.5	1.8	65	20	1.44	4	0.15		109
2.0	2.0	55	10	1.92	4	0.20		110
2.0	2.0	65	20	1.92	4	0.20		111
2.5	2.5	55	12	2.40	4	0.25		112
2.5	2.5	65	20	2.40	4	0.25		113

16711



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
400–450	180–320	250–420	180–320	300–450	400–550	250–420

16712 Solid carbide mini radius cutters

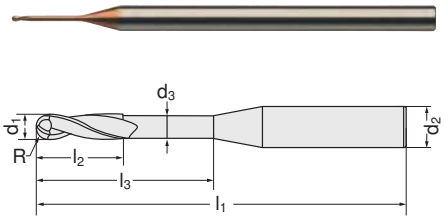
VHM ZrCN Ultra-N | HSC | Z 2 | ≈ 30° | DIN 6535 HA | max. | ALU | CU | MS | Kunst-stoffe

ATORN®

Design
Radius tolerance +/-0.01

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16712	...
0.5	0.9	55	4	0.48	4	0.25		101
0.5	0.9	65	6	0.48	4	0.25		102
0.5	0.9	65	10	0.48	4	0.25		103
1.0	1.5	55	5	0.95	4	0.50		104
1.0	1.5	65	10	0.95	4	0.50		105
1.0	1.5	65	15	0.95	4	0.50		106
1.5	1.8	55	8	1.44	4	0.75		107
1.5	1.8	65	15	1.44	4	0.75		108
1.5	1.8	65	20	1.44	4	0.75		109
2.0	2.0	55	10	1.92	4	1.00		110
2.0	2.0	65	20	1.92	4	1.00		111
2.5	2.5	55	12	2.40	4	1.75		112
2.5	2.5	65	20	2.40	4	1.75		113

16712



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
400–450	180–320	250–420	180–320	300–450	400–550	250–420

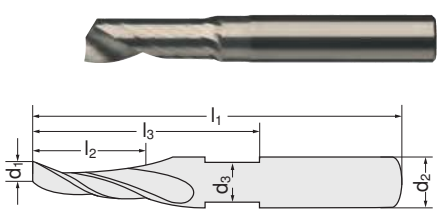
16715 Solid carbide single-tooth cutters

VHM poliert | HSC | Z 1 | ≈ 30° | DIN 6535 HA | 90° | max. | ALU | CU | MS | Kunst-stoffe

ATORN®

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	16715	...
1.5	6	50	22	1.45	3		101
2.0	8	50	22	1.80	3		102
3.0	12	50	22	2.80	3		103
4.0	15	57	29	3.80	4		104
5.0	17	60	32	4.80	5		105
6.0	20	64	28	5.80	6		106
8.0	24	64	28	7.80	8		107
10.0	25	73	33	9.70	10		108
12.0	32	84	39	11.70	12		109
16.0	38	93	45	15.70	16		110

16715



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16717 Solid carbide end mill

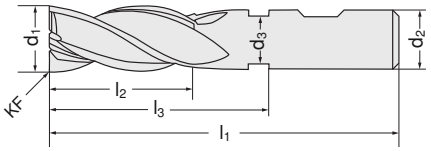
ATORN®

Design
- With edge chamfer

VHM poliert | HSC | Z 2 | ≈ 45° | DIN 6535 HB | 45° | max. | ALU | CU | MS | Kunst-stoffe

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16717	...
3.0	8	57	18	2.90	6	0.1		101
4.0	11	57	18	3.90	6	0.1		102
5.0	13	57	20	4.90	6	0.1		103
6.0	13	57	20	5.80	6	0.1		104
8.0	19	63	26	7.80	8	0.1		105
10.0	22	72	29	9.70	10	0.2		106
12.0	26	83	36	11.70	12	0.2		107
16.0	32	92	42	15.70	16	0.2		108
20.0	38	104	52	19.70	20	0.2		109

16717



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
300-400	120-200	160-300	120-200	200-250	300-400	160-300

16718 - 16719 Solid carbide end mill

ATORN®

Design
- With edge chamfer

VHM ZrCN Ultra-N | HSC | Z 2 | ≈ 45° | 45° | max. | ALU | CU | MS | Kunst-stoffe

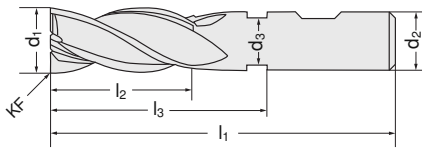
DIN 6535 HA

16718

DIN 6535 HB

16719

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16718	...	16719	...
3.0	8	57	18	2.9	6	0.1		101		101
4.0	11	57	18	3.9	6	0.1		102		102
5.0	13	57	20	4.9	6	0.1		103		103
6.0	13	57	20	5.8	6	0.1		104		104
8.0	19	63	26	7.8	8	0.1		105		105
10.0	22	72	29	9.7	10	0.2		106		106
12.0	26	83	36	11.7	12	0.2		107		107
16.0	32	92	42	15.7	16	0.2		108		108



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	250–500	200–350

16722 - 16724 Solid carbide end mill

ATORN®

Design
- With edge chamfer

VHM poliert | HSC | Z 3 | ≈ 45° | 45° | max. | ALU | CU | MS | Kunst-stoffe

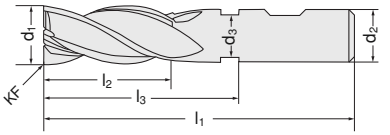
DIN 6535 HA

16722

DIN 6535 HB

16724

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16722	...	16724	...
3.0	12	57	16	2.8	6	0.1		101		101
4.0	12	57	18	3.8	6	0.1		102		102
5.0	15	57	18	4.7	6	0.1		103		103
6.0	16	57	21	5.6	6	0.1		104		104
8.0	22	64	28	7.6	8	0.1		105		105
10.0	25	73	33	9.6	10	0.2		106		106
12.0	28	84	39	11.4	12	0.2		107		107
16.0	35	93	45	15.4	16	0.2		108		108
20.0	40	104	54	19.4	20	0.2		109		109



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
300–450	125–200	175–300	175–300	200–350	300–450	175–300

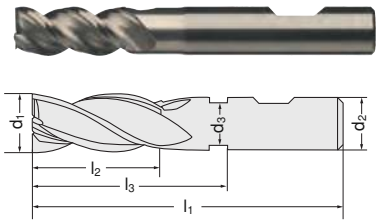
16725 Solid carbide end mill

ATORN®

Design
- Sharp-edged

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	16725 ...
3.0	12	57	16	2.8	6	**101**
4.0	12	57	18	3.8	6	**102**
5.0	15	57	18	4.7	6	**103**
6.0	16	57	21	5.6	6	**104**
8.0	22	64	28	7.6	8	**105**
10.0	25	73	33	9.6	10	**106**
12.0	28	84	39	11.4	12	**107**
16.0	35	93	45	15.4	16	**108**
20.0	40	104	54	19.4	20	**109**

16725



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
300–450	125–200	175–300	175–300	200–350	300–450	175–300

16726 - 16727 Solid carbide end mill

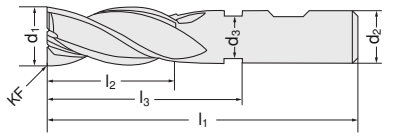
ATORN®

Design
- With edge chamfer

16726

16727

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16726 ...	16727 ...
3.0	12	57	16	2.8	6	0.1	**101**	**101**
4.0	12	57	18	3.8	6	0.1	**102**	**102**
5.0	15	57	18	4.7	6	0.1	**103**	**103**
6.0	16	57	21	5.6	6	0.1	**104**	**104**
8.0	22	64	28	7.6	8	0.1	**105**	**105**
10.0	25	73	33	9.6	10	0.2	**106**	**106**
12.0	28	84	39	11.4	12	0.2	**107**	**107**
16.0	35	93	45	15.4	16	0.2	**108**	**108**
20.0	40	104	54	19.4	20	0.2	**109**	**109**



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

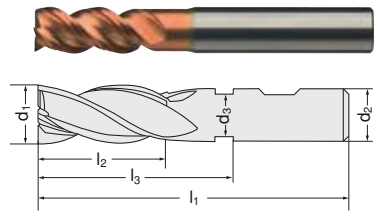
16728 Solid carbide end mill

ATORN®

Design
- Sharp-edged

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	16728 ...
3.0	12	57	16	2.8	6	**101**
4.0	12	57	18	3.8	6	**102**
5.0	15	57	18	4.7	6	**103**
6.0	16	57	21	5.6	6	**104**
8.0	22	64	28	7.6	8	**105**
10.0	25	73	33	9.6	10	**106**
12.0	28	84	39	11.4	12	**107**
16.0	35	93	45	15.4	16	**108**
20.0	40	104	54	19.4	20	**109**

16728



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16729 - 16730 Solid carbide end mill

ATORN®

Design
- With edge chamfer

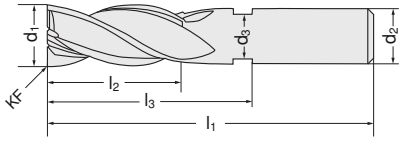
Z 3 | ≈ 45° | DIN 6535 HA | 45° | max. | ALU | CU | MS | Kunst-stoffe | VHM poliert | HSC

16729

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16729 ...	16730 ...
3.0	15	64	21	2.8	6	0.1	101	101
4.0	19	64	27	3.8	6	0.1	102	102
5.0	20	64	28	4.7	6	0.1	103	103
6.0	20	64	28	5.6	6	0.1	104	104
8.0	38	80	44	7.6	8	0.1	105	105
10.0	45	95	55	9.6	10	0.2	106	106
12.0	53	100	55	11.4	12	0.2	107	107
16.0	63	123	75	15.4	16	0.2	108	108
20.0	65	125	75	19.4	20	0.2	109	109

VHM ZrCN Ultra-N | HPC

16730



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
300–450	125–200	175–300	175–300	200–350	300–450	175–300

16731 Solid carbide end mill

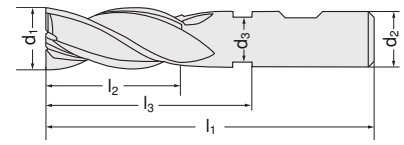
ATORN®

Design
- **Sharp-edged**

VHM ZrCN Ultra-N | HPC | Z 3 | ≈ 45° | DIN 6535 HA | 90° | max. | ALU | CU | MS | Kunst-stoffe

16731

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	16731 ...
3.0	15	64	21	2.8	6	101
4.0	19	64	27	3.8	6	102
5.0	20	64	28	4.7	6	103
6.0	20	64	28	5.6	6	104
8.0	38	80	44	7.6	8	105
10.0	45	95	55	9.6	10	106
12.0	53	100	55	11.4	12	107
16.0	63	123	75	15.4	16	108
20.0	65	125	75	19.4	20	109



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16758 Solid carbide roughing cutter

VHM ZrN | HPC | Z 3 | 45° | Norm | max. | ALU

Design
- Robust roughing cutter with reinforced core
- Before and after coating polished chip spaces and special edge treatment

Advantage:
- Titanium-free ZrN coating for best sliding properties developed for aluminium processing.
- Maximum machining performance and unbeatable surface quality

Applications
For roughing with the highest standards.

16758 103-125

DIN 1835 HA

16758 203-225

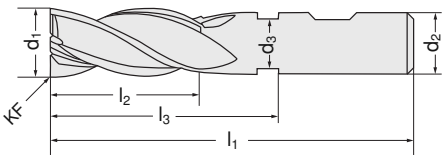
DIN 1835 HB

Short

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	DIN 1835 HA 16758 ...	DIN 1835 HB 16758 ...
3.0	8	57	12	2.8	6	0.1	103	203
4.0	11	57	18	3.8	6	0.1	104	204
5.0	13	57	18	4.8	6	0.1	105	205
6.0	13	57	18	5.8	6	0.2	106	206
8.0	21	63	25	7.8	8	0.2	108	208
10.0	22	72	30	9.7	10	0.2	110	210
12.0	26	83	36	11.7	12	0.2	112	212
16.0	36	92	42	15.7	16	0.2	116	216
18.0	36	92	42	17.6	18	0.2	118	218
20.0	41	104	52	19.5	20	0.2	120	220
25.0	50	125	65	24.5	25	0.3	125	225

Long

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	DIN 1835 HA 16758 ...	DIN 1835 HB 16758 ...
6.0	13	80	42	5.8	6	0.2	306	406
8.0	21	100	62	7.8	8	0.2	308	408
10.0	22	100	58	9.7	10	0.2	310	410
12.0	26	120	73	11.7	12	0.2	312	412
16.0	36	150	100	15.7	16	0.2	316	416
20.0	41	150	98	19.5	20	0.2	320	420



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
370–550	210–300	160–220	-	-	-	-

16732 - 16734 Solid carbide roughing cutter

VHM ZrCN Ultra-N | HPC | Z 3 | ≈ 40° | 45° | max. | ALU | CU | MS | Kunststoffe

ATORN®

Design
- With edge chamfer

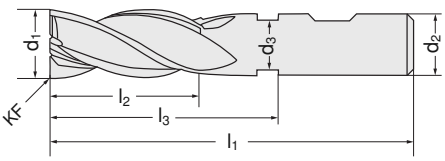
16732

DIN 6535 HA

16734

DIN 6535 HB

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16732 ...	16734 ...
6.0	13	57	18	5.6	6	0.4	101	101
8.0	21	63	25	7.6	8	0.4	102	102
10.0	22	72	30	9.6	10	0.4	103	103
12.0	26	83	36	11.4	12	0.4	104	104
16.0	36	92	42	15.4	16	0.4	105	105
20.0	41	104	52	19.4	20	0.4	106	106

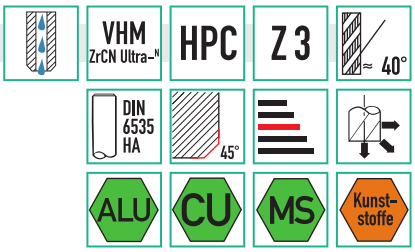


Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16735 Solid carbide roughing cutter with internal cooling

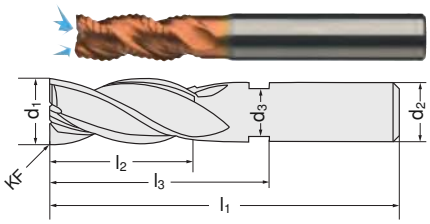
ATORN®

Design
- With edge chamfer



16735

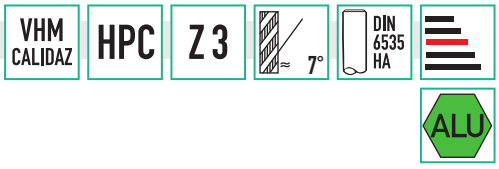
d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16735	...
6.0	13	57	18	5.6	6	0.4		101
8.0	21	63	25	7.6	8	0.4		102
10.0	22	72	30	9.6	10	0.4		103
12.0	26	83	36	11.4	12	0.4		104
16.0	36	92	42	15.4	16	0.4		105
20.0	41	104	52	19.4	20	0.4		106



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16564 Solid carbide 3D aluminium roughing cutter

ATORN®

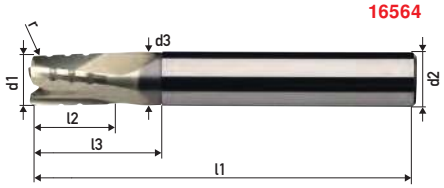


16564

Design
Centre cutting, with clearance, defined edge rounding. With straight shank in accordance with DIN 6535 HA.
Advantages: The highest cutting values can be reached in the range Vc=1000–1600 m/min with this tool thanks to the optimised cutting edge geometry (flat spirals of 7°, reinforced core, defined corner radius, chip breaker for creating discontinuous chips as well as defined edge rounding).

Applications
Especially for machining of non-ferrous metals.
Suitable for shrinking.
Quality
Multilayer PVD coating CALIDA Z (titanium-free).

Note:
Ensure stable machine conditions, secure workpiece clamping as well as sufficient coolant supply.



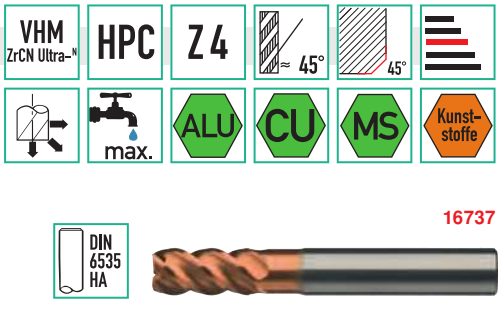
d_1e8 mm	l_2 mm	l_3 mm	l_1 mm	r mm	d_2h5 mm	d_3 mm	16564	...
6.0	8	21	57	0.6	6	5.7		106
8.0	10	27	63	0.8	8	7.7		108
10.0	12	32	72	1.0	10	9.7		110
12.0	16	38	83	1.2	12	11.7		112
16.0	20	44	92	1.6	16	15.7		116
20.0	25	54	104	2.0	20	19.0		120

Al, Al alloy	Al wrought alloy	Al<10%Si	Al >10% Si	Mg alloy	CU low alloy	Ms shrt chp.	Ms long chip.	Bronze shrt chp.	Bronze long chip.
700–730	850–890	300–330	200–240	200–240	200–230	290–315	200–240	290–315	200–240

16737 - 16738 Solid carbide end mill

ATORN®

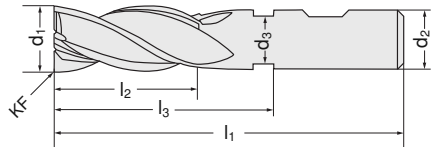
Design
- With edge chamfer



16737

16738

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16737	...	16738	...
3.0	6	57	10	2.8	6	0.1		101		101
4.0	8	57	14	3.8	6	0.1		102		102
5.0	10	57	16	4.7	6	0.1		103		103
6.0	12	57	19	5.6	6	0.2		104		104
8.0	16	63	25	7.6	8	0.2		105		105
10.0	20	72	30	9.6	10	0.2		106		106
12.0	24	83	36	11.4	12	0.2		107		107
16.0	32	92	42	15.4	16	0.2		108		108
20.0	40	104	52	19.4	20	0.2		109		109



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

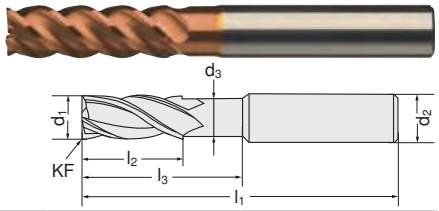
16739 Solid carbide end mill

ATORN®

Design
- With edge chamfer

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16739	...
4.0	16	62	22	3.8	6	0.1		101
5.0	17	62	24	4.7	6	0.1		102
6.0	18	62	24	5.6	6	0.2		103
8.0	24	72	30	7.6	8	0.2		104
10.0	30	80	38	9.6	10	0.2		105
12.0	36	93	46	11.4	12	0.2		106
16.0	48	108	58	15.4	16	0.2		107

16739



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

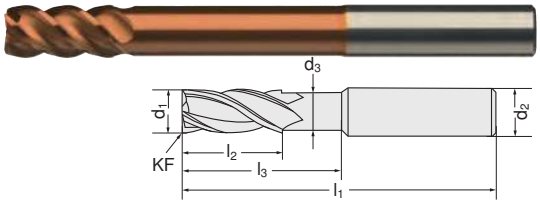
16740 Solid carbide end mill

ATORN®

Design
- With edge chamfer

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16740	...
6.0	12	80	42	5.6	6	0.2		101
8.0	16	100	58	7.6	8	0.2		102
10.0	20	100	62	9.6	10	0.2		103
12.0	24	120	75	11.4	12	0.2		104
16.0	32	150	100	15.4	16	0.2		105

16740



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
300-450	125-200	175-300	125-200	225-350	300-450	175-300

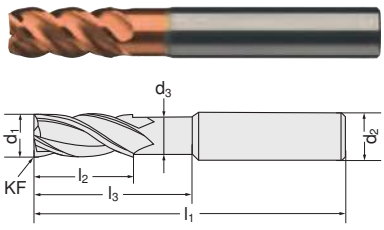
16741 Solid carbide end mill HPC

ATORN®

Design
- With edge chamfer

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16741	...
3.0	6	57	10	2.8	6	0.1		101
4.0	8	57	14	3.8	6	0.1		102
5.0	10	57	16	4.7	6	0.1		103
6.0	12	57	19	5.6	6	0.2		104
8.0	16	63	25	7.6	8	0.2		105
10.0	20	72	30	9.6	10	0.2		106
12.0	24	83	36	11.4	12	0.2		107
16.0	32	92	42	15.4	16	0.2		108
20.0	40	104	52	19.4	20	0.2		109

16741



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

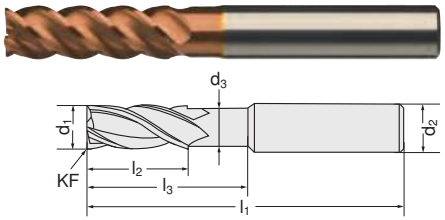
16742 Solid carbide end mill HPC

ATORN®

Design
- With edge chamfer

d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	KF mm	16742	...
4.0	16	62	22	3.8	6	0.1		101
5.0	17	62	24	4.7	6	0.1		102
6.0	18	62	24	5.6	6	0.2		103
8.0	24	68	30	7.6	8	0.2		104
10.0	30	80	38	9.6	10	0.2		105
12.0	36	93	46	11.4	12	0.2		106
16.0	48	108	58	15.4	16	0.2		107
20.0	60	126	74	19.4	20	0.2		108

16742



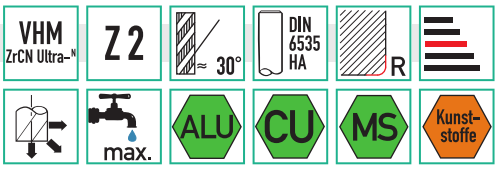
Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16745 Solid carbide torus milling cutters

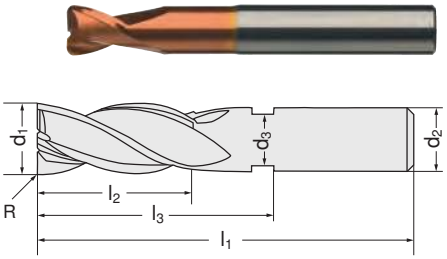
ATORN®

Design
Radius tolerance +/-0.015



d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16745	...
3.0	4	50	14	2.9	3	0.3		101
4.0	5	50	16	3.8	4	0.3		102
5.0	6	54	18	4.8	5	0.3		103
6.0	7	57	21	5.7	6	0.3		104
6.0	7	57	21	5.7	6	1.0		105
6.0	7	57	21	5.7	6	2.0		106
8.0	9	63	27	7.7	8	0.3		107
8.0	9	63	27	7.7	8	1.0		108
8.0	9	63	27	7.7	8	2.0		109
10.0	11	72	32	9.6	10	0.3		110
10.0	11	72	32	9.6	10	1.5		111
10.0	11	72	32	9.6	10	3.0		112
12.0	12	83	38	11.6	12	1.5		113
12.0	12	83	38	11.6	12	4.0		114
16.0	16	92	44	15.5	16	2.0		115
16.0	16	92	44	15.5	16	4.0		116

16745

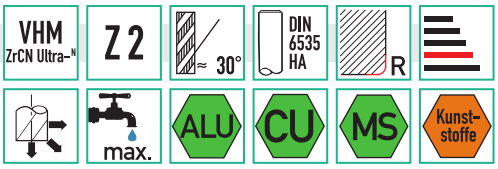


Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
375-550	175-275	225-375	175-275	275-450	375-550	225-375

16746 Solid carbide torus milling cutters

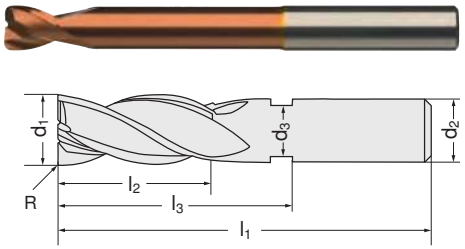
ATORN®

Design
Radius tolerance +/-0.015



d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16746	...
3.0	4	75	32	2.80	3	0.3		101
4.0	5	75	36	3.75	4	0.3		102
5.0	6	75	40	4.70	5	0.3		103
6.0	7	80	44	5.60	6	0.3		104
6.0	7	80	44	5.60	6	1.0		105
6.0	7	80	44	5.60	6	2.0		106
8.0	9	100	54	7.60	8	0.3		107
8.0	9	100	54	7.60	8	1.0		108
8.0	9	100	54	7.60	8	2.0		109
10.0	11	100	60	9.50	10	0.3		110
10.0	11	100	60	9.50	10	1.5		111
10.0	11	100	60	9.50	10	3.0		112
12.0	12	120	75	11.50	12	1.5		113
12.0	12	120	75	11.50	12	4.0		114
16.0	16	150	92	15.50	16	2.0		115
16.0	16	150	92	15.50	16	4.0		116

16746

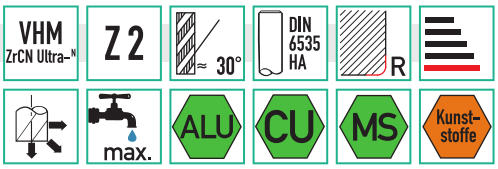


Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
375-550	175-275	225-375	175-275	275-450	375-550	225-375

16747 Solid carbide torus milling cutters

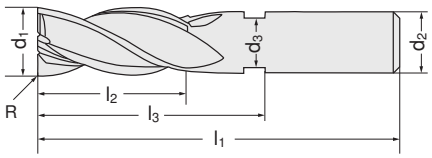
ATORN®

Design
Radius tolerance +/-0.015



16747

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16747 ...
6.0	7	120	80	5.6	6	0.3	**101**
6.0	7	120	80	5.6	6	1.0	**102**
8.0	9	130	90	7.6	8	0.3	**103**
8.0	9	130	90	7.6	8	1.0	**104**
8.0	9	130	90	7.6	8	2.0	**105**
10.0	11	150	110	9.5	10	0.3	**106**
10.0	11	150	110	9.5	10	3.0	**107**
12.0	12	160	115	11.5	12	1.5	**108**
12.0	12	160	115	11.5	12	4.0	**109**
16.0	16	200	140	15.5	16	2.0	**110**

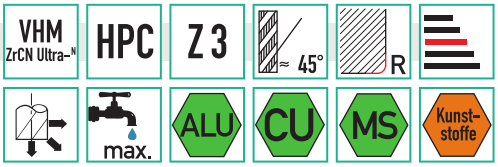


Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16748 - 16749 Solid carbide torus milling cutters

ATORN®

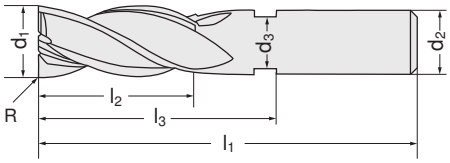
Design
Radius tolerance +/-0.015



d_1 (h9) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16748 ...	16749 ...
5.0	13	57	18	4.7	6	0.5	**101**	**101**
5.0	13	57	18	4.7	6	1.0	**102**	**102**
6.0	13	57	18	5.6	6	0.5	**103**	**103**
6.0	13	57	18	5.6	6	1.0	**104**	**104**
8.0	21	63	25	7.6	8	0.5	**105**	**105**
8.0	21	63	25	7.6	8	1.0	**106**	**106**
10.0	22	72	30	9.6	10	0.5	**107**	**107**
10.0	22	72	30	9.6	10	1.0	**108**	**108**
12.0	26	83	36	11.4	12	0.5	**109**	**109**
12.0	26	83	36	11.4	12	1.0	**110**	**110**
16.0	36	92	42	15.4	16	2.0	**111**	**111**
16.0	36	92	42	15.4	16	4.0	**112**	**112**
20.0	41	104	52	19.4	20	4.0	**113**	**113**

16748

16749



Al <10%Si	Al>10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
375-550	175-275	225-375	175-275	275-450	375-550	225-375

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16755 Solid carbide radius cutter

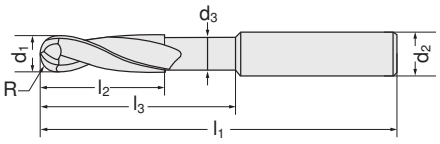
ATORN®

Design
Radius tolerance +/-0.015

VHM ZrCN Ultra-N | Z 2 | ≈ 45° | DIN 6535 HA | max. | ALU | CU | MS | Kunst-stoffe

16755

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16755	...
3.0	6	50	16	2.9	3	1.5		101
4.0	7	54	17	3.8	4	2.0		102
5.0	8	54	18	4.8	5	2.5		103
6.0	10	54	21	5.7	6	3.0		104
8.0	12	60	27	7.7	8	4.0		105
10.0	13	67	32	9.6	10	5.0		106
12.0	16	73	38	11.6	12	6.0		107
16.0	20	83	44	15.5	16	8.0		108



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
400-550	180-320	250-420	180-320	300-450	400-550	250-420

16756 Solid carbide radius cutter

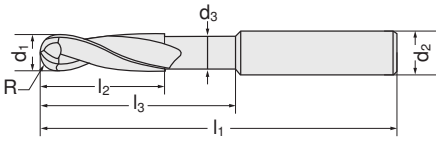
ATORN®

Design
Radius tolerance +/-0.015

VHM ZrCN Ultra-N | Z 2 | ≈ 45° | DIN 6535 HA | max. | ALU | CU | MS | Kunst-stoffe

16756

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16756	...
3.0	10	75	32	2.9	3	1.5		101
4.0	13	75	36	3.8	4	2.0		102
5.0	15	75	40	4.8	5	2.5		103
6.0	16	100	44	5.7	6	3.0		104
8.0	22	100	54	7.7	8	4.0		105
10.0	25	100	60	9.6	10	5.0		106
12.0	26	100	60	11.6	12	6.0		107
16.0	30	150	92	15.5	16	8.0		108



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
400-550	180-320	250-420	180-320	300-450	400-550	250-420

16757 Solid carbide radius cutter

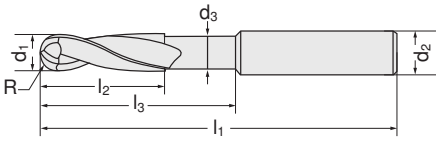
ATORN®

Design
Radius tolerance +/-0.015

VHM ZrCN Ultra-N | HPC | Z 2 | ≈ 45° | DIN 6535 HA | max. | ALU | CU | MS | Kunst-stoffe

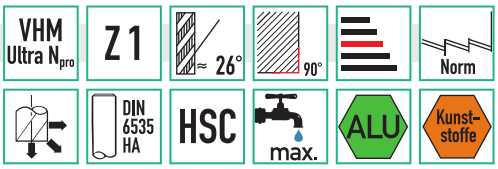
16757

d_1 (e8) mm	l_2 mm	l_1 mm	l_3 mm	d_3 mm	d_2 (h5) mm	R mm	16757	...
3.0	10	125	82	2.80	3	1.5		101
4.0	13	125	86	3.75	4	2.0		102
6.0	16	150	94	5.60	6	3.0		103
8.0	22	150	104	7.60	8	4.0		104
10.0	25	150	110	9.60	10	5.0		105
12.0	26	150	110	11.40	12	6.0		106



Al <10%Si	Al >10%Si	Cu long-chipping	Cu short-chipping	Duroplast	Thermoplastic	CFRP, GFRP
350–500	150–250	200–350	150–250	250–400	350–500	200–350

16886 Solid carbide single-tooth cutter Ultra Npro



ATORN®

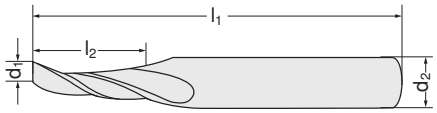
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- Ultra-smooth coating
- For grooving and contour milling
- Extremely wear-resistant
- Micro-geometry at the cutting edge

Applications
Specially for use on modern turning and milling centres.

NEW

16886



d_1 h9 mm	l_2 mm	l_1 mm	d_2 h6 mm	16886	...
1.0	4	50	3		101
1.5	6	50	3		102
2.0	8	50	3		103
3.0	12	50	3		104
4.0	15	60	4		105
5.0	17	60	5		106
6.0	20	65	6		107
8.0	22	65	8		108
10.0	25	75	10		109
12.0	30	80	12		110

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
450	400	250	190	210	175	220	110

16887 Solid carbide square end mill Ultra Npro

ATORN®

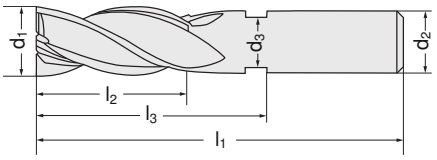
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers
- With clearance

Advantage:
- Very good chip removal, highest cutting performance
- Ultra-smooth coating
- Extremely wear-resistant
- Micro-geometry at the cutting edges

Applications
Specially for use on modern turning and milling centres.

NEW

16887



d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	Z	16887	...
3.0	11	14	50	3	2.9	2		101
4.0	13	16	54	4	3.9	2		102
5.0	15	18	54	5	4.9	2		103
6.0	16	21	64	6	5.8	2		104
8.0	22	27	70	8	7.8	2		105
10.0	25	32	72	10	9.7	2		106
12.0	28	38	83	12	11.7	3		107
16.0	36	44	92	16	15.7	3		108
20.0	41	54	104	20	19.5	4		109

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
450	400	250	190	210	175	220	110

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16888 Solid carbide square end mill Ultra Npro

VHM Ultra N_{pro} | Z 2 | ≈ 45° | 45° | Norm | DIN 6535 HA | DIN 6535 HB | max. | ALU | Kunststoffe

ATORN®

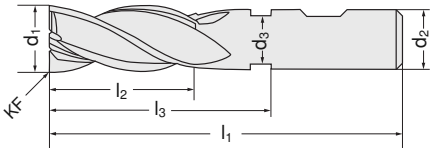
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- With edge protection chamfer for more stable cutting edges
- Ultra-smooth coating
- Extremely wear-resistant

Applications
Specially for use on modern turning and milling centres.

NEW

16888 101-107



							DIN 6535 HA		DIN 6535 HB	
d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	16888	...	16888	...
3.0	8	18	57	6	2.9	0.1		101		
4.0	11	18	57	6	3.9	0.1		102		
5.0	13	20	57	6	4.9	0.1		103		
6.0	13	20	57	6	5.8	0.1		104		
8.0	19	26	63	8	7.8	0.1		105		
10.0	22	29	72	10	9.7	0.2		106		
12.0	26	36	83	12	11.7	0.2		107		
16.0	32	42	92	16	15.7	0.2				108
20.0	38	52	104	20	19.5	0.2				109

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
450	400	225	170	190	160	220	110

16891 Solid carbide HPC high-performance cutter Ultra Npro

VHM Ultra N_{pro} | Z 3 | ≈ 45° | 45° | Norm | DIN 6535 HA | DIN 6535 HB | HPC | ≠ | max. | ALU | Kunststoffe

ATORN®

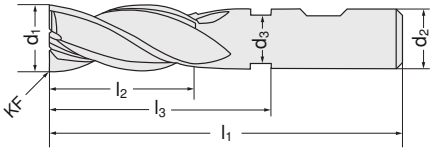
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- Uneven tooth pitch reduces vibrations
- With edge protection chamfer for more stable cutting edges
- Extremely wear-resistant
- Ultra-smooth coating
- Micro-geometry at the cutting edges

Applications
Specially for use on modern turning and milling centres.

NEW

16891 101-107



							DIN 6535 HA		DIN 6535 HB	
d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	16891	...	16891	...
3.0	12	16	57	6	2.9	0.1		101		
4.0	12	18	57	6	3.9	0.1		102		
5.0	15	18	57	6	4.9	0.1		103		
6.0	15	21	57	6	5.8	0.1		104		
8.0	22	28	64	8	7.8	0.1		105		
10.0	25	33	73	10	9.7	0.2		106		
12.0	28	39	84	12	11.7	0.2		107		
16.0	35	45	93	16	15.7	0.2				108
20.0	41	52	104	20	19.5	0.2				109

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
450	400	250	190	210	175	220	110

16889 Solid carbide end mill Ultra Npro

ATORN®

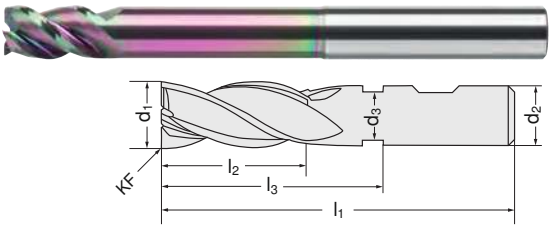
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- Uneven tooth pitch reduces vibrations
- With edge protection chamfer for more stable cutting edges
- Ultra-smooth coating
- Extremely wear-resistant
- Micro-geometry at the cutting edges

Applications
Specially for use on modern turning and milling centres.

NEW

16889 101-106



d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16889	...	DIN 6535 HB 16889	...
4.0	6.5	24	80	6	3.9	0.1		101		
5.0	8	30	80	6	4.9	0.1		102		
6.0	10	42	80	6	5.8	0.2		103		
8.0	13	62	100	8	7.8	0.2		104		
10.0	16	58	100	10	9.7	0.2		105		
12.0	19	73	120	12	11.7	0.2		106		
16.0	25	92	150	16	15.7	0.2				107
20.0	32	100	150	20	19.5	0.2				108

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
300	280	225	170	190	160	150	80

16890 Solid carbide end mill with Ultra Npro internal cooling

ATORN®

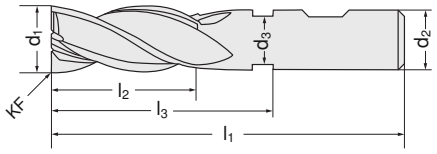
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- Uneven tooth pitch reduces vibrations
- With edge protection chamfer for more stable cutting edges
- Extremely wear-resistant
- Ultra-smooth coating
- Micro-geometry at the cutting edges
- Radial coolant outlet

Applications
Specially for use on modern turning and milling centres.

NEW

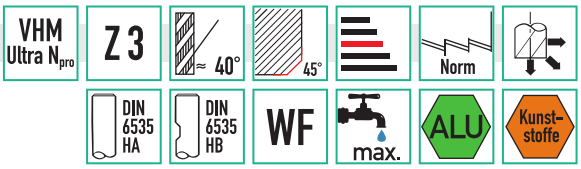
16890 101-104



d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16890	...	DIN 6535 HB 16890	...
6.0	10	42	80	6	5.8	0.2		101		
8.0	13	62	100	8	7.8	0.2		102		
10.0	16	58	100	10	9.7	0.2		103		
12.0	19	73	120	12	11.7	0.2		104		
16.0	25	92	150	16	15.7	0.2				105
20.0	32	100	150	20	19.5	0.2				106

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
300	280	225	170	190	160	150	80

16898 Solid carbide roughing cutter Ultra Npro



ATORN®

Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

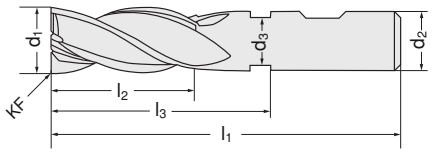
Advantage:
- Very good chip removal, highest cutting performance
- Extremely wear-resistant
- Ultra-smooth coating
- Roughing profile with micro-geometry

Applications
Specially for use on modern turning and milling centres.

NEW

16898 101-104

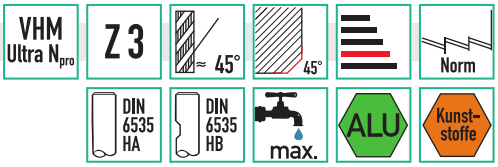
16898 201-204



							DIN 6535 HA		DIN 6535 HB		DIN 6535 HA / IC		DIN 6535 HB / IC	
d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	KF x 45° mm	16898	...	16898	...	16898	...	16898	...
6.0	14	20	57	6	5.9	0.2		101				201		
8.0	21	26	63	8	7.8	0.25		102				202		
10.0	23	31	72	10	9.8	0.3		103				203		
12.0	27	37	83	12	11.7	0.35		104				204		
16.0	36	43	92	16	15.7	0.4				105				205
20.0	41	52	104	20	19.5	0.4				106				206

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
520	490	275	210	230	195	280	-

16899 Solid carbide TVC end mill Ultra Npro



ATORN®

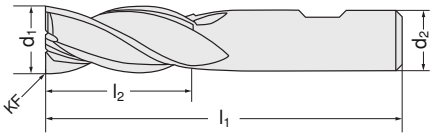
Design
- Solid carbide ultra-fine grain **trochoidal milling cutters** with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers
- Chip breaker at the circumference cutting edge

Advantage:
- Very good chip removal, highest cutting performance
- Ultra-smooth coating
- Extremely wear-resistant
- Micro-geometry at the cutting edges

Applications
Specially for use on modern turning and milling centres.
For trochoidal milling.

NEW

16899 101-104



					DIN 6535 HA		DIN 6535 HB	
d_1 h9 mm	l_2 mm	l_1 mm	d_2 h6 mm	KF x 45° mm	16899	...	16899	...
6.0	21	62	6	0.2		101		
8.0	28	68	8	0.2		102		
10.0	35	80	10	0.2		103		
12.0	42	93	12	0.2		104		
16.0	56	108	16	0.2				105
20.0	70	126	20	0.2				106

Offset chip breaker at the circumferential cutting edge

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
280	260	250	190	210	175	160	120

16892 Solid carbide HPC high-performance cutter Ultra Npro

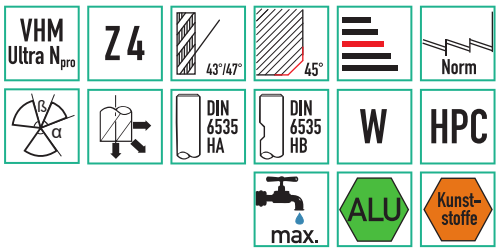
ATORN®

Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers
- Uneven pitch, uneven twist

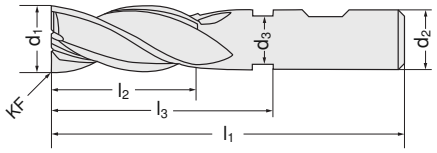
Advantage:
- Very good chip removal, highest cutting performance
- Uneven tooth pitch reduces vibrations
- With edge protection chamfer for more stable cutting edges
- Extremely wear-resistant
- Ultra-smooth coating
- Micro-geometry at the cutting edges

Applications
Specially for use on modern turning and milling centres.

NEW



16892 101-107



d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	KF x 45° mm	DIN 6535 HA 16892 ...	DIN 6535 HB 16892 ...
3.0	6	10	57	6	2.9	0.1	101	
4.0	8	14	57	6	3.9	0.1	102	
5.0	10	16	57	6	4.9	0.1	103	
6.0	12	19	57	6	5.8	0.1	104	
8.0	16	25	63	8	7.8	0.1	105	
10.0	20	30	72	10	9.7	0.2	106	
12.0	24	36	83	12	11.7	0.2	107	
16.0	32	42	92	16	15.7	0.2		108
20.0	40	52	104	20	19.5	0.2		109

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
380	360	240	180	210	150	-	-

16893 Solid carbide torus milling cutter Ultra Npro

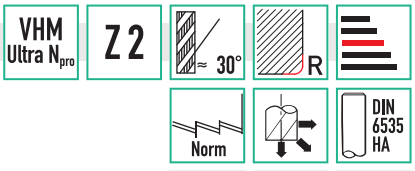
ATORN®

Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

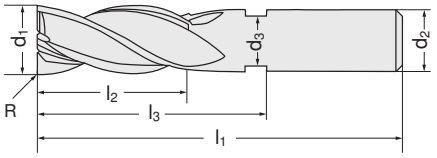
Advantage:
- Very good chip removal, highest cutting performance
- Extremely wear-resistant
- Ultra-smooth coating

Applications
Specially for use on modern turning and milling centres.

NEW



16893



d_1 h9 x R mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	16893 ...
3 x 0.3	4	14	50	6	2.9	101
4 x 0.3	5	16	50	6	3.9	102
5 x 0.3	6	18	54	6	4.9	103
6 x 0.3	7	21	57	6	5.8	104
6 x 1.0	7	21	57	6	5.8	105
6 x 2.0	7	21	57	6	5.8	106
8 x 0.3	9	27	63	8	7.8	107
8 x 1.0	9	27	63	8	7.8	108
8 x 2.0	9	27	63	8	7.8	109
10 x 0.3	11	32	72	10	9.7	110
10 x 1.5	11	32	72	10	9.7	111
10 x 3.0	11	32	72	10	9.7	112
12 x 1.5	13	38	83	12	11.7	113
12 x 4.0	13	38	83	12	11.7	114
16 x 2.0	17	44	92	16	15.7	115
16 x 5.0	17	44	92	16	15.7	116

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
320	280	250	190	210	175	240	160

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16894 Solid carbide torus milling cutter Ultra Npro

VHM Ultra N_{pro} | Z 2 | ≈ 30° | R | Norm | DIN 6535 HA | max. | ALU | Kunst-stoffe

ATORN®

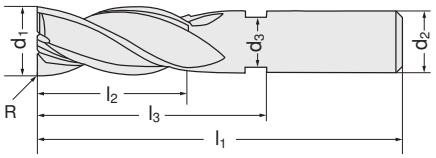
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- With polishing sanding in the chip chambers

Advantage:
- Very good chip removal, highest cutting performance
- Extremely wear-resistant
- Ultra-smooth coating

Applications
Specially for use on modern turning and milling centres.

NEW

16894



d_1 h9 x R mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	16894	...
3 x 0.3	4	32	75	6	2.9		**101**
4 x 0.3	5	36	75	6	3.9		**102**
5 x 0.3	6	40	75	6	4.9		**103**
6 x 0.3	7	44	80	6	5.8		**104**
6 x 1.0	7	44	80	6	5.8		**105**
6 x 2.0	7	44	80	6	5.8		**106**
8 x 0.3	9	54	100	8	7.8		**107**
8 x 1.0	9	54	100	8	7.8		**108**
8 x 2.0	9	54	100	8	7.8		**109**
10 x 0.3	11	60	100	10	9.7		**110**
10 x 1.5	11	60	100	10	9.7		**111**
10 x 3.0	11	60	100	10	9.7		**112**
12 x 1.5	13	75	120	12	11.7		**113**
12 x 4.0	13	75	120	12	11.7		**114**
16 x 2.0	17	92	150	16	15.7		**115**
16 x 5.0	17	92	150	16	15.7		**116**

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
220	180	250	190	210	175	160	120

16895 Solid carbide TVC/HPC torus milling cutter Ultra Npro

VHM Ultra N_{pro} | Z 3 | ≈ 45° | R | Norm | DIN 6535 HA | HPC | max. | ALU | Kunst-stoffe

ATORN®

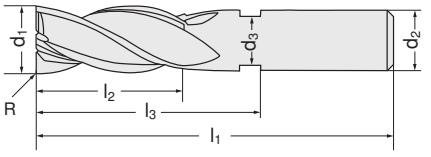
Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- Uneven pitch

Advantage:
- Very good chip removal, highest cutting performance
- Uneven tooth pitch reduces vibrations
- Extremely wear-resistant
- Ultra-smooth coating
- Micro-geometry at the face cutting edges

Applications
Specially for use on modern turning and milling centres.
For trochoidal milling.

NEW

16895

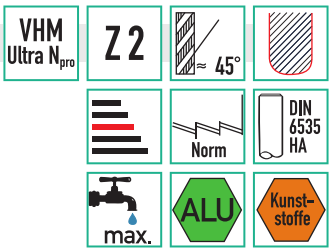


Offset chip breaker at the circumferential cutting edge

d_1 h9 x R mm	l_2 mm	l_3 mm	l_1 mm	d_2 h6 mm	d_3 mm	16895	...
6 x 0.5	25	31	71	6	5.8		**101**
6 x 1.0	25	31	71	6	5.8		**102**
8 x 0.5	33	41	80	8	7.8		**103**
8 x 1.0	33	41	80	8	7.8		**104**
8 x 2.0	33	41	80	8	7.8		**105**
10 x 0.5	41	51	95	10	9.7		**106**
10 x 1.0	41	51	95	10	9.7		**107**
10 x 2.0	41	51	95	10	9.7		**108**
12 x 0.5	49	61	109	12	11.7		**109**
12 x 1.0	49	61	109	12	11.7		**110**
12 x 2.0	49	61	109	12	11.7		**111**
16 x 2.0	65	81	132	16	15.7		**112**
16 x 3.0	65	81	132	16	15.7		**113**
20 x 2.0	82	101	154	20	19.5		**114**
20 x 3.0	82	101	154	20	19.5		**115**

Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
280	260	250	190	210	175	160	120

16896 Solid carbide radius cutter short Ultra Npro



ATORN®

Design
- Solid carbide ultra-fine grain cutter with **Ultra Npro coating** (same as DLC)
- Radius tolerance +/- 0.01 mm

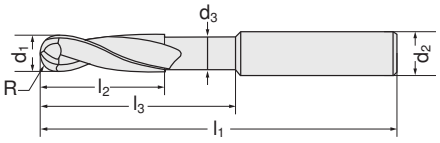
Advantage:
- Very good chip removal, highest cutting performance
- Extremely wear-resistant
- Ultra-smooth coating

Applications
Specially for use on modern turning and milling centres.

NEW

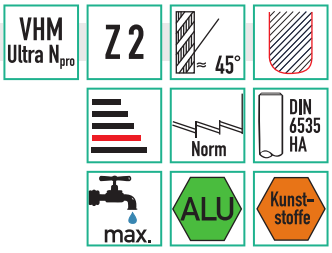
16896

d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	KF x 45° mm	16896	...
3.0	6	16	50	3	2.9	0.1		101
4.0	7	17	54	4	3.9	0.1		102
5.0	8	18	54	5	4.9	0.1		103
6.0	10	21	54	6	5.8	0.1		104
8.0	12	27	59	8	7.8	0.1		105
10.0	13	32	67	10	9.7	0.2		106
12.0	16	38	73	12	11.7	0.2		107
16.0	20	44	83	16	15.7	0.2		108



Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
800	600	275	210	230	190	500	-

16897 Solid carbide radius cutter Ultra Npro



ATORN®

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- Radius tolerance +/- 0.01 mm

Advantage:
- Very good chip removal, highest cutting performance
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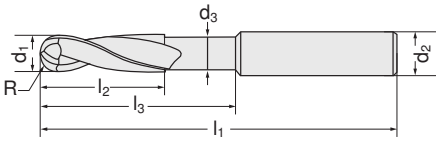
Applications
Specially for use on modern turning and milling centres.

NEW

16897

d_1 h9 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm	d_3 mm	KF x 45° mm	16897	...
3.0	10	32	75	3	2.9	0.1		101
4.0	13	36	75	4	3.9	0.1		102
5.0	15	40	75	5	4.9	0.1		103
6.0	16	44	100	6	5.8	0.1		104
8.0	22	54	100	8	7.8	0.1		105
10.0	25	60	100	10	9.7	0.2		106
12.0	26	60	100	12	11.7	0.2		107
16.0	30	92	150	16	15.7	0.2		108



Al <10%Si	Al >10%Si	Brass long-chipping	Brass short-chipping	Bronze long-chipping	Bronze short-chipping	Thermoplastic	CFRP, GFRP
700	550	250	190	210	170	450	-

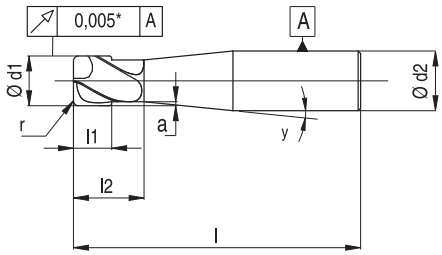
16702 Solid carbide end mill for graphite

VHM | Z 2–3 | DIN 6535 HA | Graphit | GFK

Design

Long and extra long, right cutting,
2–3 cutting edges, right-hand twist approx. 40°,
centre cutting, with smooth straight shank in
accordance with DIN 6535 HA.

16702



d_1 g7 mm	r mm	d_2 h5 mm	l mm	l_1 mm	Z	y (°)	16702	...
2.0	0.1	2	50	10	3	–		102
2.0	0.1	3	50	10	3	15		103
3.0	0.1	3	50	10	3	–		104
4.0	0.2	4	60	15	3	–		106
L 4.0	0.3	4	102	10	2	–		107
5.0	0.2	5	60	20	3	–		109
L 5.0	0.5	5	102	13	2	–		110
6.0	0.3	6	78	30	3	–		112
L 6.0	0.5	6	102	42	2	–		113
XL 6.0	0.5	6	150	26	2	–		114
8.0	0.3	8	78	30	3	–		116
L 8.0	0.5	8	150	41	2	–		117
10.0	0.3	10	78	30	3	–		119
L 10.0	0.5	10	150	42	2	–		120
12.0	0.3	12	89	30	3	–		122

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Graphite
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200

16703 Solid carbide diamond copy milling cutter DC Ultra

VHM | Z 4 | ≈ 30° | DIN 6535 HA | Norm | Graphit | GFK

ATORN®

Design
- Solid carbide cutter with crystalline diamond coating
- Special cemented carbide with excellent coating adhesion for the longest possible service life
- Shaft tolerance: h5
- Coating thickness: 6 + 2 µm
- Concentricity: 5 µm
- Radius accuracy: +/- 3 µm

Applications
For milling graphite, copper and GFRP materials.

16703

Short

d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16703	...
4.0	0.40	8	16	50	3.7	4		101
4.0	0.50	8	16	50	3.7	4		102
4.0	1.00	8	16	50	3.7	4		103
5.0	0.50	10	18	54	4.6	5		104
5.0	1.00	10	18	54	4.6	5		105
6.0	0.50	13	21	57	5.5	6		106
6.0	1.00	13	21	57	5.5	6		107
6.0	1.50	13	21	57	5.5	6		108
8.0	0.50	15	27	63	7.4	8		109
8.0	1.00	15	27	63	7.4	8		110
8.0	1.50	15	27	63	7.4	8		111
8.0	2.00	15	27	63	7.4	8		112
10.0	0.50	18	32	72	9.2	10		113
10.0	1.00	18	32	72	9.2	10		114
10.0	1.50	18	32	72	9.2	10		115
10.0	2.00	18	32	72	9.2	10		116
12.0	0.50	26	38	83	11.0	12		117
12.0	1.00	26	38	83	11.0	12		118
12.0	1.50	26	38	83	11.0	12		119
12.0	2.00	26	38	83	11.0	12		120
16.0	0.50	32	50	92	15.0	16		121
16.0	1.00	32	50	92	15.0	16		122
16.0	1.50	32	50	92	15.0	16		123
16.0	2.00	32	50	92	15.0	16		124

Long

d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16703	...
4.0	0.40	8	36	80	3.7	4		201
4.0	0.50	8	36	80	3.7	4		202
4.0	1.00	8	36	80	3.7	4		203
5.0	0.50	10	40	80	4.6	5		204
5.0	1.00	10	40	80	4.6	5		205
6.0	0.50	13	44	90	5.5	6		206
6.0	1.00	13	44	90	5.5	6		207
6.0	1.50	13	44	90	5.5	6		208
8.0	0.50	15	54	100	7.4	8		209
8.0	1.00	15	54	100	7.4	8		210
8.0	1.50	15	54	100	7.4	8		211
8.0	2.00	15	54	100	7.4	8		212
10.0	0.50	18	60	100	9.2	10		213
10.0	1.00	18	60	100	9.2	10		214
10.0	1.50	18	60	100	9.2	10		215
10.0	2.00	18	60	100	9.2	10		216
12.0	0.50	26	75	120	11.0	12		217
12.0	1.00	26	75	120	11.0	12		218
12.0	1.50	26	75	120	11.0	12		219
12.0	2.00	26	75	120	11.0	12		220
16.0	0.50	32	85	120	15.0	16		221
16.0	1.00	32	85	120	15.0	16		222
16.0	1.50	32	85	120	15.0	16		223
16.0	2.00	32	85	120	15.0	16		224

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Graphite
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140–340

16704 Solid carbide diamond radius cutter DC Ultra

VHM | Z 2 | ≈ 30° | DIN 6535 HA | Norm | Graphit | GFK

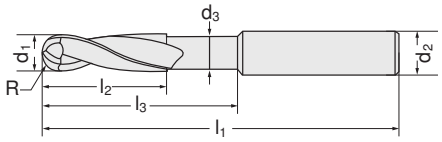
ATORN®

Design
- Solid carbide cutter with crystalline diamond coating (DiaDur)
- Special cemented carbide with excellent coating adhesion for the longest possible service life
- Shaft tolerance: h5
- Coating thickness: 10 + 2 µm
- Concentricity: 5 µm
- Radius accuracy: +/- 3 µm

Applications
For milling graphite, copper and GFRP materials.

16704 101-151

16704 152-161



d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16704 ...
0.2	0.10	0.2	1	55	0.18	4	**101**
0.3	0.15	0.3	1	55	0.27	4	**102**
0.3	0.15	0.3	3	55	0.27	4	**103**
0.3	0.15	0.3	5	55	0.27	4	**104**
0.3	0.15	0.3	8	55	0.27	4	**105**
0.4	0.20	0.4	4	55	0.35	4	**106**
0.4	0.20	0.4	6	55	0.35	4	**107**
0.4	0.20	0.4	8	55	0.35	4	**108**
0.5	0.25	0.5	5	55	0.45	4	**109**
0.5	0.25	0.5	10	55	0.45	4	**110**
0.6	0.30	0.6	6	55	0.56	4	**111**
0.6	0.30	0.6	9	55	0.56	4	**112**
0.6	0.30	0.6	12	55	0.56	4	**113**
0.7	0.35	0.7	7	55	0.65	4	**114**
0.7	0.35	0.7	14	55	0.65	4	**115**
0.8	0.40	0.8	8	55	0.75	4	**116**
0.8	0.40	0.8	12	55	0.75	4	**117**
0.8	0.40	0.8	16	55	0.75	4	**118**
1.0	0.50	1.0	5	55	0.90	4	**119**
1.0	0.50	1.0	10	55	0.90	4	**120**
1.0	0.50	1.0	15	55	0.90	4	**121**
1.0	0.50	1.0	20	55	0.90	4	**122**
1.0	0.50	1.0	25	55	0.90	4	**123**
1.0	0.50	1.0	30	55	0.90	4	**124**
1.2	0.60	1.2	5	55	1.10	4	**125**
1.2	0.60	1.2	10	55	1.10	4	**126**
1.2	0.60	1.2	15	55	1.10	4	**127**
1.5	0.75	1.5	5	55	1.40	4	**128**
1.5	0.75	1.5	10	55	1.40	4	**129**
1.5	0.75	1.5	15	55	1.40	4	**130**
1.5	0.75	1.5	20	55	1.40	4	**131**

d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16704 ...
1.5	0.75	1.5	25	55	1.40	4	**132**
1.8	0.90	1.8	10	55	1.70	4	**133**
1.8	0.90	1.8	20	55	1.70	4	**134**
2.0	1.00	2	10	55	1.90	4	**135**
2.0	1.00	2	15	55	1.90	4	**136**
2.0	1.00	2	20	55	1.90	4	**137**
2.0	1.00	2	25	65	1.90	4	**138**
2.0	1.00	2	30	65	1.90	4	**139**
3.0	1.50	3	10	65	2.90	4	**140**
3.0	1.50	3	15	65	2.90	4	**141**
3.0	1.50	3	20	65	2.90	4	**142**
3.0	1.50	3	25	75	2.90	4	**143**
3.0	1.50	3	30	75	2.90	4	**144**
4.0	2.00	4	20	65	3.90	6	**145**
4.0	2.00	4	30	75	3.90	6	**146**
4.0	2.00	4	40	90	3.90	6	**147**
5.0	2.50	5	20	65	4.90	6	**148**
5.0	2.50	5	30	75	4.90	6	**149**
5.0	2.50	5	40	90	4.90	6	**150**
5.0	2.50	5	50	90	4.90	6	**151**
6.0	3.00	6	30	75	5.90	6	**152**
6.0	3.00	6	40	90	5.90	6	**153**
6.0	3.00	6	50	90	5.90	6	**154**
6.0	3.00	6	60	100	5.90	6	**155**
8.0	4.00	8	30	80	7.80	8	**156**
8.0	4.00	8	60	100	7.80	8	**157**
10.0	5.00	10	30	80	9.80	10	**158**
10.0	5.00	10	60	100	9.80	10	**159**
12.0	6.00	12	30	80	11.80	12	**160**
12.0	6.00	12	60	100	11.80	12	**161**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Graphite
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140–340

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16705 Solid carbide diamond torus milling cutter DC Ultra

VHM | HSC | Z 2 | ≈ 30° | DIN 6535 HA | Norm | Graphit | GFK

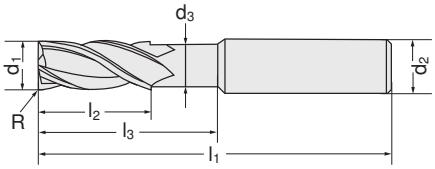
ATORN®

Design
- Solid carbide cutter with crystalline diamond coating
- Special cemented carbide with excellent coating adhesion for the longest possible service life
- Shaft tolerance: h5
- Coating thickness: 10 + 2 µm
- Concentricity: 5 µm
- Radius accuracy: +/- 3 µm

Applications
For milling graphite, copper and GFRP materials.

16705 201-257

16705 258-275



d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16705 ...
0.2	0.05	0.20	1	55	0.19	4	**201**
0.3	0.05	0.30	1	55	0.27	4	**202**
0.3	0.05	0.30	3	55	0.27	4	**203**
0.4	0.05	0.40	2	55	0.35	4	**204**
0.4	0.05	0.40	4	55	0.35	4	**205**
0.4	0.05	0.40	8	55	0.35	4	**206**
0.5	0.05	0.50	2	55	0.45	4	**207**
0.5	0.05	0.50	5	55	0.45	4	**208**
0.5	0.05	0.50	10	55	0.45	4	**209**
0.6	0.06	0.80	3	55	0.56	4	**210**
0.6	0.06	0.80	6	55	0.56	4	**211**
0.6	0.06	0.80	9	55	0.56	4	**212**
0.6	0.06	1.80	12	55	0.56	4	**213**
0.8	0.08	1.00	4	55	0.75	4	**214**
0.8	0.08	1.00	8	55	0.75	4	**215**
0.8	0.08	1.00	12	55	0.75	4	**216**
0.8	0.08	1.00	16	55	0.75	4	**217**
1.0	0.10	1.00	5	55	0.90	4	**218**
1.0	0.10	1.00	10	55	0.90	4	**219**
1.0	0.10	1.00	15	55	0.90	4	**220**
1.0	0.10	1.00	20	55	0.90	4	**221**
1.0	0.10	1.00	25	55	0.90	4	**222**
1.2	0.12	1.50	5	55	1.10	4	**223**
1.2	0.12	1.50	10	55	1.10	4	**224**
1.2	0.12	1.50	15	55	1.10	4	**225**
1.5	0.15	2.00	5	55	1.50	4	**226**
1.5	0.15	2.00	10	55	1.50	4	**227**
1.5	0.15	2.00	15	55	1.50	4	**228**
1.5	0.15	2.00	20	55	1.50	4	**229**
1.5	0.15	2.00	25	55	1.50	4	**230**
1.8	0.18	2.00	10	55	1.70	4	**231**
1.8	0.18	2.00	20	55	1.70	4	**232**
2.0	0.20	2.00	10	56	1.90	4	**233**
2.0	0.20	2.00	15	56	1.90	4	**234**
2.0	0.20	2.00	20	56	1.90	4	**235**
2.0	0.20	2.00	25	56	1.90	4	**236**
2.0	0.50	2.00	10	56	1.90	4	**237**
2.0	0.50	2.00	15	56	1.90	4	**238**

d_1 mm	R mm	l_2 mm	l_3 mm	l_1 mm	d_3 mm	d_2 (h5) mm	16705 ...
2.0	0.50	2.00	20	65	1.90	4	**239**
2.0	0.50	2.00	25	65	1.90	4	**240**
3.0	0.30	3.00	15	65	2.90	4	**241**
3.0	0.30	3.00	25	75	2.90	4	**242**
3.0	0.50	3.00	10	65	2.90	4	**243**
3.0	0.50	3.00	15	65	2.90	4	**244**
3.0	0.50	3.00	20	65	2.90	4	**245**
3.0	0.50	3.00	25	75	2.90	4	**246**
3.0	0.50	3.00	30	75	2.90	4	**247**
4.0	0.30	4.00	15	65	3.90	6	**248**
4.0	0.40	4.00	15	65	3.90	6	**249**
4.0	0.40	4.00	25	75	3.90	6	**250**
4.0	0.50	4.00	20	65	3.90	6	**251**
4.0	0.50	4.00	30	75	3.90	6	**252**
4.0	0.50	5.00	40	90	3.90	6	**253**
5.0	0.50	5.00	20	75	4.90	6	**254**
5.0	0.50	5.00	30	75	4.90	6	**255**
5.0	0.50	5.00	40	90	4.90	6	**256**
5.0	0.50	5.00	50	90	4.90	6	**257**
6.0	0.50	6.00	30	75	5.90	6	**258**
6.0	0.50	6.00	40	90	5.90	6	**259**
6.0	0.50	6.00	50	90	5.90	6	**260**
6.0	0.50	6.00	60	90	5.90	6	**261**
6.0	1.00	6.00	30	75	5.90	6	**262**
6.0	1.00	6.00	40	90	5.90	6	**263**
8.0	0.50	8.00	30	80	7.80	8	**264**
8.0	0.50	8.00	60	100	8.80	8	**265**
8.0	1.00	8.00	30	80	9.80	8	**266**
8.0	1.00	8.00	60	100	10.80	8	**267**
10.0	0.50	10.00	30	80	9.80	10	**268**
10.0	0.50	10.00	60	100	9.80	10	**269**
10.0	1.00	10.00	30	80	9.80	10	**270**
10.0	1.00	10.00	60	100	9.80	10	**271**
12.0	0.50	12.00	30	80	11.80	12	**272**
12.0	0.50	12.00	60	100	11.80	12	**273**
12.0	1.00	12.00	30	80	11.80	12	**274**
12.0	1.00	12.00	60	100	11.80	12	**275**

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<45HRC	<55HRC	<60HRC	<67HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Graphite
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140–340

16909 Solid carbide HSC compression milling cutters

VHM | Norm | DIN 6535 HA | HSC | GFK CFK | Aramid | Faser Plast | NEW

ATORN®

Design
- With opposing chip flutes
- With chip breaker and spiral from left to right
- Simultaneous drawing and pushing cut
- Finishing quality (Ra < 2 µm)

Advantage:
- Prevention of delamination

Applications
For machining fibre plastics as well as carbon and epoxy resin or polyester-based fibreglass.

Quality
Dia.HC-coated surface.

Alternating twist short

d_1 h10 mm	l_2 mm	l_1 mm	W_A mm	d_2 mm	16909 ...
6.0	13	57	4	6	101
8.0	19	63	6	8	102
10.0	22	72	7	10	103
12.0	26	83	8	12	104

16909 101-104

Alternating twist medium

d_1 h10 mm	l_2 mm	l_1 mm	W_B mm	d_2 mm	16909 ...
6.0	13	57	6.5	6	105
8.0	19	63	9.5	8	106
10.0	22	72	11	10	107
12.0	26	83	13	12	108

16909 105-108

Alternating twist long

d_1 h10 mm	l_2 mm	l_1 mm	W_C mm	d_2 mm	16909 ...
6.0	22	60	11	6	109
8.0	32	78	16	8	110
10.0	35	78	17.5	10	111
12.0	40	83	20	12	112

16909 109-112

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	300–500	300–500	-	-	-	-

16911 VHM HSC end mill

VHM | Norm | DIN 6535 HA | HSC | GFK CFK | Aramid | Faser Plast | NEW

ATORN®

Design
- With large chip flutes and synchronous chip breaker
- Diamond-coated surface

Advantage:
- Continuous cutting with good chip removal

Applications
For machining fibre composite materials.

Quality
Dia.HC-coated surface.

Helix W 0° — **5 cutting edges**

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16911 ...
4.0	14	40	6	103
5.0	16	50	6	104
6.0	18	50	6	105
8.0	20	63	8	106
10.0	25	72	10	107
12.0	30	83	12	108

Z5

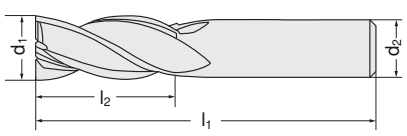
16911 103-108

Helix W 10° — **6 cutting edges**

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16911 ...
4.0	20	50	6	111
5.0	16	50	6	112
6.0	18	50	6	113
L 6.0	35	75	6	114
8.0	20	63	8	115
L 8.0	40	100	8	116
10.0	25	72	10	117
12.0	30	83	12	118

Z6

16911 111-118



Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	100–150	100–200	90–140	-	-	-

16912 - 16914 Solid carbide HSC end mill with spur cut

VHM poliert | Norm | DIN 6535 HA | HSC | GFK CFK | Aramid | Faser Plast

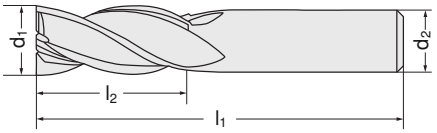
NEW

ATORN®

Design
- With pyramid cross-toothing with extremely sharp cutting edges
- Multi-tooth milling cutter face

Advantage:
- Can be used for a wide variety of materials

Applications
Fine: For machining fibre plastics with high fibre content
Medium: Soft fibre plastics with a tendency to stick
Coarse: Sandwich materials and foams



Fine toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16912 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16912

Medium toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16913 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16913

Coarse toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16914 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16914

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	100–150	100–200	90–140	-	-	-

16915 Solid carbide HSC honeycomb cutter

VHM poliert | Norm | DIN 6535 HA | HSC | Honey Comb

NEW

ATORN®

Design
- With special toothing for drawing cut
- Extremely sharp multi-flute toothing

Advantage:
- Good surface for further machining

Applications
For machining honeycomb materials.

16915

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16915 ...
6.0	16	50	6	101
8.0	19	63	8	102
10.0	22	72	10	103
12.0	26	83	12	104
16.0	17	100	12	106
20.0	17	100	12	107

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	-	-	-	-	-	350

16916 - 16921 Solid carbide HSC end mill with groove cutter tip

Z 2 | Norm | DIN 6535 HA | HSC | GFK CFK | Aramid | Faser Plast | NEW

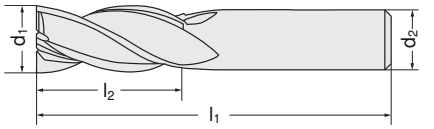
ATORN®

Design
- With pyramid cross-toothing with groove cutter tip for drilling, grooving and trimming
- Extremely sharp cutting edges

Advantage:
- Can be used for a wide variety of materials

Applications
Fine: For machining fibre plastics with high fibre content
Medium: soft fibre plastics with a tendency to stick
Coarse: Sandwich materials and foams

Quality
Surface polished or Dia.HC-coated.



Fine toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	Solid carbide 16916 ...	Solid carbide Dia.HC 16919 ...
4.0	15	40	4	105	105
5.0	16	50	5	107	107
6.0	18	50	6	109	109
L 6.0	35	75	6	110	110
8.0	25	63	8	111	111
L 8.0	40	100	8	112	112
10.0	30	72	10	113	113
12.0	32	83	12	114	114

VHM poliert — 16916

VHM — 16919

Medium toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	Solid carbide 16917 ...	Solid carbide Dia.HC 16920 ...
4.0	15	40	4	105	105
5.0	16	50	5	107	107
6.0	18	50	6	109	109
L 6.0	35	75	6	110	110
8.0	25	63	8	111	111
L 8.0	40	100	8	112	112
10.0	30	72	10	113	113
12.0	32	83	12	114	114

VHM poliert — 16917

VHM — 16920

Coarse toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	Solid carbide 16918 ...	Solid carbide Dia.HC 16921 ...
4.0	15	40	4	105	105
5.0	16	50	5	107	107
6.0	18	50	6	109	109
L 6.0	35	75	6	110	110
8.0	25	63	8	111	111
L 8.0	40	100	8	112	112
10.0	30	72	10	113	113
12.0	32	83	12	114	114

VHM poliert — 16918

VHM — 16921

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	100–150	100–200	90–140	-	-	-

16925 Solid carbide HSC radius cutter

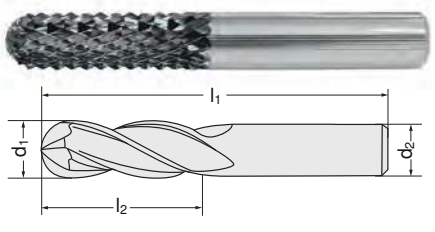
VHM | Norm | DIN 6535 HA | HSC | GFK CFK | Aramid | Faser Plast | NEW

ATORN®

Design
- With pyramid cross-toothing for drawing cut
- Extremely sharp toothing

Applications
For soft fibre plastics with a tendency to stick.
Face radius for copy machining.

16925



Medium toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	Solid carbide Dia.HC 16925 ...
4.0	15	40	4	103
6.0	18	50	6	107
8.0	25	63	8	109
L 8.0	40	100	8	110
10.0	30	72	10	111
12.0	32	83	12	112

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	100–150	100–200	90–140	-	-	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

16926 - 16928 Solid carbide HPC end mill with drill tip

VHM poliert | Norm | DIN 6535 HA | 135° | HSC | Honey Comb | GFK CFK | Aramid | Faser Plast

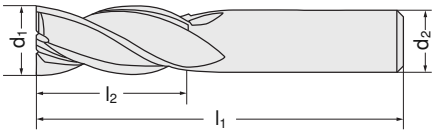
NEW

ATORN®

Design
- With pyramid cross-toothing with extremely sharp cutting edges
- With 135° drill tip for drilling and trimming

Advantage:
- Can be used for a wide variety of materials

Applications
Fine: For machining fibre plastics with high fibre content
Medium: Soft fibre plastics with a tendency to stick
Coarse: Sandwich materials and foams



Fine toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16926 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16926

Medium toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16927 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16927

Coarse toothing

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16928 ...
4.0	15	40	4	105
5.0	16	50	5	107
6.0	18	50	6	109
8.0	25	63	8	111
10.0	30	72	10	113
12.0	32	83	12	114

16928

Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	100–150	100–200	90–140	-	-	-

16933 Solid carbide HSC cutter for aramid

VHM poliert | Norm | DIN 6535 HA | HSC | Aramid

NEW

ATORN®

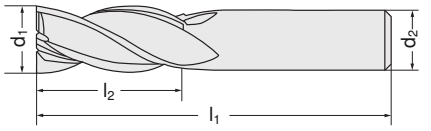
Design
- With opposing toothing
- Right cutting with right/left-hand spiral
- Extremely sharp cutting edges
- Shearing cut

Applications
For machining aramid.

Quality
Surface polished.

16933

d_1 h10 mm	l_2 mm	l_1 mm	d_2 mm	16933 ...
6.0	20	50	6	101
8.0	22	63	8	102
10.0	25	72	10	103
12.0	30	83	12	104



Al<8%Si	Al>8%Si	Cu alloy	Duro	Thermo	GFRP	CFRP	Aramid	Composite ceramic	Faserplast	Honeycomb
-	-	-	-	-	-	-	100–130	-	-	-

16760 - 16780 Interchangeable head holder

ATORN®

Design
- Precision-ground mounts

Interchangeable head holder, short (steel)

HPC | DIN 1835 B | h6

Size	$Ø_2$ mm	l_1 mm	Clearance Ø mm	l_3 mm	16760	...
20	10	65	9.6	5		102
30	12	75	11.6	5		103
40	16	80	15.4	6		104
50	20	90	19.2	6		105

Interchangeable head holder, long (steel)

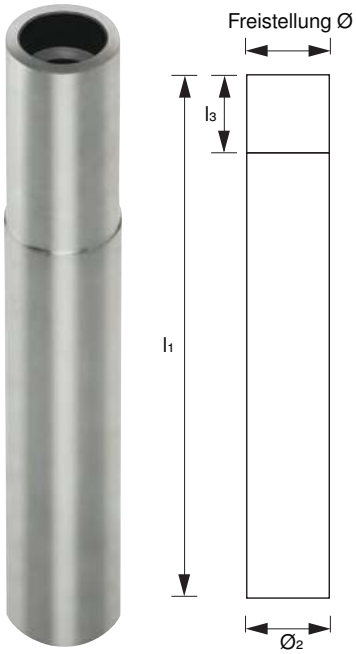
DIN 1835 HA | h6

Size	$Ø_2$ mm	l_1 mm	Clearance Ø mm	l_3 mm	16760	...
20	10	75	9.6	18		202
30	12	85	11.6	21		203
40	16	95	15.4	23		204
50	20	110	19.2	28		205

Interchangeable head holder, extra long (solid carbide)

DIN 1835 HA | h6

Size	$Ø_2$ mm	l_1 mm	Clearance Ø mm	l_3 mm	16760	...
20	10	111	9.6	56		302
30	12	128	11.6	63		303
40	16	149	15.4	79		304
50	20	174	19.2	94		305



Interchangeable head holder, conical 5° (steel)

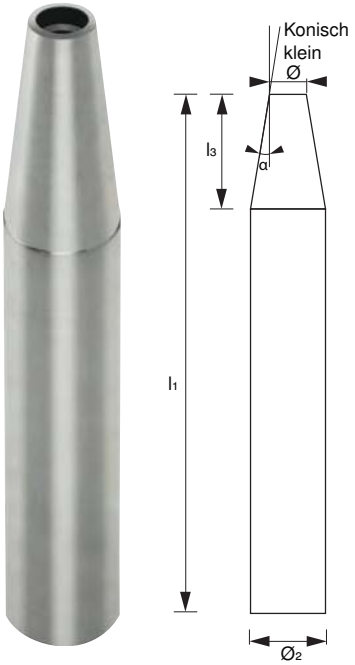
DIN 1835 HA | h6

Size	$Ø_2$ mm	l_1 mm	Ø conical small mm	l_3 mm	16761	...
20	16	105	9.6	36		102
30	20	120	11.6	48		103
40	20	135	15.4	26		104
50	25	150	19.2	33		105

Interchangeable head holder, conical 1° (steel)

DIN 1835 HA | h6

Size	$Ø_2$ mm	l_1 mm	Ø conical small mm	l_3 mm	16761	...
20	16	110	9.6	36		202
30	20	130	11.6	53		203
40	20	145	15.4	59		204
50	25	180	19.2	74		205



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= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

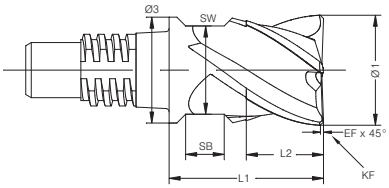
Continued

ATORN®

Design
- Solid carbide milling system for replaceable inserts
- High concentricity < 10 µm thanks to conical and flat face

Advantages:
- Guaranteed repetitive accuracy
- High stability and rigidity due to the pilot and the flat face
- Low-vibration
- Short set-up times

Solid carbide cutter 35/38°



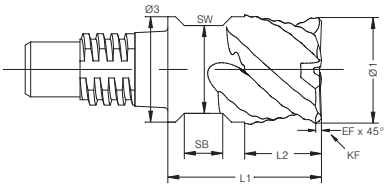
VHM TiAlN | HPC | Z 4 | 35°/38° | 45° | ≤ 1200 N/mm² | GG(G)

16763

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	KF mm	SW x SB mm	Z	16763	...
20	10	7	14	9.6	0.3	8 x 3	4		102
30	12	9	17	11.6	0.3	10 x 4	4		103
40	16	12	21	15.4	0.4	13 x 5	4		104
50	20	15	26	19.2	0.5	16 x 5	4		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	190	170	150	130	130	110	-	-	-	-	75	-	-	170	-

Solid carbide roughing cutter type NRf



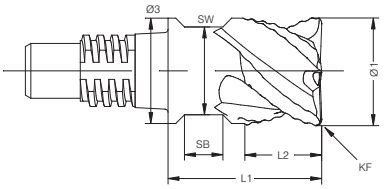
VHM AlTiN | MTC | Z 4-6 | ≈ 45° | 45° | ≤ 1200 N/mm² | VA

16764

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	KF mm	SW x SB mm	Z	16764	...
20	10	7	14	9.6	0.2	8 x 3	4		102
30	12	9	17	11.6	0.2	10 x 4	4		103
40	16	12	21	15.4	0.25	13 x 5	5		104
50	20	15	26	19.2	0.25	16 x 5	6		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	190	190	180	125	120	110	-	-	-	-	90	90	-	160	-

Solid carbide roughing cutter type NR



VHM AlTiN | MTC | Z 4-5 | ≈ 45° | 45° | VA | Uni

16765

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	KF mm	SW x SB mm	Z	16765	...
20	10	7	14	9.6	0.2	8 x 3	4		102
30	12	9	17	11.6	0.2	10 x 4	4		103
40	16	12	21	15.4	0.25	13 x 5	5		104
50	20	15	26	19.2	0.25	16 x 5	5		105

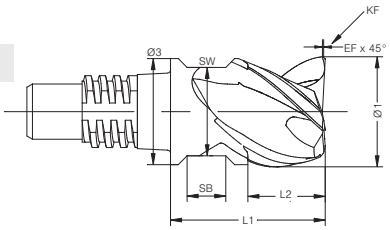
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	-	190	190	180	130	120	110	-	-	-	90	-	-	160	-

Continued

16760 - 16780 Interchangeable head milling system

Continued

Solid carbide aluminium cutter



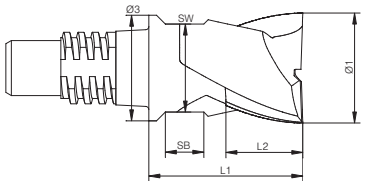
VHM ZrN | HPC | Z 3 | ≈ 45° | 45° | ALU

16766

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	KF mm	SW x SB mm	Z	16766	...
20	10	7	14	9.6	0.2	8 x 3	3		102
30	12	9	17	11.6	0.2	10 x 4	3		103
40	16	12	21	15.4	0.2	13 x 5	3		104
50	20	15	26	19.2	0.2	16 x 5	3		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
400	250	160	450	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Solid carbide square end mill



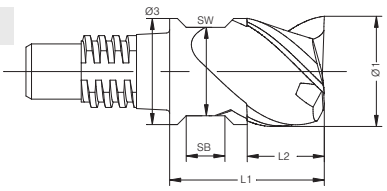
VHM TiAlN | Z 2 | ≈ 30° | 90° | Uni

16767

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	SW x SB mm	Z	16767	...
20	10	7	14	9.6	8 x 3	2		102
30	12	9	17	11.6	10 x 4	2		103
40	16	12	21	15.4	13 x 5	2		104
50	20	15	26	19.2	16 x 5	2		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
250	200	200	200	220	195	175	165	160	150	-	-	-	120	-	-	180	-

Solid carbide end mill



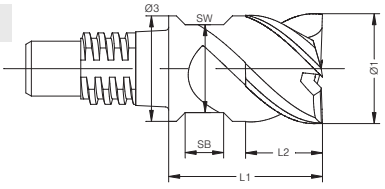
VHM TiAlN | Z 3 | ≈ 45° | 90° | Uni

16768

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	SW x SB mm	Z	16768	...
20	10	7	14	9.6	8 x 3	3		102
30	12	9	17	11.6	10 x 4	3		103
40	16	12	21	15.4	13 x 5	3		104
50	20	15	26	19.2	16 x 5	3		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
250	200	200	200	220	195	175	165	160	150	-	-	-	120	-	-	180	-

Solid carbide end mill



VHM TiAlN | Z 4 | ≈ 45° | 90° | Uni

16769

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	SW x SB mm	Z	16769	...
20	10	7	14	9.6	8 x 3	4		102
30	12	9	17	11.6	10 x 4	4		103
40	16	12	21	15.4	13 x 5	4		104
50	20	15	26	19.2	16 x 5	4		105

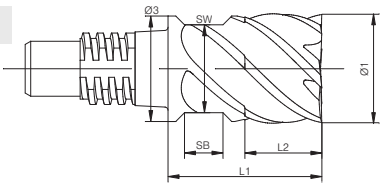
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
250	200	200	200	220	195	175	165	160	150	-	-	-	120	-	-	180	-

Continued

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

Continued

Solid carbide finishing cutters



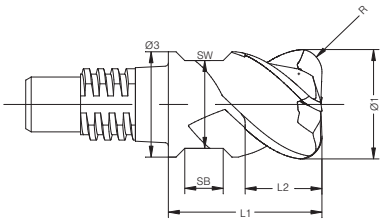
VHM TiAlN | Z 6–8 | ≈ 45° | Uni

16770

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	SW x SB mm	Z	16770	...
20	10	7	14	9.6	8 x 3	6		102
30	12	9	17	11.6	10 x 4	6		103
40	16	12	21	15.4	13 x 5	6		104
50	20	15	26	19.2	16 x 5	8		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	200	220	195	175	165	160	150	-	-	-	-	120	-	-	180	-

Solid carbide torus milling cutters



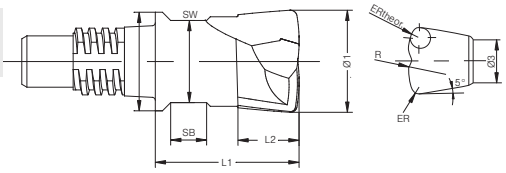
naco blue | HPC | HSC | Z 4 | ≈ 45° | Trocken-bearbeitung | ≤ 1400 N/mm² | 60 HRC

16771

Size	Ø1 x R mm	l2 mm	l1 mm	Clearance mm	SW x SB mm	Z	16771	...
20	10 x 0.5	7	14	9.6	8 x 3	4		106
20	10 x 1.0	7	14	9.6	8 x 3	4		107
20	10 x 1.5	7	14	9.6	8 x 3	4		108
20	10 x 2.0	7	14	9.6	8 x 3	4		109
30	12 x 0.5	9	17	11.6	10 x 4	4		110
30	12 x 1.0	9	17	11.6	10 x 4	4		111
30	12 x 1.5	9	17	11.6	10 x 4	4		112
30	12 x 2.0	9	17	11.6	10 x 4	4		113
40	16 x 0.5	12	21	15.4	13 x 5	4		114
40	16 x 1.0	12	21	15.4	13 x 5	4		115
40	16 x 1.5	12	21	15.4	13 x 5	4		116
40	16 x 2.0	12	21	15.4	13 x 5	4		117
50	20 x 1.0	15	26	19.2	16 x 5	4		118

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
HPC																	
-	-	-	195	185	180	150	140	130	-	-	-	-	-	-	-	-	-
HSC																	
-	-	-	350	330	320	270	250	230	-	-	-	-	-	-	-	-	-

Solid carbide high-feed milling cutter



VHM AlTiN | HSC | Z 2 | ≈ 15° | Trocken-bearbeitung | ≤ 1400 N/mm² | 60 HRC

16772

Size	Ø1 mm	l2 mm	l1 mm	Clearance mm	ER mm	R mm	ERtheor. mm	SW x SB mm	Z	16772	...
20	10	7	14	9.6	0.64	15	0.9	8 x 3	2		102
30	12	9	17	11.6	0.75	15	1.1	10 x 4	2		103
40	16	12	21	15.4	1.06	25	1.45	13 x 5	2		104
50	20	15	26	19.2	1.25	50	1.65	16 x 5	2		105

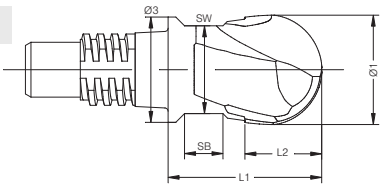
Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	200	180	150	130	125	120	95	90	70	-	-	-	-	-	-

Continued

16760 - 16780 Interchangeable head milling system

Continued

Solid carbide radius cutter



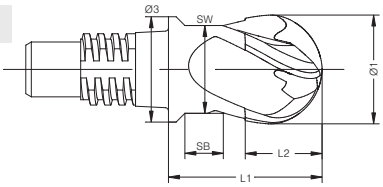
naco blue | HPC | HSC | Z 2 | ≈ 30° | Trocken-bearbeitung | V 1400 N/mm² | 60 HRC

16773

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	SW x SB mm	Z	16773	...
20	10	7	14	9.6	8 x 3	2		102
30	12	9	17	11.6	10 x 4	2		103
40	16	12	21	15.4	13 x 5	2		104
50	20	15	26	19.2	16 x 5	2		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	570	450	350	300	270	240	180	160	150	-	-	-	-	-	-

Solid carbide full radius cutter



VHM TiAlN | Z 4 | ≈ 30° | Uni

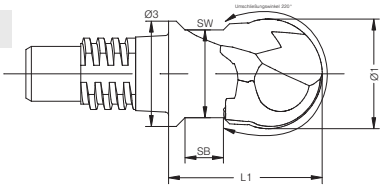
16774

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	SW x SB mm	Z	16774	...
20	10	7	14	9.6	8 x 3	4		102
30	12	9	17	11.6	10 x 4	4		103
40	16	12	21	15.4	13 x 5	4		104
50	20	15	26	19.2	16 x 5	4		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	200	220	195	175	165	160	150	-	-	-	-	120	-	-	180	-

Solid carbide ball head cutter

Design
- Enclosing angle 220°



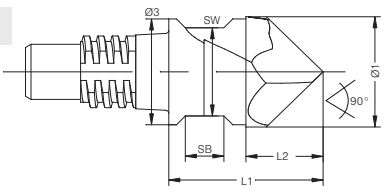
VHM AlTiN | HSC | Z 2 | ≈ 15° | Trocken-bearbeitung | V 1400 N/mm² | 60 HRC

16775

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	SW x SB mm	Z	16775	...
20	10	7	14	9.6	8 x 3	2		102
30	12	9	17	11.6	10 x 4	2		103
40	16	12	21	15.4	13 x 5	2		104
50	20	15	26	19.2	16 x 5	2		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
-	-	-	450	350	300	250	210	170	120	90	70	-	-	-	-	-	-

Solid carbide multi-mill



VHM TiAlN | Z 2 | ≈ 30° | 90° | Uni

16776

Size	Ø$_1$ mm	l$_2$ mm	l$_1$ mm	Clearance mm	SW x SB mm	Z	16776	...
20	10	7	14	9.6	8 x 3	2		102
30	12	9	17	11.6	10 x 4	2		103
40	16	12	21	15.4	13 x 5	2		104
50	20	15	26	19.2	16 x 5	2		105

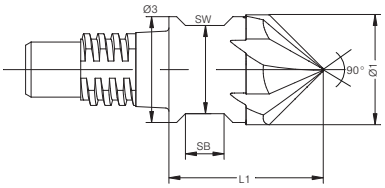
Continued

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	280	200	120	105	90	75	70	65	-	-	-	-	80	-	-	120	-

= The specified prices are unit prices. Only sold in the specified packing units. Always specify number of units in order information.

Continued

Solid carbide deburring tool



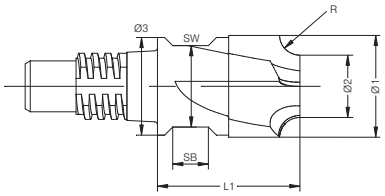
VHM TiAlN | Z 6 | 90° | Uni

16777

Size	$Ø_1$ mm	l_2 mm	l_1 mm	Clearance mm	SW x SB mm	Z	16777	...
20	10	7	14	9.6	8 x 3	6		102
30	12	9	17	11.6	10 x 4	6		103
40	16	12	21	15.4	13 x 5	6		104
50	20	15	26	19.2	16 x 5	6		105

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	280	300	190	170	160	150	130	120	-	-	-	-	110	75	-	-	-

Solid carbide quarter circle cutter



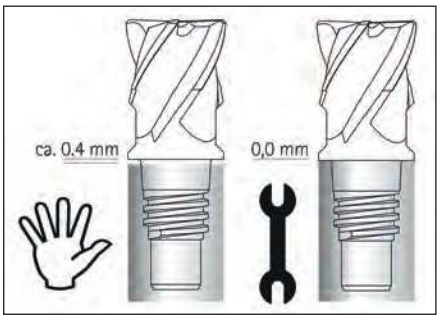
VHM TiAlN | Z 4 | 90° | Uni

16778

Size	$Ø_1$ x R mm	l_2 mm	l_1 mm	Clearance mm	SW x SB mm	Z	16778	...
20	10 x 1.5	7	14	9.6	8 x 3	4		103
20	10 x 2.0	7	14	9.6	8 x 3	4		104
30	12 x 2.5	9	17	11.6	10 x 4	4		105
30	12 x 3.0	9	17	11.6	10 x 4	4		106
40	16 x 3.5	12	21	15.4	13 x 5	4		107
40	16 x 4.0	12	21	15.4	13 x 5	4		108
40	16 x 4.5	12	21	15.4	13 x 5	4		109
50	20 x 5.0	15	26	19.2	13 x 5	4		110
50	20 x 6.0	15	26	19.2	16 x 5	4		111

Al<10%Si	Al>10%Si	Cu	St<520N	St<750N	St<900N	St<1100N	St<1200N	St<1400N	<50HRC	<55HRC	<60HRC	<65HRC	VA<900N	VA>900N	Ti alloy	GG(G)	Plastic
300	280	300	190	170	160	150	130	120	-	-	-	-	110	75	-	-	-

Installation instructions:
- Clean the interface on the milling head and on the tool holder
- Screw the milling head clockwise and hand-tighten into the interchangeable head holder (note: Caution risk of injury — use cut protection gloves when installing)
- Tighten the milling head with the torque wrench and the specified torques (see table) form-fit.



Single open-end wrench

Plug-in tool

Torque wrench

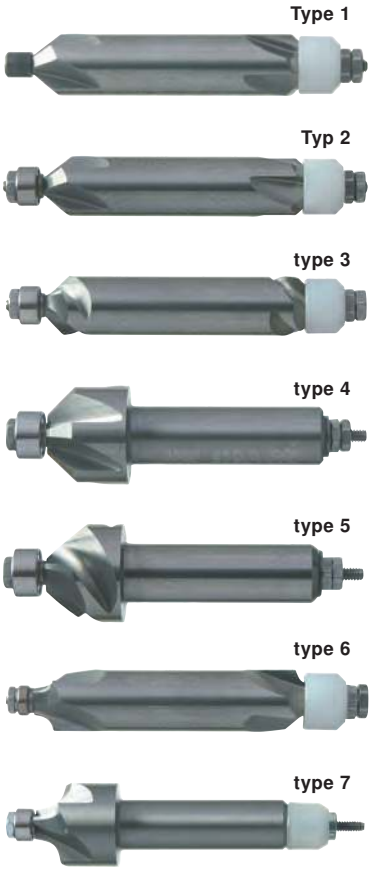
Size mm	SW mm	Torque Nm	16779	...	16780	...	55780	...
20	8	13		102		102		202
30	10	25		103		103		202
40	13	30		104		104		202
50	16	40		105		105		202

16750 Solid carbide form milling cutter

Design
- Double-edged (art. no. 16750 139-152 single-edged)
- Clamping shank 6 mm
- Start-up pin hardened

Applications
For edge and contour deburring tools.
Chip angle 0° for short-chipping, hard materials.
Chip angle 6° for tough materials.
Chip angle 12° for tough to soft materials.
Chip angle 30° for soft materials.

Quality
Universal carbide ultra-fine grain.



Type	Applications/Design	D x L mm	Tip angle/ Radius	Z	Chip angle	Coating	16750	...
1	with rotating start-up pin (Ø 2.5 mm)	6 x 34	90°	4	0°	TiAlN		102
2	with ball bearing start roller (Ø 3.0 mm)	6 x 34	90°	4	0°	–		103
2	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	4	0°	TiAlN		106
2	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	6	0°	–		111
2	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	6	0°	TiAlN		112
1	with rotating start-up pin (Ø 2.5 mm)	6 x 34	90°	4	6°	TiAlN		114
2	with ball bearing start roller (Ø 3.0 mm)	6 x 34	90°	4	6°	TiAlN		116
2	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	4	6°	–		117
2	with ball bearing start roller (Ø 3.0 mm)	6 x 34	90°	4	12°	–		122
2	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	4	12°	–		125
3	with rotating start-up pin (Ø 2.5 mm)	6 x 34	90°	3	30°	TiAlN-ALU		130
3	with ball bearing start roller (Ø 3.0 mm)	6 x 34	90°	3	30°	–		131
3	with ball bearing start roller (Ø 4.0 mm)	6 x 34	90°	3	30°	–		134
4	with ball bearing start roller (Ø 4.0 mm)	10 x 34	90°	6	0°	–		137
4	with ball bearing start roller (Ø 5.0 mm)	10 x 34	90°	6	0°	–		139
4	with ball bearing start roller (Ø 5.0 mm)	10 x 34	90°	6	0°	TiAlN		140
4	with ball bearing start roller (Ø 4.0 mm)	10 x 34	90°	3	6°	–		141
4	with ball bearing start roller (Ø 5.0 mm)	10 x 34	90°	3	6°	TiAlN		144
5	with ball bearing start roller (Ø 4.0 mm)	10 x 34	90°	3	30°	–		145
6	with ball bearing start roller (Ø 3.0 mm)	6 x 34	R 0.5 mm	3	0°	-		151
6	with ball bearing start roller (Ø 3.0 mm)	6 x 34	R 1.0 mm	3	0°	-		152
6	with ball bearing start roller (Ø 3.0 mm)	6 x 34	R 1.5 mm	3	0°	-		153
7	with ball bearing start roller (Ø 4.0 mm)	10 x 34	R 2.0 mm	3	0°	-		154
7	with ball bearing start roller (Ø 4.0 mm)	10 x 34	R 2.5 mm	3	0°	-		155
7	with ball bearing start roller (Ø 4.0 mm)	10 x 34	R 3.0 mm	3	0°	-		156
7	with ball bearing start roller (Ø 4.0 mm)	10 x 34	R 3.0 mm	3	0°	-		156

Recommendations for the use of solid carbide form milling cutter art. no. 16750 ++ Ideal + Limited suitability

Type	MILLING CUTTER	Steel: Hardened steels	Steel: Tool steels	Steel: Case-hardening steels, Heat-treated steels	Steel: Carbon steel (short-chipping)	Copper alloys/ cast iron: Copper, soft brass, soft	Copper alloys/ cast iron: Nickel-brass, hard Bronze	Copper alloys/ cast iron: Cast iron	Stainless steel: Soft, tough varieties	Stainless steel: High-strength, brittle varieties	Stainless steel: Carbon alloy (short-chipping)	Aluminium: Soft, long-chipping	Aluminium: Carbon alloy (short-chipping)	Plastics: Soft, long-chipping	Plastics: Hard, short-chipping
1	16750 102	++	++		++		++	++							
2	16750 103				++		++	+					++		++
2	16750 106	++	++		++		++	++							
2	16750 111				++		++	+					+		++
2	16750 112	++	++		++		++	++							
1	16750 114			++	++		++			++	++				
2	16750 116			++	++		++			++	++				
2	16750 117				++		++				++		++		++
2	16750 122				++	+	++		+		+	+	++	+	++
2	16750 125				++	+	++		+		+	+		+	++
3	16750 130					++						++	++	++	++
3	16750 131					++			+			++	++	++	++
3	16750 134					++			+			++	++	++	++
4	16750 137				++		++	+					+		
4	16750 139				++		++	+					+		
4	16750 140	++	+		++		++	++							
4	16750 141				++		++		+		+	+	++	+	++
4	16750 144			++	++		++		++		++				
5	16750 145					++			+			++	++	++	++
6	16750 151	+	++	++	++	++	++	++	+	++	++	++	++	++	++
6	16750 152	+	++	++	++	++	++	++	+	++	++	++	++	++	++
6	16750 153		+	++	++	++	++	++	+	++	++	++	++	++	++
7	16750 154		+	++	++	++	++	++	+	++	++	++	++	++	++
7	16750 155		+	+	++	++	++	++	+	++	++	+	++	++	++
7	16750 156		+	+	++	++	++	++	+	+	++	+	++	++	++

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