



Milling tools...  
...made by JONGEN!

# VHM 643 TiO<sub>2</sub>



## The Tool

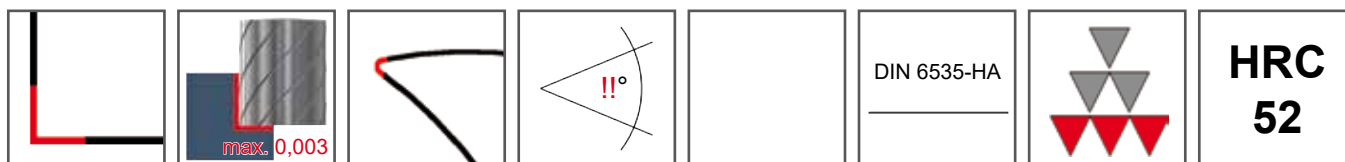
This high-precision solid carbide cutter has been designed especially for contour milling and finishing operations.

The application areas range from the machining of steel, stainless steel as well as cast iron.

## Product characteristics

Characteristic	Your advantages
High-precision shank type milling cutter	Highest precision at work piece Conicity max. in $\mu\text{m}$ - range
Excellent surface finish	Surface finish within range of $R_z$ 0,3-0,5 can be easily produced
Dynamic angle of twist $>45^\circ$ Dynamic tooth pitch	High running smoothness Excellent surface finish
6 cutting edges	High productivity
Holding shaft made to DIN 6535-HA	Stable tool holder
Micro geometry	Improved micro geometries for long tool life
Hard metal	Ultra finest-grain carbide type K20 Very good wear resistance
Coating type	TiAlN- Nanokomposit-coating for highest wear resistance at very high operating temperatures
Hard metal + coating type = Type Ti02	Long tool lives at high application parameters Universally applicable

## Technical Data



Order-No.	D	l	$d_{h6}$	L	Z
VHM 643-06 Ti02	6	19	6	64	6
VHM 643-08 Ti02	8	28	8	75	6
VHM 643-10 Ti02	10	34	10	83	6
VHM 643-12 Ti02	12	40	12	100	6
VHM 643-16 Ti02	16	48	16	110	6
VHM 643-20 Ti02	20	56	20	125	6
VHM 643-25 Ti02	25	75	25	140	6



## Cutting Data Recommendations

Material	D [mm]	V <sub>c</sub> [m/min]	F <sub>z</sub> [m/min]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	V <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
Structural steel, Unalloyed steel  <800 N/mm <sup>2</sup>	6	220 (180-240)	0,030 (0,015-0,060)	19	0,2	11.670	2.100	8,0
	8	220 (180-240)	0,040 (0,020-0,060)	28	0,2	8.750	2.100	11,8
	10	220 (180-240)	0,045 (0,030-0,090)	34	0,2	7.000	1.890	12,9
	12	220 (180-240)	0,050 (0,030-0,090)	40	0,2	5.840	1.750	14,0
	16	220 (180-240)	0,060 (0,040-0,120)	48	0,2	4.380	1.575	15,1
	20	220 (180-240)	0,070 (0,050-0,140)	56	0,2	3.500	1.470	16,5
	25	220 (180-240)	0,080 (0,060-0,140)	75	0,2	2.800	1.345	20,2
Tool steel, Heat-treatable steel, Alloyed steel  800-1200 N/mm <sup>2</sup>	6	180 (140-220)	0,030 (0,015-0,060)	19	0,2	9.550	1.720	6,5
	8	180 (140-220)	0,040 (0,020-0,060)	28	0,2	7.160	1.720	9,6
	10	180 (140-220)	0,045 (0,030-0,090)	34	0,2	5.730	1.545	10,5
	12	180 (140-220)	0,050 (0,030-0,090)	40	0,2	4.770	1.430	11,4
	16	180 (140-220)	0,060 (0,040-0,120)	48	0,2	3.580	1.290	12,4
	20	180 (140-220)	0,070 (0,050-0,140)	56	0,2	2.860	1.200	13,4
	25	180 (140-220)	0,080 (0,060-0,140)	75	0,2	2.290	1.100	16,5
High grade steel, High alloyed steel	6	140 (100-160)	0,030 (0,015-0,060)	19	0,2	7.430	1.335	5,1
	8	140 (100-160)	0,040 (0,020-0,060)	28	0,2	5.570	1.335	7,5
	10	140 (100-160)	0,045 (0,030-0,090)	34	0,2	4.460	1.205	8,2
	12	140 (100-160)	0,050 (0,030-0,090)	40	0,2	3.710	1.115	8,9
	16	140 (100-160)	0,060 (0,040-0,120)	48	0,2	2.790	1.005	9,6
	20	140 (100-160)	0,070 (0,050-0,140)	56	0,2	2.230	935	10,5
	25	140 (100-160)	0,090 (0,070-0,150)	75	0,2	1.780	855	12,8
Titanium alloys >300 HB  (z.B. TiAlV6)	6	60 (20-80)	0,030 (0,015-0,060)	19	0,2	3.180	570	2,2
	8	60 (20-80)	0,040 (0,020-0,060)	28	0,2	2.390	575	3,2
	10	60 (20-80)	0,045 (0,030-0,090)	34	0,2	1.910	515	3,5
	12	60 (20-80)	0,050 (0,030-0,090)	40	0,2	1.590	475	3,8
	16	60 (20-80)	0,060 (0,040-0,120)	48	0,2	1.190	430	4,1
	20	60 (20-80)	0,070 (0,050-0,140)	56	0,2	950	400	4,5
	25	60 (20-80)	0,080 (0,060-0,140)	75	0,2	760	365	5,5
Nickel-base alloys hardenable  (e.g. Inconell 718)	6	30 (20-60)	0,030 (0,015-0,060)	19	0,2	1.590	285	1,1
	8	30 (20-60)	0,040 (0,020-0,060)	28	0,2	1.190	285	1,6
	10	30 (20-60)	0,045 (0,030-0,090)	34	0,2	950	255	1,7
	12	30 (20-60)	0,050 (0,030-0,090)	40	0,2	800	240	1,9
	16	30 (20-60)	0,060 (0,040-0,120)	48	0,2	600	215	2,1
	20	30 (20-60)	0,070 (0,050-0,140)	56	0,2	480	200	2,2
	25	30 (20-60)	0,080 (0,060-0,140)	75	0,2	380	180	2,7
Cast iron GG(G)	6	180 (150-200)	0,030 (0,015-0,060)	19	0,2	9.550	1.720	6,5
	8	180 (150-200)	0,040 (0,020-0,060)	28	0,2	7.160	1.720	9,6
	10	180 (150-200)	0,045 (0,030-0,090)	34	0,2	5.730	1.545	10,5
	12	180 (150-200)	0,050 (0,030-0,090)	40	0,2	4.770	1.430	11,4
	16	180 (150-200)	0,060 (0,040-0,120)	48	0,2	3.580	1.290	12,4
	20	180 (150-200)	0,070 (0,050-0,140)	56	0,2	2.860	1.200	13,4
	25	180 (150-200)	0,080 (0,060-0,140)	75	0,2	2.290	1.100	16,5

The above-mentioned data are standard values that may vary depending on processing, type of machine and material grade. For processing use a machine with the highest preciseness and rigidity. Should the available cutting speed be lower of that given in the table, reduce feed rate proportionally.

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Modifications, errors and omissions excepted!