Pilana

KARBID

Sharper Bite ...

Mills

Drills

CATALOGUE 2025

Contents

Carbide mills

Carbide chamfer mills

Carbide drills

✓ **in stock**

✸ **production on request**

Notes on colour coding of tools

- universal steel machining
- machining of aluminium alloys, plastics, artificial wood, etc.
- machining of stainless steels
- machining of hardened materials

Information on Viper and Rainbow editions coatings

Viper AlTiSiN - tools for steel machining

The **Viper AlTiSiN** multi-layer nanocomposite coating offers **uncompromising performance** when machining even the most difficult materials.
High microhardness, excellent wear resistance and low thermal conductivity ensure long tool life and excellent results even at high cutting speeds.
The special composition of the coating allows its **use in both dry and wet machining of titanium and nickel alloys, hardened and stainless steels**.

Rainbow DLC - tools for machining aluminium alloys

The ultra-thin **Rainbow DLC** coating is the ideal combination of extreme hardness (>5000 HV), high slip properties and excellent wear resistance. This makes it **an excellent solution for the demanding machining of a wide range of materials from aluminium (especially with higher Si content) to composites**. It prevents built-up edge formation, keeps the tool edge sharp and ensures a precise cut. The result is longer tool life and lower production costs.

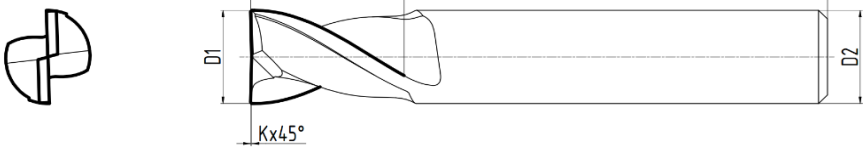
Carbide end mills
2 flutes

OR201
OR202

- 2 cutting edges to the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: steel, stainless steel, cast iron, < 55 HRc, < 1600 N/mm2
Applicable: aluminium, copper
Geometry: λ 30°, γ 8°
Coating: AlTiN



Short version

Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
	D1 h10	D2 h6	L1	L2	K x 45°
OR201.005	0,5	3	38	2	0,02
OR201.010	1	3	38	4	0,02
OR201.020	2	3	38	7	0,05
OR201.030	3	3	38	7	0,07
OR201.040	4	4	50	8	0,07
OR201.050	5	5	50	10	0,07
OR201.060	6	6	57	10	0,07
OR201.080	8	8	63	16	0,12
OR201.100	10	10	72	19	0,2
OR201.120	12	12	83	22	0,2
OR201.140	14	14	83	22	0,2
OR201.160	16	16	92	26	0,2
OR201.180	18	18	92	26	0,2
OR201.200	20	20	104	32	0,3

Long version

Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
	D1 h10	D2 h6	L1	L2	K x 45°
OR202.020	2	3	50	12	0,05
OR202.030	3	3	50	12	0,07
OR202.040	4	4	60	15	0,07
OR202.050	5	5	60	20	0,07
OR202.060	6	6	60	20	0,07
OR202.080	8	8	70	25	0,12
OR202.100	10	10	110	30	0,2
OR202.120	12	12	110	30	0,2
OR202.140	14	14	110	40	0,2
OR202.160	16	16	110	50	0,2
OR202.180	18	18	110	50	0,2
OR202.200	20	20	110	55	0,3

Recommended cutting conditions on page 46.

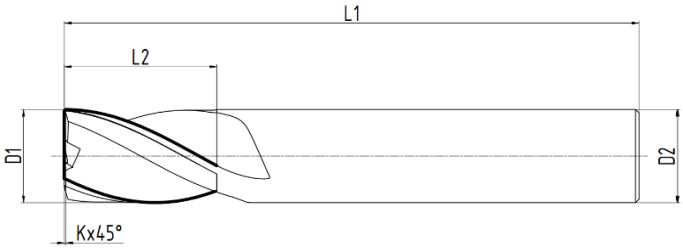
Carbide end mills
3 flutes

OR301

- 3 cutting edges, one through the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: steel, stainless steel, cast iron, < 55 HRc, < 1600 N/mm2
Applicable: aluminium, copper
Geometry: λ 30°, γ 8°
Coating: AlTiN



Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
OR301.020	2	3	38	6	0,04
OR301.025	2,5	3	38	7	0,05
OR301.030	3	3	38	7	0,07
OR301.035	3,5	4	50	7	0,07
OR301.040	4	4	50	8	0,07
OR301.050	5	5	50	10	0,07
OR301.060	6	6	57	10	0,07
OR301.080	8	8	63	16	0,12
OR301.100	10	10	72	19	0,2
OR301.120	12	12	83	22	0,2
OR301.140	14	14	83	22	0,2
OR301.160	16	16	92	26	0,2
OR301.180	18	18	92	26	0,2
OR301.200	20	20	104	32	0,3

Recommended cutting conditions on page 46.

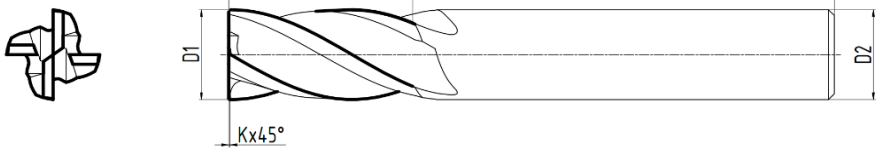
Carbide end mills
4 flutes

OR401
OR402

- 4 cutting edges, of which 2 cutting edges to the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: steel, stainless steel, cast iron, < 55 HRc, < 1600 N/mm2
Applicable: aluminium, copper
Geometry: λ 30°, γ 8°
Coating: AlTiN



Short version

Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
OR401.030	3	3	38	10	0,07
OR401.040	4	4	50	11	0,07
OR401.050	5	5	50	13	0,07
OR401.060	6	6	57	13	0,07
OR401.080	8	8	63	19	0,12
OR401.100	10	10	72	22	0,2
OR401.120	12	12	83	26	0,2
OR401.140	14	14	83	26	0,2
OR401.160	16	16	92	32	0,2
OR401.180	18	18	92	32	0,2
OR401.200	20	20	104	38	0,3

Long version

Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
OR402.030	3	3	65	20	0,07
OR402.040	4	4	65	25	0,07
OR402.050	5	5	70	30	0,07
OR402.060	6	6	70	30	0,07
OR402.080	8	8	100	40	0,12
OR402.100	10	10	110	40	0,2
OR402.120	12	12	110	45	0,2
OR402.140	14	14	110	45	0,2
OR402.160	16	16	124	65	0,2
OR402.180	18	18	124	65	0,2
OR402.200	20	20	150	65	0,3
OR402.250	25	25	165	80	0,3

Recommended cutting conditions on page 46.

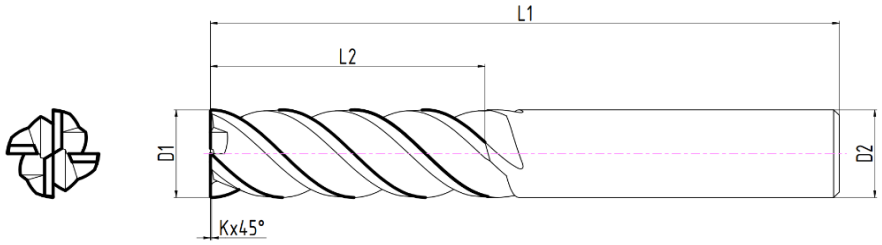
Carbide end mills
4 flutes, helix 45°

OR452

- 4 cutting edges, of which 2 cutting edges to the centre, helix 45°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: steel, stainless steel, cast iron, < 60 HRc, < 1600 N/mm2
Applicable: aluminium, copper
Geometry: λ 45°, γ 8°
Coating: AlCrN



Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
OR452.040	4	4	50	10	0,07
OR452.060	6	6	62	18	0,07
OR452.080	8	8	70	24	0,12
OR452.100	10	10	80	30	0,2
OR452.120	12	12	90	36	0,2
OR452.140	14	14	100	42	0,2
OR452.160	16	16	110	48	0,2
OR452.200	20	20	124	65	0,3

Short version

Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
OR451.200	20	20	104	42	0,3

Recommended cutting conditions on page 46.

Carbide end mills
4 flutes with double helix

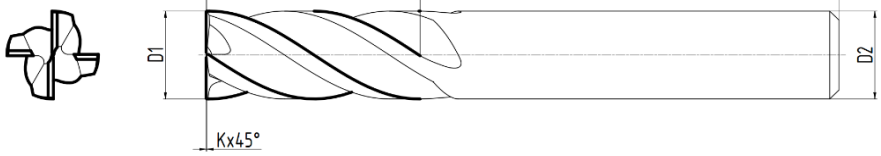
OR411
OR411G

- 4 cutting edges, of which 2 cutting edges to the centre, helix 35°/38°
- high tool rigidity, more resistant to vibration
- **optimised for trochoidal and helical milling (ramp) as well as the drilling of the tool**
- suitable for intensive roughing, grooving and finishing
- clamping shank DIN 6535 HA (plain)
- tools also in **Golden edition** with **AlCrZrN** coating

On request:
- clamping shank with weldon
- tapering of the neck

OPTIMIZED FOR

Recommended use: steel, stainless steel, cast iron, < 60 HRc, < 1600 N/mm2
Applicable: hard to machine materials
Geometry: λ 35°/38°, γ 8°
Coating: AlCrN or AlCrZrN



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
Standard	Golden edition	D1 h10	D2 h6	L1	L2	K x 45°
OR411.020	OR411.020G	2	4	50	5	0,05
OR411.030	OR411.030G	3	6	57	8	0,07
OR411.040	OR411.040G	4	6	57	12	0,07
OR411.050	OR411.050G	5	6	57	13	0,07
OR411.060	OR411.060G	6	6	57	15	0,07
OR411.080	OR411.080G	8	8	63	19	0,12
OR411.100	OR411.100G	10	10	72	24	0,2
OR411.120	OR411.120G	12	12	83	28	0,2
OR411.140	OR411.140G	14	14	83	28	0,2
OR411.160	OR411.160G	16	16	92	35	0,2
OR411.200	OR411.200G	20	20	110	42	0,3
OR411.250	OR411.250G	25	25	125	55	0,3

Golden edition

The combined zirconium-based coating with a gold surface layer improves sliding properties and chip removal, reduces cutting resistance and cutting edge wear.

Golden edition NEW 2025

Recommended cutting conditions on page 46.

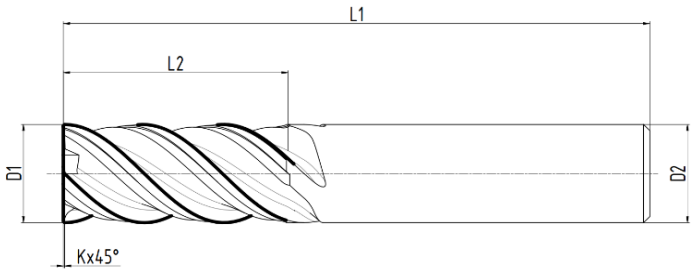
End mills 4 flutes for tough applications
UNI & HARD

HR411
HR411G

- 4 cutting edges, of which 2 cutting edges to the centre
- multihelix, irregular tooth pitch, rectified cutting edge
- designed for hard abrasion resistant and difficult to machine materials
- in the Golden Edition version, excellent results in both hard and soft materials
- clamping shank DIN 6535 HA (plain)
- two coating options substantially increase the variety of materials for machining

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: tool steels and special wear-resistant materials such as Hardox, Toolox, etc.
Applicable: universal end mills suitable also for structural and unalloyed steels and cast iron
Geometry: λ 35°/38°/36°/37°, γ 7°
Coating: AlTIN or Golden edition AlCrZrN



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
Standard	Golden edition	D1 h10	D2 h6	L1	L2	K x 45°
HR411.030	HR411.030G	3	6	57	7	0,07
HR411.040	HR411.040G	4	6	57	9	0,07
HR411.050	HR411.050G	5	6	57	11	0,10
HR411.060	HR411.060G	6	6	57	13	0,10
HR411.080	HR411.080G	8	8	63	19	0,16
HR411.100	HR411.100G	10	10	72	22	0,225
HR411.120	HR411.120G	12	12	83	26	0,33
HR411.160	HR411.160G	16	16	92	32	0,38
HR411.200	HR411.200G	20	20	104	42	0,45

Golden edition

The combined zirconium-based coating with a gold surface layer improves sliding properties and chip removal, reduces cutting resistance and cutting edge wear.

CUT PRICE 2025

Golden edition NEW 2025

Recommended cutting conditions on page 48.

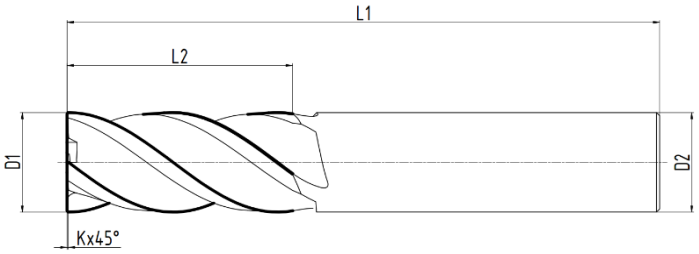
Carbide end mills
4 flutes with double helix - INOX

NR411
NR411G

- 4 cutting edges, of which 2 cutting edges to the centre, helix 38°/40°
- optimized cutting geometry for machining stainless steel
- more resistant to vibration
- clamping shank DIN 6535 HA (plain)
- end mills also available in the **Golden Edition** with **AlCrZrN** coating

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, stainless steel
Applicable: copper, aluminium
Geometry: λ 38°/40°, γ 12°
Coating: AlCrN or AlCrZrN



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
Standard	Golden edition	D1 h10	D2 h6	L1	L2	K x 45°
NR411.030	NR411.030G	3	6	57	10	0,07
NR411.040	NR411.040G	4	6	57	12	0,07
NR411.050	NR411.050G	5	6	57	15	0,07
NR411.060	NR411.060G	6	6	57	17	0,07
NR411.080	NR411.080G	8	8	63	21	0,12
NR411.100	NR411.100G	10	10	72	26	0,2
NR411.120	NR411.120G	12	12	83	31	0,2
NR411.160	NR411.160G	16	16	92	35	0,2
NR411.200	NR411.200G	20	20	110	42	0,3

Golden edition

The combined zirconium-based coating with a gold surface layer improves sliding properties and chip removal, reduces cutting resistance and cutting edge wear.

Golden edition NEW 2025

Recommended cutting conditions on page 46.

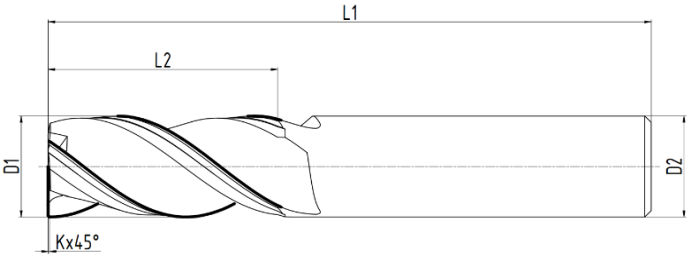
Carbide end mills
3 flutes with triple helix - ALU

AR311
AR311R

- 3 cutting edges, one through the centre
- multispiral, helix 37°/39°/41°
- more resistant to vibration
- polished finish
- clamping shank DIN 6535 HA (plain)
- end mills also available in the **Rainbow Edition** with **DLC** coating

On request:
- clamping shank with weldon
- tapering of the neck
- coating

Recommended use: aluminium and its alloys, copper, plastic
Applicable: < 55 HRc
Geometry: λ 37°/39°/41°, γ 15°
Coating: uncoated or Rainbow DLC



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
Standard	Rainbow	D1 h10	D2 h6	L1	L2	K x 45°
AR311.030	**AR311.030R**	3	6	57	10	0,07
AR311.040	**AR311.040R**	4	6	57	12	0,07
AR311.050	**AR311.050R**	5	6	57	13	0,07
AR311.060	**AR311.060R**	6	6	57	15	0,07
AR311.080	**AR311.080R**	8	8	63	19	0,12
AR311.100	**AR311.100R**	10	10	72	24	0,2
AR311.120	**AR311.120R**	12	12	83	28	0,2
AR311.160	**AR311.160R**	16	16	92	35	0,2
AR311.200	**AR311.200R**	20	20	110	42	0,3

Rainbow edition NEW 2025

Recommended cutting conditions on page 46.
More information about coatings on page 3.

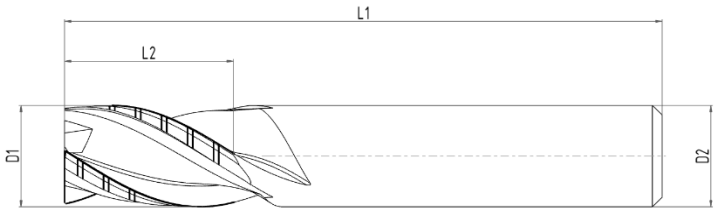
Carbide end mills 3 flutes with chip breakers and triple helix- ALU

AP311
AP311R

- suitable for both roughing and finishing operations
- chip breakers decrease machine load, enabling greater material removal without tool overload
- 3 cutting edges, one through the centre
- multispiral, helix 37°/39°/41°
- more resistant to vibration
- polished finish
- clamping shank DIN 6535 HA (plain)
- end mills also available in the **Rainbow Edition** with **DLC** coating

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: aluminium and its alloys, copper, plastic
Applicable: with Rainbow Edition even for composite machining
Geometry: λ 37°/39°/41°, γ 15°
Coating: uncoated or Rainbow DLC



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
Standard	Rainbow	D1 h10	D2 h6	L1	L2	K x 45°
AP311.030	AP311.030R	3	6	57	10	0,07
AP311.040	AP311.040R	4	6	57	12	0,07
AP311.050	AP311.050R	5	6	57	13	0,07
AP311.060	AP311.060R	6	6	57	15	0,07
AP311.080	AP311.080R	8	8	63	19	0,12
AP311.100	AP311.100R	10	10	72	24	0,2
AP311.120	AP311.120R	12	12	83	28	0,2
AP311.160	AP311.160R	16	16	95	35	0,2
AP311.200	AP311.200R	20	20	110	42	0,3

Rainbow edition NEW 2025

Recommended cutting conditions on page 46.
More information about coatings on page 3.

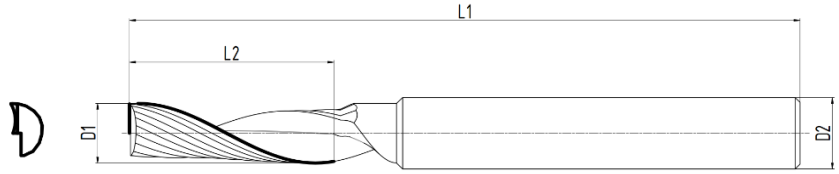
Carbide end mills
1 flute

AR101 / AR102
AR101R / AR102R

- 1 cutting edge through the centre, helix 25°
- polished surface
- clamping shank DIN 6535 HA (plain)
- end mills also available in the **Rainbow Edition** with **DLC** coating

On request:
- clamping shank with weldon
- tapering of the neck
- coating

Recommended use: aluminium, plastic
Geometry: λ 25°, γ 20°
Coating: uncoated or Rainbow DLC



Short version

	Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length
	Standard	Rainbow	D1 h10	D2 h6	L1	L2
✓	AR101.030	AR101.030R	3	6	54	15
✓	AR101.040	AR101.040R	4	6	54	15
✓	AR101.050	AR101.050R	5	6	54	17
✓	AR101.060	AR101.060R	6	6	60	20
✓	AR101.080	AR101.080R	8	8	63	22
✓	AR101.100	AR101.100R	10	10	72	25
✓	AR101.120	AR101.120R	12	12	83	30
✸	AR101.140	AR101.140R	14	14	92	30
✸	AR101.160	AR101.160R	16	16	92	35

Long version

	Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length
	Standard	Rainbow	D1 h10	D2 h6	L1	L2
✸	AR102.030	AR102.030R	3	6	100	15
✸	AR102.040	AR102.040R	4	6	100	15
✸	AR102.050	AR102.050R	5	6	100	17
✸	AR102.060	AR102.060R	6	6	100	20
✸	AR102.080	AR102.080R	8	8	100	22
✸	AR102.100	AR102.100R	10	10	100	25
✓	AR102.120	AR102.120R	12	12	100	35
✸	AR102.140	AR102.140R	14	14	100	35
✸	AR102.160	AR102.160R	16	16	110	40

✓ **in stock**
✸ **production on request**

Rainbow edition **NEW 2025**

Recommended cutting conditions on page 46.
More information about coatings on page 3.

Carbide end mills with chip breakers for dynamic machining 6 flutes

DR611V / DR612V DR611G / DR612G

- 6 cutting edges, of which 3 cutting edges to the centre, multihelix
- stronger core, chip breakers along the edges of the tool
- Suitable for productive milling processes (**H**igh **P**roductivity **M**achining) using dynamic, adaptive or trochoidal machining strategies
- these cutters are designed for large depths of cutting and allow the maximum amount of material to be removed in a short time with consistent loading
- clamping shank DIN 6535 HA (plain)
- end mills also available in the **Golden Edition** with **AlCrZrN** coating

On request:
- clamping shank with weldon
- tapering of the neck

Golden edition NEW 2025

Recommended use: < 50 HRc, < 1200 N/mm2, steel, stainless steel
Aplicable: cast steel, heat resistant alloys
Geometry: λ 30°/31°, γ 10°
Coating: Viper edition AlTiSiN or AlCrZrN

Short version 3xD

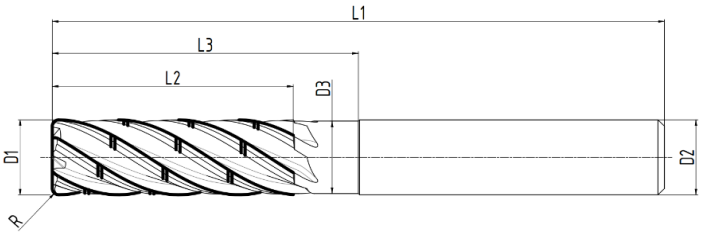
Catalogue number		Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
Viper edition	Golden edition	D1 h10	D2 h6	D3	L1	L2	L3	R +/-0,05
DR611.060V	DR611.060G	6	6	5,8	63	19	25	0,2
DR611.080V	DR611.080G	8	8	7,7	71	25	33	0,2
DR611.100V	DR611.100G	10	10	9,7	82	31	41	0,5
DR611.120V	DR611.120G	12	12	11,6	94	37	47	1
DR611.160V	DR611.160G	16	16	15,5	110	49	61	1
DR611.200V	DR611.200G	20	20	19,5	127	61	75	2

Long version 5xD

Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Corner radius
Viper edition	Golden edition	D1 h10	D2 h6	L1	L2	R +/-0,05
DR612.080V	DR612.080G	8	8	85	41	0,2
DR612.100V	DR612.100G	10	10	100	51	0,5
DR612.120V	DR612.120G	12	12	115	61	1
DR612.160V	DR612.160G	16	16	140	81	1
DR612.200V	DR612.200G	20	20	163	102	2

Golden edition

The combined zirconium-based coating with a gold surface layer improves sliding properties and chip removal, reduces cutting resistance and cutting edge wear.



Recommended cutting conditions on page 48.
More information about coatings on page 3.

High-speed carbide end mills
4 flutes

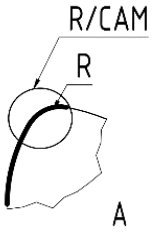
HSC401

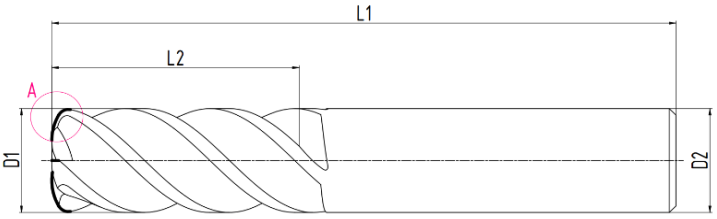
- 4 cutting edges, helix 45°
- only the face of the cutter is cutable
- end mills are designed for **H**igh **S**peed **C**utting, when the tool cuts with the face at a shallow depth at a high feed rate
- the R/CAM value must be entered into the program
- clamping shank DIN 6535 HA (plain)

On request:

- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Geometry: λ 45°, γ 4°
Coating: AlTiN





Catalogue number	Diameter D1 +/-0,01	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner radius R	R/CAM	Cutting depth a_p
HSC401.040	4	6	57	11	0,5	0,67	0,2
HSC401.060	6	6	57	15	0,5	0,76	0,3
HSC401.080	8	8	63	20	1	1,38	0,5
HSC401.100	10	10	72	26	1,5	1,99	0,7
HSC401.120	12	12	83	30	1,5	2,1	0,8
HSC401.160	16	16	92	36	2	2,75	1

Recommended cutting conditions on page 47.

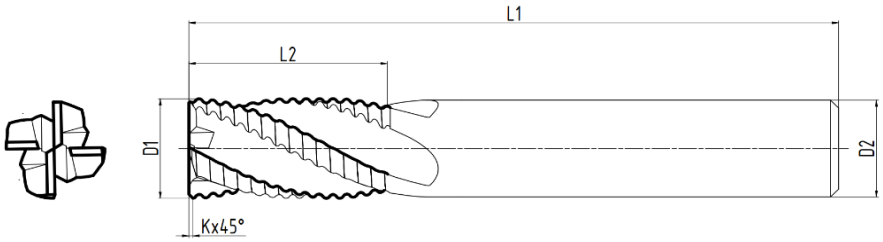
Carbide roughing end mills
4 flutes

OH401

- 4 cutting edges, of which 2 cutting edges to the centre
- NR profile, helix 40°
- irregular edge spacing
- cutting edge rectification
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Geometry: NR profile, λ 40°, γ 7°
Coating: AlCrN



Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
	D1 h10	D2 h6	L1	L2	K x 45°
OH401.050	5	6	57	13	0,15
OH401.060	6	6	57	13	0,15
OH401.080	8	8	63	19	0,2
OH401.100	10	10	72	22	0,2
OH401.120	12	12	83	26	0,25
OH401.140	14	14	92	32	0,25
OH401.160	16	16	92	32	0,35
OH401.200	20	20	104	42	0,4
OH401.200-L	20	20	110	50	0,4

INNOVATED

Recommended cutting conditions on page 46.

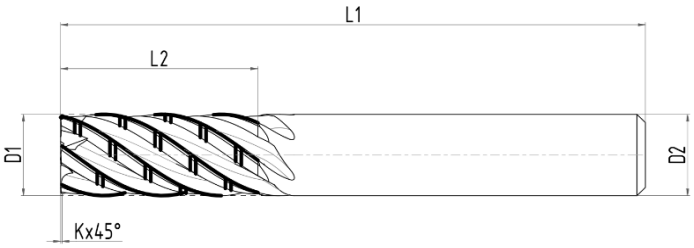
Carbide roughing end mills 5-6 flutes with chip breakers

OP601V
OP601G

- 5 or 6 cutting edges, of which 2 cutting edges to the centre
- stronger core, chip breakers along the edges of the tool
- suitable for both roughing and finishing operations
- chip breakers reduce machine load, allowing for higher material removal rates
- cutting edge rectification
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Geometry: λ 42°, γ 5°
Coating: Viper AlTiSiN or Golden edition AlCrZrN



Catalogue number		Diameter	Shank diameter	Overall length	Cutting edge length	Number of cutting edges	Corner bevel
Viper edition	Golden edition	D1 h10	D2 h6	L1	L2	Z	K x 45°
OP501.050V	OP501.050G	5	6	57	13	5	0,15
OP501.060V	OP501.060G	6	6	57	13	5	0,15
OP601.080V	OP601.080G	8	8	63	19	6	0,2
OP601.100V	OP601.100G	10	10	72	22	6	0,2
OP601.120V	OP601.120G	12	12	83	26	6	0,25
OP601.140V	OP601.140G	14	14	92	32	6	0,25
OP601.160V	OP601.160G	16	16	92	32	6	0,35
OP601.200V	OP601.200G	20	20	104	42	6	0,4

Golden edition

The combined zirconium-based coating with a gold surface layer improves sliding properties and chip removal, reduces cutting resistance and cutting edge wear.

CUT PRICE 2025

Golden edition NEW 2025

Viper edition NEW 2025

Recommended cutting conditions on page 46.
More information about coatings on page 3.

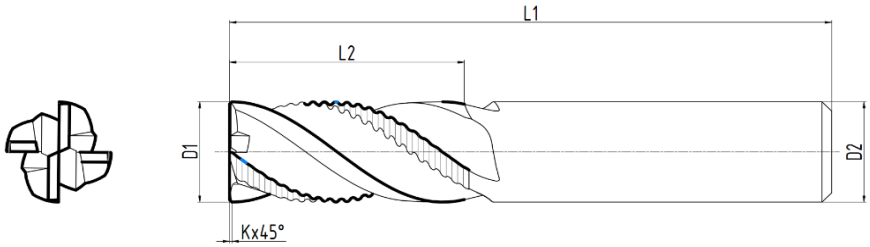
Carbide roughing-finishing end mills 4 flutes

RF401

- 4 cutting edges, of which 2 cutting edges to the centre, helix 40°, NR profile
- higher performance (Vc, fz) compared to OH401 end mills by approx. 30 %
- smooth surface
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Geometry: NR profile, λ 40°, γ 8°
Coating: AlTiN



Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Corner bevel
	D1 h10	D2 h6	L1	L2	K x 45°
RF401.060	6	6	57	15	0,15
RF401.080	8	8	63	22	0,2
RF401.100	10	10	72	26	0,2
RF401.120	12	12	83	30	0,25
RF401.160	16	16	92	36	0,35
RF401.200	20	20	104	42	0,4

Recommended cutting conditions on page 47.

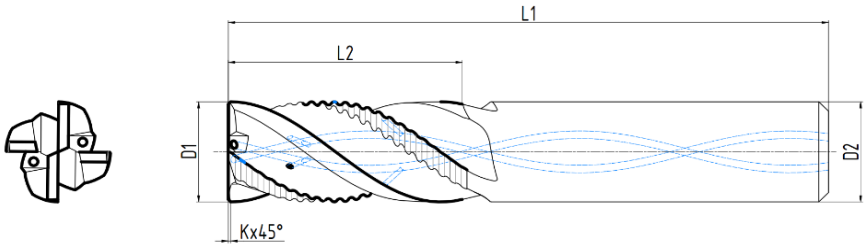
Carbide roughing-finishing end mills
4 flutes with internal cooling

RF401-IC

- 4 cutting edges, of which 2 cutting edges to the centre, helix 40°, NR profile
- front and side cooling outlets
- higher performance (Vc, fz) compared to OH401 end mills by approx. 30 %
- smooth surface
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel
Applicable: heat resistant steel, inconel
Geometry: NR profile, λ 40°, γ 10°
Coating: AlCrN



Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner bevel K x 45°
RF401.060 IK	6	6	57	15	0,15
RF401.080 IK	8	8	63	22	0,2
RF401.100 IK	10	10	72	26	0,2
RF401.120 IK	12	12	83	30	0,25
RF401.160 IK	16	16	92	36	0,35
RF401.200 IK	20	20	104	42	0,4

Recommended cutting conditions on page 47.

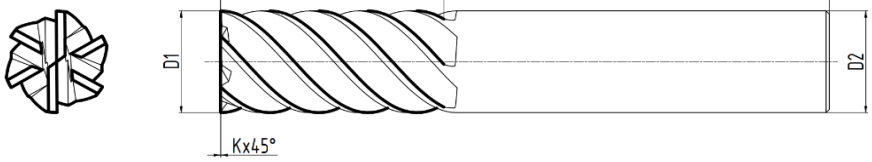
Carbide finishing multi-flute end mills

OR601
OR602

- 6-10 cutting edges, of which 2 cutting edges to the centre, helix 45°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 60 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: aluminium
Geometry: λ 45°, γ 7°
Coating: AlCrN



Short version

Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Number of cutting edges	Corner bevel
	D1 h10	D2 h6	L1	L2	Z	K x 45°
OR601.050	5	5	54	13	6	0,02
OR601.060	6	6	57	13	6	0,03
OR601.080	8	8	63	19	6	0,04
OR601.100	10	10	72	22	6	0,05
OR601.120	12	12	83	26	6	0,05
OR601.160	16	16	92	32	6	0,06
OR601.180	18	18	92	32	6	0,06
OR801.200	20	20	104	38	8	0,07
OR1001.250	25	25	121	50	10	0,08

Long version

Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Number of cutting edges	Corner bevel
	D1 h10	D2 h6	L1	L2	Z	K x 45°
OR602.060	6	6	70	26	6	0,03
OR602.080	8	8	90	36	6	0,04
OR602.100	10	10	100	46	6	0,05
OR602.120	12	12	110	56	6	0,05
OR602.160	16	16	130	66	6	0,06
OR802.200	20	20	140	76	8	0,07
OR1002.250	25	25	180	92	10	0,08

Recommended cutting conditions on page 46.

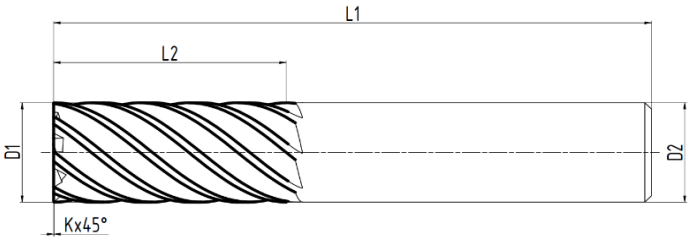
Carbide finishing end mills for hard materials

KR

- 4-12 cutting edges, of which 2 edges to the centre, variable helix 30° - 45°
- more resistant to vibration
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 65 HRc, hardened steel, stainless steel, cast iron
Applicable: < 55 HRc
Geometry: λ 30°- 45°, γ 0°
Coating: AlCrN



Short version

Catalogue number	Diameter	Shank diameter	Overall length	Cutting edge length	Number of cutting edges	Corner bevel
	D1 h10	D2 h6	L1	L2	Z	K x 45°
KR401.030	3	6	57	12	4	0,02
KR401.040	4	6	57	13	4	0,02
KR601.050	5	6	57	15	6	0,02
KR601.060	6	6	57	16	6	0,03
KR601.080	8	8	70	22	6	0,04
KR601.100	10	10	72	25	6	0,05
KR601.120	12	12	83	28	6	0,05
KR601.140	14	14	83	30	6	0,06
KR801.160	16	16	92	35	8	0,06
KR1001.200	20	20	104	40	10	0,07

Long version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Number of cutting edges	Corner bevel
	D1 h10	D2 h6	D3	L1	L2	L3	Z	K x 45°
KR1002.200	20	20	19,8	135	70	85	10	0,07
KR1202.250	25	25	24	186	55	132	12	0,07

Recommended cutting conditions on page 46.

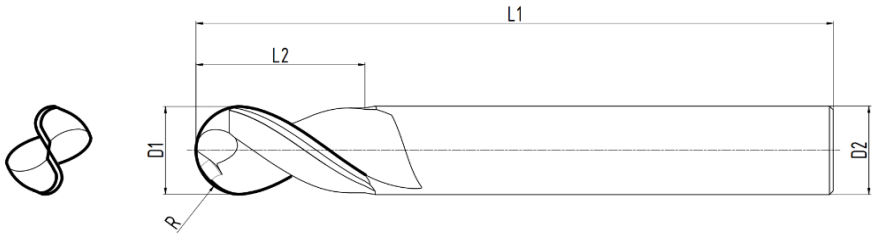
Carbide ball-nose end mills
2 flutes

OK201
OK202

- 2 cutting edges to the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: aluminium
Geometry: λ 30°, γ 8°
Coating: AlTiN



Short version

Catalogue number	Diameter D1 h8	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner radius R0/-0,02
OK201.010	1	3	38	3	0,5
OK201.020	2	3	38	5	1
OK201.030	3	3	38	7	1,5
OK201.040	4	4	50	8	2
OK201.050	5	5	50	10	2,5
OK201.060	6	6	57	10	3
OK201.080	8	8	63	16	4
OK201.100	10	10	72	19	5
OK201.120	12	12	83	22	6
OK201.140	14	14	83	22	7
OK201.160	16	16	92	26	8
OK201.180	18	18	92	26	9
OK201.200	20	20	104	32	10

Long version

Catalogue number	Diameter D1 h8	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner radius R0/-0,02
OK202.030	3	3	60	8	1,5
OK202.040	4	4	70	8	2
OK202.050	5	5	80	10	2,5
OK202.060	6	6	90	12	3
OK202.080	8	8	110	14	4
OK202.100	10	10	110	18	5
OK202.120	12	12	110	22	6
OK202.140	14	14	110	26	7
OK202.160	16	16	140	30	8
OK202.200	20	20	160	38	10

Recommended cutting conditions on page 46.

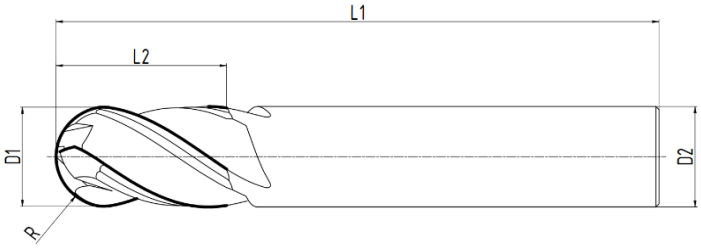
Carbide ball-nose end mills
4 flutes

OK401
OK402

- 4 cutting edges, of which 2 cutting edges to the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: aluminium
Geometry: λ 30°, γ 8°
Coating: AlTiN



Short version

Catalogue number	Diameter D1 h8	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner radius R0/-0,02
OK401.030	3	3	38	7	1,5
OK401.040	4	4	50	8	2
OK401.050	5	5	50	10	2,5
OK401.060	6	6	57	10	3
OK401.080	8	8	63	16	4
OK401.100	10	10	72	19	5
OK401.120	12	12	83	22	6
OK401.140	14	14	83	22	7
OK401.160	16	16	92	26	8
OK401.180	18	18	92	26	9
OK401.200	20	20	104	32	10

Long version

Catalogue number	Diameter D1 h8	Shank diameter D2 h6	Overall length L1	Cutting edge length L2	Corner radius R0/-0,02
OK402.030	3	3	60	8	1,5
OK402.040	4	4	70	8	2
OK402.050	5	5	80	10	2,5
OK402.060	6	6	90	12	3
OK402.080	8	8	110	14	4
OK402.100	10	10	110	18	5
OK402.120	12	12	110	22	6
OK402.140	14	14	110	26	7
OK402.160	16	16	140	30	8
OK402.200	20	20	160	38	10

Recommended cutting conditions on page 46.

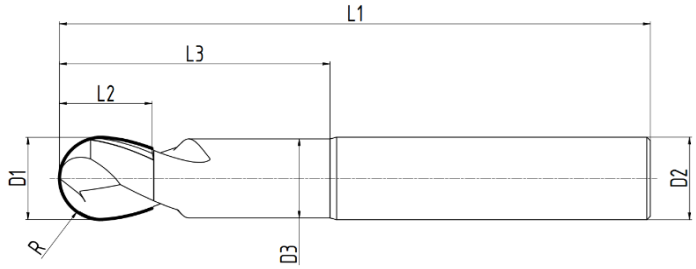
Carbide ball-nose end mills for hard materials

KK201
KK202

- 2 cutting edges to the centre, helix 20°
- end mills diameter 16 mm 4 cutting edges, of which 2 edges to the centre
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 65 HRc, hardened steel, stainless steel, cast iron
Applicable: < 55 HRc
Geometry: λ 20°, γ 0°
Coating: AlCrN



Short version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h8	D2 h6	D3	L1	L2	L3	R0/-0,02
KK201.010	1	6	0,95	57	2	3	0,5
KK201.015	1,5	6	1,45	57	2,5	5	0,75
KK201.020	2	6	1,9	57	3	7	1
KK201.030	3	6	2,8	57	4	8	1,5
KK201.040	4	6	3,8	57	5	14	2
KK201.050	5	6	4,8	57	6	21	2,5
KK201.060	6	6	5,8	57	7	21	3
KK201.080	8	8	7,6	63	9	27	4
KK201.100	10	10	9,6	72	11	32	5
KK201.120	12	12	11,5	83	13	38	6
KK401.160	16	16	15,5	92	17	44	8

Long version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h8	D2 h6	D3	L1	L2	L3	R0/-0,02
KK202.020	2	6	1,9	70	3	17	1
KK202.030	3	6	2,8	70	4	18	1,5
KK202.040	4	6	3,8	80	5	19	2
KK202.050	5	6	4,8	80	6	44	2,5
KK202.060	6	6	5,8	80	7	44	3
KK202.080	8	8	7,6	90	9	54	4
KK202.100	10	10	9,6	100	11	60	5
KK202.120	12	12	11,5	110	13	65	6
KK402.160	16	16	15,5	130	17	82	8

Recommended cutting conditions on page 46.

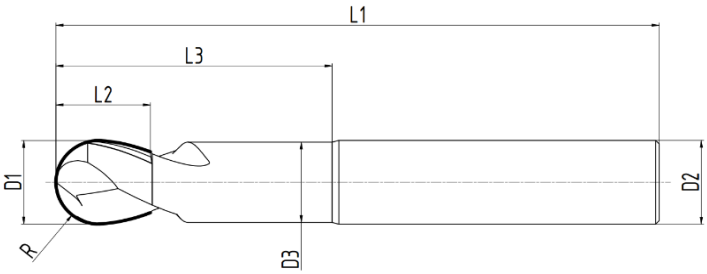
Carbide ball-nose end mills for extra hard materials

KK251
KK252

- 2 cutting edges to the centre, helix 20°
- end mills diameter 16 mm 4 cutting edges, of which 2 edges to the centre
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 70 HRc, hardened steel
Applicable: cast iron
Geometry: λ 20°, γ -2°
Coating: AlCrN



Short version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h8	D2 h6	D3	L1	L2	L3	R0/-0,02
KK251.020	2	6	1,9	57	2	7	1
KK251.030	3	6	2,8	57	3	8	1,5
KK251.040	4	6	3,8	57	4	14	2
KK251.050	5	6	4,8	57	5	21	2,5
KK251.060	6	6	5,8	57	6	21	3
KK251.080	8	8	7,6	63	8	27	4
KK251.100	10	10	9,6	72	10	32	5
KK251.120	12	12	11,5	83	12	38	6
KK451.160	16	16	15,5	92	16	44	8

Long version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h8	D2 h6	D3	L1	L2	L3	R0/-0,02
KK252.020	2	6	1,9	70	2	17	1
KK252.030	3	6	2,8	70	3	18	1,5
KK252.040	4	6	3,8	80	4	19	2
KK252.050	5	6	4,8	80	5	44	2,5
KK252.060	6	6	5,8	80	6	44	3
KK252.080	8	8	7,6	90	8	54	4
KK252.100	10	10	9,6	100	10	60	5
KK252.120	12	12	11,5	110	12	65	6
KK452.160	16	16	15,5	130	16	82	8

Recommended cutting conditions on page 46.

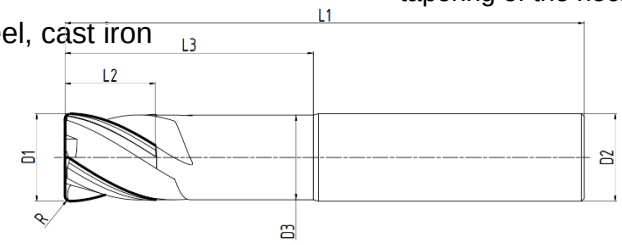
Carbide end mills with corner radius 4 flutes

KT401
KT402

- 4 cutting edges, of which 2 cutting edges to the centre, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 65 HRc, steel, stainless steel, cast iron
Applicable: < 55 HRc
Geometry: λ 30°, γ 4°
Coating: AlCrN



Short version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h10	D2 h6	D3	L1	L2	L3	R0/-0,02
KT401.030.03	3	6	2,9	57	4	14	0,3
KT401.030.05	3	6	2,9	57	4	14	0,5
KT401.040.03	4	6	3,8	57	4	14,5	0,3
KT401.040.05	4	6	3,8	57	4	14,5	0,5
KT401.050.05	5	6	4,8	57	6	14,5	0,5
KT401.060.05	6	6	5,8	57	6	21	0,5
KT401.060.10	6	6	5,8	57	6	21	1
KT401.060.15	6	6	5,8	57	6	21	1,5
KT401.080.05	8	8	7,6	63	8	27	0,5
KT401.080.10	8	8	7,6	63	8	27	1
KT401.080.20	8	8	7,6	63	8	27	2
KT401.100.05	10	10	9,6	72	10	32	0,5
KT401.100.10	10	10	9,6	72	10	32	1
KT401.100.20	10	10	9,6	72	10	32	2
KT401.120.05	12	12	11,5	83	12	38	0,5
KT401.120.10	12	12	11,5	83	12	38	1
KT401.120.15	12	12	11,5	83	12	38	1,5
KT401.120.20	12	12	11,5	83	12	38	2
KT401.120.30	12	12	11,5	83	12	38	3
KT401.160.10	16	16	15,5	92	16	44	1
KT401.160.15	16	16	15,5	92	16	44	1,5
KT401.160.20	16	16	15,5	92	16	44	2

Long version

Catalogue number	Diameter	Shank diameter	Neck diameter	Overall length	Cutting edge length	Neck length	Corner radius
	D1 h10	D2 h6	D3	L1	L2	L3	R0/-0,02
KT402.040.03	4	6	3,8	80	4	16	0,3
KT402.040.05	4	6	3,8	80	4	16	0,5
KT402.060.05	6	6	5,8	90	9	21	0,5
KT402.060.10	6	6	5,8	90	9	21	1
KT402.080.05	8	8	7,6	100	12	27	0,5
KT402.080.10	8	8	7,6	100	12	27	1
KT402.100.05	10	10	9,6	100	15	32	0,5
KT402.100.10	10	10	9,6	100	15	32	1
KT402.100.20	10	10	9,6	100	15	32	2
KT402.120.05	12	12	11,5	110	18	38	0,5
KT402.120.10	12	12	11,5	110	18	38	1
KT402.120.20	12	12	11,5	110	18	38	2

Recommended cutting conditions on page 46.

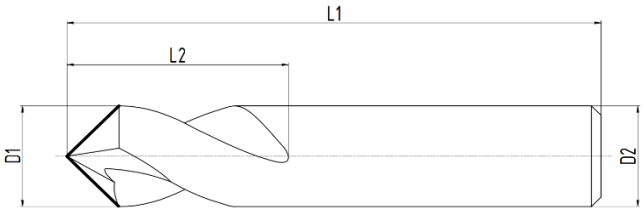
Carbide NC spot drills

NC090
NC120

- 2 cutting edges, helix 30°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 30°
Coating: AlTiN



Point angle 90°

Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Helix length L2
NC090.030	3	3	40	8
NC090.040	4	4	50	10
NC090.050	5	5	50	13
NC090.060	6	6	57	13
NC090.080	8	8	63	23
NC090.100	10	10	72	24
NC090.120	12	12	82	24
NC090.140	14	14	82	26
NC090.160	16	16	82	29
NC090.200	20	20	110	35

Point angle 120°

Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Helix length L2
NC120.030	3	3	40	8
NC120.040	4	4	50	10
NC120.050	5	5	50	13
NC120.060	6	6	57	13
NC120.080	8	8	63	23
NC120.100	10	10	72	24
NC120.120	12	12	82	24
NC120.140	14	14	82	26
NC120.160	16	16	82	29
NC120.200	20	20	110	35

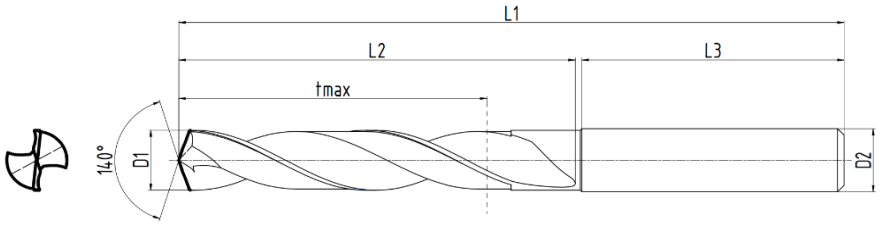
Carbide drills 3xD without internal cooling - production on request

VS302

- 2 cutting edges, helix 30°, point angle 140°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 30°
Coating: AlTiN



Catalogue number	Diameter	Shank diameter	Overall length	Helix length	Shank length	Max. drilling depth	Diameter tolerance
	D1	D2 h6	L1	L2	L3	t_{max}	m7
VS302.0300 ⇩ VS302.0370	3,0 - 3,7	6	62	20	36	14	0,004/0,016
VS302.0380 ⇩ VS302.0470	3,8 - 4,7	6	66	24	36	17	0,004/0,016
VS302.0480 ⇩ VS302.0600	4,8 - 6,0	6	66	28	36	20	0,004/0,016
VS302.0610 ⇩ VS302.0700	6,1 - 7,0	8	79	34	36	24	0,006/0,021
VS302.0710 ⇩ VS302.0800	7,1 - 8,0	8	79	41	36	29	0,006/0,021
VS302.0810 ⇩ VS302.1000	8,1 - 10,0	10	89	47	40	35	0,006/0,021
VS302.1010 ⇩ VS302.1200	10,1 - 12,0	12	102	55	45	40	0,007/0,025
VS302.1215 ⇩ VS302.1400	12,1 - 14,0	14	107	60	45	43	0,007/0,025
VS302.1420 ⇩ VS302.1600	14,1 - 16,0	16	115	65	48	45	0,007/0,025
VS302.1605 ⇩ VS302.1800	16,1 - 18,0	18	123	73	48	51	0,007/0,025
VS302.1850 ⇩ VS302.2000	18,1 - 20,0	20	131	79	50	55	0,008/0,029

Custom production of less used drill sizes according to customer requirements.

It is possible to produce the required dimension given in hundredths of mm and the agreed tolerance.

Minimum order quantity:
D < 10,0 mm = 5 pcs
D < 16,0 mm = 3 pcs
D > 16,0 mm = 2 pcs

Recommended cutting conditions on page 49.

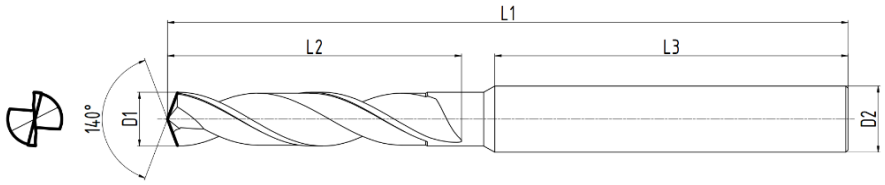
Carbide drills 4xD for hard materials - production on request

VK402

- 2 cutting edges, helix 15°, point angle 140°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: 45 - 65 HRc, hardened steel, cast iron
Geometry: λ 15°
Coating: AlTiSiN



Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Helix length L2	Shank length L3	Diameter tolerance m7
VK402.0200 ⇩ VK402.0290	2,0 - 2,9	4	54	13	36	0,004/0,016
VK402.0300 ⇩ VK402.0370	3,0 - 3,7	6	65	24	36	0,004/0,016
VK402.0380 ⇩ VK402.0470	3,8 - 4,7	6	74	28	36	0,004/0,016
VK402.0480 ⇩ VK402.0600	4,8 - 6,0	6	82	35	36	0,004/0,016
VK402.0610 ⇩ VK402.0800	6,1 - 8,0	8	91	50	36	0,006/0,021
VK402.0810 ⇩ VK402.1000	8,1 - 10,0	10	103	63	40	0,006/0,021
VK402.1010 ⇩ VK402.1200	10,1 - 12,0	12	118	71	45	0,007/0,025
VK402.1210 ⇩ VK402.1400	12,1 - 14,0	14	124	77	45	0,007/0,025
VK402.1410 ⇩ VK402.1600	14,1 - 16,0	16	133	83	48	0,007/0,025

Custom production of less used drill sizes according to customer requirements.
It is possible to produce the required dimension given in hundredths of mm and the agreed tolerance.

Minimum order quantity: D < 10,0 mm = 5 pcs
D < 16,0 mm = 3 pcs

Recommended cutting conditions on page 49.

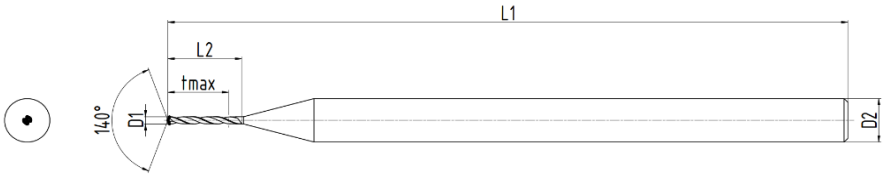
Carbide micro drills 5xD without internal cooling - production on request

VM502

- 2 cutting edges, helix 30°, point angle 140°
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 30°
Coating: AlTiN



Catalogue number	Diameter D1 m7	Shank diameter D2 h6	Overall length L1	Helix length L2	Max. drilling depth t_{max}
VM502.0050 ⇩ VM502.0070	0,5 - 0,7	3	45	4,5	3,5
VM502.0075 ⇩ VM502.0100	0,75 - 1,0	3	45	6,5	5
VM502.0110 ⇩ VM502.0150	1,1 - 1,5	3	54	10	7,5
VM502.0160 ⇩ VM502.0200	1,6 - 2,0	3	54	13	10
VM502.0210 ⇩ VM502.0250	2,1 - 2,5	3	65	17	12,5
VM502.0260 ⇩ VM502.0290	2,6 - 2,9	3	65	20	15

Production on request. The price is valid for the production of at least 10 pieces.

Recommended cutting conditions on page 49.

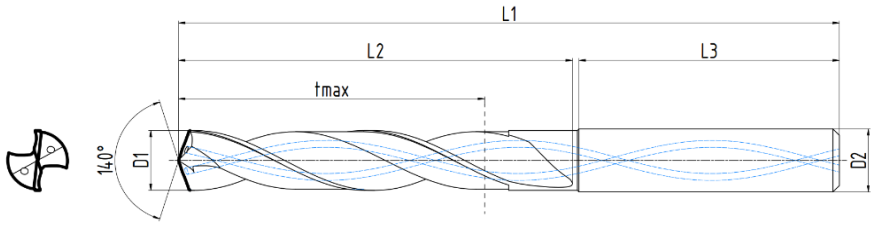
Carbide drills 5xD with internal cooling - production on request

VS501
VS501V

- 2 cutting edges, helix 30°, point angle 140°
- clamping shank DIN 6535 HA (plain)
- tools are also available with **Viper coating – designated V**

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: (λ 30°)
Coating: AlTiN or Viper AlTiSiN



Catalogue number	Diameter	Shank diameter	Overall length	Helix length	Shank length	Max. drilling depth
	D1 m7	D2 h6	L1	L2	L3	t_{max}
VS501.0300(V) ⇩ VS501.0370(V)	3,0 - 3,7	6	66	28	36	23
VS501.0380(V) ⇩ VS501.0470(V)	3,8 - 4,7	6	74	36	36	29
VS501.0480(V) ⇩ VS501.0600(V)	4,8 - 6,0	6	82	44	36	35
VS501.0610(V) ⇩ VS501.0800(V)	6,1 - 8,0	8	91	53	36	43
VS501.0810(V) ⇩ VS501.1000(V)	8,1 - 10,0	10	103	61	40	49
VS501.1010(V) ⇩ VS501.1200(V)	10,1 - 12,0	12	118	71	45	56
VS501.1210(V) ⇩ VS501.1400(V)	12,1 - 14,0	14	124	77	45	60
VS501.1410(V) ⇩ VS501.1600(V)	14,1 - 16,0	16	133	83	48	63
VS501.1610(V) ⇩ VS501.1800(V)	16,1 - 18,0	18	143	93	48	71
VS501.1810(V) ⇩ VS501.2000(V)	18,1 - 20,0	20	153	101	50	77

Custom production of less used drill sizes according to customer requirements.

It is possible to produce the required dimension given in hundredths of mm and the agreed tolerance.

Minimum order quantity: D < 10,0 mm = 5 pcs
D < 16,0 mm = 3 pcs
D > 16,0 mm = 2 pcs

Viper edition NEW 2025

Recommended cutting conditions on page 49.

More information about coatings on page 3.

Carbide drills 5xD with internal cooling - in stock

VS501
VS501V

Catalogue number		Diameter	Shank diameter	Overall length	Helix length	Shank length	Max. drilling depth	Diameter tolerance
Standard	Viper	D1 m7	D2 h6	L1	L2	L3	t_{max}	m7
VS501.0278	VS501.0278V	2,78	4	54	21	30	16	0,004/0,016
VS501.0300	VS501.0300V	3,00	6	66	28	36	23	0,004/0,016
VS501.0330	VS501.0330V	3,30	6	66	28	36	23	0,004/0,016
VS501.0370	VS501.0370V	3,70	6	66	28	36	23	0,004/0,016
VS501.0400	VS501.0400V	4,00	6	74	36	36	29	0,004/0,016
VS501.0420	VS501.0420V	4,20	6	74	36	36	29	0,004/0,016
VS501.0450	VS501.0450V	4,50	6	74	36	36	29	0,004/0,016
VS501.0465	VS501.0465V	4,65	6	74	36	36	29	0,004/0,016
VS501.0480	VS501.0480V	4,80	6	82	44	36	35	0,004/0,016
VS501.0500	VS501.0500V	5,00	6	82	44	36	35	0,004/0,016
VS501.0510	VS501.0510V	5,10	6	82	44	36	35	0,004/0,016
VS501.0530	VS501.0530V	5,30	6	82	44	36	35	0,004/0,016
VS501.0550	VS501.0550V	5,50	6	82	44	36	35	0,004/0,016
VS501.0555	VS501.0555V	5,55	6	82	44	36	35	0,004/0,016
VS501.0580	VS501.0580V	5,80	6	82	44	36	35	0,004/0,016
VS501.0600	VS501.0600V	6,00	6	82	44	36	35	0,004/0,016
VS501.0650	VS501.0650V	6,50	8	91	53	36	43	0,006/0,021
VS501.0680	VS501.0680V	6,80	8	91	53	36	43	0,006/0,021
VS501.0690	VS501.0690V	6,90	8	91	53	36	43	0,006/0,021
VS501.0700	VS501.0700V	7,00	8	91	53	36	43	0,006/0,021
VS501.0740	VS501.0740V	7,40	8	91	53	36	43	0,006/0,021
VS501.0780	VS501.0780V	7,80	8	91	53	36	43	0,006/0,021
VS501.0800	VS501.0800V	8,00	8	91	53	36	43	0,006/0,021
VS501.0850	VS501.0850V	8,50	10	103	61	40	49	0,006/0,021
VS501.0860	VS501.0860V	8,60	10	103	61	40	49	0,006/0,021
VS501.0880	VS501.0880V	8,80	10	103	61	40	49	0,006/0,021
VS501.0900	VS501.0900V	9,00	10	103	61	40	49	0,006/0,021
VS501.0930	VS501.0930V	9,30	10	103	61	40	49	0,006/0,021
VS501.0950	VS501.0950V	9,50	10	103	61	40	49	0,006/0,021
VS501.0980	VS501.0980V	9,80	10	103	61	40	49	0,006/0,021
VS501.1000	VS501.1000V	10,00	10	103	61	40	49	0,006/0,021
VS501.1020	VS501.1020V	10,20	12	118	71	45	56	0,007/0,025
VS501.1050	VS501.1050V	10,50	12	118	71	45	56	0,007/0,025
VS501.1080	VS501.1080V	10,80	12	118	71	45	56	0,007/0,025
VS501.1100	VS501.1100V	11,00	12	118	71	45	56	0,007/0,025
VS501.1120	VS501.1120V	11,20	12	118	71	45	56	0,007/0,025
VS501.1180	VS501.1180V	11,80	12	118	71	45	56	0,007/0,025
VS501.1200	VS501.1200V	12,00	12	118	71	45	56	0,007/0,025
VS501.1250	VS501.1250V	12,50	14	124	77	45	60	0,007/0,025
VS501.1300	VS501.1300V	13,00	14	124	77	45	60	0,007/0,025
VS501.1350	VS501.1350V	13,50	14	124	77	45	60	0,007/0,025
VS501.1380	VS501.1380V	13,80	14	124	77	45	60	0,007/0,025
VS501.1400	VS501.1400V	14,00	14	124	77	45	60	0,007/0,025
VS501.1450	VS501.1450V	14,50	16	133	83	48	63	0,007/0,025
VS501.1480	VS501.1480V	14,80	16	133	83	48	63	0,007/0,025
VS501.1500	VS501.1500V	15,00	16	133	83	48	63	0,007/0,025
VS501.1550	VS501.1550V	15,50	16	133	83	48	63	0,007/0,025
VS501.1580	VS501.1580V	15,80	16	133	83	48	63	0,007/0,025
VS501.1600	VS501.1600V	16,00	16	133	83	48	63	0,007/0,025
VS501.1650	VS501.1650V	16,50	18	143	93	48	71	0,007/0,025
VS501.1700	VS501.1700V	17,00	18	143	93	48	71	0,007/0,025
VS501.1750	VS501.1750V	17,50	18	143	93	48	71	0,007/0,025
VS501.1800	VS501.1800V	18,00	18	143	93	48	71	0,007/0,025
VS501.1850	VS501.1850V	18,50	20	153	101	50	77	0,008/0,029
VS501.1900	VS501.1900V	19,00	20	153	101	50	77	0,008/0,029
VS501.1980	VS501.1980V	19,80	20	153	101	50	77	0,008/0,029
VS501.2000	VS501.2000V	20,00	20	153	101	50	77	0,008/0,029

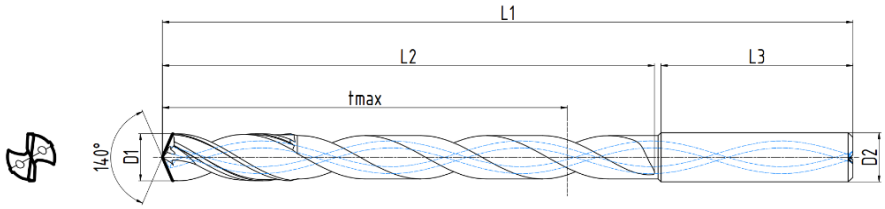
Carbide drills 8xD with internal cooling - production on request

VS801
VS801V

- 2 cutting edges, 4 peripheral facets
- helix 30°, point angle 140°
- clamping shank DIN 6535 HA (plain)
- tools are also available with **Viper coating – designated V**

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: (λ 30°)
Coating: AlTiN or Viper AlTiSiN



Catalogue number	Diameter	Shank diameter	Overall length	Helix length	Shank length	Max. drilling depth
	D1 m7	D2 h6	L1	L2	L3	t_{max}
VS801.0300(V) ⇩ VS801.0370(V)	3,0 - 3,7	6	72	34	36	29
VS801.0380(V) ⇩ VS801.0470(V)	3,8 - 4,7	6	81	43	36	36
VS801.0480(V) ⇩ VS801.0600(V)	4,8 - 6,0	6	95	57	36	48
VS801.0610(V) ⇩ VS801.0800(V)	6,1 - 8,0	8	114	76	36	64
VS801.0810(V) ⇩ VS801.1000(V)	8,1 - 10,0	10	142	95	40	80
VS801.1010(V) ⇩ VS801.1200(V)	10,1 - 12,0	12	162	114	45	96
VS801.1210(V) ⇩ VS801.1400(V)	12,1 - 14,0	14	178	133	45	110
VS801.1410(V) ⇩ VS801.1600(V)	14,1 - 16,0	16	203	152	48	128
VS801.1610(V) ⇩ VS801.1800(V)	16,1 - 18,0	18	222	171	48	144
VS801.1810(V) ⇩ VS801.2000(V)	18,1 - 20,0	20	243	190	50	160

Custom production of less used drill sizes according to customer requirements.
It is possible to produce the required dimension given in hundredths of mm and the agreed tolerance.

Minimum order quantity: D < 10,0 mm = 5 pcs
D < 16,0 mm = 3 pcs
D > 16,0 mm = 2 pcs

Viper edition NEW 2025

Recommended cutting conditions on page 49.

More information about coatings on page 3.

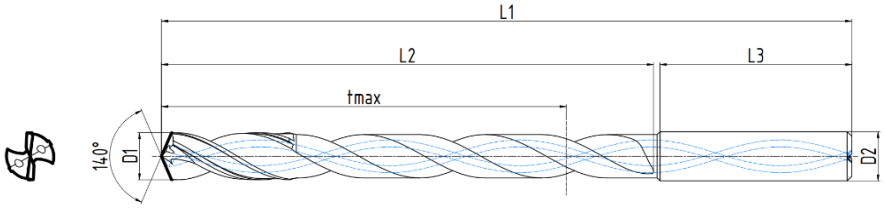
Carbide drills 12xD with internal cooling - production on request

VS1201
VS1201V

- 2 cutting edges, 4 peripheral facets
- helix 30°, point angle 140°
- clamping shank DIN 6535 HA (plain)
- tools are also available with **Viper coating – designated V**

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: (λ 30°)
Coating: AlTiN or Viper AlTiSiN



Catalogue number	Diameter D1 m7	Shank diameter D2 h6	Overall length L1	Helix length L2	Shank length L3	Max. drilling depth t_{max}
VS1201.0300(V) ⇩ VS1201.0370(V)	3,0 - 3,7	6	92	54	36	48
VS1201.0380(V) ⇩ VS1201.0470(V)	3,8 - 4,7	6	102	64	36	58
VS1201.0480(V) ⇩ VS1201.0600(V)	4,8 - 6,0	6	116	78	36	70
VS1201.0610(V) ⇩ VS1201.0800(V)	6,1 - 8,0	8	146	108	36	94
VS1201.0810(V) ⇩ VS1201.1000(V)	8,1 - 10,0	10	162	120	40	110
VS1201.1010(V) ⇩ VS1201.1200(V)	10,1 - 12,0	12	204	156	45	142
VS1201.1210(V) ⇩ VS1201.1400(V)	12,1 - 14,0	14	230	182	45	166
VS1201.1410(V) ⇩ VS1201.1600(V)	14,1 - 16,0	16	260	208	48	192
VS1201.1610(V) ⇩ VS1201.1800(V)	16,1 - 18,0	18	285	234	48	216
VS1201.1810(V) ⇩ VS1201.2000(V)	18,1 - 20,0	20	310	258	50	240

Custom production of less used drill sizes according to customer requirements.
It is possible to produce the required dimension given in hundredths of mm and the agreed tolerance.

Minimum order quantity: D < 10,0 mm = 5 pcs
D < 16,0 mm = 3 pcs
D > 16,0 mm = 2 pcs

Viper edition NEW 2025

Recommended cutting conditions on page 49.

More information about coatings on page 3.

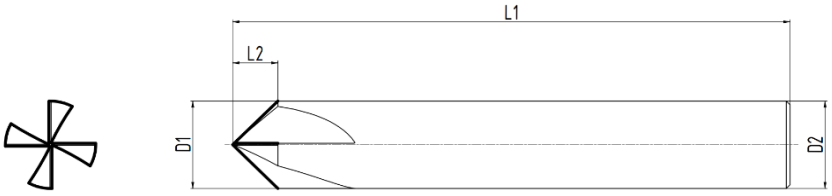
Carbide chamfer mills
60° and 90° chamfer angle

JS090
JS060

- 4 cutting edges
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 0°
Coating: AlTiN



Chamfer angle 90°

Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Flute length L2
JS090.030	3	3	50	1,5
JS090.040	4	4	54	2
JS090.050	5	5	54	2,5
JS090.060	6	6	57	3
JS090.080	8	8	59	4
JS090.100	10	10	65	5
JS090.120	12	12	74	6
JS090.160	16	16	82	8
JS090.200	20	20	100	10

Chamfer angle 60°

Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Flute length L2
JS060.030	3	3	50	2,6
JS060.040	4	4	54	3,4
JS060.050	5	5	54	4,3
JS060.060	6	6	57	5,2
JS060.080	8	8	59	6,9
JS060.100	10	10	65	8,6
JS060.120	12	12	74	10,4

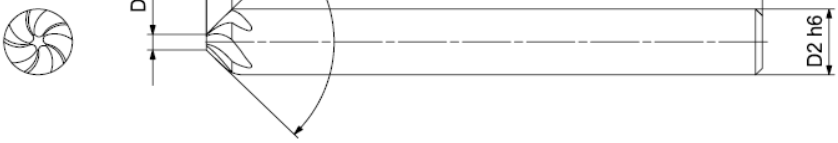
Carbide chamfer mills with helix 90° chamfer angle

JSH090

- 5 cutting edges
- helix 15-30°
- suitable also for machining flame-cut parts and for less rigid machines
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 15-30°
Coating: Viper AlTiSiN



Catalogue number	Diameter D1	Shank diameter D2 h6	Overall length L1	Flute length L2
JSH090.060	1,5	6	57	2,25
JSH090.080	2	8	63	3
JSH090.100	2,5	10	72	3,75
JSH090.120	3	12	82	4,5
JSH090.160	4	16	93	6
JSH090.200	5	20	104	7,5

Viper edition NEW 2025

More information about coatings on page 3.

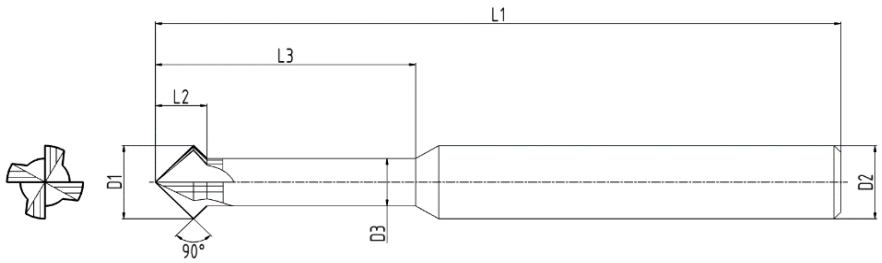
Carbide chamfer mills front/back deburring tools

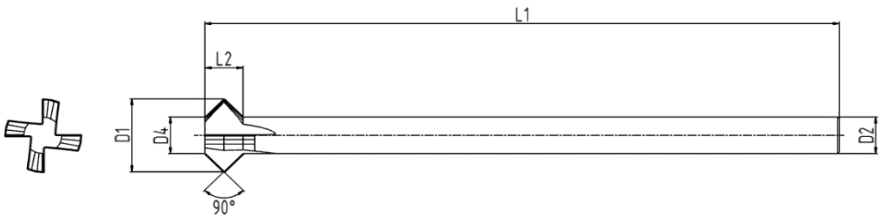
OS401
OS402

- 4 cutting edges, 45° front and back chamfer angle
- clamping shank DIN 6535 HA (plain)
- tipped tools are indicated by the < sign in column D4

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: copper, aluminium
Geometry: λ 0°
Coating: AlTiN





Short version

Catalogue number	Diameter D1	Shank diameter D2 h6	Face diameter D4	Neck diameter D3	Overall length L1	Flute length L2	Neck length L3
OS401.050	5	5	<	2,9	54	3	25
OS401.060	6	6	<	3,9	54	4	20,5
OS401.080	8	8	6	6	82	2	40

Long version

Catalogue number	Diameter D1	Shank diameter D2 h6	Face diameter D4	Neck diameter D3	Overall length L1	Flute length L2	Neck length L3
OS402.030	3	3	<	2	75	2	12
OS402.040	4	4	<	2,9	82	3	17,5
OS402.050	5	5	<	2,9	100	3	19,5
OS402.060	6	6	<	3,9	100	4	20,5
OS402.080	8	6	6	-	100	2	-
OS402.100	10	6	6	-	100	4	-
OS402.120	12	6	6	-	100	6	-

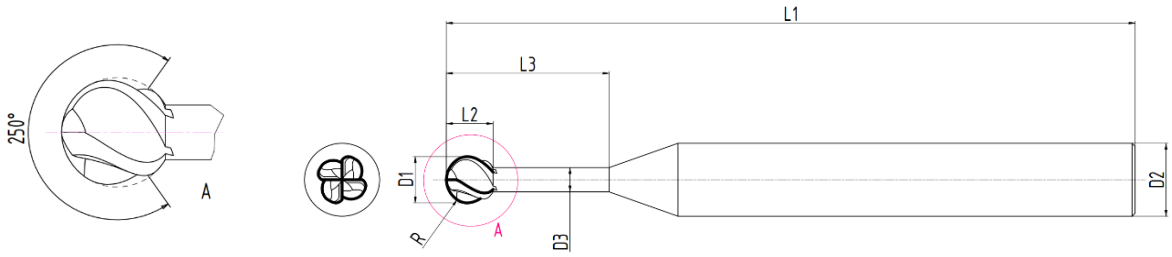
Lollipop carbide cutters
4 flutes

OS451

- 4 cutting edges
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: aluminium
Coating: AlTiN



Catalogue number	Diameter D1 h10	Shank diameter D2 h6	Neck diameter D3	Overall length L1	Neck length L3	Corner radius R
OS451.030	3	3	1,5	60	6	1,5
OS451.040	4	4	2	54	8	2
OS451.050	5	5	2,5	70	10	2,5
OS451.060	6	6	3	80	12	3
OS451.080	8	8	4	80	14	4
OS451.100	10	10	5	100	16	5
OS451.120	12	12	6	125	18	6

Recommended cutting conditions on page 46.

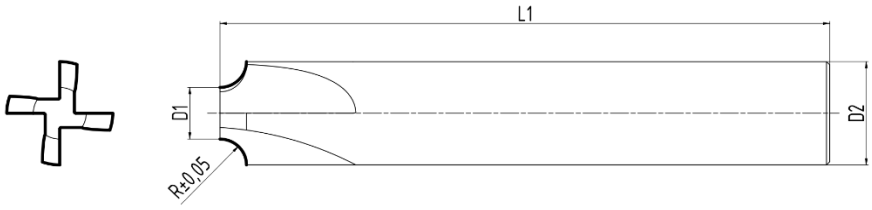
Corner rounding end mills

OC301
OC401

- 3-4 cutting edges
- clamping shank DIN 6535 HA (plain)

On request:
- clamping shank with weldon

Recommended use: < 55 HRc, < 1600 N/mm2, steel, stainless steel, cast iron
Applicable: aluminium
Geometry: λ 0°, γ 0°
Coating: AlTiN



Catalogue number	Corner radius	Shank diameter	Overall length	Number of cutting edges	Diameter
	R	D2 h6	L1	Z	D1 h10
OC301.060.050	0,5	6	57	3	5
OC301.060.075	0,75	6	57	3	4,5
OC301.060.080	0,8	6	57	3	4,5
OC401.080.100	1	8	63	4	6
OC401.080.125	1,25	8	63	4	5,5
OC401.080.150	1,5	8	63	4	5
OC401.100.200	2	10	72	4	6
OC401.100.250	2,5	10	72	4	5
OC401.120.300	3	12	82	4	6
OC401.140.350	3,5	14	82	4	7
OC401.160.400	4	16	92	4	8
OC401.160.450	4,5	16	92	4	7
OC401.160.500	5	16	92	4	6
OC401.200.600	6	20	104	4	8
OC401.220.800	8	22	110	4	6
OC401.250.900	9	25	110	4	7

Recommended cutting conditions on page 46.

Carbide thread end mills for metric internal threads ISO

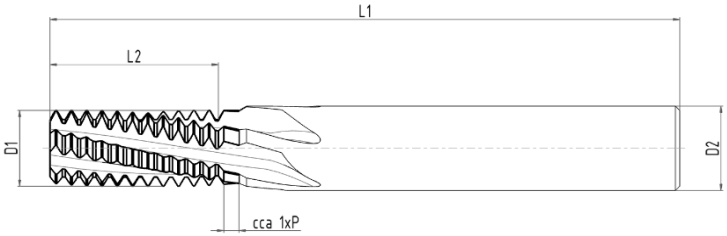
OZ401
OZ501

- 4-5 cutting edges, helix 14-18°
- clamping shank DIN 6535 HA (plain)
- dimensions M6 - M20 with internal cooling (IC)
- thread depth: max. 1.5xD
- optimized end mill geometry minimizes vibrations and ensures stable cutting
- the last helical cutting edge deburrs the hole, eliminating the need for additional deburring operations

On request:
- clamping shank with weldon
- tapering of the neck

Recommended use: < 1300 N/mm2, steel, stainless steel, cast iron, non-ferrous metals
Applicable: hardened steels <55 HRC
Geometry: λ 15°
Coating: AlCrN

INNOVATED



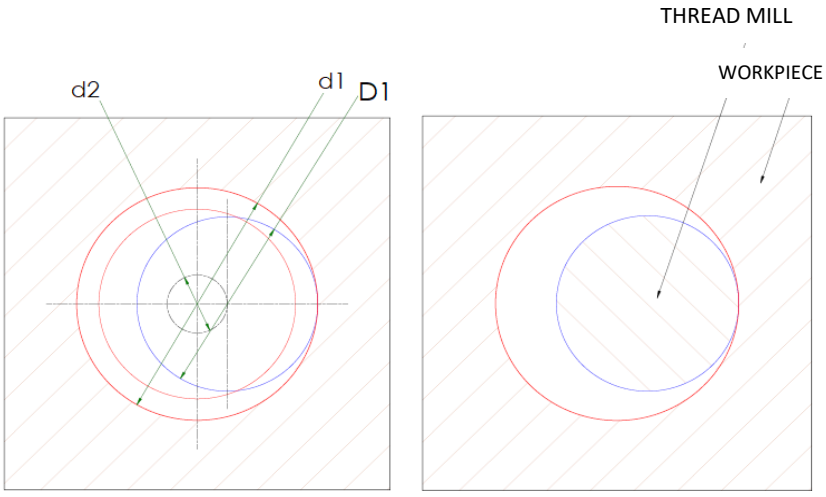
Catalogue number	Thread	Diameter	Shank diameter	Overall length	Cutting edge length	Number of cutting edges	Thread pitch
		D1 h10	D2 h6	L1	L2	Z	p
OZ401.M4	M4	3,1	6	54	6,3	4	0,7
OZ401.M5	M5	4	6	54	8	4	0,8
OZ401.M6	M6	4,5	6	54	9	4	1
OZ401.M8	M8	6	8	65	12,5	4	1,25
OZ501.M10	M10	7,5	10	72	15	5	1,5
OZ501.M12	M12	9	10	72	19,25	5	1,75
OZ501.M14	M14	10,5	12	82	21	5	2
OZ501.M16	M16	12	12	82	24	5	2
OZ501.M18	M18	13,5	14	92	27,5	5	2,5
OZ501.M20	M20	15	16	92	30	5	2,5

Calculation of feed correction for milling internal threads

$$V_{cnc} = V_f * \frac{(d_1 - D_2)}{d_1}$$

V_{cnc} = input feed rate (mm/min)
V_f = basic feed rate (mm/min) - see page 46
d_1 = large thread diameter (mm)
d_2 = Ø of tool axis trajectory (mm)
$d_2 = d_1 - D_1$
D_1 = Ø of the cutting section of the tool (mm)

Recommended running-in the bore: 1/8 to 1/2 revolution.



In addition to these catalogue tools, we also supply a range of custom-made milling cutters for threading technology.

Special carbide cutting tools
Milling

Our technological capabilities allow us to offer a wide range of milling tools.

We are able to provide customers with a drawing of the required tool as early as the quotation process and help them choose the most suitable machining strategy. Once the tooling is made, our support can continue with technical advice or assistance with production start-up.

Technical functional limits:

- minimum tool diameter 0.2 mm
- maximum diameter of cylindrical shank 40 mm
- maximum tool unloading length from the chuck 350 mm

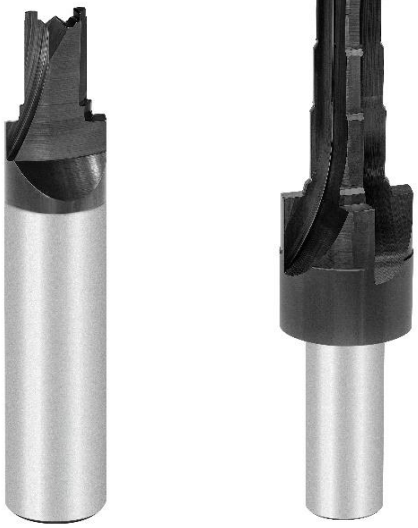
- trochoidal end mills
- end mills for adaptive machining
- thread end mills
- copy and radius end mills
- end mills with chip breakers
- conical end mills
- shape end mills
- crown end mills
- disc milling cutters
- T-slot cutters
- dovetail end mills
- profile end mills
- modular end mills for gear production
- drilling-milling cutters
- countersinking end mills
- deburring tools
- tapered and angle end mills
- spherical cutters
- multifunctional end mills
- end mills for machining HARDOX
- end mills for machining superalloys
- end mills for machining of graphite
- end mills for wood machining
- end mills for plastics and composites
- engraving end mills and needles

Special carbide cutting tools
Hole machining

We produce special tools for hole machining on request.
In this way, we are able to solve customer problems when it is not possible to use catalogue tools for a given application or when it is appropriate to combine several operations in order to reduce production times.
Simply provide a drawing of the workpiece and our engineering office will design customized tools for you.

Technical functional limits:
- minimum tool diameter 0.2 mm
- maximum diameter of cylindrical shank 40 mm
- maximum tool unloading length from the chuck 350 mm

Drilling & Boring
- micro drills
- step drills
- shape drills
- drills for hardened material
- spot drill bits
- pilot drills
- flat lance drills
- single-edged drills
- drills for deep holes
- combined and multi-purpose tools



Core drilling and reaming
- machine reamers
- drill reamers
- step reamers
- taper reamers
- shape reamers
- reamers with guide

Countersinking
- tapered countersinks
- edge chamfers
- stepped countersinks
- shaped countersinks
- reverse countersinks
- combined tools

Special carbide cutting tools

Indexable cutter bodies for screw-in inserts
Modular cutting tools

We produce to order indexable cutting bodies for replaceable inserts.

Based on the customer's needs, we will prepare a design solution as well as 2D and 3D documentation. The technological solution covers the tool for screw-in inserts according to the client's specifications and also the recommended cutting parameters.

Technical functional limits:

- indexable end mills with cylindrical shank max. Ø 40 mm
- indexable end mills with mounting hole max. Ø 50 mm
- tapered shank option for HSK, ISO clamping systems (other clamping systems by agreement)
- maximum tool unloading length from the toolholder 200 mm

1. Cutter bodies

Milling

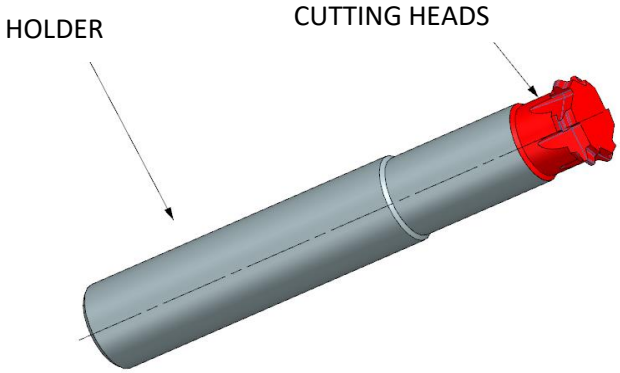
- shank, socket and disc milling tools
- milling tools with internal cooling
- combined milling tools
- tool cartridges

Drilling & Boring

- drills with screw-in inserts in 2D and 3D lengths
- boring step tools
- drills and countersinks with internal cooling
- drills and countersinks fitted with adjustable cartridges
- combined screw-in inserts tools
- special combined tools

2. Modular tools with solid carbide cutting heads

- for milling, chamfering, gear groove production, etc.



Special carbide cutting tools
Turning, forming and others

The product portfolio of our custom tools is not limited to milling and hole machining, but covers the entire range of machining. Therefore, we can provide customers with almost any tool they need for their applications.

Turning

- turning knives
- modifications of cutting insert
- cartridges for screw-in inserts

Forming

- solid carbide punches
- solid carbide broaches

Engraving, cutting

- engraving needles
- knives for CNC routers

Cooperation

- round grinding
  (carbide parts, blanks and tools)
- precision 5-axis machining

Special carbide cutting tools
Threading

In 2023, we have significantly expanded our portfolio of threading tools by adding carbide machine taps to our range. These precision tools are primarily used in the mass production of machined parts and enable demanding customers to significantly reduce production times, lower unit costs, increase machining productivity and thereby gain a competitive advantage.

Carbide machine taps are available with both helix and straight flutes.
They are equipped with internal cooling, with outlets in each tool flute.
We currently supply taps in a range of sizes from M4 upwards.

Overview of threading tools

- solid carbide machine taps with straight flutes (especially for through holes)
- solid carbide machine taps with helix (for blind holes)
- solid carbide thread end mills for ISO metric threads
  (part of the catalogue range - in the catalogue on page 40)
- solid carbide thread end mills for other thread types
- solid carbide combined tools for drilling, threading and edge beveling
- modifications of cutting inserts for thread production

SC machine tap with helix

SC machine tap with straight flutes

SC thread end mill

SC combined tool

Recommended cutting conditions for carbide end mills

Machined material	Material strenght N/mm²	Cutting speed Vc (m/min)	Feed per tooth fz (mm) Ø 2-3	Ø 4-5	Ø 6-10	Ø 12-16	Ø 20
General construction steels Non alloyed steel castings Low alloyed steel castings	< 750	160	0,02	0,03	0,04	0,07	0,08
Free cutting steels General construction steels	< 600	180	0,02	0,04	0,05	0,08	0,12
Heat resistant steels Alloyed steel castings	< 1100	100	0,02	0,025	0,04	0,07	0,08
Castings steels Inconel	< 1400	20	0,01	0,01	0,02	0,04	0,05
Nitriding steels Cementation steels	< 950	130	0,02	0,03	0,04	0,07	0,08
Tool steels	< 1400	90	0,01	0,01	0,02	0,035	0,05
High speed steels	< 1100	110	0,015	0,02	0,035	0,07	0,08
Heat resistant alloys	< 850	60	0,01	0,015	0,02	0,04	0,05
Hardened steels	< 55 HRc	80	0,015	0,02	0,04	0,07	0,09
Hardened steels	< 70 HRc	65	0,01	0,015	0,02	0,03	0,04
Stainless steels	< 900	80	0,01	0,015	0,02	0,04	0,05
Grey cast iron Malleable cast iron	< 240 HB	150	0,02	0,03	0,05	0,08	0,12
Ductile cast iron Alloyed cast iron	< 800 HB	110	0,01	0,02	0,04	0,07	0,1
Aluminium alloys <10%Si	< 400	800	0,02	0,03	0,055	0,085	0,12
Aluminium alloys >10%Si	< 600	450	0,01	0,02	0,04	0,06	0,1
Copper	< 500	280	0,01	0,02	0,04	0,07	0,1
Copper alloys	< 700	250	0,01	0,02	0,04	0,07	0,1

Cutting speed Vc:

$$Vc = \frac{D1 \times \pi \times n}{1000} \quad m/min$$

Revolutions n:

$$n = \frac{Vc \times 1000}{D1 \times \pi} \quad ot/min$$

Rate of feed Vf:

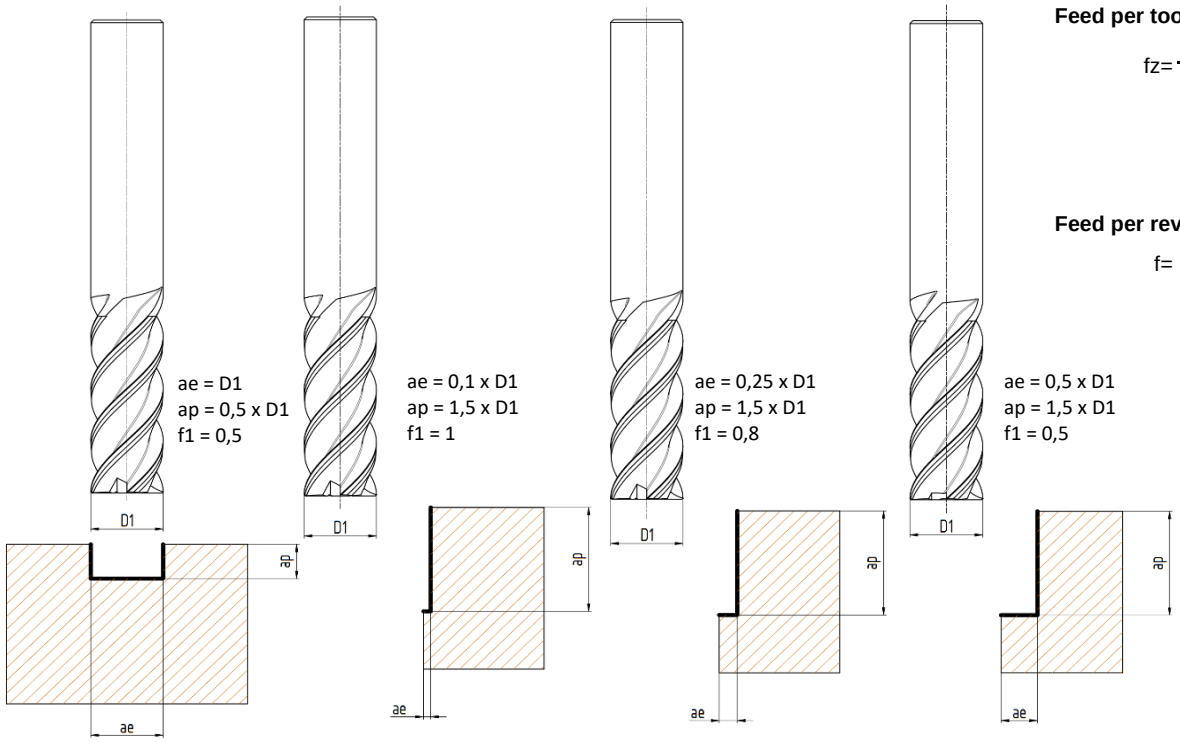
$$Vf = fz \times z \times n \times f1 \quad mm/min$$

Feed per tooth fz:

$$fz = \frac{Vf}{z \times n} \quad mm$$

Feed per revolutions f:

$$f = fz \times z \quad mm$$



Recommended cutting conditions for carbide end mills

High-speed carbide end mills — HSC401

General construction steels <600Nmm²												
D	ø 4	ø 4	ø 6	ø 6	ø 8	ø 8	ø 10	ø10	ø12	ø12	ø 16	ø 16
ap (mm)	0.2	–	0.3	–	0.4	–	0.45	–	0.5	–	0.65	–
	–	0.15	–	0.2	–	0.3	–	0.4	–	0.45	–	0.5
Vc (mm/min)	65	–	65	–	65	–	65	–	65	–	65	–
	–	130	–	130	–	130	–	130	–	130	–	130
fz (mm/z)	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8	–
	–	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8

Alloyed steels <1100Nmm²												
D	ø 4	ø 4	ø 6	ø 6	ø 8	ø 8	ø 10	ø10	ø12	ø12	ø 16	ø 16
ap (mm)	0.2	–	0.3	–	0.4	–	0.45	–	0.5	–	0.65	–
	–	0.15	–	0.2	–	0.3	–	0.4	–	0.45	–	0.5
Vc (mm/min)	60	–	60	–	60	–	60	–	60	–	60	–
	–	120	–	120	–	120	–	120	–	120	–	120
fz (mm/z)	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8	–
	–	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8

Castings steels, Inconel <1400Nmm²												
D	ø 4	ø 4	ø 6	ø 6	ø 8	ø 8	ø 10	ø10	ø12	ø12	ø 16	ø 16
ap (mm)	0.15	–	0.2	–	0.25	–	0.3	–	0.35	–	0.45	–
	–	0.12	–	0.15	–	0.2	–	0.25	–	0.3	–	0.4
Vc (mm/min)	50	–	50	–	50	–	50	–	50	–	50	–
	–	95	–	95	–	95	–	95	–	95	–	95
fz (mm/z)	0.15	–	0.25	–	0.35	–	0.4	–	0.45	–	0.6	–
	–	0.15	–	0.25	–	0.35	–	0.4	–	0.45	–	0.6

High speed steels <1100Nmm²												
D	ø 4	ø 4	ø 6	ø 6	ø 8	ø 8	ø 10	ø10	ø12	ø12	ø 16	ø 16
ap (mm)	0.17	–	0.22	–	0.27	–	0.35	–	0.42	–	0.55	–
	–	0.12	–	0.17	–	0.22	–	0.28	–	0.35	–	0.45
Vc (mm/min)	55	–	55	–	55	–	55	–	55	–	55	–
	–	100	–	100	–	100	–	100	–	100	–	100
fz (mm/z)	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8	–
	–	0.2	–	0.35	–	0.45	–	0.5	–	0.6	–	0.8

Carbide roughing-finishing end mills — RF401
Carbide roughing-finishing end mills with internal cooling — RF401-IC

Castings steels ≤ 240HB		
D	V_c	f_z
6 - 8	130 - 240	0,04 - 0,09
8 - 10	115 - 200	0,04 - 0,10
12 - 16	100 - 190	0,05 - 0,11
≤ 20	95 - 180	0,06 - 0,12

General construction steels 600N/mm²		
D	V_c	f_z
6 - 8	160 - 220	0,03 - 0,09
8 - 10	150 - 180	0,04 - 0,10
12 - 16	150 - 180	0,05 - 0,11
≤ 20	140 - 180	0,06 - 0,12

Alloyed steels 1100N/mm²		
D	V_c	f_z
6 - 8	100 - 150	0,03 - 0,08
8 - 10	90 - 140	0,03 - 0,09
12 - 16	90 - 140	0,04 - 0,10
≤ 20	85 - 140	0,05 - 0,11

Heat resistant steels ≤ 850N/mm²		
D	V_c	f_z
6 - 8	80 - 160	0,03 - 0,08
8 - 10	70 - 130	0,04 - 0,09
12 - 16	60 - 120	0,05 - 0,10
≤ 20	50 - 120	0,05 - 0,12

High speed steels 1100N/mm²		
D	V_c	f_z
6 - 8	100 - 150	0,03 - 0,08
8 - 10	95 - 140	0,03 - 0,09
12 - 16	90 - 120	0,04 - 0,10
≤ 20	80 - 120	0,05 - 0,11

The values given in the table represent only a suggestion under ideal conditions.
It is necessary to take into account the clamping of the tool and the workpiece, the condition of the machine, etc.

Recommended cutting conditions for carbide end mills

Carbide end mills for wear-resistant materials - HARD HR411

Machined material	Material strenght	Cutting speed Vc	Feed per tooth fz					
			Diameter					
			6	8	10	12	16	20
Hardox 450	Rm 1250 Mpa	85	0,055	0,07	0,09	0,1	0,15	0,18
Hardox 550	Rm 1700 Mpa	80	0,05	0,06	0,08	0,095	0,13	0,15
* Structural and non-alloy steels	< 750 N/mm^2	140	0,06	0,09	0,1	0,13	0,15	0,18
* High speed steels	< 1100 N/mm^2	110	0,04	0,045	0,05	0,07	0,09	0,095

* Possible uses

Carbide end mills with chip breakers for dynamic machining DR611 DR612

Machined material	ISO	Material strenght	Cutting speed Vc	Angle of rotation	Feed per tooth fz					
					Diameter D1					
					6	8	10	12	16	20
Steel	P	< 1200 N/mm^2	270	50°	0,11	0,14	0,17	0,2	0,25	0,28
Stainless steels	K	< 900 N/mm^2	290	50°	0,15	0,17	0,2	0,23	0,27	0,3
* Cast steels	M	< 600 HB	140	45°	0,09	0,11	0,14	0,16	0,19	0,21
* Heat resistant alloys	S	< 850 N/mm2	90	40°	0,05	0,06	0,08	0,09	0,11	0,13

* Possible uses

	basic	reduction	reduction
Basic feed rate f1:	$a_e = 0,05xD_1$ $f_1 = 1$	$a_e = 0,1xD_1$ $f_1 = 0,75$	$a_e = 0,15xD_1$ $f_1 = 0,6$

The values given in the table represent only a suggestion under ideal conditions.
It is necessary to take into account the clamping of the tool and the workpiece, the condition of the machine, etc.

Recommended cutting conditions for carbide drills

Machined material	Material strenght N/mm^2	Vc (m/mm) with IC	Vc (m/min) without IC	Rate of feed (mm/ot.)				
				ø 3-4	ø 5-6	ø 7-11	ø 12-16	ø 18-20
General construction steels **Non alloyed steel castings** **Low alloyed steel castings**	<750	115	80	0,14	0,18	0,24	0,29	0,35
Free cutting steels **General construction steels**	<600	150	110	0,16	0,23	0,29	0,35	0,42
Heat resistant steels **Alloyed steel castings**	<1100	75	60	0,11	0,13	0,16	0,21	0,25
Castings steels **Inconel**	<1400	55	50	0,1	0,15	0,19	0,23	0,26
Nitriding steels **Cementation steels**	<950	70	50	0,08	0,11	0,16	0,18	0,22
Tool steels	<1400	55	40	0,1	0,12	0,16	0,2	0,24
High speed steels	<1100	65	45	0,09	0,11	0,15	0,18	0,22
Heat resistant alloys	<850	35	30	0,06	0,08	0,1	0,12	0,15
Hardened steels	<55 HRc	60	50	0,06	0,08	0,11	0,14	0,17
Stainless steels	<900	45	35	0,08	0,11	0,15	0,19	0,22
Grey cast iron **Malleable cast iron**	<240 HB	90	80	0,14	0,19	0,24	0,3	0,35
Ductile cast iron **Alloyed cast iron**	<800 HB	55	45	0,15	0,2	0,25	0,33	0,39
Aluminium alloys <10%Si	<400	300	250	0,16	0,21	0,25	0,31	0,35
Aluminium alloys >10%Si	<600	300	250	0,17	0,25	0,3	0,35	0,42
Copper	<500	220	100	0,15	0,22	0,26	0,32	0,37
Copper alloys	<700	200	100	0,13	0,18	0,23	0,27	0,32

Cutting speed Vc:

$$Vc = \frac{D1 \cdot \pi \cdot n}{1000} \quad m/min$$

Revolutions n:

$$n = \frac{Vc \times 1000}{D1 \times \pi} \quad ot/min$$

Rate of feed Vf:

$$Vf = fz \times z \times n \times f1 \quad mm/min$$

Feed per tooth fz:

$$fz = \frac{Vf}{z \times n} \quad mm$$

Feed per revolutions f:

$$f = fz \times z \quad mm$$

Notes

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