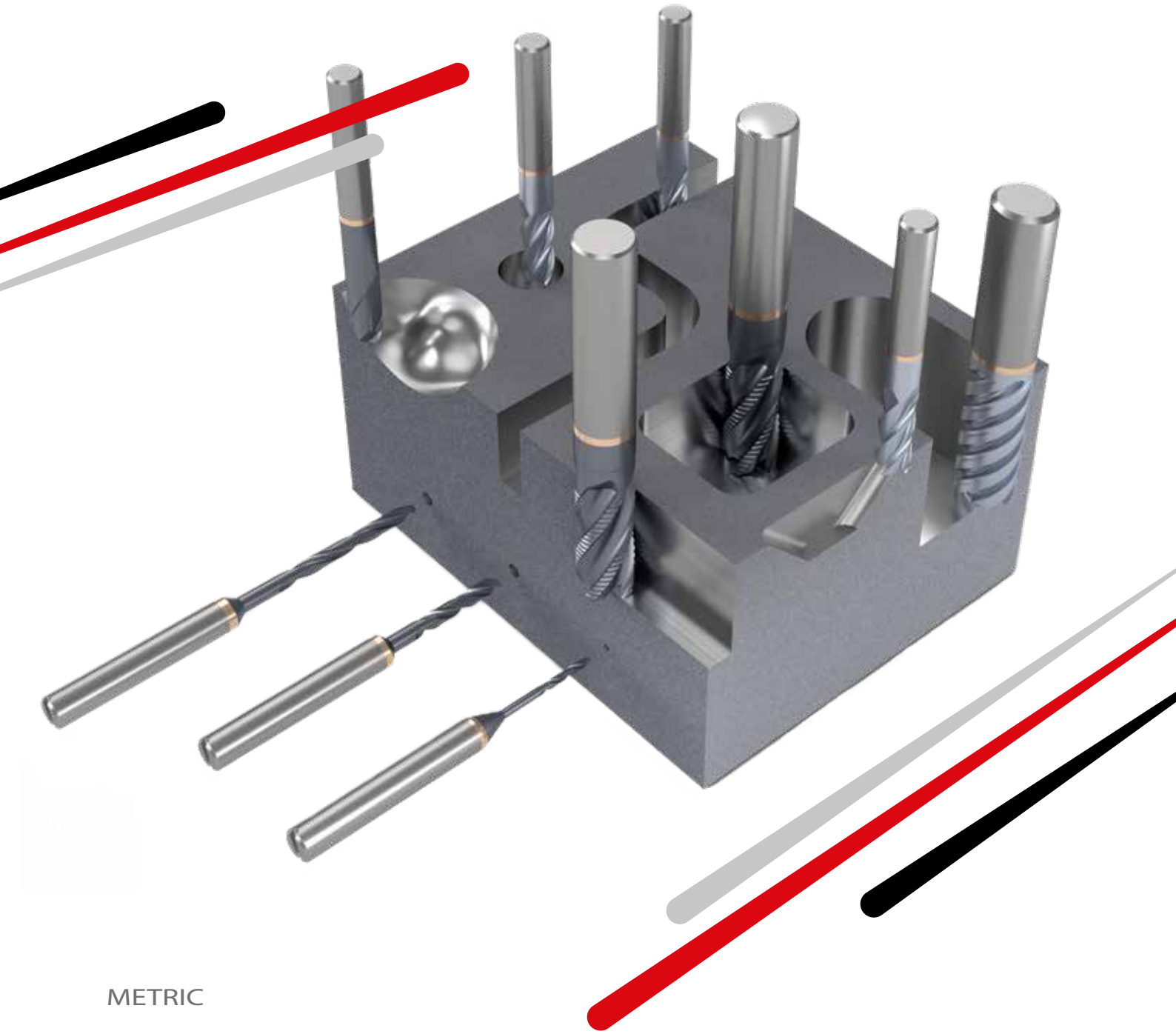
vargus
NEUMO Ehrenberg Group

Офіційний партнер в Україні
СМАРТТЕК
РОЗУМНІ ТЕХНОЛОГІЇ

NEW & EXPANDED

V-MILL
Superior Milling Solutions

V-DRILL
Accurate Drilling Solutions



METRIC

COMPANY PROFILE

VARGUS is a world leading developer, manufacturer, and supplier of high-quality, precision threading, grooving, turning and hand deburring tools and has been at the forefront of the tooling industry for more than **60 years**.
Established in 1960, **VARGUS** is the cutting tools division of the **NEUMO Ehrenberg Group**, a multinational organization headquartered in Germany.

The NEUMO Ehrenberg Group is one of Europe's largest privately owned manufacturers and distributors of industrial stainless steel products, stainless steel flow equipment and metal cutting tools.
A customer-focused organization, **VARGUS Ltd**. is committed to providing products and solutions of the highest quality and excellent value, and is renowned for its technical expertise and uncompromising service.

The company's major product lines are:

VARDEX

for Thread Turning, Thread Milling, Tapping, Whirling & Gear Milling solutions.

GROOVEX

provides a wide range of internal and external grooving, parting off, boring and turning applications.

SHAVIV

is a world leader in hand-deburring solutions for a wide range of materials, and now includes the SV-BURR line of premium carbide burrs.

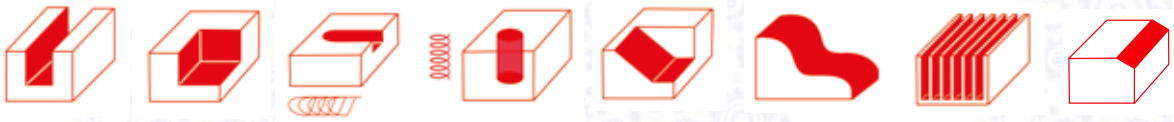
V-MILL | V-DRILL

Elevate Your Machining Efficiency with VARGUS's NEW V-Mill and V- Drill Series
In the highly competitive field of carbide mills and drills, **VARGUS** proudly introduces the **V-Mill** and **V-Drill** solid carbide series, designed to exceed industry standards with unparalleled efficiency and precision, and deliver optimal balance of performance and value. With innovative geometries in milling and drilling technology, these versatile tools deliver superior performance across a comprehensive range of materials including steel, stainless steels, exotic metals, aluminum, and gray cast steel.

INDEX

V-MILL
Superior Milling Solutions

Solid Carbide End Mills



V-DRILL
Accurate Drilling Solutions

Solid Carbide Drills

ТОВ «СМАРТТЕК ІНЖИНІРИНГ», т. +380-50-396-90-96, info@smarttec.com.ua, https://www.smarttec.com.ua

СМАРТТЕК
РОЗУМНІ ТЕХНОЛОГІЇ

High Performance Product Line

- Solid carbide end mills for a wide variety of materials and applications
- Diameter range: 0.1 mm (.0039") to 20 mm (.787")
- Multiple tool geometries available
- Suitable for machining Steel, Stainless Steel, Exotic Alloys, Aluminum, and Cast Iron
- Excellent cutting-edge surface finish provides stable tool life and repeatability in performance

Features and Benefits:

- **Optimized Design:** VARGUS end mills are meticulously designed to provide maximum stability and efficiency, reducing vibration and enhancing cutting accuracy.
  The tools feature cutting-edge geometric designs and advanced flute designs.
- **Superior Edge Preparation:** Each end mill edge is prepared to the highest standards with specialized cutting-edge preparations to reduce wear, ensure maximum productivity and extended tool life.
- **Advanced Carbide Grade:** Utilizing the latest NANO substrate and coating technologies, our end mills offer superior hardness and heat resistance, ensuring consistent performance in the toughest of materials.

  VM9 - Universal High-Performance Coating AlCrSiN for higher cutting speeds

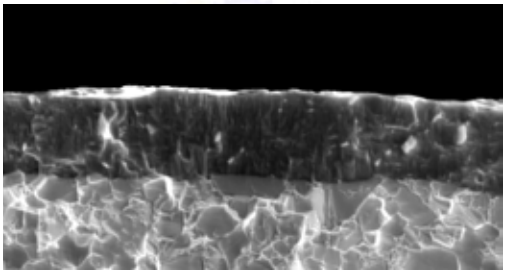
  VM6 - High Hardness Coating TiAlCrSiN achieves hardness up to 4000HV with superior wear resistance, ensuring stability at high temperatures

  VM3 - High Temperature AlCrN - Delivers excellent wear resistance for machining with emulsions
- **Versatility:** These versatile tools offer application-specific solutions for diverse materials including Stainless Steels, Exotic Alloys, Aluminum, and Cast Iron, with ease and reliability
- **Tool Families with Variable Helix Angle & Unequal Tooth Pitch Design**
  4 and 5 flutes - VMSC-Z4-TV-G VM9, VMSC-Z4&5-SV-G-R VM9, VMSC-Z4-FV-S VM3, VMSC-Z4-FV-S-R VM3, VMSC-Z5-FV-S VM3
  Featuring enhanced high-performance cutting by reducing chatter and vibrations, providing smoother and more efficient machining operations. Optimized rake geometries allow for superior chip evacuation across materials, while maintaining tight dimensional tolerances

Grades

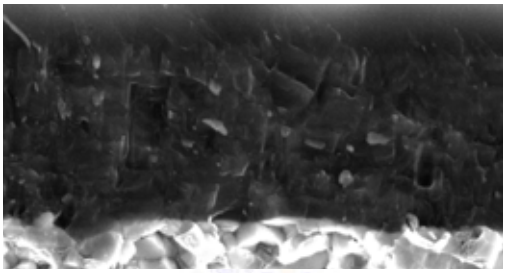
VM9 - Universal High Performance AlCrSiN (Aluminum Chromium Silicon Nitride) Coating

This coating significantly increases productivity through higher cutting speeds and feed rates across various materials. Its unique structural design provides an optimal balance between toughness, thermal shock resistance, and internal stress management.



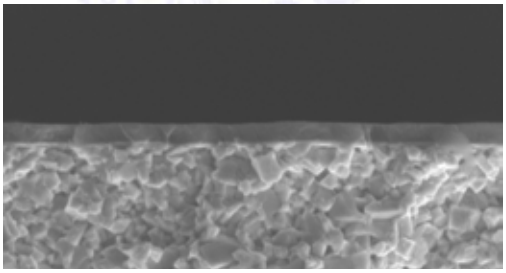
VM6 - High Hardness TiAlCrSiN (Titanium Aluminum Chromium Silicon Nitride) Coating

The coating achieves hardness up to 4000HV with superior wear resistance. Its specialized transition layer ensures strong bonding (up to 100N) between the hard coating and base material.
The advanced nano-composite design provides exceptional oxidation resistance up to 1100°C, ensuring stability at high temperatures.



VM3 - High Temperature AlCrN (Aluminum Chromium Nitride Coating) Coating

This coating delivers excellent resistance to oxidation and high-temperature wear, ideal for cutting Exotic Materials and Titanium Alloys.



Solid Carbide End Mills

Technical Data

V-Mill Ordering Code System

VMS	C	-	001	T	001	/	003	-	Z2	C	04	G	-	VM9
1	2		3	4	5		6		7	8	9	10		12

VMS	B	-	050	T	040	/	200	-	Z2	C	04	G	-	VM9
1	2		3	4	5		6		7	8	9	10		12

VMS	R	-	060	F	160	-	Z4	C	06	G	C02	-	VM9
1	2		3	4	5		7	8	9	10	11		12

1- Line
VMS - VARGUS Solid Carbide Mills

2 - Geometry
C - Cylindrical
B - Ball Nose
R - Rougher
D - Deburring
F - Feed Mill

3 - Milling Diameter
001 - 200 - 0.1 mm - 20.0 mm

4 - Helix
N - 0°
B - 28°
T - 30°
C - 35°
TV - 35°/38° (Variable)
FV - 40°/42° (Variable)
F - 45°
SV - 45°/46° (Variable)

5 - APMX - Depth of Cut Maximum
001-800 - 0.1 mm-80.0 mm

6 - LU - Usable Length
003 - 200 - 0.3 mm - 20 mm

7 - Z - Number of Flutes
Z2 - 2 Flutes
Z3 - 3 Flutes
Z4 - 4 Flutes
Z5 - 5 Flutes
Z6 - 6 Flutes

8 - Shank Type
C - Cylindrical
W - Weldon

9 - Shank Dia. Range
04 - 4.0 mm
06 - 6.0 mm
08 - 8.0 mm
10 - 10.0 mm
12 - 12.0 mm
16 - 16.0 mm
20 - 20.0 mm

10 - Material
G - General Use
P - Steel
M - Stainless Steel
K - Cast Iron
N - Aluminum
S - Titanium
H - Hard Material

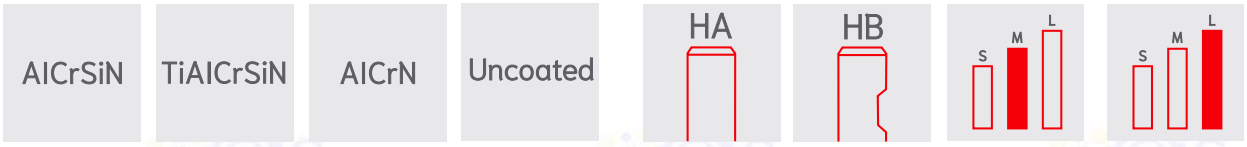
11 - Chamfer/Radius
C - Chamfer
R - Radius

If R/C< 0.1 mm
then only R/C shown

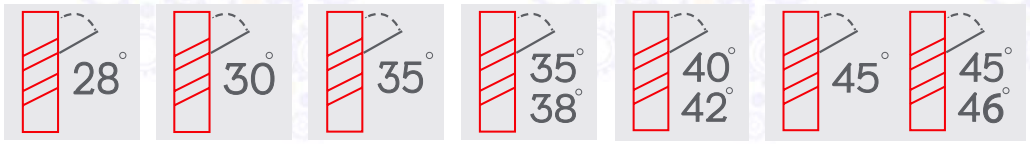
12 - BMC Grade
VM9 - AlCrSiN coated
VM6 - TiAlCrSin coated
VM3 - AlCrN coated
VM1 - Uncoated

Solid Carbide End Mill Icons

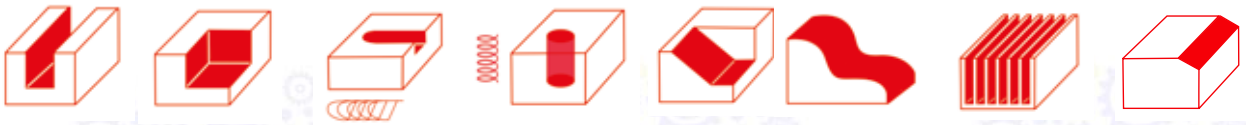
2 Flutes | 3 Flutes | 4 Flutes | 5 Flutes | 6 Flutes



Aluminum Chromium Silicon Nitride Coating | Titanium Aluminum Chromium Silicon Nitride Coating | Aluminum Chromium Nitride Coating | Uncoated | Cylindrical Type | Weldon Type | Medium Length | Long Length



Helix Angle 28° | Helix Angle 30° | Helix Angle 35° | Helix Angle 35°/38° | Helix Angle 40°/42° | Helix Angle 45° | Helix Angle 45°/46°



Slot Milling | Shoulder Milling | Trochoidal Milling | Helical Interpolation | Ramping | Profiling | Small Parts | Chamfering

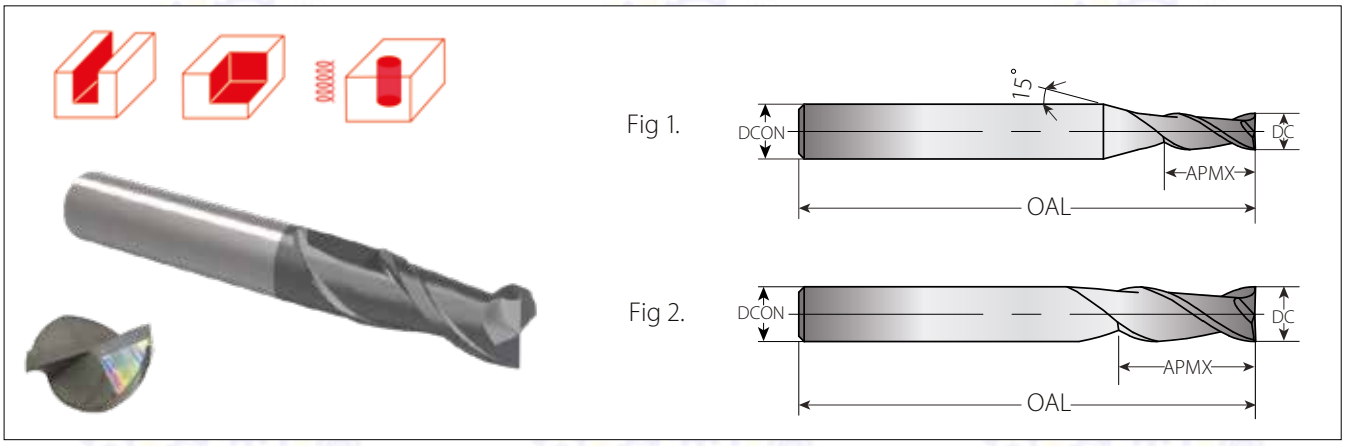
ISO 13399

VARGUS defines the new V-Mill Line according to the ISO 13399 standard.
See the list below of the dimensions used in this catalog.
ISO 13399 is an international technical standard for the computer-interpretable representation and exchange of cutting tools and toolholders. The objective of this standard is to provide a system that allows for a neutral file exchange, and a basis for implementing and sharing product databases and archiving.

ISO 13399 Dimension	Description
DC	Cutting Diameter
DCON	Connection Diameter
APMX	Depth of Cut Maximum
LU	Usable Length
DN	Neck Diameter
OAL	Overall Length
RE	Corner Radius
CHW	Chamfer Width
FHA	Flute Helix Angle

GENERAL MACHINING

VMSC-Z2-C-G



Square Head End Mills 35° Helix - 2 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-010C030-Z2C04G-VM9	G21-00101	1	4	3	50	•
VMSC-020C060-Z2C04G-VM9	G21-00102	2	4	6	50	•
VMSC-030C090-Z2C04G-VM9	G21-00103	3	4	9	50	•
VMSC-040C110-Z2C04G-VM9	G21-00104	4	4	11	50	•
VMSC-050C130-Z2C06G-VM9	G21-00105	5	6	13	50	•
VMSC-060C160-Z2C06G-VM9	G21-00106	6	6	16	50	•
VMSC-080C200-Z2C08G-VM9	G21-00107	8	8	20	60	•
VMSC-100C250-Z2C10G-VM9	G21-00108	10	10	25	75	•
VMSC-120C300-Z2C12G-VM9	G21-00109	12	12	30	75	•
VMSC-160C360-Z2C16G-VM9	G21-00110	16	16	36	100	•
VMSC-200C450-Z2C20G-VM9	G21-00111	20	20	45	100	•

• In Stock

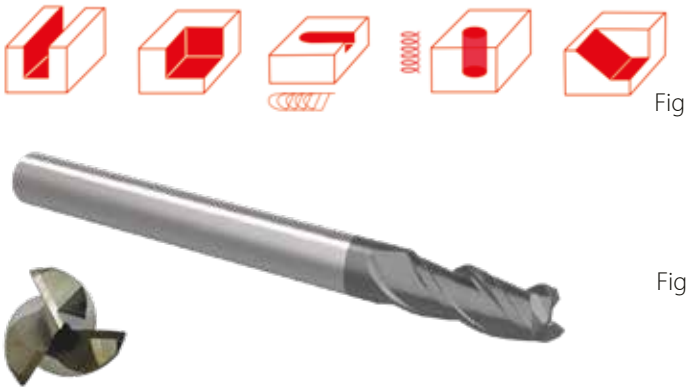


Fig 1.

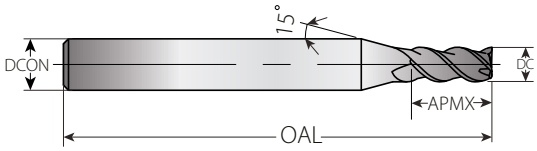
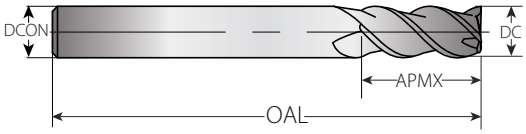


Fig 2.



Square Head End Mills 35° Helix - 3 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

P M K S

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-020C060-Z3C04G-VM9	G21-00112	2	4	6	50	•
VMSC-030C090-Z3C04G-VM9	G21-00113	3	4	9	50	•
VMSC-040C110-Z3C04G-VM9	G21-00114	4	4	11	50	•
VMSC-050C130-Z3C06G-VM9	G21-00115	5	6	13	50	•
VMSC-060C160-Z3C06G-VM9	G21-00116	6	6	16	50	•
VMSC-080C200-Z3C08G-VM9	G21-00117	8	8	20	60	•
VMSC-100C250-Z3C10G-VM9	G21-00118	10	10	25	75	•
VMSC-120C300-Z3C12G-VM9	G21-00119	12	12	30	75	•
VMSC-160C360-Z3C16G-VM9	G21-00120	16	16	36	100	•
VMSC-200C450-Z3C20G-VM9	G21-00121	20	20	45	100	•

• In Stock

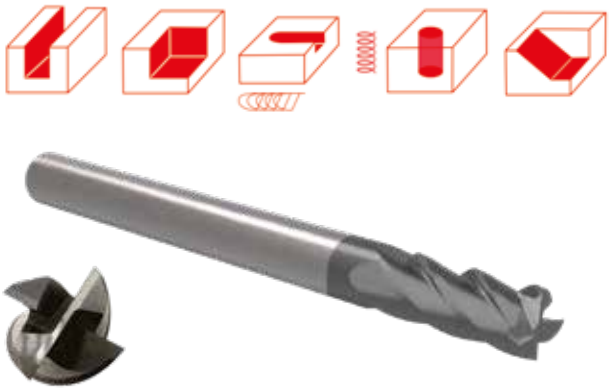


Fig 1.

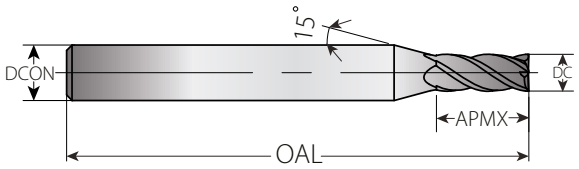
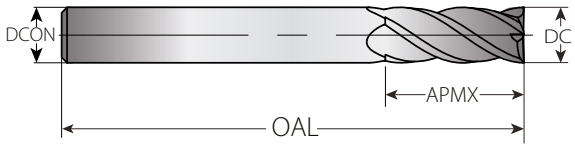


Fig 2.



Square Head End Mills 35° Helix - 4 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-010C030-Z4C04G-VM9	G21-00122	1	4	3	50	•
VMSC-020C060-Z4C04G-VM9	G21-00123	2	4	6	50	•
VMSC-030C090-Z4C04G-VM9	G21-00124	3	4	9	50	•
VMSC-040C110-Z4C04G-VM9	G21-00125	4	4	11	50	•
VMSC-050C130-Z4C06G-VM9	G21-00126	5	6	13	50	•
VMSC-060C160-Z4C06G-VM9	G21-00127	6	6	16	50	•
VMSC-080C200-Z4C08G-VM9	G21-00128	8	8	20	60	•
VMSC-100C250-Z4C10G-VM9	G21-00129	10	10	25	75	•
VMSC-120C300-Z4C12G-VM9	G21-00130	12	12	30	75	•
VMSC-160C360-Z4C16G-VM9	G21-00131	16	16	40	100	•
VMSC-200C450-Z4C20G-VM9	G21-00132	20	20	45	100	•

• In Stock

VMSC-Z4-C-G LONG

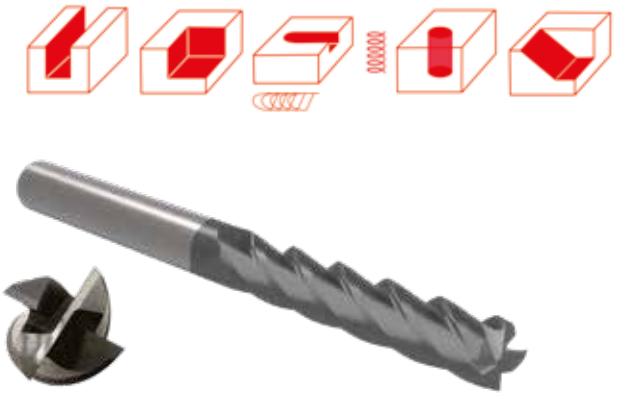


Fig 1.

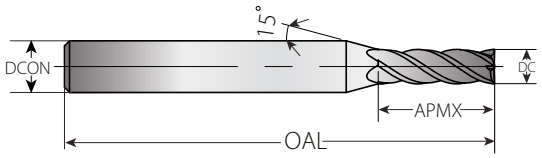
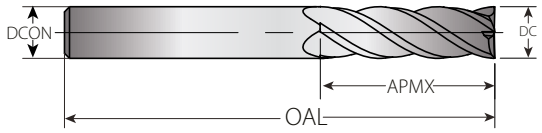


Fig 2.

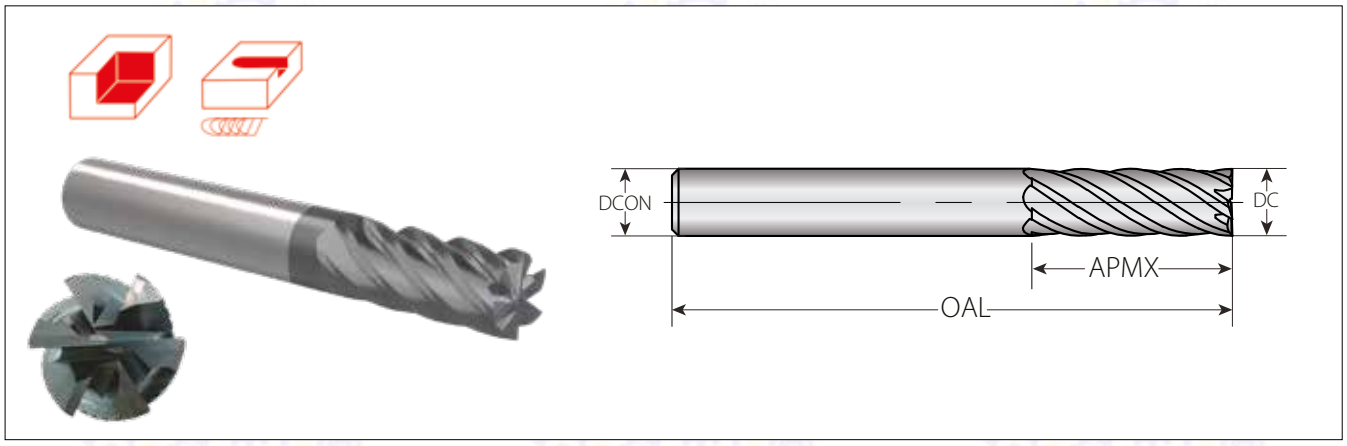


Square Head End Mills 35° Helix - 4 Flutes LONG Length with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear for extra long applications, while providing extended tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-010C040-Z4C04G-VM9	G21-00133	1	4	4	50	•
VMSC-020C100-Z4C04G-VM9	G21-00134	2	4	10	50	•
VMSC-030C150-Z4C04G-VM9	G21-00135	3	4	15	60	•
VMSC-040C200-Z4C04G-VM9	G21-00136	4	4	20	60	•
VMSC-050C250-Z4C06G-VM9	G21-00137	5	6	25	75	•
VMSC-060C300-Z4C06G-VM9	G21-00138	6	6	30	75	•
VMSC-080C400-Z4C08G-VM9	G21-00139	8	8	40	100	•
VMSC-100C500-Z4C10G-VM9	G21-00140	10	10	50	100	•
VMSC-120C500-Z4C12G-VM9	G21-00141	12	12	50	100	•
VMSC-160C700-Z4C16G-VM9	G21-00142	16	16	70	150	•
VMSC-200C800-Z4C20G-VM9	G21-00143	20	20	80	150	•

• In Stock



Square Head End Mills 35° Helix - 6 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-060C150-Z6C06G-VM9	G21-00144	6	6	15	50	•
VMSC-080C200-Z6C08G-VM9	G21-00145	8	8	20	60	•
VMSC-100C250-Z6C10G-VM9	G21-00146	10	10	25	75	•
VMSC-120C300-Z6C12G-VM9	G21-00147	12	12	30	75	•
VMSC-160C360-Z6C16G-VM9	G21-00148	16	16	36	100	•

• In Stock

V-MILL Superior Milling Solutions

Fig 1.

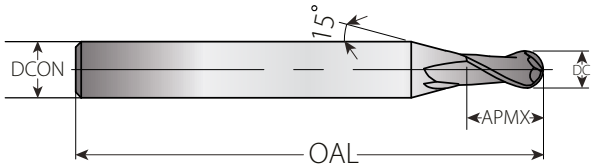
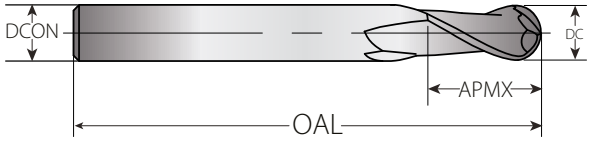


Fig 2.



Ball Nose End Mills 30° Helix - 2 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

P M K S

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSB-010T020-Z2C04G-VM9	G21-00149	1	4	2	50	•
VMSB-020T040-Z2C04G-VM9	G21-00150	2	4	4	50	•
VMSB-030T060-Z2C04G-VM9	G21-00151	3	4	6	50	•
VMSB-040T080-Z2C04G-VM9	G21-00152	4	4	8	50	•
VMSB-050T100-Z2C06G-VM9	G21-00153	5	6	10	50	•
VMSB-060T120-Z2C06G-VM9	G21-00154	6	6	12	50	•
VMSB-080T140-Z2C08G-VM9	G21-00155	8	8	14	60	•
VMSB-100T180-Z2C10G-VM9	G21-00156	10	10	18	75	•
VMSB-120T220-Z2C12G-VM9	G21-00157	12	12	22	75	•
VMSB-160T300-Z2C16G-VM9	G21-00158	16	16	30	100	•
VMSB-200T380-Z2C20G-VM9	G21-00159	20	20	38	100	•

• In Stock

VMSB-Z4-T-G

Fig 1.

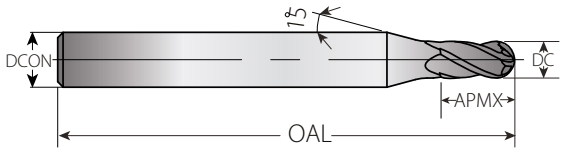


Fig 2.

Ball Nose End Mills 30° Helix - 4 Flutes with AlCrSiN Coating for General Use

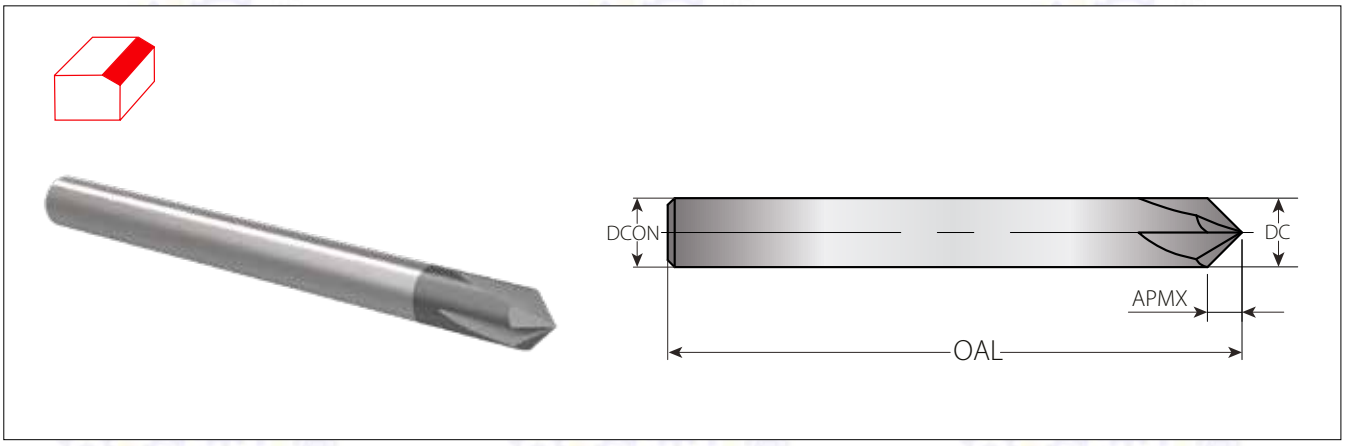
This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

P M K S

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSB-020T040-Z4C04G-VM9	G21-00160	2	4	4	50	•
VMSB-030T060-Z4C04G-VM9	G21-00161	3	4	6	50	•
VMSB-040T080-Z4C04G-VM9	G21-00162	4	4	8	50	•
VMSB-050T100-Z4C06G-VM9	G21-00163	5	6	10	50	•
VMSB-060T120-Z4C06G-VM9	G21-00164	6	6	12	50	•
VMSB-080T140-Z4C08G-VM9	G21-00165	8	8	14	60	•
VMSB-100T180-Z4C10G-VM9	G21-00166	10	10	18	75	•
VMSB-120T220-Z4C12G-VM9	G21-00167	12	12	22	75	•
VMSB-160T300-Z4C16G-VM9	G21-00168	16	16	30	100	•
VMSB-200T380-Z4C20G-VM9	G21-00169	20	20	38	100	•

• In Stock

VMSD-Z4 -N-G Deburring



Chamfer/Deburring End Mills 90° - 4 Flutes with AlCrSiN Coating for General Use

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSD-040N020-Z4C04G-VM9	G21-00170	4	4	2	50	•
VMSD-060N030-Z4C06G-VM9	G21-00171	6	6	3	50	•
VMSD-080N040-Z4C08G-VM9	G21-00172	8	8	4	60	•
VMSD-100N050-Z4C10G-VM9	G21-00173	10	10	5	75	•
VMSD-120N060-Z4C12G-VM9	G21-00174	12	12	6	75	•

• In Stock

VMSC Z4-TV-G

Fig 1.

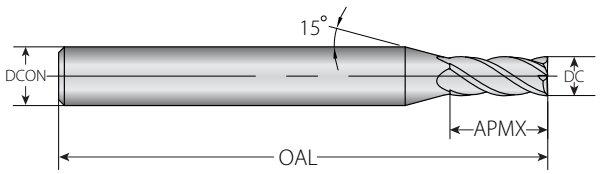
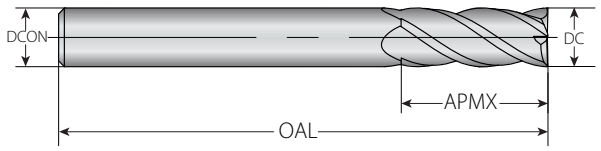


Fig 2.



Square Head End Mills with Variable Helix - 4 Flutes

The 4 flute tools with variable helix angles are designed for high-performance machining of Stainless Steel, Alloy Steel, and Carbon Steel up to 45 HRC hardness. This design reduces vibration and noise during machining. The ultra-fine grain structure, AlCrSiN coating, and special edge preparation improve cutting edge strength and sharpness. This allows for higher metal removal rates and longer tool life.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM9
VMSC-020TV060-Z4C04G-VM9	G21-00055	2	4	6	50	•
VMSC-025TV080-Z4C04G-VM9	G21-00056	2.5	4	8	50	•
VMSC-030TV090-Z4C04G-VM9	G21-00057	3	4	9	50	•
VMSC-040TV110-Z4C04G-VM9	G21-00058	4	4	11	50	•
VMSC-050TV130-Z4C06G-VM9	G21-00059	5	6	13	50	•
VMSC-060TV160-Z4C06G-VM9	G21-00060	6	6	16	50	•
VMSC-080TV200-Z4C08G-VM9	G21-00061	8	8	20	60	•
VMSC-100TV250-Z4C10G-VM9	G21-00062	10	10	25	75	•
VMSC-120TV300-Z4C12G-VM9	G21-00063	12	12	30	75	•
VMSC-160TV360-Z4C16G-VM9	G21-00064	16	16	36	100	•

• In Stock

Unique geometry with variable pitch and unequal helix angle

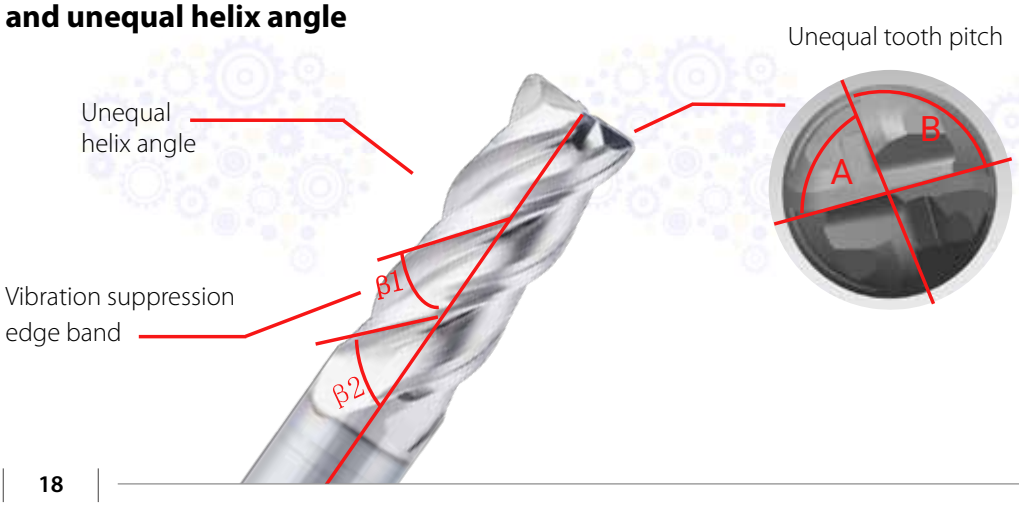


Fig 1.

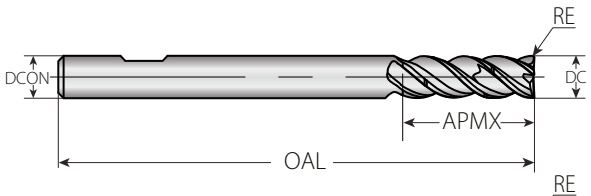
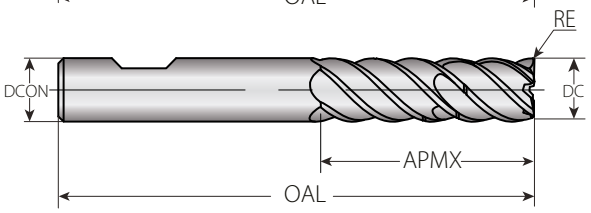


Fig 2.



Square Head End Mills Variable 45°/46° Helix - 4 & 5 Flutes with AlCrSiN Coating for Trochoidal Milling

These square head end mills feature variable 45°/46° helix angles with 4 and 5 flute options, and include AlCrSiN coating optimized for trochoidal milling. The tool provides excellent heat and wear resistance, with long tool life when cutting Steel (up to 55 HRC), Stainless Steel, and Cast Iron.

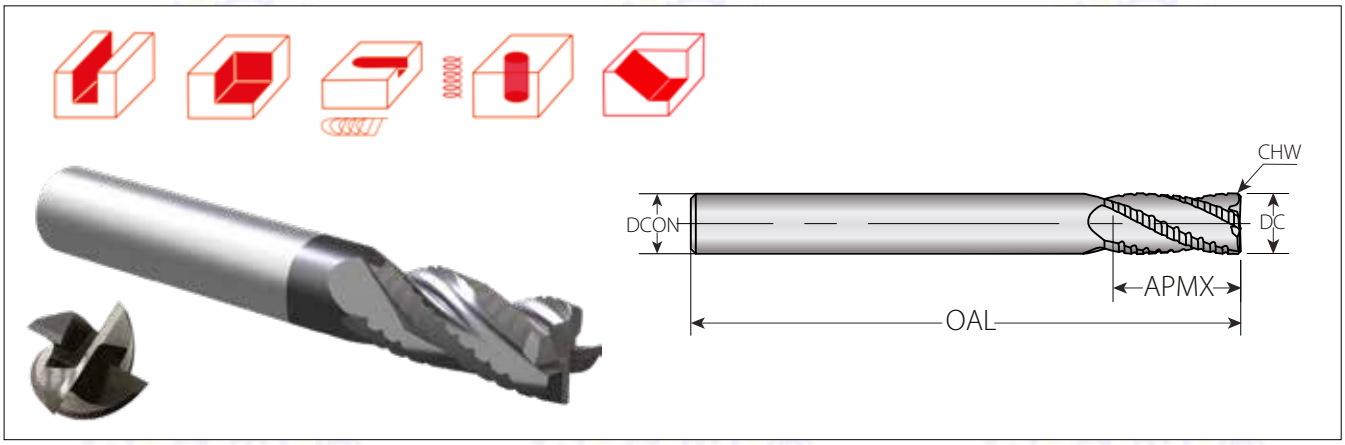
Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6)	APMX	OAL	RE	NOF	VM9
VMSC-060SV200-Z4W06GR01-VM9	G21-00175	6	6	20	57	0.1	4	•
VMSC-080SV260-Z4W08GR01-VM9	G21-00176	8	8	26	63	0.1	4	•
VMSC-100SV320-Z5W10GR01-VM9	G21-00177	10	10	32	72	0.1	5	•
VMSC-120SV380-Z5W12GR01-VM9	G21-00178	12	12	38	83	0.12	5	•
VMSC-160SV520-Z5W16GR01-VM9	G21-00179	16	16	52	115	0.15	5	•
VMSC-200SV620-Z5W16GR02-VM9	G21-00180	20	20	62	131	0.2	5	•

• In Stock

- This method improves efficiency by converting slot milling to side milling, allowing for narrow cuts at greater depths. Combined with high feed rates, this achieves faster processing.
- The tool maintains consistent feed rates and cutting conditions throughout operation, resulting in highly precise machining.
- The cutting path requires a very rigid machine tool.
  Without sufficient rigidity, the machine may vibrate and deform, leading to:
  - Reduced cutting accuracy
  - Potential damage to both the tool and workpiece

The chip breaker design is used to achieve short chips and facilitate chip removal.

VMSR-Z4 B-G

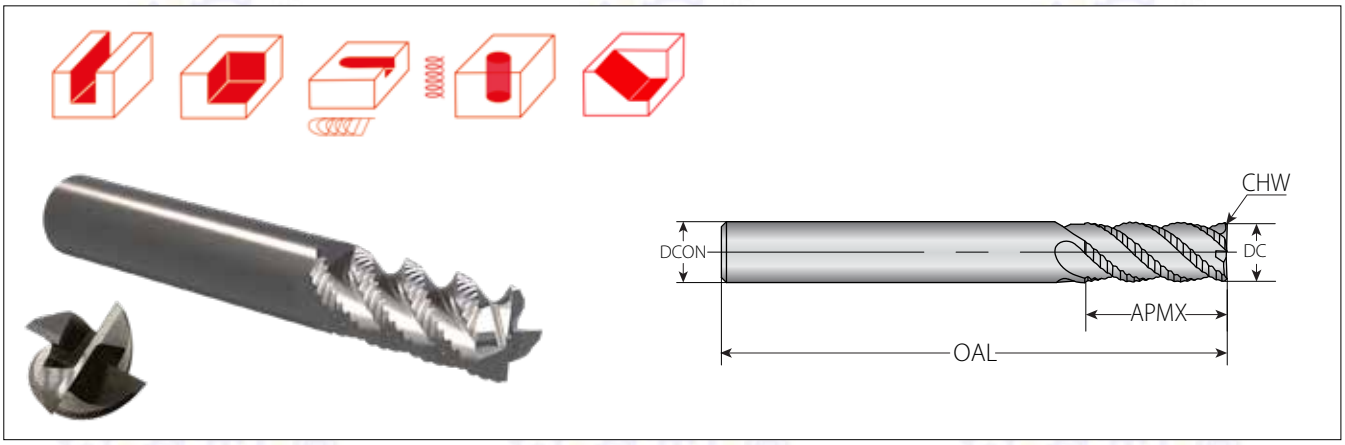


Square Head End Mills 28° Helix - 4 Flutes with AlCrSiN Coating for for Roughing General Use Applications

This mill offers excellent resistance to heat and wear, while providing long tool life when cutting Steel (up to 45 HRC), Stainless Steel, and Cast Iron.
The lower Helix angle provides better chip evacuation at low speeds (60 to 100 m/min) and a more reinforced cutting edge. The smaller 28° Helix angle provides better chip evacuation at relatively slow speeds.

Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	CHW	VM9
VMSR-060B160-Z4C06GC02-VM9	G21-00181	6	6	16	50	0.2	•
VMSR-080B200-Z4C08GC02-VM9	G21-00182	8	8	20	60	0.2	•
VMSR-100B250-Z4C10GC03-VM9	G21-00183	10	10	25	75	0.3	•
VMSR-120B300-Z4C12GC03-VM9	G21-00184	12	12	30	75	0.3	•
VMSR-160B360-Z4C16GC04-VM9	G21-00185	16	16	36	100	0.4	•
VMSR-200B450-Z4C16GC05-VM9	G21-00186	20	20	45	100	0.5	•

• In Stock



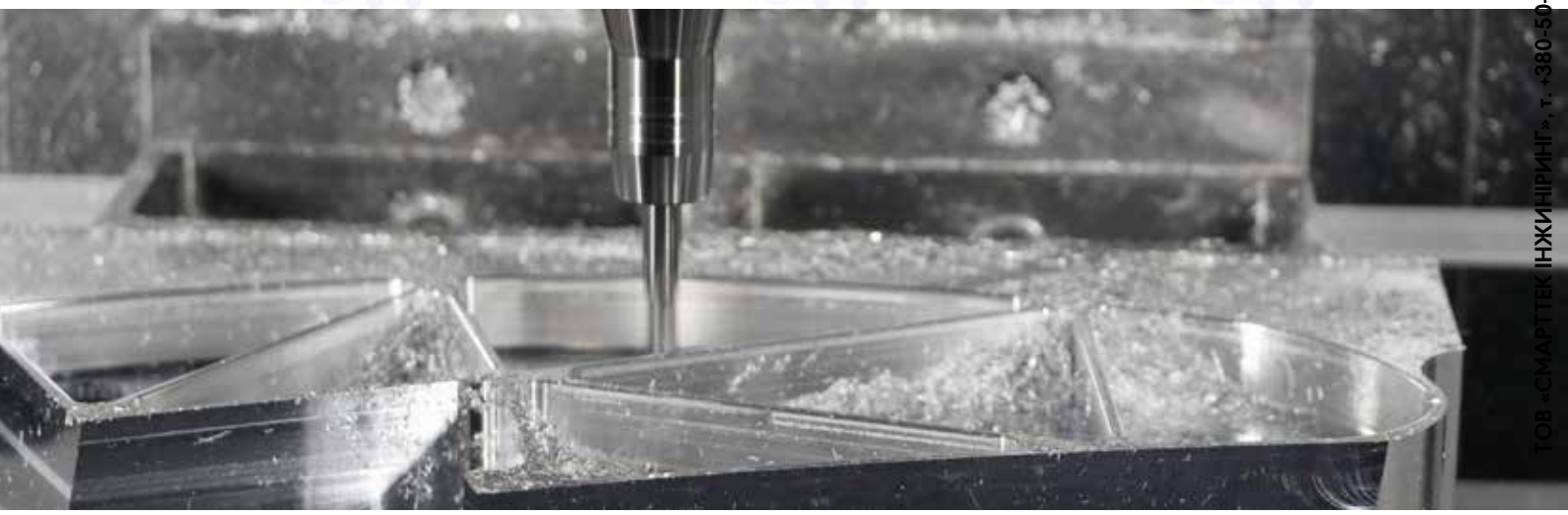
Square End Mills with Roughing Geometry 45° Helix- 4 Flutes

The 4 flute tool angles are designed for high-performance machining of Stainless Steel, Alloy Steel, and Carbon Steel up to 45 HRC hardness.
This design reduces vibration and noise during machining.
The ultra-fine grain structure, AlCrSiN coating, and special edge preparation improve cutting edge strength and sharpness. This allows for higher metal removal rates and longer tool life.
The higher Helix angle requires less force and effort from the machine and allows for easier and smoother cutting.
The larger 45° Helix angle requires less machine power, allowing work on higher feeds.

Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	CHW	VM9
VMSR-060F160-Z4C06GC02-VM9	G21-00083	6	6	16	50	0.2	•
VMSR-080F200-Z4C08GC02-VM9	G21-00084	8	8	20	60	0.2	•
VMSR-100F250-Z4C10GC03-VM9	G21-00085	10	10	25	75	0.3	•
VMSR-120F300-Z4C12GC03-VM9	G21-00086	12	12	30	75	0.3	•
VMSR-160F360-Z4C16GC04-VM9	G21-00087	16	16	36	100	0.4	•

• In Stock

ALUMINUM



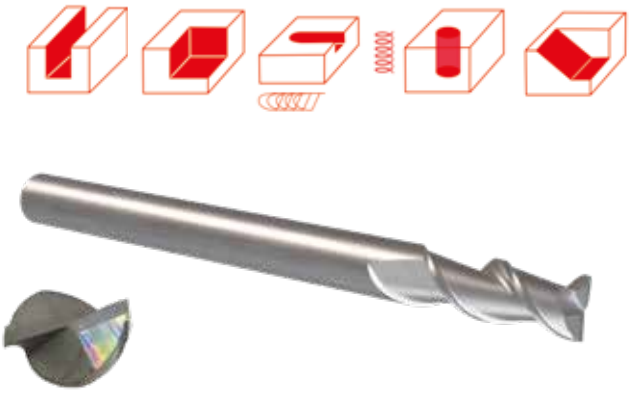


Fig 1.

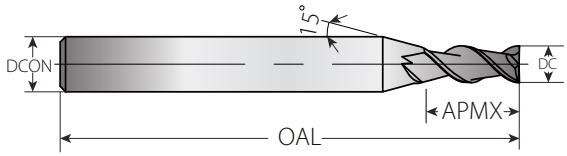
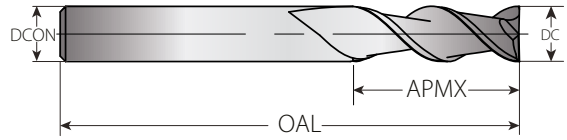


Fig 2.



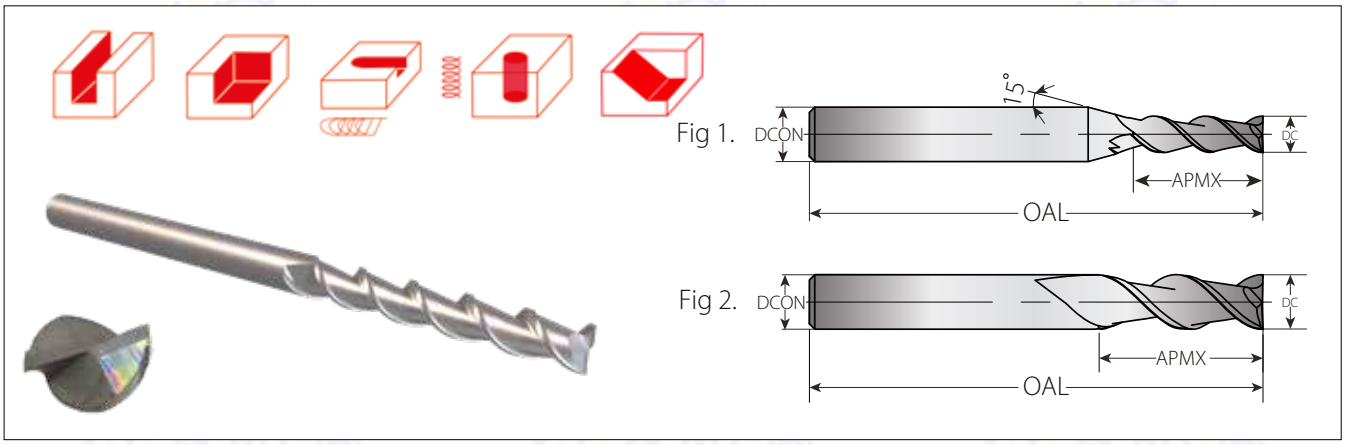
Square Head End Mills 45° Helix - 2 Flutes Uncoated for Machining Aluminum

This flute is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM1
VMSC-010F030-Z2C04N-VM1	G21-00187	1	4	3	50	•
VMSC-020F060-Z2C04N-VM1	G21-00188	2	4	6	50	•
VMSC-030F090-Z2C04N-VM1	G21-00189	3	4	9	50	•
VMSC-040F110-Z2C04N-VM1	G21-00190	4	4	11	50	•
VMSC-050F130-Z2C06N-VM1	G21-00191	5	6	13	50	•
VMSC-060F160-Z2C06N-VM1	G21-00192	6	6	16	50	•
VMSC-080F200-Z2C08N-VM1	G21-00193	8	8	20	60	•
VMSC-100F250-Z2C10N-VM1	G21-00194	10	10	25	75	•
VMSC-120F300-Z2C12N-VM1	G21-00195	12	12	30	75	•
VMSC-160F360-Z2C16N-VM1	G21-00196	16	16	36	100	•
VMSC-200F450-Z2C20N-VM1	G21-00197	20	20	45	100	•

• In Stock

VMSC-Z2-F-N-LONG

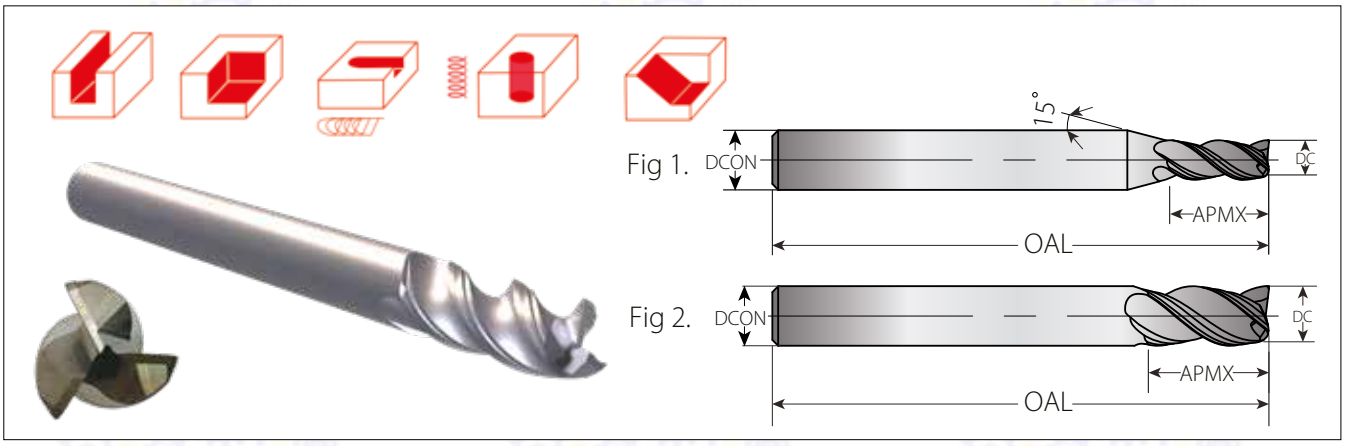


Square Head End Mills 45° Helix - 2 Flutes LONG Uncoated for Machining Aluminum

This LONG flute tool is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.

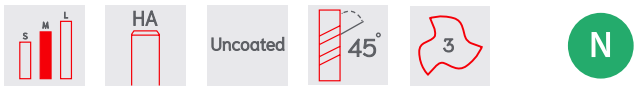
Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM1
VMSC-020F200-Z2C04N-VM1	G21-00198	2	4	20	75	•
VMSC-030F250-Z2C04N-VM1	G21-00199	3	4	25	75	•
VMSC-040F300-Z2C04N-VM1	G21-00200	4	4	30	75	•
VMSC-050F300-Z2C06N-VM1	G21-00201	5	6	30	75	•
VMSC-060F350-Z2C06N-VM1	G21-00202	6	6	35	75	•
VMSC-080F400-Z2C08N-VM1	G21-00203	8	8	40	100	•
VMSC-100F450-Z2C10N-VM1	G21-00204	10	10	45	100	•
VMSC-120F500-Z2C12N-VM1	G21-00205	12	12	50	100	•
VMSC-160F600-Z2C16N-VM1	G21-00206	16	16	60	150	•
VMSC-200F700-Z2C20N-VM1	G21-00207	20	20	70	150	•

• In Stock



Square Head End Mills 45° Helix - Polished 3 Flutes Uncoated for Machining Aluminum

This polished flute is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.



Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM1
VMSC-030F090-Z3C04NP-VM1	G21-00208	3	6	9	50	•
VMSC-040F110-Z3C04NP-VM1	G21-00209	4	6	11	50	•
VMSC-050F130-Z3C06NP-VM1	G21-00210	5	6	13	50	•
VMSC-060F160-Z3C06NP-VM1	G21-00211	6	6	16	50	•
VMSC-080F200-Z3C08NP-VM1	G21-00212	8	8	20	60	•
VMSC-100F250-Z3C10NP-VM1	G21-00213	10	10	25	75	•
VMSC-120F300-Z3C12NP-VM1	G21-00214	12	12	30	75	•

• In Stock

VMSC-Z3-F-N

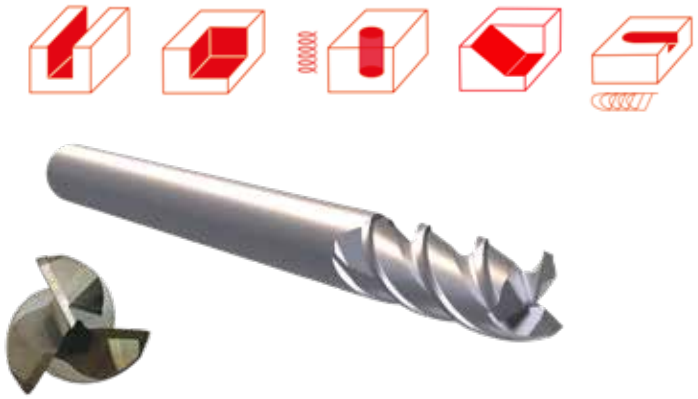


Fig 1.

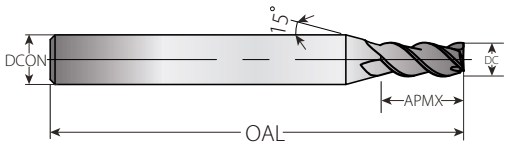
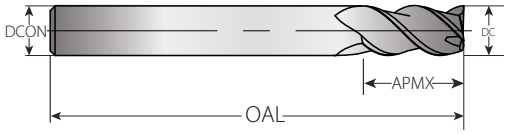


Fig 2.



Square Head End Mills 45° Helix - 3 Flutes Uncoated for Machining Aluminum

This uncoated flute is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM1
VMSC-010F030-Z3C04N-VM1	G21-00215	1	4	3	50	•
VMSC-020F060-Z3C04N-VM1	G21-00216	2	4	6	50	•
VMSC-030F090-Z3C04N-VM1	G21-00275	3	4	9	50	•
VMSC-040F110-Z3C04N-VM1	G21-00276	4	4	11	50	•
VMSC-050F130-Z3C06N-VM1	G21-00277	5	6	13	50	•
VMSC-060F160-Z3C06N-VM1	G21-00278	6	6	16	50	•
VMSC-080F200-Z3C08N-VM1	G21-00279	8	8	20	60	•
VMSC-100F250-Z3C10N-VM1	G21-00280	10	10	25	75	•
VMSC-120F300-Z3C12N-VM1	G21-00281	12	12	30	75	•
VMSC-160F360-Z3C16N-VM1	G21-00217	16	16	36	100	•
VMSC-200F450-Z3C20N-VM1	G21-00218	20	20	45	100	•

• In Stock

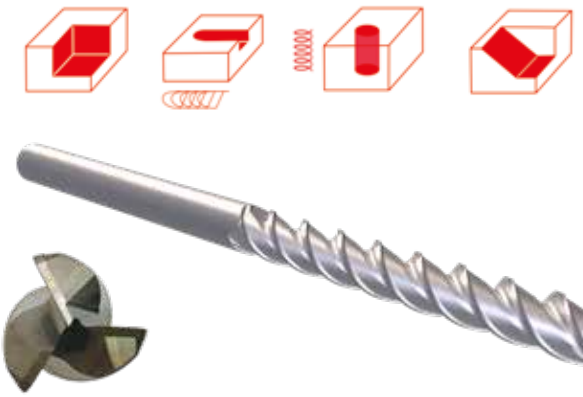


Fig 1.

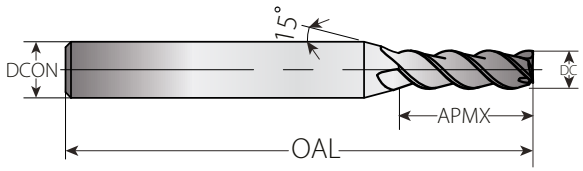
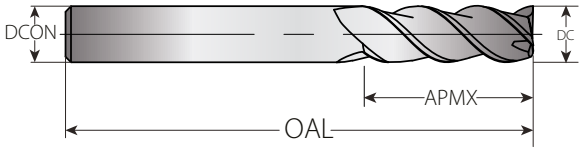


Fig 2.



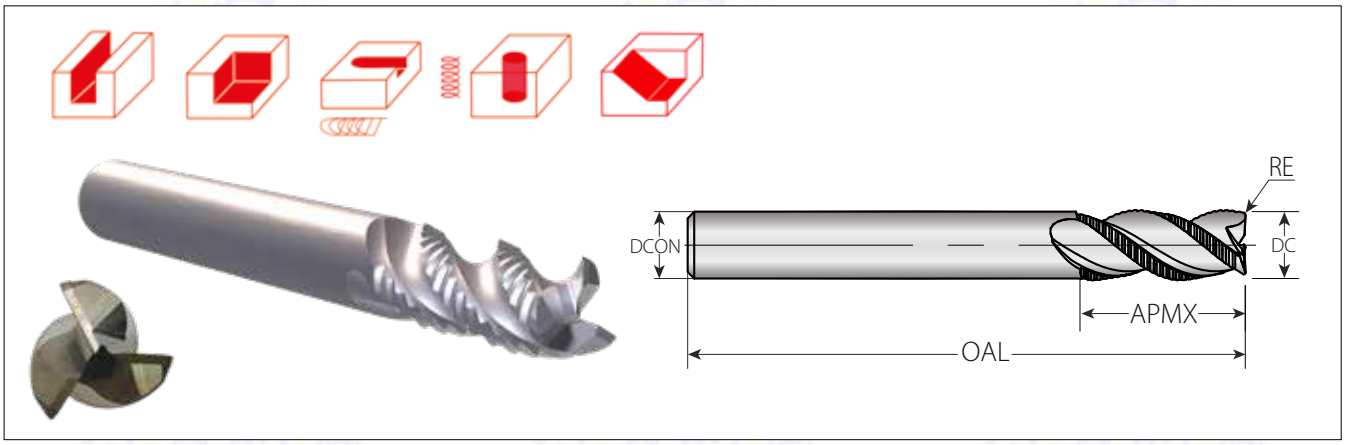
Square Head End Mills 45° Helix - 3 Flutes LONG Uncoated for Machining Aluminum

This LONG uncoated flute is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM1
VMSC-020F200-Z3C04N-VM1	G21-00219	2	4	20	75	•
VMSC-030F250-Z3C04N-VM1	G21-00220	3	4	25	75	•
VMSC-040F300-Z3C04N-VM1	G21-00221	4	4	30	75	•
VMSC-050F300-Z3C06N-VM1	G21-00222	5	6	30	75	•
VMSC-060F350-Z3C06N-VM1	G21-00223	6	6	35	75	•
VMSC-080F400-Z3C08N-VM1	G21-00224	8	8	40	100	•
VMSC-100F450-Z3C10N-VM1	G21-00225	10	10	45	100	•
VMSC-120F500-Z3C12N-VM1	G21-00226	12	12	50	100	•
VMSC-160F600-Z3C16N-VM1	G21-00227	16	16	60	150	•
VMSC-200F700-Z3C20N-VM1	G21-00228	20	20	70	150	•

• In Stock

VMSR-Z3-B-N



Square Head End Mills 28° Helix - 3 Flutes Uncoated for Roughing Aluminum Applications

This uncoated flute is designed to cut Aluminum and other non-ferrous materials, including those containing up to 12% silicon.

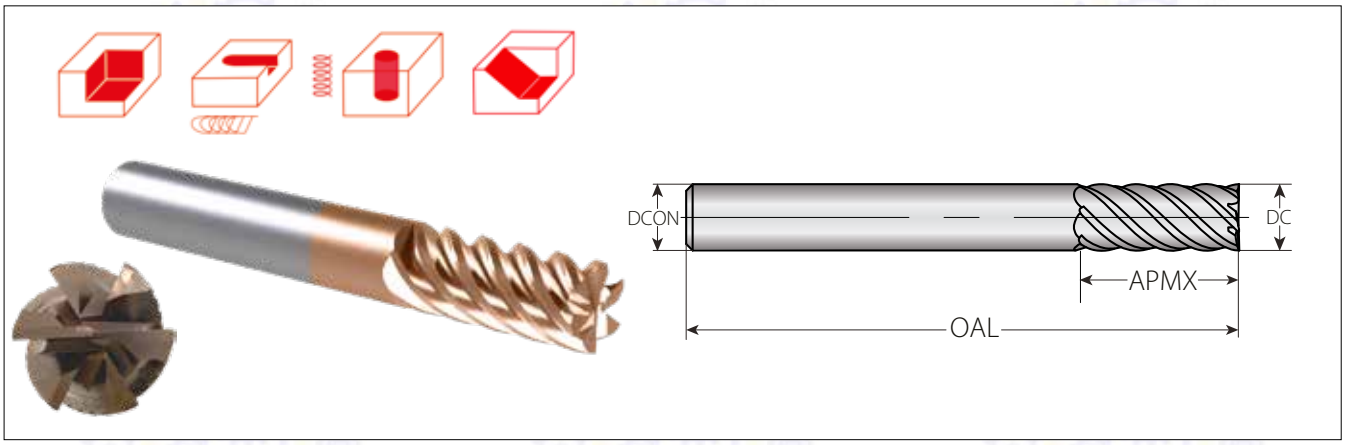
Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	RE	VM1
VMSR-060B160-Z3C06NR01-VM1	G21-00229	6	6	16	50	0.1	•
VMSR-080B200-Z3C08NR02-VM1	G21-00230	8	8	20	60	0.2	•
VMSR-100B250-Z3C10NR02-VM1	G21-00231	10	10	25	75	0.25	•
VMSR-120B300-Z3C12NR02-VM1	G21-00232	12	12	30	75	0.25	•
VMSR-160B360-Z3C16NR03-VM1	G21-00233	16	16	36	100	0.3	•
VMSR-200B450-Z3C16NR03-VM1	G21-00234	20	20	45	100	0.3	•

• In Stock

HARD MATERIALS

VMSC-Z6-F-H

V-MILL
Superior Milling Solutions

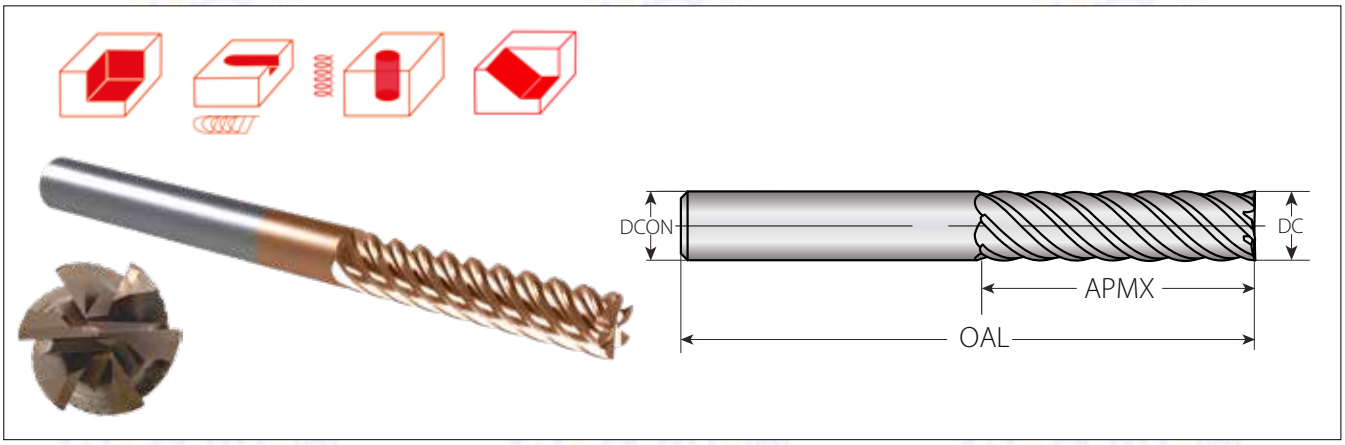


Square Head End Mills 45° Helix - 6 Flutes with TiAlCrSiN Coating for Hard Materials

These end mills demonstrate exceptional resistance to heat and wear in long applications, offering extended tool life when cutting materials up to **65 HRC hardness**, including hard and exotic materials.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM6
VMSC-060F150-Z6C06H-VM6	G21-00235	6	6	15	50	•
VMSC-080F200-Z6C08H-VM6	G21-00236	8	8	20	60	•
VMSC-100F300-Z6C10H-VM6	G21-00237	10	10	30	75	•
VMSC-120F300-Z6C12H-VM6	G21-00238	12	12	30	75	•
VMSC-160F400-Z6C16H-VM6	G21-00239	16	16	40	100	•
VMSC-200F450-Z6C20H-VM6	G21-00240	20	20	45	100	•

• In Stock



Square Head End Mills 45° Helix - 6 Flutes LONG with TiAlCrSiN Coating for Hard Materials

These end mills demonstrate exceptional resistance to heat and wear in long applications, offering extended tool life when cutting materials up to **65 HRC**, including hard materials and exotic materials.

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM6
VMSC-060F300-Z6C06H-VM6	G21-00241	6	6	30	100	•
VMSC-080F400-Z6C08H-VM6	G21-00242	8	8	40	100	•
VMSC-100F500-Z6C10H-VM6	G21-00243	10	10	50	150	•
VMSC-120F600-Z6C12H-VM6	G21-00244	12	12	60	150	•
VMSC-160F600-Z6C16H-VM6	G21-00245	16	16	80	150	•
VMSC-200F800-Z6C20H-VM6	G21-00246	20	20	80	150	•

• In Stock

VMSB-Z2-T-H

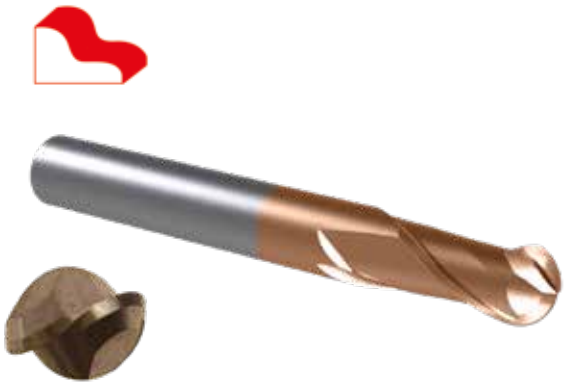


Fig 1.

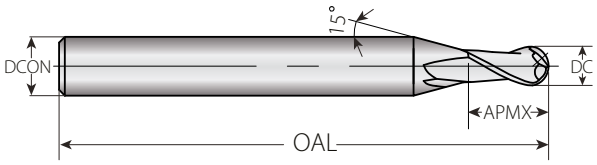
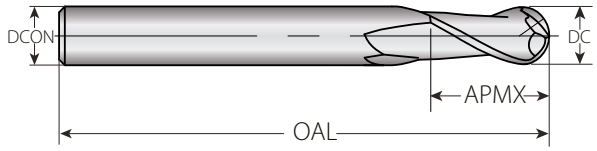


Fig 2.



Ball Nose End Mills 30° Helix - 2 Flutes with TiAlCrSiN Coating for Hard Materials

This ball nose end mill, designed for profiling, demonstrates exceptional resistance to heat and wear, offering extended tool life when cutting materials up to **65 HRC**, including hard materials and exotic materials.

P M K S H

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM6
VMSB-006T009-Z2C04H-VM6	G21-00247	0.6	4	0.9	50	•
VMSB-010T020-Z2C04H-VM6	G21-00248	1	4	2	50	•
VMSB-020T040-Z2C04H-VM6	G21-00249	2	4	4	50	•
VMSB-030T060-Z2C04H-VM6	G21-00250	3	4	6	50	•
VMSB-040T080-Z2C04H-VM6	G21-00251	4	4	8	50	•
VMSB-050T100-Z2C06H-VM6	G21-00252	5	6	10	50	•
VMSB-060T120-Z2C06H-VM6	G21-00253	6	6	12	50	•
VMSB-080T160-Z2C08H-VM6	G21-00254	8	8	16	60	•
VMSB-100T200-Z2C10H-VM6	G21-00255	10	10	20	75	•
VMSB-120T240-Z2C12H-VM6	G21-00256	12	12	24	75	•
VMSB-160T320-Z2C16H-VM6	G21-00257	16	16	32	100	•
VMSB-200T300-Z2C20H-VM6	G21-00258	20	20	30	100	•

• In Stock

V-MILL Superior Milling Solutions

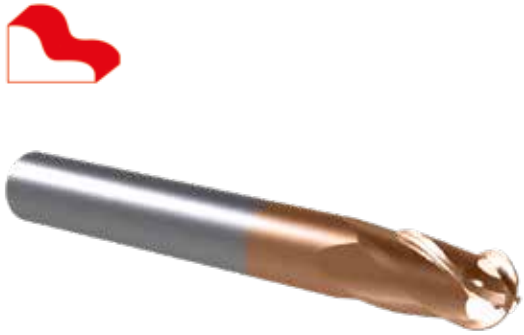


Fig 1.

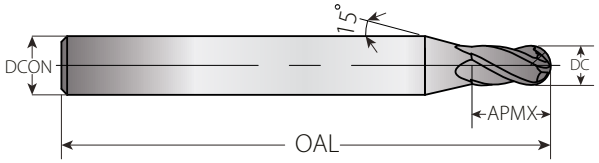
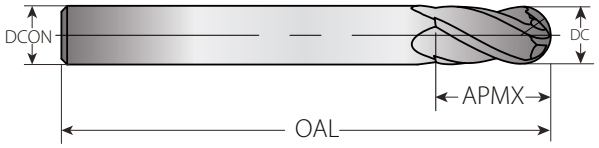


Fig 2.



Ball Nose End Mills 30° Helix - 4 Flutes with TiAlCrSiN Coating for Hard Materials

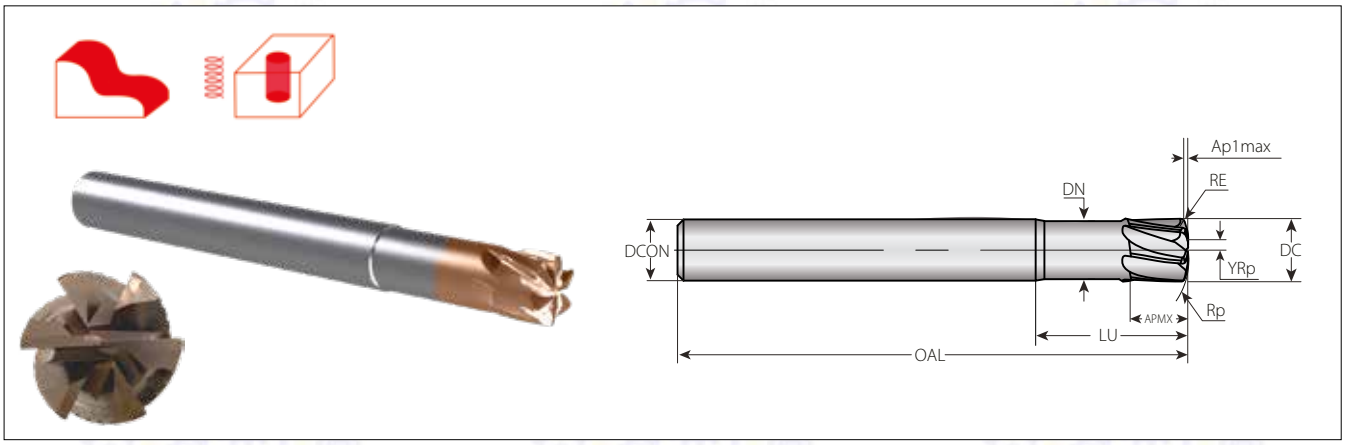
This ball nose end mill, designed for profiling and finishing, demonstrates exceptional resistance to heat and wear, offering extended tool life when cutting materials up to **65 HRC**, including hard materials and exotic materials.

P M K S H

Ordering Code	Item No.	Dimensions mm				Grade
		DC	DCON (h6)	APMX	OAL	VM6
VMSB-050C100-Z4C06H-VM6	G21-00259	5	6	10	60	•
VMSB-060C120-Z4C06H-VM6	G21-00260	6	6	12	50	•
VMSB-080C160-Z4C08H-VM6	G21-00261	8	8	16	60	•
VMSB-100C200-Z4C10H-VM6	G21-00262	10	10	20	75	•
VMSB-120C240-Z4C12H-VM6	G21-00263	12	12	24	75	•
VMSB-160C320-Z4C16H-VM6	G21-00264	16	16	32	100	•

• In Stock

VMSF-Z6-T-H



High Feed End Mills 30 Helix - 6 Flutes with TiAlCrSiN Coating for Hard Materials

This mill demonstrates exceptional resistance to heat and wear, offering extended tool life when cutting materials up to **65 HRC**, including hard materials and exotic materials.

Ordering Code	Item No.	Dimensions mm										Grade
		DC	DCON	AP1max	APMX	LU	DN	OAL	RE	Rp	YRp	VM6
VMSF-060T050-Z6C06H-VM6	G21-00265	6	6	0.2	5	18	5.5	60	0.375	9	0.75	•
VMSF-080T070-Z6C08H-VM6	G21-00266	8	8	0.27	7	24	7.5	75	0.5	12	1	•
VMSF-100T080-Z6C10H-VM6	G21-00267	10	10	0.33	8	30	9.5	90	0.625	15	1.25	•
VMSF-120T100-Z6C12H-VM6	G21-00268	12	12	0.4	10	36	11.5	100	0.75	18	1.5	•
VMSF-160T140-Z6C16H-VM6	G21-00269	16	16	0.54	14	48	15.5	110	1	24	2	•
VMSF-200T180-Z6C20H-VM6	G21-00270	20	20	0.67	18	60	19.5	125	1.25	30	2	•

• In Stock

Rp- Head radius size

YRp- Distance from center line to the crown of the Rp

RE- The shoulder radius or radius at the corner of the cutter

Ramping Guide for Circular and Linear Ramping

Circular Interpolation

Optimal Range of Circle Diameter for a Single Pass

Smallest	Largest
8.52	12
11.36	16
14.02	20
17.04	24
22.72	32
28.4	40

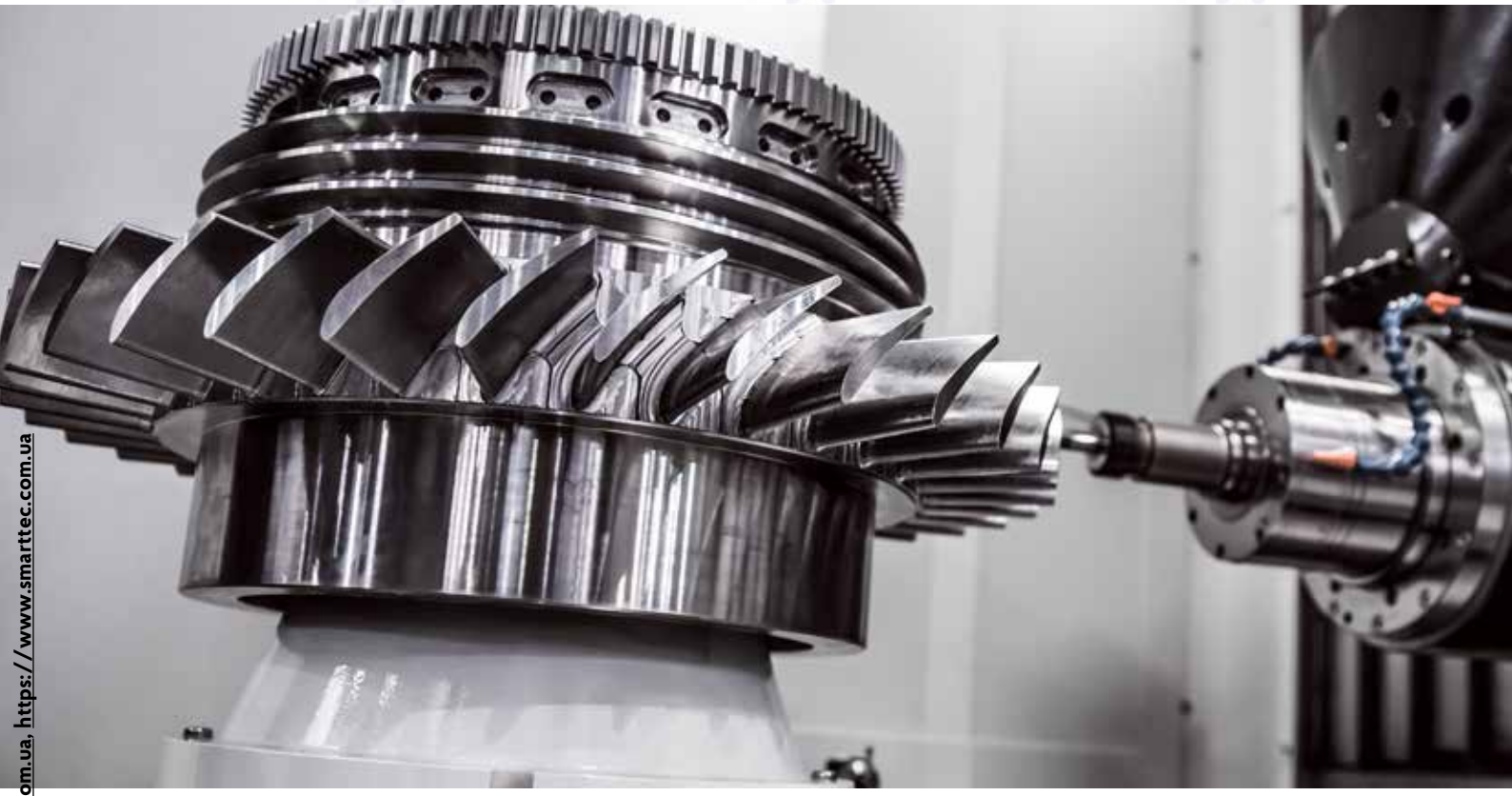
Linear Ramping

Calculated Length Per Ramp Angle (mm)

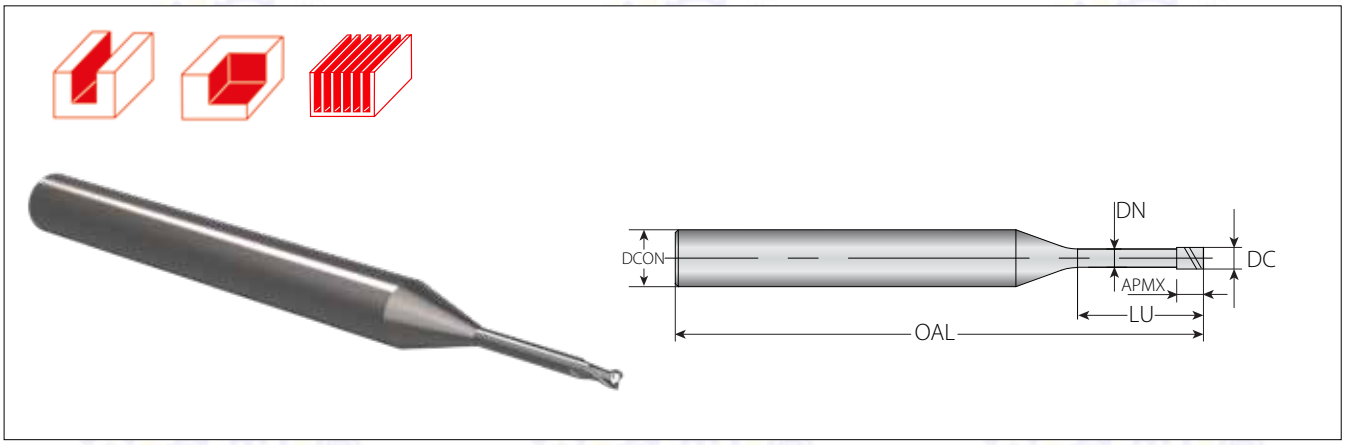
Ramp Angle (degree)				
1°	2°	3°	4°	5°
11.51	5.75	3.83	2.87	2.3
15.34	7.67	5.11	3.83	3.06
19.18	9.58	6.39	4.79	3.83
23.01	11.5	7.66	5.74	4.59
30.68	15.34	10.22	7.66	6.12
38.35	19.17	12.77	9.57	7.65
100%	**70%**	**50%**	**30%**	**10%**

Recommended percentage of programmed feed rate to use while ramping

STAINLESS STEEL,TITANIUM AND EXOTIC MATERIALS



VMSC-Z2-T-G-NECK



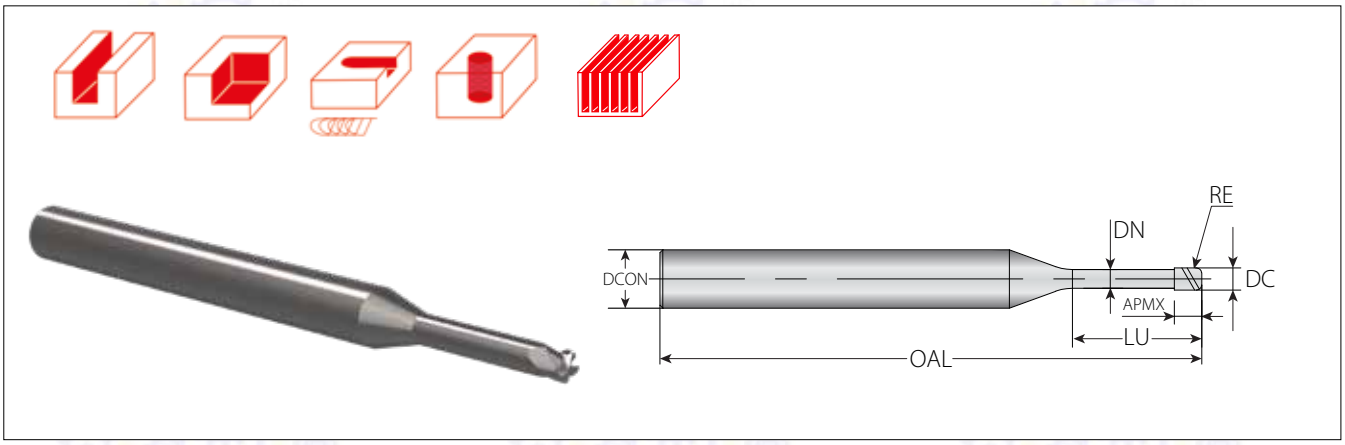
Square Head End Mills with Reduced Neck - 2 Flutes

Excellent solution for deep cavity micro/RIB - processing with ultra nano grain and AlCrSiN coating for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel up to 45 HRC.

Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h5)	APMX	LU	DN	OAL	VM9
VMSC-001T001/003-Z2C04G-VM9	G21-00001	0.1	4	0.15	0.3	0.08	50	•
VMSC-002T003/005-Z2C04G-VM9	G21-00002	0.2	4	0.3	0.5	0.17	50	•
VMSC-003T004/010-Z2C04G-VM9	G21-00003	0.3	4	0.45	1	0.27	50	•
VMSC-004T006/010-Z2C04G-VM9	G21-00004	0.4	4	0.6	1	0.37	50	•
VMSC-005T007/010-Z2C04G-VM9	G21-00005	0.5	4	0.75	1	0.47	50	•
VMSC-006T009/020-Z2C04G-VM9	G21-00006	0.6	4	0.9	2	0.57	50	•
VMSC-007T010/020-Z2C04G-VM9	G21-00007	0.7	4	1.05	2	0.67	50	•
VMSC-008T012/040-Z2C04G-VM9	G21-00008	0.8	4	1.2	4	0.76	50	•
VMSC-009T013/060-Z2C04G-VM9	G21-00009	0.9	4	1.35	6	0.86	50	•
VMSC-010T015/020-Z2C04G-VM9	G21-00010	1	4	1.5	2	0.96	50	•
VMSC-010T015/060-Z2C04G-VM9	G21-00011	1	4	1.5	6	0.96	50	•
VMSC-012T018/060-Z2C04G-VM9	G21-00012	1.2	4	1.8	6	1.15	50	•
VMSC-014T021/060-Z2C04G-VM9	G21-00013	1.4	4	2.1	6	1.34	50	•
VMSC-015T022/060-Z2C04G-VM9	G21-00014	1.5	4	2.25	6	1.44	50	•
VMSC-016T024/060-Z2C04G-VM9	G21-00015	1.6	4	2.4	6	1.54	50	•
VMSC-018T027/060-Z2C04G-VM9	G21-00016	1.8	4	2.7	6	1.73	50	•
VMSC-020T030/040-Z2C04G-VM9	G21-00017	2	4	3	4	1.92	50	•
VMSC-020T030/080-Z2C04G-VM9	G21-00018	2	4	3	8	1.92	50	•
VMSC-025T037/080-Z2C04G-VM9	G21-00019	2.5	4	3.75	8	2.4	50	•
VMSC-030T045/080-Z2C06G-VM9	G21-00020	3	6	4.5	8	2.88	55	•
VMSC-040T060/120-Z2C06G-VM9	G21-00021	4	6	6	12	3.86	60	•
VMSC-050T075/200-Z2C06G-VM9	G21-00022	5	6	7.5	20	4.85	70	•
VMSC-060T090/200-Z2C06G-VM9	G21-00023	6	6	9	20	5.85	70	•

• In Stock

VMSC-Z4-T-G-R-NECK



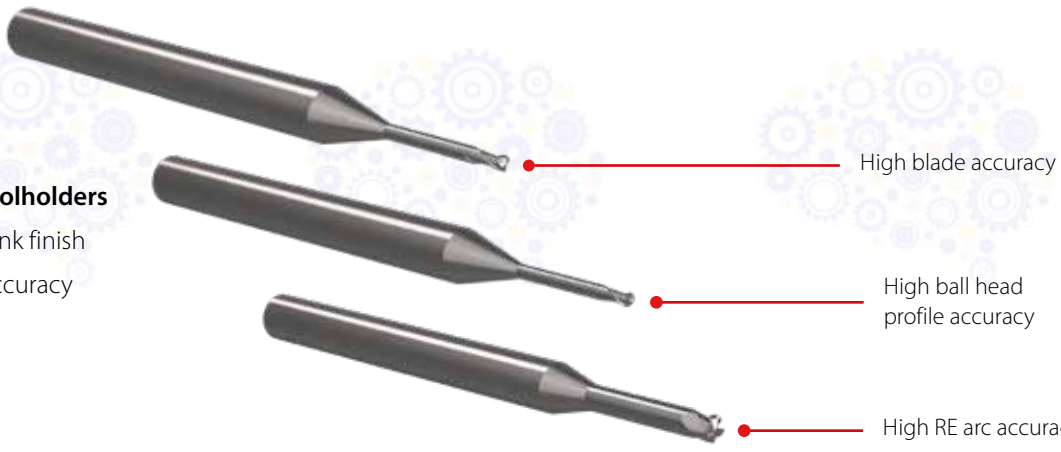
Corner Radius End Mills with Reduced Neck - 4 Flutes

Excellent solution with 4 flutes for deep cavity micro/RIB - processing with ultra nano grain and AlCrSiN coating for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel up to 45 HRC.

Ordering Code	Item No.	Dimensions mm							Grade
		DC	DCON (h5)	APMX	LU	DN	OAL	RE	VM9
VMSC-010T010/020-Z4C04GR -VM9	G21-00024	1	4	0.8	4	0.96	50	0.05	•
VMSC-010T010/020-Z4C04GR01-VM9	G21-00025	1	4	0.8	8	0.96	50	0.1	•
VMSC-020T030/040-Z4C04GR -VM9	G21-00026	2	4	1.6	4	1.92	50	0.05	•
VMSC-020T030/040-Z4C04GR01-VM9	G21-00027	2	4	1.6	8	1.92	50	0.1	•
VMSC-030T045/080-Z4C06GR01-VM9	G21-00028	3	6	2.4	8	2.88	60	0.1	•
VMSC-030T045/160-Z4C06GR01-VM9	G21-00097	3	6	2.4	16	2.88	60	0.1	•
VMSC-040T060/120-Z4C06GR01-VM9	G21-00029	4	6	3.2	12	3.86	60	0.1	•
VMSC-040T060/200-Z4C06GR01-VM9	G21-00098	4	6	3.2	20	3.86	60	0.1	•
VMSC-050T075/200-Z4C06GR01-VM9	G21-00030	5	6	4	20	4.85	70	0.1	•
VMSC-050T075/400-Z4C06GR01-VM9	G21-00099	5	6	4	40	4.85	90	0.1	•
VMSC-060T090/300-Z4C06GR02-VM9	G21-00031	6	6	4.8	30	5.85	80	0.2	•
VMSC-060T090/540-Z4C06GR02-VM9	G21-00100	6	6	4.8	54	5.85	100	0.2	•

• In Stock

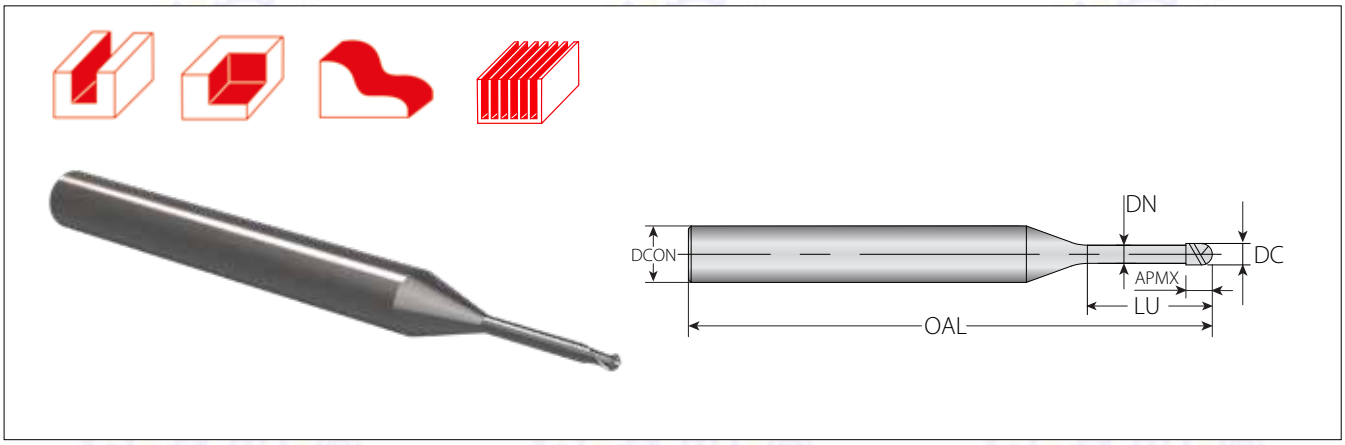
Design Features: High accuracy



High precision toolholders

- **Higher** tool shank finish
- **Better** set-up accuracy

VMSB-Z2-T-G-NECK



Ball Nose End Mills with Reduced Neck - 2 Flutes

Excellent solution for deep cavity micro/RIB - processing with ultra nano grain and AlCrSiN coating for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel up to 45 HRC.
Excellent for the precise Medical and Mold industries.

Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h5)	APMX	LU	DN	OAL	VM9
VMSB-001T001/002-Z2C04G-VM9	G21-00032	0.1	4	0.08	0.2	0.08	50	•
VMSB-002T001/010-Z2C04G-VM9	G21-00033	0.2	4	0.16	1	0.17	50	•
VMSB-003T002/010-Z2C04G-VM9	G21-00034	0.3	4	0.24	1	0.27	50	•
VMSB-004T003/010-Z2C04G-VM9	G21-00035	0.4	4	0.32	1	0.37	50	•
VMSB-005T004/010-Z2C04G-VM9	G21-00036	0.5	4	0.4	1	0.47	50	•
VMSB-006T004/010-Z2C04G-VM9	G21-00037	0.6	4	0.48	1	0.57	50	•
VMSB-007T005/020-Z2C04G-VM9	G21-00038	0.7	4	0.56	2	0.67	50	•
VMSB-008T006/040-Z2C04G-VM9	G21-00039	0.8	4	0.64	2	0.76	50	•
VMSB-009T007/060-Z2C04G-VM9	G21-00040	0.9	4	0.72	2	0.86	50	•
VMSB-010T008/020-Z2C04G-VM9	G21-00041	1	4	0.8	2	0.96	50	•
VMSB-011T008/020-Z2C04G-VM9	G21-00042	1.1	4	0.88	2	1.06	50	•
VMSB-012T009/040-Z2C04G-VM9	G21-00043	1.2	4	0.96	4	1.15	50	•
VMSB-014T011/080-Z2C04G-VM9	G21-00044	1.4	4	1.12	8	1.34	50	•
VMSB-015T012/080-Z2C04G-VM9	G21-00045	1.5	4	1.2	8	1.44	50	•
VMSB-016T012/080-Z2C04G-VM9	G21-00046	1.6	4	1.28	8	1.54	50	•
VMSB-018T014/080-Z2C04G-VM9	G21-00047	1.8	4	1.44	8	1.73	50	•
VMSB-020T016/080-Z2C04G-VM9	G21-00048	2	4	1.6	8	1.92	50	•
VMSB-025T024/100-Z2C04G-VM9	G21-00049	2.5	4	2	10	2.4	50	•
VMSB-030T024/100-Z2C06G-VM9	G21-00050	3	6	2.4	10	2.88	55	•
VMSB-035T028/150-Z2C06G-VM9	G21-00051	3.5	6	2.8	15	3.36	60	•
VMSB-040T032/160-Z2C06G-VM9	G21-00052	4	6	3.2	16	3.86	60	•
VMSB-050T040/200-Z2C06G-VM9	G21-00053	5	6	4	20	4.85	65	•
VMSB-060T060/200-Z2C06G-VM9	G21-00054	6	6	6	20	5.85	65	•

• In Stock

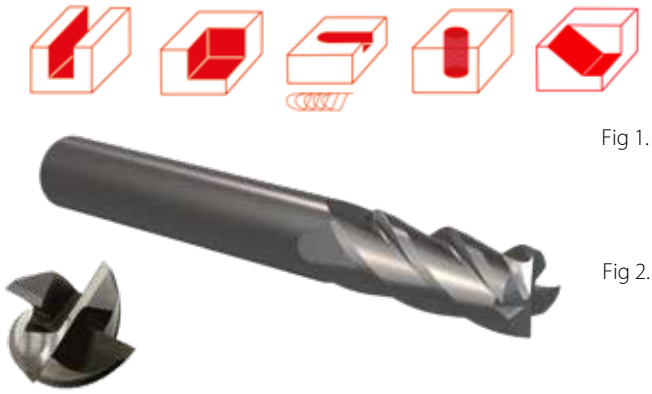


Fig 1.

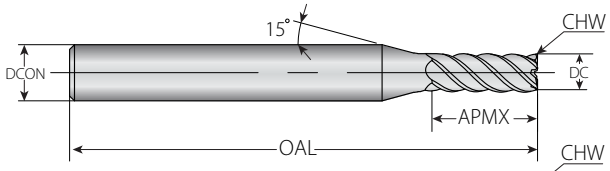
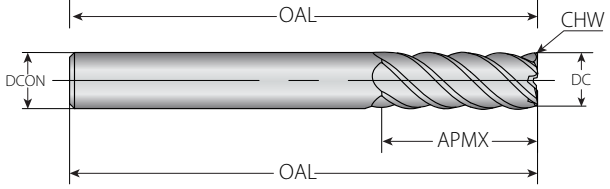


Fig 2.



Square Head End Mills with Variable Helix & Tooth Pitch - 4 Flutes

Specially Designed for Machining Stainless & Alloy Steel

These tools with variable helix angles are designed for high-performance machining of Stainless Steel, Alloy Steel, and Carbon Steel up to 45 HRC hardness. This design reduces vibration and noise during machining. The ultra-fine grain structure, AlCrN coating, and special edge preparation improve cutting edge strength and sharpness.

This allows for higher metal removal rates and longer tool life.

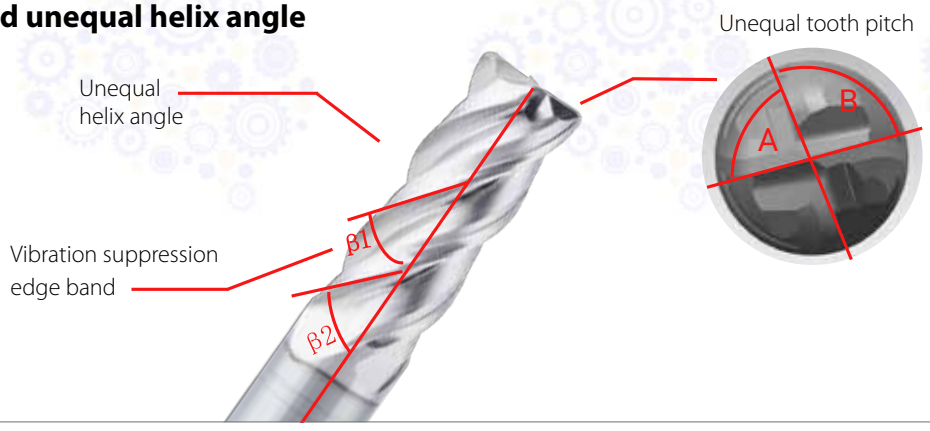
The AlCrN coating prevents thermal cracking when using emulsion coolant.

These tools are suitable for Aerospace and Medical industry applications.

Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	CHW	VM3
VMSC-020FV060-Z4C04SC-VM3	G21-00065	2	4	6	50	0.02	•
VMSC-030FV090-Z4C04SC-VM3	G21-00066	3	4	9	50	0.03	•
VMSC-040FV110-Z4C04SC-VM3	G21-00067	4	4	11	50	0.04	•
VMSC-050FV130-Z4C06SC-VM3	G21-00068	5	6	13	50	0.05	•
VMSC-060FV160-Z4C06SC-VM3	G21-00069	6	6	16	50	0.06	•
VMSC-080FV200-Z4C08SC-VM3	G21-00070	8	8	20	60	0.08	•
VMSC-100FV250-Z4C10SC01-VM3	G21-00071	10	10	25	75	0.1	•
VMSC-120FV300-Z4C12SC01-VM3	G21-00072	12	12	30	75	0.1	•
VMSC-160FV360-Z4C16SC01-VM3	G21-00073	16	16	36	100	0.1	•

• In Stock

Unique geometry with variable pitch and unequal helix angle



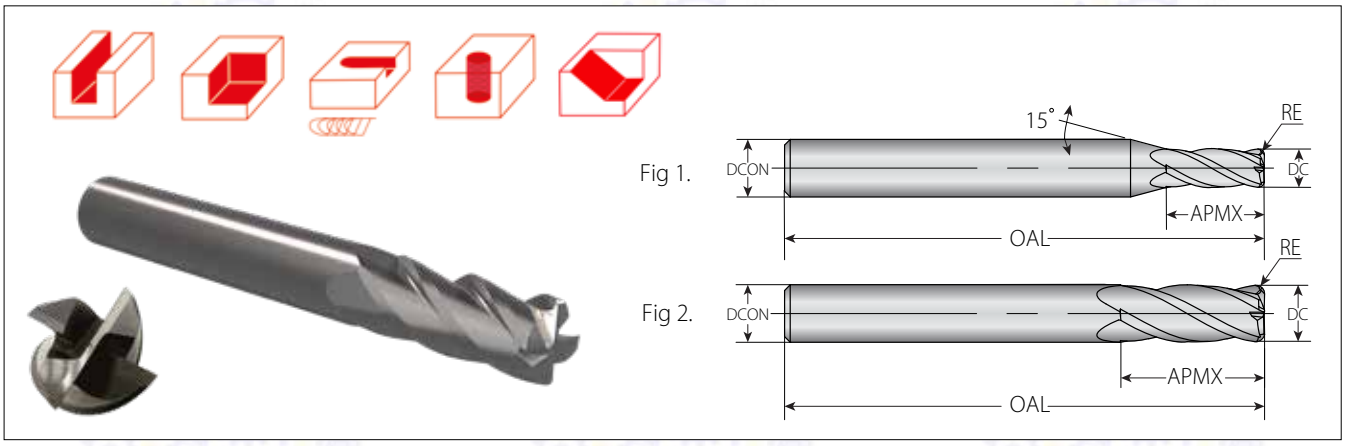


Fig 1.

Fig 2.

Reinforced Corner Radius End Mills with Variable Helix & Tooth Pitch - 4 Flutes

Specially Designed for Machining Stainless & Alloy Steel

The 4 flute Solid Carbide tools with variable helix angles are designed for high-performance machining of Stainless Steel, Alloy Steel, and Carbon Steel up to 45 HRC hardness.
This design reduces vibration and noise during machining.
The ultra-fine grain structure, AlCrN coating, and special edge preparation improve cutting edge strength and sharpness. This allows for higher metal removal rates and longer tool life.
The AlCrN coating prevents thermal cracking when using emulsion coolant.

Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	RE	VM3
VMSC-020FV060-Z4C04SR02-VM3	G21-00074	2	4	6	50	0.2	•
VMSC-030FV090-Z4C04SR03-VM3	G21-00075	3	4	9	50	0.3	•
VMSC-040FV110-Z4C04SR03-VM3	G21-00076	4	4	11	50	0.3	•
VMSC-050FV130-Z4C06SR05-VM3	G21-00077	5	6	13	50	0.5	•
VMSC-060FV160-Z4C06SR05-VM3	G21-00078	6	6	16	50	0.5	•
VMSC-080FV200-Z4C08SR05-VM3	G21-00079	8	8	20	60	0.5	•
VMSC-100FV250-Z4C10SR05-VM3	G21-00080	10	10	25	75	0.5	•
VMSC-120FV300-Z4C12SR05-VM3	G21-00081	12	12	30	75	0.5	•
VMSC-160FV360-Z4C16SR05-VM3	G21-00082	16	16	36	100	0.5	•

• In Stock

Fig 1.

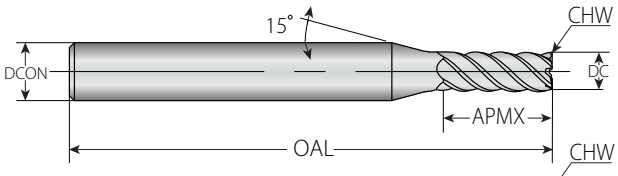
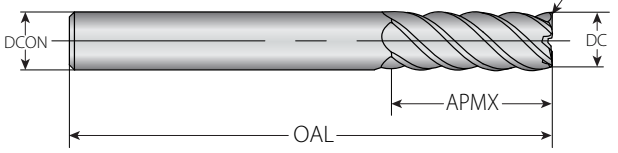


Fig 2.



Square Head End Mills with Variable Helix & Tooth Pitch - 5 Flutes

Specially Designed for Machining Stainless & Alloy Steel

The 5 Flute Solid Carbide tools with variable helix angles are designed for high-performance machining of Stainless Steel, Alloy Steel, and Carbon Steel up to 45 HRC hardness. This design reduces vibration and noise during machining. The ultra-fine grain structure, AlCrN coating, and special edge preparation improve cutting edge strength and sharpness.

This allows for higher metal removal rates and longer tool life.

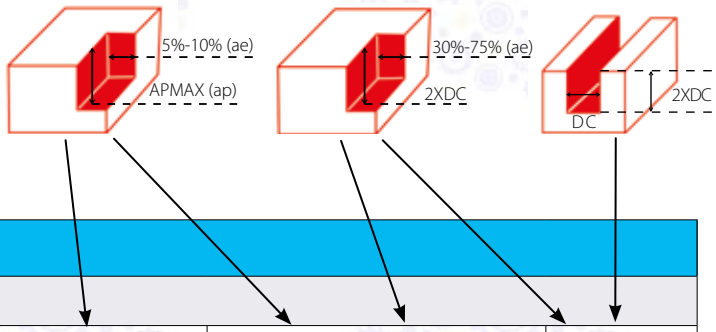
The AlCrN coating prevents thermal cracking when using emulsion coolant.

These tools are suitable for Aerospace and Medical industry applications.

Ordering Code	Item No.	Dimensions mm					Grade
		DC	DCON (h6)	APMX	OAL	CHW	VM3
VMSC-020FV060-Z5C04SC-VM3	G21-00088	2	4	6	50	0.02	•
VMSC-030FV090-Z5C04SC-VM3	G21-00089	3	4	9	50	0.03	•
VMSC-040FV110-Z5C04SC-VM3	G21-00090	4	4	11	50	0.04	•
VMSC-050FV130-Z5C06SC-VM3	G21-00091	5	6	13	50	0.05	•
VMSC-060FV160-Z5C06SC-VM3	G21-00092	6	6	16	50	0.06	•
VMSC-080FV200-Z5C08SC-VM3	G21-00093	8	8	20	60	0.08	•
VMSC-100FV250-Z5C10SC01-VM3	G21-00094	10	10	25	75	0.1	•
VMSC-120FV300-Z5C12SC01-VM3	G21-00095	12	12	30	75	0.1	•
VMSC-160FV360-Z5C16SC01-VM3	G21-00096	16	16	36	100	0.1	•

• In Stock

Recommended Cutting Conditions



P Standard Steel (P20, 4140 / 4340)

Cutting Speed (m/min) and Feed (mm/rev)				
Diameter Range		Finishing ae ≤ 10%XDC	Semi-Finishing ae ≤ 30%XDC	Roughing
1-6 mm	Speed	100-170	70-130	50-110
	Feed	0.02-0.07	0.03-0.06	0.02-0.05
6-10 mm	Speed	90-160	80-150	60-130
	Feed	0.04-0.09	0.03-0.08	0.02-0.07
12-20 mm	Speed	80-140	80-170	70-150
	Feed	0.04-0.12	0.04-0.1	0.04-0.08

M Stainless Steel

Cutting Speed (m/min) and Feed (mm/rev)				
Diameter Range		Finishing ae ≤ 10%XD	Semi-Finishing ae ≤ 30%XD	Roughing
1-6 mm	Speed	40-70	30-70	30-60
	Feed	0.02-0.07	0.02-0.06	0.02-0.05
6-12 mm	Speed	60-80	50-70	40-60
	Feed	0.03-0.1	0.03-0.09	0.02-0.07
12-20 mm	Speed	60-80	50-70	40-70
	Feed	0.06-0.14	0.05-0.12	0.04-0.1

K Cast Iron

Cutting Speed (m/min) and Feed (mm/rev)				
Diameter Range		Finishing ae ≤10%XD	Semi-Finishing ae ≤ 30%XD	Roughing
1-6 mm	Speed	100-180	70-130	50-120
	Feed	0.02-0.07	0.03-0.06	0.02-0.05
6-12 mm	Speed	90-170	80-150	60-140
	Feed	0.04-0.09	0.03-0.08	0.02-0.07
12-2 0mm	Speed	80-150	80-170	70-150
	Feed	0.04-0.12	0.04-0.1	0.04-0.08

S Titanium Alloys (Ti-6Al-4V)

Cutting Speed (m/min) and Feed (mm/rev)				
Diameter Range		Finishing ae ≤ 10%XD	Semi-Finishing ae ≤ 30%XD	Roughing
1-6 mm	Speed	25-45	20-40	20-35
	Feed	0.02-0.06	0.01-0.05	0.01-0.04
6-12 mm	Speed	25-45	20-40	20-35
	Feed	0.03-0.07	0.03-0.06	0.02-0.05
12-20 mm	Speed	25-45	20-40	20-35
	Feed	0.03-0.09	0.03-0.08	0.02-0.07

Note: Refer to the cutting conditions tables on page: 43-49.

General Milling Roughers and Variable Helix -1

V-MILL Superior Milling Solutions

Tool Family Groups: **VMSR-Z4 B-G | VMSR Z4-F-G | VMSC Z4-TV-G | VMSC-Z4-FV-S | VMSC-Z4-FV-S-R**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							ae(mm)≤30% ap(mm)=2XD		
					Coolant		Dia.	Dia.	Dia.
					Air	Emulsion	2.0-5.0	6.0-10	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.03-0.06	0.05-0.10	0.05-0.12
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150			
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	40-90	0.02-0.05	0.02-0.08	0.03-0.12
	12		Hardened	330					
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.03-0.06	0.05-0.10	0.05-0.12
	25		Pearlitic (long chips)	230	90-120	100-170			
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200			
	27		High Tensile Strength	260	70-100	90-160			
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130			
	29		Pearlitic	260	60-85	80-110			
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	20-50	0.01-0.03	0.02-0.07	0.03-0.11
	20		Aged (iron based)	280		20-45			
	21		Annealed (nickel or cobalt based)	250		15-30			
	22		Aged (nickel or cobalt based)	350		15-30			
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		35-55			

General Milling Roughers and Variable Helix -2

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							ae(mm)≤75% ap(mm)=2XD		
					Coolant		Dia.	Dia.	Dia.
					Air	Emulsion	2.0-5.0	6.0-10	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.02-0.04	0.02-0.06	0.03-0.08
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150			
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	40-90	0.02-0.04	0.03-0.06	0.03-0.08
	12		Hardened	330					
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.02-0.04	0.02-0.06	0.03-0.08
	25		Pearlitic (long chips)	230	90-120	100-170			
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200			
	27		High Tensile Strength	260	70-100	90-160			
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130			
	29		Pearlitic	260	60-85	80-110			
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	20-50	0.01-0.03	0.03-0.06	0.03-0.1
	20		Aged (iron based)	280		20-45			
	21		Annealed (nickel or cobalt based)	250		15-30			
	22		Aged (nickel or cobalt based)	350		15-30			
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		35-55			

General Milling Roughers and Variable Helix -3

V-MILL Superior Milling Solutions

Tool Family Groups: **VMSR-Z4 B-G | VMSR Z4-F-G | VMSC Z4-TV-G | VMSC-Z4-FV-S | VMSC-Z4-FV-S-R**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							ae=100% ap(mm)=2.0XD *		
					Coolant		Dia.	Dia.	Dia.
					Air	Emulsion	2.0-5.0	6.0-10	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.02-0.04	0.02-0.05	0.03-0.07
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150			
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	40-90	0.02-0.04	0.02-0.05	0.03-0.06
	12		Hardened	330					
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.02-0.04	0.02-0.06	0.03-0.08
	25		Pearlitic (long chips)	230	90-120	100-170			
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200			
	27		High Tensile Strength	260	70-100	90-160			
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130			
	29		Pearlitic	260	60-85	80-110			
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	20-50	0.01-0.02	0.03-0.05	0.03-0.08
	20		Aged (iron based)	280		20-45			
	21		Annealed (nickel or cobalt based)	250		15-30			
	22		Aged (nickel or cobalt based)	350		15-30			
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		35-55			

* For M and S materials, the ap max is 1.5XD.

V-Mill Recommended Cutting Conditions for RIB Processing -1

Tool Family Groups: **VMSC-Z2 | VMSB-Z2 | VSMC-Z4 R**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		Tool Dia =0.1-1.9 mm ap=Dx0.02 / ae=Dx0.1 Tool Dia =2.0-6.0 mm ap=Dx0.04 / ae=Dx0.3 Fz [mm/t]					
					Coolant		Dia.	Dia.	Dia.	Dia.	Dia.	Dia.
					Air	Emulsion	0.1 -0.3	0.4 -0.7	0.8-1.0	1.1-1.9	2.0-4.0	4.0-6.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.002-0.004	0.002-0.004	0.003-0.005	0.003-0.006	0.004-0.007	0.008-0.016
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150						
	3		High Carbon (C=0.55-0.85%)	170								
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150						
	5		Hardened	275								
	6		Hardened	350								
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140						
	8		Hardened	325								
	9	Cast Steel	Low Alloy (alloying elements <5%)	200								
	10		High Alloy (alloying elements >5%)	225								
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	75-120	0.002-0.003	0.001-0.003	0.003-0.005	0.004-0.007	0.004-0.009	0.008-0.014
	12		Hardened	330								
	13	Stainless Steel Austenitic	Austenitic	180								
	14		Super Austenitic	200								
	15	Stainless Steel Cast Ferritic	Non Hardened	200								
	16		Hardened	330								
	17	Stainless Steel Cast Austenitic	Austenitic	200								
	18		Hardened	330								
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.002-0.004	0.002-0.004	0.003-0.005	0.003-0.006	0.004-0.007	0.008-0.016
	25		Pearlitic (long chips)	230	90-120	100-170						
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200						
	27		High Tensile Strength	260	70-100	90-160						
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130						
	29		Pearlitic	260	60-85	80-110						
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	30-60	0.001-0.002	0.001-0.002	0.002-0.004	0.002-0.005	0.003-0.006	0.003-0.008
	20		Aged (iron based)	280		20-45						
	21		Annealed (nickel or cobalt based)	250								
	22		Aged (nickel or cobalt based)	350								
	23	Titanium Alloys	Pure 99.5 Ti	400Rm								

V-Mill Recommended Cutting Conditions for RIB Processing -2

Tool Family Groups: **VMSC-Z2 | VMSB-Z2 | VSMC-Z4 R**

V-MILL Superior Milling Solutions

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		Tool Dia =0.1-1.9 mm ap=DCx0.0 3 / **ae=DCXx0.2**					
							Tool Dia =2.0-6.0 mm ap=DCx0.05 / **ae=DCXx0.45**					
							Fz [mm/t]					
					Coolant		Dia.	Dia.	Dia.	Dia.	Dia.	Dia.
					Air	Emulsion	0.1 -0.3	0.4 -0.7	0.8-1.0	1.1-1.9	2.0-4.0	4.0-6.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.001-0.003	0.001-0.004	0.002-0.004	0.002-0.005	0.004-0.007	0.006-0.013
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150						
	3		High Carbon (C=0.55-0.85%)	170								
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150						
	5		Hardened	275								
	6		Hardened	350								
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140						
	8		Hardened	325								
	9	Cast Steel	Low Alloy (alloying elements <5%)	200								
	10		High Alloy (alloying elements >5%)	225								
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	75-120	0.001-0.003	0.001-0.004	0.002-0.004	0.002-0.004	0.004-0.006	0.006-0.01
	12		Hardened	330								
	13	Stainless Steel Austenitic	Austenitic	180								
	14		Super Austenitic	200								
	15	Stainless Steel Cast Ferritic	Non Hardened	200								
	16		Hardened	330								
	17	Stainless Steel Cast Austenitic	Austenitic	200								
	18		Hardened	330								
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.001-0.003	0.001-0.004	0.002-0.004	0.002-0.005	0.004-0.007	0.006-0.013
	25		Pearlitic (long chips)	230	90-120	100-170						
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200						
	27		High Tensile Strength	260	70-100	90-160						
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130						
	29		Pearlitic	260	60-85	80-110						
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	30-60	0.001-0.002	0.002-0.003	0.002-0.004	0.002-0.004	0.004-0.005	0.006-0.007
	20		Aged (iron based)	280		20-45						
	21		Annealed (nickel or cobalt based)	250								
	22		Aged (nickel or cobalt based)	350								
	23	Titanium Alloys	Pure 99.5 Ti	400Rm								

V-Mill Recommended Cutting Conditions for RIB Processing -3

Tool Family Groups: **VMSC-Z2 | VMSB-Z2 | VSMC-Z4 R**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		Tool Dia. =0.1-1.9mm ap=DCXx0.015/ **ae=D**					
							Tool Dia. =2.0-6.0mm ap=DCXx0.04/ **ae=D**					
							Fz [mm/t]					
					Coolant		Dia.	Dia.	Dia.	Dia.	Dia.	Dia.
					Air	Emulsion	0.1 -0.3	0.4 -0.7	0.8-1.0	1.1-1.9	2.0-4.0	4.0-6.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	150-220	120-170	0.001-0.003	0.001-0.004	0.002-0.005	0.004-0.005	0.004-0.006	0.006-0.01
	2		Medium Carbon (C=0.25-0.55%)	150	140-210	100-150						
	3		High Carbon (C=0.55-0.85%)	170								
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	140-210	100-150						
	5		Hardened	275								
	6		Hardened	350								
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	120-200	80-140						
	8		Hardened	325								
	9	Cast Steel	Low Alloy (alloying elements <5%)	200								
	10		High Alloy (alloying elements >5%)	225								
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	75-120	0.001-0.003	0.001-0.003	0.002-0.004	0.003-0.004	0.003-0.005	0.006-0.01
	12		Hardened	330								
	13	Stainless Steel Austenitic	Austenitic	180								
	14		Super Austenitic	200								
	15	Stainless Steel Cast Ferritic	Non Hardened	200								
	16		Hardened	330								
	17	Stainless Steel Cast Austenitic	Austenitic	200								
	18		Hardened	330								
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.001-0.003	0.001-0.004	0.002-0.005	0.004-0.005	0.004-0.006	0.006-0.01
	25		Pearlitic (long chips)	230	90-120	100-170						
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200						
	27		High Tensile Strength	260	70-100	90-160						
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130						
	29		Pearlitic	260	60-85	80-110						
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	30-60	0.001-0.002	0.001-0.003	0.002-0.004	0.002-0.004	0.004-0.006	0.004-0.008
	20		Aged (iron based)	280		20-45						
	21		Annealed (nickel or cobalt based)	250								
	22		Aged (nickel or cobalt based)	350								
	23	Titanium Alloys	Pure 99.5 Ti	400Rm								

General Milling Semi-Finish -1

Tool Family Groups: **VMSC-Z2-C-G | VMSC-Z3-C-G | VMSC-Z4-C-G | VMSC-Z4-C-G Long**
VMSC-Z6-C-G | VMSC Z4-TV-G | VMSC-Z4&5-SV-G-R | VMSB-Z2-T-G | VMSB-Z4-T-G

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							ae(mm)≥5% ap(mm)=MAX		
					Coolant		Dia.	Dia.	Dia.
					Air	Emulsion	2.0-5.0	6.0-10	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	180-250	150-200	0.03-0.06	0.05-0.10	0.05-0.12
	2		Medium Carbon (C=0.25-0.55%)	150	160-230	120-180			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180					
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	140-210	100-160			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	100-160	0.02-0.05	0.02-0.08	0.03-0.8
	12		Hardened	330		80-120			
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.03-0.06	0.05-0.10	0.05-0.12
	25		Pearlitic (long chips)	230	90-120	100-170			
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200			
	27		High Tensile Strength	260	70-100	90-160			
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130			
	29		Pearlitic	260	60-85	80-110			
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	20-50	0.01-0.03	0.02-0.07	0.03-0.11
	20		Aged (iron based)	280		20-45			
	21		Annealed (nickel or cobalt based)	250		15-30			
	22		Aged (nickel or cobalt based)	350		15-30			
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		35-55			

General Milling Semi-Finish -2

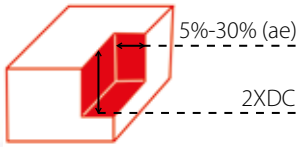
Tool Family Groups: **VMSC-Z2-C-G | VMSC-Z3-C-G | VMSC-Z4-C-G | VMSC-Z4-C-G Long**
VMSC-Z6-C-G | VMSC Z4-TV-G | VMSC-Z4&5-SV-G-R | VMSB-Z2-T-G | VMSB-Z4-T-G

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							ae(mm)≥15% ap(mm)=MAX		
					Coolant		Dia.	Dia.	Dia.
					Air	Emulsion	2.0-5.0	6.0-10	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	180-250	150-200	0.03-0.06	0.05-0.10	0.05-0.12
	2		Medium Carbon (C=0.25-0.55%)	150	160-230	120-180			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180					
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	140-210	100-160			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	Not recommended	100-160	0.02-0.05	0.02-0.08	0.03-0.8
	12		Hardened	330		80-120			
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	120-150	140-200	0.03-0.06	0.05-0.10	0.05-0.12
	25		Pearlitic (long chips)	230	90-120	100-170			
	26	Grey Cast Iron	Low Tensile Strength	180	90-120	140-200			
	27		High Tensile Strength	260	70-100	90-160			
	28	Nodular Sg Iron	Ferritic	160	75-00	100-130			
	29		Pearlitic	260	60-85	80-110			
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	Not recommended	20-50	0.01-0.03	0.02-0.07	0.03-0.11
	20		Aged (iron based)	280		20-45			
	21		Annealed (nickel or cobalt based)	250		15-30			
	22		Aged (nickel or cobalt based)	350		15-30			
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		35-55			

Finish and Semi-Finish

Tool Family Groups: **VMSC-Z2-F-N | VMSC-Z3-F-N-P | VMSC-Z3-F-N | VMSR-Z3-B-N**

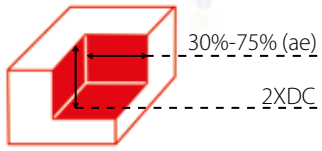
Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/t]		
						ae(mm)≥30%	ap(mm)=2XDC	
					Emulsion	Dia.	Dia.	Dia.
						2.0-5.0	6.0-10	12.0-20.0
N Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	200-300	0.02-0.05	0.03-0.09	0.05-0.12
	35		Aged	100				
	36	Aluminum Alloys	Cast	75	150-230			
	37		Cast & Aged	90	180-280			
	38	Aluminum Alloys	Cast Si 13-22%	130	120-180			
	39	Copper and Copper Alloys	Brass	90	80-130			
	40		Bronze And Non Leaded Copper	100	70-120			



Semi-Finish and Roughing

Tool Family Groups: **VMSC-Z2-F-N | VMSC-Z3-F-N-P | VMSC-Z3-F-N | VMSR-Z3-B-N**

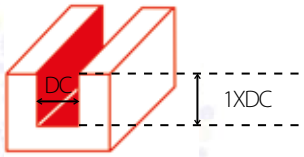
Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/t]		
						ae(mm)≥75%	ap(mm)=2XDC	
					Emulsion	Dia.	Dia.	Dia.
						2.0-5.0	6.0-10	12.0-20.0
N Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	200-300	0.02-0.04	0.02-0.07	0.04-0.1
	35		Aged	100				
	36	Aluminium Alloys	Cast	75	150-230			
	37		Cast & Aged	90	180-280			
	38	Aluminium Alloys	Cast Si 13-22%	130	120-180			
	39	Copper and Copper Alloys	Brass	90	80-130			
	40		Bronze And Non Leaded Copper	100	70-120			



Roughing

Tool Family Groups: **VMSC-Z2-F-N | VMSC-Z3-F-N-P | VMSC-Z3-F-N | VMSR-Z3-B-N**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/t]		
						ae=100%	ap(mm) =1XDC	
					Emulsion	Dia.	Dia.	Dia.
						2.0-5.0	6.0-10	12.0-20.0
N Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	200-300	0.01-0.03	0.02-0.05	0.03-0.09
	35		Aged	100				
	36	Aluminum Alloys	Cast	75	150-230			
	37		Cast & Aged	90	180-280			
	38	Aluminum Alloys	Cast Si 13-22%	130	120-180			
	39	Copper and Copper Alloys	Brass	90	80-130			
	40		Bronze And Non Leaded Copper	100	70-120			



Finish and Semi-Finish

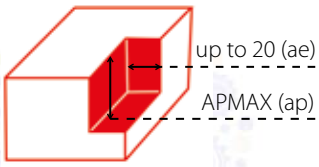
Tool Family Groups: **VMSC-Z2-F-N-LONG | VMSC-Z3-F-N -LONG**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/t]]		
						ae(mm)≥10% ap(mm)=max		
					Emulsion	Dia.	Dia.	Dia.
						2.0-5.0	6.0-10	12.0-20.0
N Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	170-300	0.02-0.04	0.03-0.09	0.05-0.10
	35		Aged	100	170-250			
	36	Aluminum Alloys	Cast	75	200-300			
	37		Cast & Aged	90	180-300			
	38	Aluminum Alloys	Cast Si 13-22%	130	120-180			
	39	Copper and Copper Alloys	Brass	90	80-120			
	40		Bronze And Non Leaded Copper	100	70-110			

Finish and Semi-Finish

Tool Family Groups: **VMSC-Z2-F-N-LONG | VMSC-Z3-F-N -LONG**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/t]]		
						ae(mm)≥20% ap(mm)=max		
					Emulsion	Dia.	Dia.	Dia.
						2.0-5.0	6.0-10	12.0-20.0
N Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	170-300	0.02-0.04	0.02-0.06	0.04-0.09
	35		Aged	100	170-250			
	36	Aluminum Alloys	Cast	75	200-300			
	37		Cast & Aged	90	180-300			
	38	Aluminum Alloys	Cast Si 13-22%	130	120-180			
	39	Copper and Copper Alloys	Brass	90	80-120			
	40		Bronze And Non Leaded Copper	100	70-110			



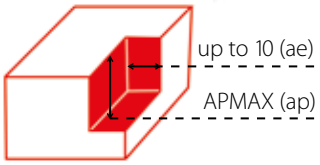
V-Mill Recommended Cutting Conditions for Machining Hard Materials

V-MILL Superior Milling Solutions

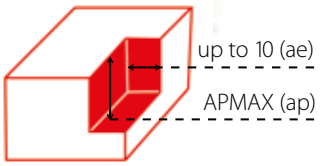
Square Head End Mills

Tool Family Groups: **VMSC-Z6-F-H | VMSC-Z6-F-H -LONG**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							Tool Dia =6-20mm ap=MAX/ae=DCXx10%		
					Air	Emulsion	Dia.	Dia.	Dia.
							6.0-8.0	10.0-12	16.0-20.0
H Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	60-110	40-80	0.02-0.05	0.03-0.07	0.04-0.1
	26			51-55HRc	40-80	30-70			
				55-60HRc	30-60	20-40			



Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							Tool Dia =6.0-20.0mm **LONG** ap=MAX/ ae=DCXx10%		
					Air	Emulsion	Dia.	Dia.	Dia.
							6.0-8.0	10.0-12	16.0-20.0
H Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	60-110	40-80	0.02-0.04	0.03-0.06	0.04-0.09
	26			51-55HRc	40-80	30-70			
				55-60HRc	30-60	20-40			



Ball Nose End Mills

Tool Family Groups: **VMSB-Z2-T-H | VMSB-Z4-C-H**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							Tool Dia=6-20mm ap=DX10%/ae=CXDx10%		
					Air	Emulsion	Dia.	Dia.	Dia.
							6.0-8.0	10.0-12	16.0-20.0
H Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	60-110	40-80	0.02-0.05	0.03-0.07	0.04-0.1
	26			51-55HRc	40-80	30-70			
				55-60HRc	30-60	20-40			

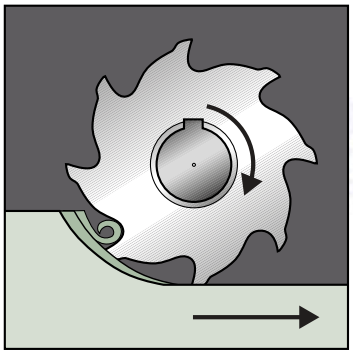
High Feed End Mills

Tool Family Groups: **VMSF-Z6-T-H**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/t]		
							Tool Dia=6-20mm ap=ap1-max/ae=DCXx40%		
					Air	Emulsion	Dia.	Dia.	Dia.
							6.0-8.0	10.0-12	16.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	120-180	120-170	0.1-0.3	0.12-0.45	0.15-0.6
	2		Medium Carbon (C=0.25-0.55%)	150	100-160	100-150			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	100-170	100-150			
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	90-150	60-110			
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
H Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	60-90	40-60	0.1-0.3	0.12-0.45	0.15-0.6
	26			51-55HRc	45-60	35-55			
				55-60HRc	25-50	20-45			

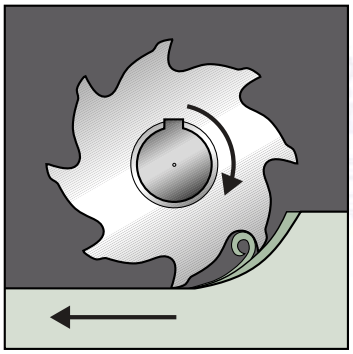
Technical Data
Milling Methods

Up Milling
Up milling, also known as conventional milling



- Hard Layer
- Old Machine
- Unstable Machines

Down Milling
Down milling, also known as climb milling

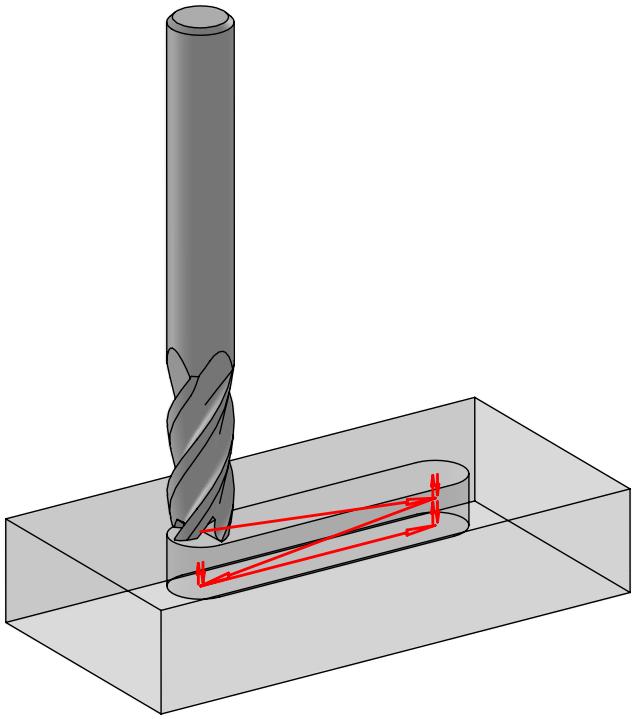


- Higher Tool Life (40%-50%)
- Lower Cutting Forces
- Better Surface Finish
- Good Chip Evacuation
- Less Power - Quiet

Machining Tips

Pocket - Rampdown

- Recommended rampdown angle
- Dia. up to 10 mm 5-10°
- Dia. from 10 mm 3-7°
- Deep cavities with rampdown
- Backward and forward 0.2-0.3 mm
- Prevents wear on the bottom of the tool



Machining Tips

Helical Interpolation

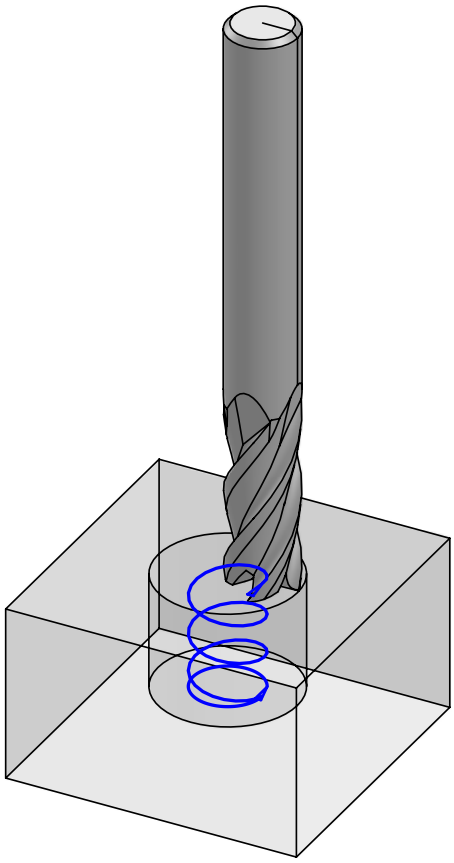
Helical Milling:

- Faster machining
- Improved reliability
- Better chip evacuation
- Full cutting of the tooth

Hole Dia. Helical Milling:

DMIN = ØDC end mill + 1 mm
DMAX = 2 x ØDC end mill -1 mm

- Dia. up to 10 mm 5-10°
- Dia. from 10 mm 3-7°



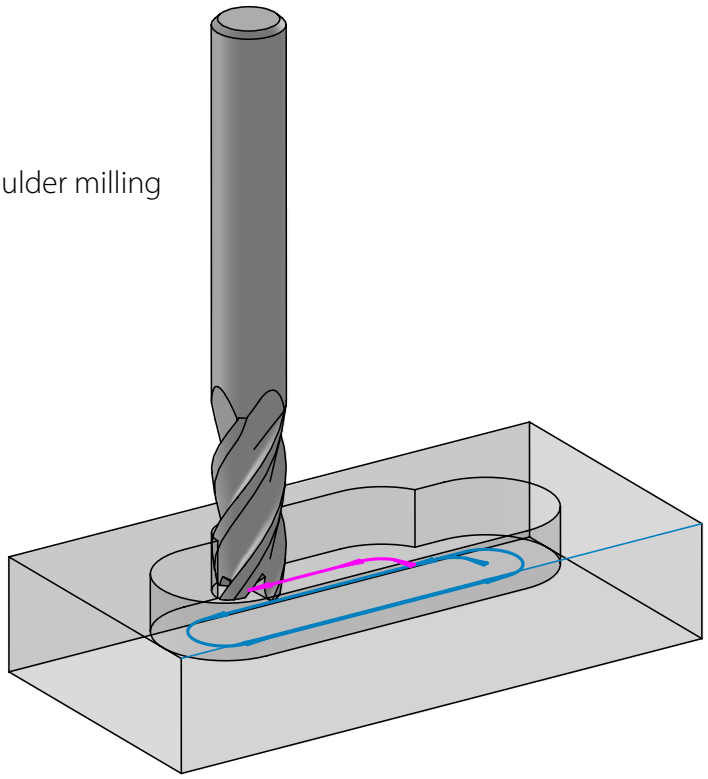
Pocket

Recommendation:

- Open the pocket in the middle and then perform shoulder milling
- Width of cut ae = 40% - 60% x ØDC

Benefits:

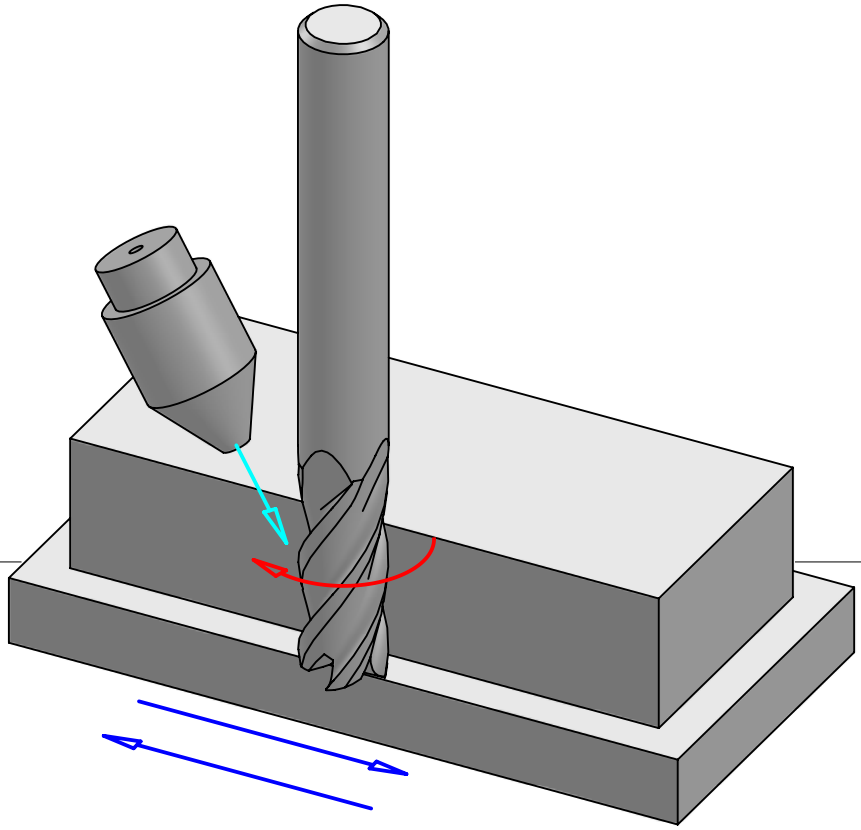
- Better chip evacuation
- No mismatch in the corner
- Consistent operation
- Less vibration
- Longer tool life



Coolant Recommendations

The use of coolants, air or emulsion, is very important for chip evacuation and tool life

- It is preferable to use one coolant hole with high pressure
- It is very important to have a constant coolant to avoid thermal shock.
  If not, it is recommended to use air.

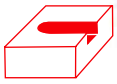


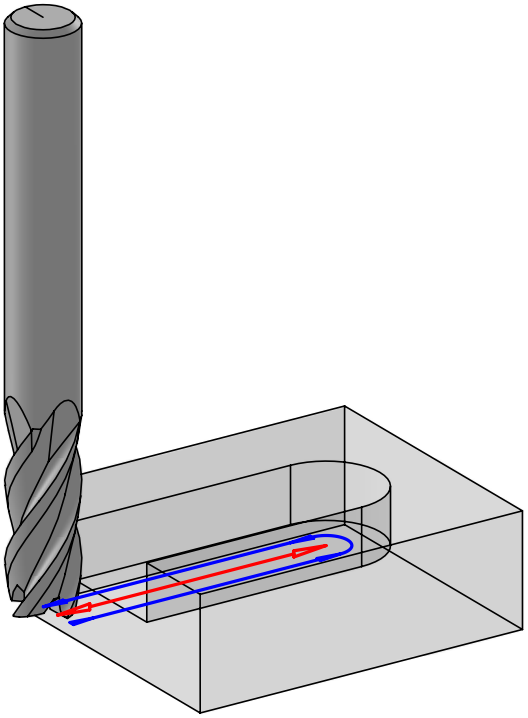
Recommended Coolant Methods

Air:
For machining Steel up to 45 HRC, longer tool life and avoiding thermal cracks

Emulsion:
For machining Stainless Steel, Exotic Materials and Aluminum

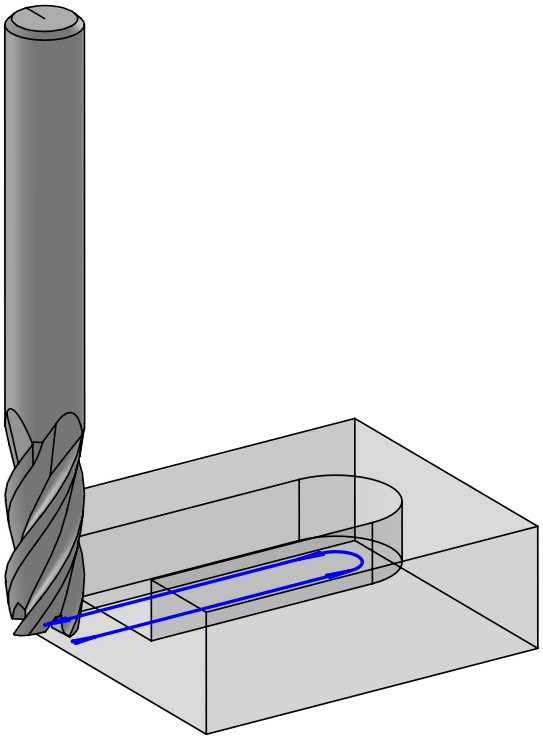
Roughing Side Pockets





Alternative recommended method:
Make one short pass to cut through the full slot groove in the pocket's center, then follow with a second pass around the pocket's profile.

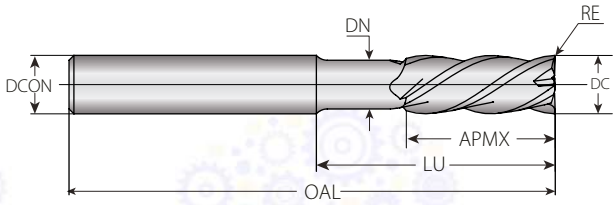
- Better chip evacuation
- Accurate profile
- Less corner vibration

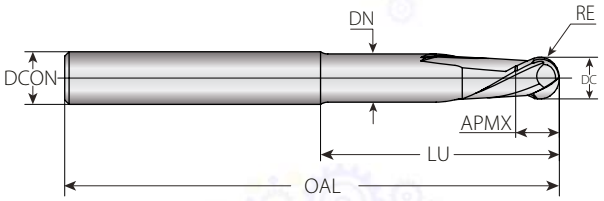


Conventional method:

- Poor chip evacuation
- May cause chipping
- One pass - full slot groove

Special Tools





☐ Square Head End Mills ☐ Ball Nose End Mills ☐ Square End Mill with Roughing Geometry

☐ Other: _____

DC- Cutting Diameter: _____

DCON- Connection Diameter (Shank): _____

APMX- Depth of Cut Maximum: _____

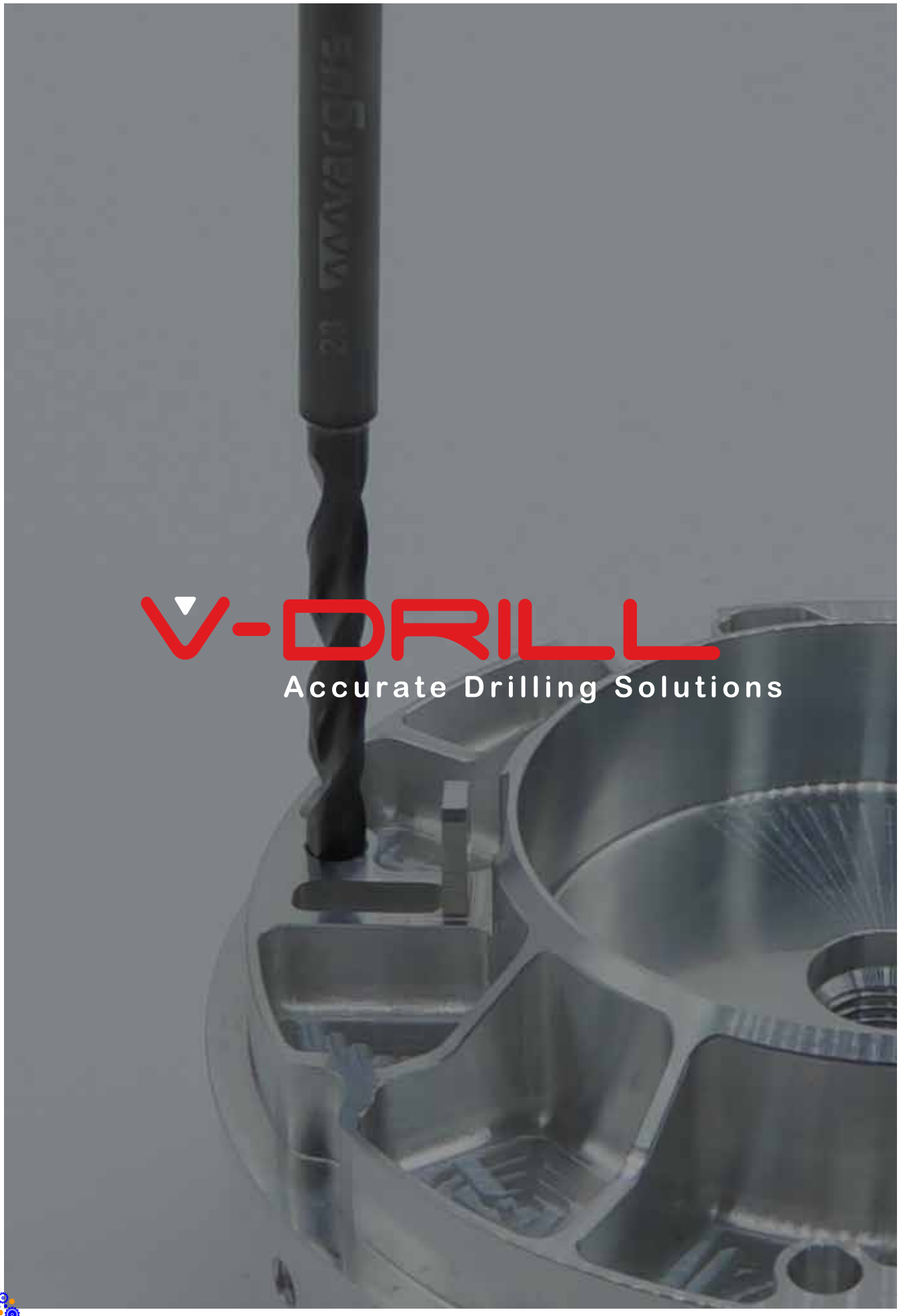
LU- Usable Length: _____

DN- Neck Diameter: _____

OAL- Overall Length: _____

RE- Corner Radius: _____

CHW- Chamfer Width: _____



Introducing the NEW V-Drill line of high-performance solid carbide drills.

The VARGUS V-Drill series revolutionizes ultra-high efficiency machining for Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel. Our advanced engineering optimizes drill design, enhances edge preparation surface quality, and incorporates cutting-edge NANO substrate and coating technologies. The result is a tool that delivers exceptional performance, longevity, and precision for application-specific solutions.

High Performance Product Line

- Solid Carbide Drills diameter range: 1.0 mm (.039") to 20 mm (0.783)
  Pre-Drilling and Pilot Holes for Thread Mills - 3XD-C and 5XD-C: up to 21.0 mm (.826")
- Multiple length-to-diameter configurations:
  3XD, 5XD: with and without Coolant thru
  8XD, 12XD: with Coolant thru
  All tools are suitable for Machining Stainless Steel, Steel and Titanium
- Center (NC) Drills: 90° and 120°
- Precision-ground pre-drilling tools specifically engineered to interface with threading solutions

Features and Benefits:

- **Optimized Design:** Engineered for maximum stability and efficiency, VARGUS drills reduce vibration and enhance cutting accuracy.
- **Unique Tool Diameter:** For pre-drilling operations, perfectly matched with thread milling cutters and taps to create a seamless machining process for M- Coarse, UNF, UNC, NPT and BSP standards.
- **Superior Edge Preparation:** Each drill edge is prepared to the highest standards, minimizing wear, ensuring repeatability, and extending tool life.
- **Advanced Carbide Grade:** Our drills utilize the latest NANO substrate and coating technologies, providing superior hardness and heat resistance for consistent performance in the toughest materials.
- **Versatility:** V-Drill tools are designed to handle a wide range of applications with ease and reliability, whether working with Stainless Steel, Titanium Alloys, Alloy Steel, or Carbon Steel.

Solid Carbide Drills

Technical Data

V-Drill Ordering Code System

VDS	-	0200	-	0100	-	04	-	Z2	-	3D	-	C	-	VM10
1		2		3		4		5		6		7		8

1- Line	2 - Drill Diameter Range	3 - LU - Max Drill Depth Range	4 - Shank Diameter	5 - Z - Number of Flutes
VDS - VARGUS Solid Carbide Drills	0100 - 0600 - 1.0 mm - 6.0 mm	0048 - 0368 - 4.8 mm - 36.8 mm	04 - 4.0 mm 06 - 6.0 mm	Z2 - 2 Flutes

6 - Max Depth	7 - Coolant	8 - BMC Grade
3XD 5XD 8XD 12XD	C - Coolant Thru	VM10 - AlTiN Nano Coated

V-Drill Center Drills

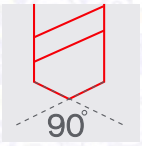
VDSC	-	090	-	0005	-	04	-	Z2	-	2D	-	VM8
1		2		3		4		5		6		7

1- Line	2 - Drill Type	3 - LU - Max Drill Depth Range	4 - Shank Diameter Range	5 - Z - Number of Flutes
VDSC - VARGUS Solid Carbide Center Drills	090 - 90° 120 - 120°	0005 - 0017 - 5.0 mm - 17 mm	04 - 12 - 4.0 mm - 12 mm	Z2 - 2 Flutes

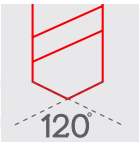
6 - Max Depth	7- BMC Grade
2XD	VM8 - AlTiN Coated

Solid Carbide Drills Icons

2 Flutes



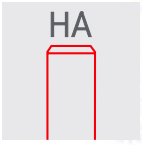
NC Drill 90°



NC Drill 120°

Aluminum Titanium Nitride Nano Coating

Aluminum Titanium Nitride Coating



Cylindrical Type

Drililing Depth 2XD

Drililing Depth 3XD

Drililing Depth 5XD

Drililing Depth 8XD

Drililing Depth 12XD


Coolant Thru


Drilling


Center Drill

Table of Tolerances

Nominal Size Range mm	DC (m7)	DCON (h6)
≥2-3	+0.002/+0.012	0.000/-0.006
>3-6	+0.004/+0.016	0.000/-0.008
>6-10	+0.006/+0.021	0.000/-0.009
>10-18	+0.007/+0.025	0.000/-0.011
>18-20	+0.008/+0.029	0.000/-0.013

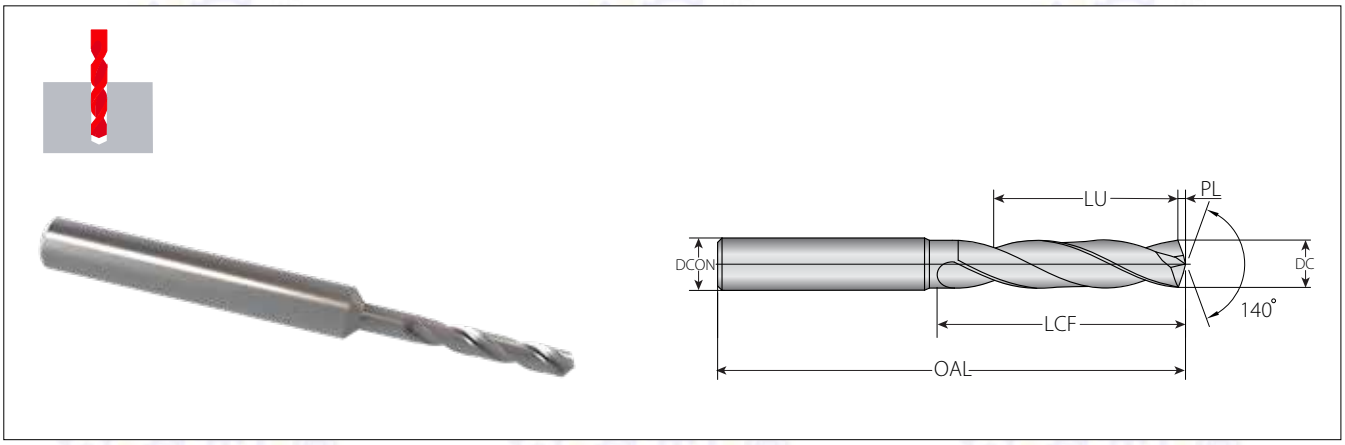
ISO 13399

VARGUS defines the new V-Drill Line according to the ISO 13399 standard.
See the list below of the dimensions used in this catalog.
ISO 13399 is an international technical standard for the computer-interpretable representation and exchange of cutting tools and toolholders. The objective of this standard is to provide a system that allows for a neutral file exchange, and a basis for implementing and sharing product databases and archiving.

ISO 13399 Dimension	Description
DC	Cutting Diameter
DCON	Connection Diameter
APMX	Depth of Cut Maximum
LU	Usable Length
OAL	Overall Length
LCF	Length Chip Flute
SIG	Point Angle
PL	Point Length

VDS 3XD

V-DRILL
Accurate Drilling Solutions



3XD Coated Twist Drills

These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable
for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.
The coating provides excellent wear resistance.

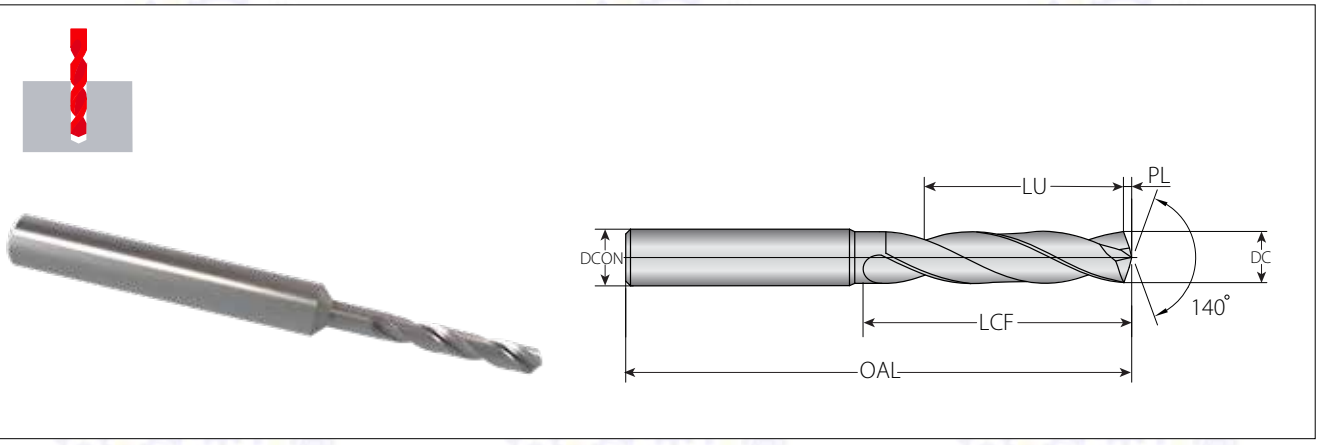
Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0100-0055-04-Z2-3D-VM10	G20-00001	1	4	5.5	0.18	7	45	•
VDS-0110-0054-04-Z2-3D-VM10	G20-00002	1.1	4	5.4	0.2	7	45	•
VDS-0120-0052-04-Z2-3D-VM10	G20-00003	1.2	4	5.2	0.22	7	45	•
VDS-0125-0051-04-Z2-3D-VM10	G20-00004	1.25	4	5.1	0.23	7	45	•
VDS-0130-0051-04-Z2-3D-VM10	G20-00005	1.3	4	5.1	0.24	7	45	•
VDS-0140-0049-04-Z2-3D-VM10	G20-00006	1.4	4	4.9	0.25	7	45	•
VDS-0145-0048-04-Z2-3D-VM10	G20-00007	1.45	4	4.8	0.26	7	45	•
VDS-0150-0068-04-Z2-3D-VM10	G20-00008	1.5	4	6.8	0.27	9	55	•
VDS-0160-0066-04-Z2-3D-VM10	G20-00009	1.6	4	6.6	0.29	9	55	•
VDS-0165-0065-04-Z2-3D-VM10	G20-00010	1.65	4	6.5	0.30	9	55	•
VDS-0170-0065-04-Z2-3D-VM10	G20-00011	1.7	4	6.5	0.31	9	55	•
VDS-0175-0064-04-Z2-3D-VM10	G20-00012	1.75	4	6.4	0.32	9	55	•
VDS-0180-0063-04-Z2-3D-VM10	G20-00013	1.8	4	6.3	0.33	9	55	•
VDS-0185-0009-04-Z2-3D-VM10	G20-00014	1.85	4	6.2	0.34	9	55	•
VDS-0190-0062-04-Z2-3D-VM10	G20-00015	1.9	4	6.2	0.35	9	55	•
VDS-0195-0061-04-Z2-3D-VM10	G20-00016	1.95	4	6.1	0.35	9	55	•
VDS-0200-0100-04-Z2-3D-VM10	G20-00017	2	4	10.0	0.36	13	55	•
VDS-0205-0099-04-Z2-3D-VM10	G20-00018	2.05	4	9.9	0.37	13	55	•
VDS-0210-0099-04-Z2-3D-VM10	G20-00019	2.1	4	9.9	0.38	13	55	•
VDS-0215-0098-04-Z2-3D-VM10	G20-00020	2.15	4	9.8	0.39	13	55	•
VDS-0220-0097-04-Z2-3D-VM10	G20-00021	2.2	4	9.7	0.40	13	55	•
VDS-0230-0096-04-Z2-3D-VM10	G20-00022	2.3	4	9.6	0.42	13	55	•
VDS-0240-0134-04-Z2-3D-VM10	G20-00023	2.4	4	13.4	0.44	17	55	•
VDS-0250-0133-04-Z2-3D-VM10	G20-00024	2.5	4	13.3	0.45	17	55	•

• In Stock

* Shank DIN 6535HA

VDS 3XD (con't)

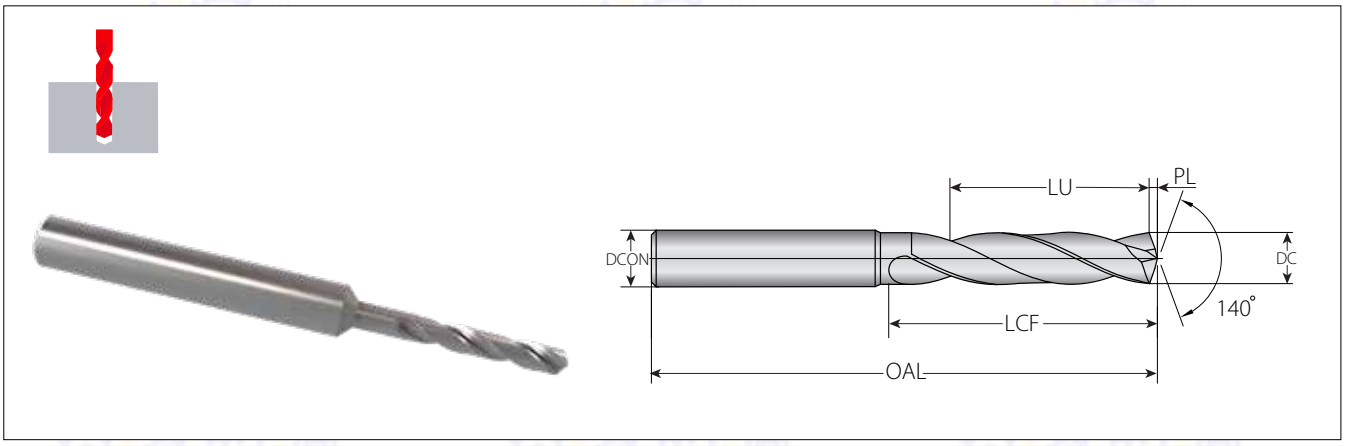
V-DRILL
Accurate Drilling Solutions



Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0260-0131-04-Z2-3D-VM10	G20-00025	2.6	4	13.1	0.47	17	55	•
VDS-0270-0130-04-Z2-3D-VM10	G20-00026	2.7	4	13.0	0.49	17	55	•
VDS-0275-0129-04-Z2-3D-VM10	G20-00027	2.75	4	12.9	0.50	17	55	•
VDS-0280-0128-04-Z2-3D-VM10	G20-00028	2.8	4	12.8	0.51	17	55	•
VDS-0290-0127-04-Z2-3D-VM10	G20-00029	2.9	4	12.7	0.53	17	55	•
VDS-0300-0155-04-Z2-3D-VM10	G20-00030	3	4	15.5	0.55	20	62	•
VDS-0310-0154-04-Z2-3D-VM10	G20-00031	3.1	4	15.4	0.56	20	62	•
VDS-0315-0153-04-Z2-3D-VM10	G20-00032	3.15	4	15.3	0.57	20	62	•
VDS-0320-0152-04-Z2-3D-VM10	G20-00033	3.2	4	15.2	0.58	20	62	•
VDS-0325-0151-04-Z2-3D-VM10	G20-00034	3.25	4	15.1	0.59	20	62	•
VDS-0330-0149-04-Z2-3D-VM10	G20-00035	3.3	4	15.1	0.60	20	62	•
VDS-0340-0148-04-Z2-3D-VM10	G20-00036	3.4	4	14.9	0.62	20	62	•
VDS-0350-0146-04-Z2-3D-VM10	G20-00037	3.5	4	14.8	0.64	20	62	•
VDS-0360-0145-04-Z2-3D-VM10	G20-00038	3.6	4	14.6	0.66	20	62	•
VDS-0370-0183-04-Z2-3D-VM10	G20-00039	3.7	4	14.5	0.67	20	62	•
VDS-0380-0182-04-Z2-3D-VM10	G20-00040	3.8	4	18.3	0.69	24	66	•
VDS-0390-0180-04-Z2-3D-VM10	G20-00041	3.9	4	18.2	0.71	24	66	•
VDS-0400-0179-06-Z2-3D-VM10	G20-00042	4	6	18.0	0.73	24	66	•
VDS-0410-0177-06-Z2-3D-VM10	G20-00043	4.1	6	17.9	0.75	24	66	•
VDS-0420-0176-06-Z2-3D-VM10	G20-00044	4.2	6	17.7	0.76	24	66	•
VDS-0425-0176-06-Z2-3D-VM10	G20-00045	4.25	6	17.6	0.77	24	66	•
VDS-0430-0176-06-Z2-3D-VM10	G20-00046	4.3	6	17.6	0.78	24	66	•
VDS-0440-0174-06-Z2-3D-VM10	G20-00047	4.4	6	17.4	0.8	24	66	•
VDS-0450-0173-06-Z2-3D-VM10	G20-00048	4.5	6	17.3	0.82	24	66	•
VDS-0460-0171-06-Z2-3D-VM10	G20-00049	4.6	6	17.1	0.84	24	66	•
VDS-0465-0170-06-Z2-3D-VM10	G20-00050	4.65	6	17	0.85	24	66	•
VDS-0470-0170-06-Z2-3D-VM10	G20-00051	4.7	6	17	0.86	24	66	•
VDS-0480-0208-06-Z2-3D-VM10	G20-00052	4.8	6	20.8	0.87	28	66	•
VDS-0490-0207-06-Z2-3D-VM10	G20-00053	4.9	6	20.7	0.89	28	66	•
VDS-0500-0205-06-Z2-3D-VM10	G20-00054	5	6	20.5	0.91	28	66	•
VDS-0510-0204-06-Z2-3D-VM10	G20-00055	5.1	6	20.4	0.93	28	66	•
VDS-0520-0205-06-Z2-3D-VM10	G20-00056	5.2	6	20.5	0.95	28	66	•
VDS-0530-0201-06-Z2-3D-VM10	G20-00057	5.3	6	20.1	0.96	28	66	•
VDS-0540-0199-06-Z2-3D-VM10	G20-00058	5.4	6	19.9	0.98	28	66	•
VDS-0550-0198-06-Z2-3D-VM10	G20-00059	5.5	6	19.8	1	28	66	•
VDS-0560-0197-06-Z2-3D-VM10	G20-00060	5.6	6	19.7	1.01	28	66	•
VDS-0570-0196-06-Z2-3D-VM10	G20-00061	5.7	6	19.6	1.02	28	66	•
VDS-0580-0193-06-Z2-3D-VM10	G20-00062	5.8	6	19.3	1.06	28	66	•
VDS-0590-0192-06-Z2-3D-VM10	G20-00063	5.9	6	19.2	1.07	28	66	•
VDS-0600-0190-06-Z2-3D-VM10	G20-00064	6	6	19	1.09	28	66	•

• In Stock
* Shank DIN 6535HA

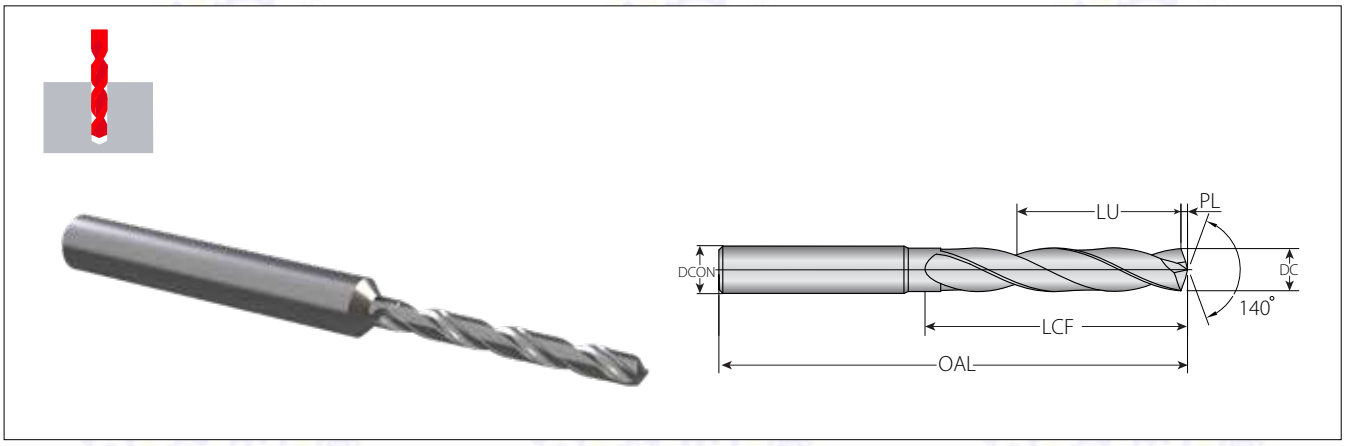
VDS 3XD (con't)



Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0650-0243-08-Z2-3D-VM10	G20-00145	6.5	8	24.3	1.18	34	79	•
VDS-0700-0235-08-Z2-3D-VM10	G20-00146	7	8	23.5	1.27	34	79	•
VDS-0750-0298-08-Z2-3D-VM10	G20-00147	7.5	8	29.8	1.36	41	79	•
VDS-0800-0290-08-Z2-3D-VM10	G20-00148	8	8	29.0	1.46	41	79	•
VDS-0850-0343-10-Z2-3D-VM10	G20-00149	8.5	10	34.3	1.55	47	89	•
VDS-0900-0335-10-Z2-3D-VM10	G20-00150	9	10	33.5	1.64	47	89	•
VDS-0950-0328-10-Z2-3D-VM10	G20-00151	9.5	10	32.8	1.73	47	89	•
VDS-1000-0320-10-Z2-3D-VM10	G20-00152	10	10	32.0	1.82	47	89	•
VDS-1050-0393-12-Z2-3D-VM10	G20-00153	10.5	12	39.3	1.91	55	102	•
VDS-1100-0385-12-Z2-3D-VM10	G20-00154	11	12	38.5	2.00	55	102	•
VDS-1150-0378-12-Z2-3D-VM10	G20-00155	11.5	12	37.8	2.09	55	102	•
VDS-1200-0370-12-Z2-3D-VM10	G20-00156	12	12	37.0	2.18	55	102	•
VDS-1300-0405-14-Z2-3D-VM10	G20-00157	13	14	40.5	2.37	60	107	•
VDS-1400-0390-14-Z2-3D-VM10	G20-00158	14	14	39.0	2.55	60	107	•
VDS-1500-0425-16-Z2-3D-VM10	G20-00159	15	16	42.5	2.73	65	115	•
VDS-1600-0410-16-Z2-3D-VM10	G20-00160	16	16	41.0	2.91	65	115	•
VDS-1700-0475-18-Z2-3D-VM10	G20-00161	17	18	47.5	3.09	73	123	•
VDS-1800-0460-18-Z2-3D-VM10	G20-00162	18	18	46.0	3.28	73	123	•
VDS-1900-0505-20-Z2-3D-VM10	G20-00163	19	20	50.5	3.46	79	131	•
VDS-2000-0490-20-Z2-3D-VM10	G20-00164	20	20	49.0	3.64	79	131	•

• In Stock

* Shank DIN 6535HA



5XD Coated Twist Drills

These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.
The coating provides excellent wear resistance.

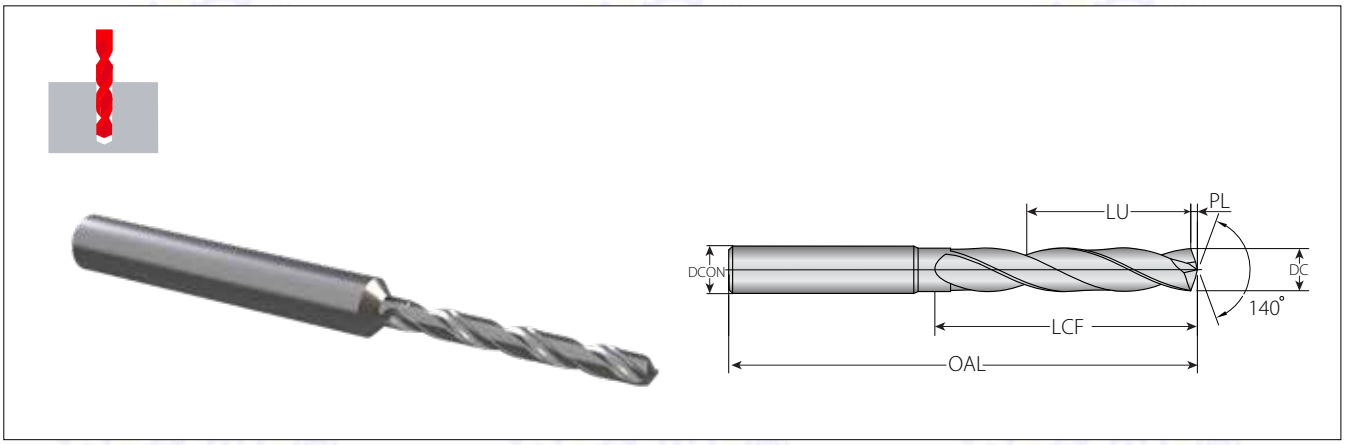
HA | AlTiN nano | 5xD | 2 | P | M | K | S

Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0100-0075-04-Z2-5D-VM10	G20-00065	1	4	7.5	0.18	9	45	•
VDS-0110-0074-04-Z2-5D-VM10	G20-00066	1.1	4	7.4	0.2	9	45	•
VDS-0120-0072-04-Z2-5D-VM10	G20-00067	1.2	4	7.2	0.22	9	45	•
VDS-0130-0071-04-Z2-5D-VM10	G20-00068	1.3	4	7.1	0.24	9	45	•
VDS-0140-0069-04-Z2-5D-VM10	G20-00069	1.4	4	6.9	0.25	9	45	•
VDS-0150-0098-04-Z2-5D-VM10	G20-00070	1.5	4	9.8	0.27	12	55	•
VDS-0160-0096-04-Z2-5D-VM10	G20-00071	1.6	4	9.6	0.29	12	55	•
VDS-0170-0095-04-Z2-5D-VM10	G20-00072	1.7	4	9.5	0.31	12	55	•
VDS-0180-0093-04-Z2-5D-VM10	G20-00073	1.8	4	9.3	0.33	12	55	•
VDS-0190-0092-04-Z2-5D-VM10	G20-00074	1.9	4	9.2	0.35	12	55	•
VDS-0200-0150-04-Z2-5D-VM10	G20-00075	2	4	15	0.36	18	62	•
VDS-0210-0149-04-Z2-5D-VM10	G20-00076	2.1	4	14.9	0.38	18	62	•
VDS-0220-0147-04-Z2-5D-VM10	G20-00077	2.2	4	14.7	0.4	18	62	•
VDS-0230-0146-04-Z2-5D-VM10	G20-00078	2.3	4	14.6	0.42	18	62	•
VDS-0240-0184-04-Z2-5D-VM10	G20-00079	2.4	4	18.4	0.44	22	62	•
VDS-0250-0183-04-Z2-5D-VM10	G20-00080	2.5	4	18.3	0.45	22	62	•
VDS-0260-0181-04-Z2-5D-VM10	G20-00081	2.6	4	18.1	0.47	22	62	•
VDS-0270-0180-04-Z2-5D-VM10	G20-00082	2.7	4	18	0.49	22	62	•
VDS-0280-0178-04-Z2-5D-VM10	G20-00083	2.8	4	17.8	0.51	22	62	•
VDS-0290-0177-04-Z2-5D-VM10	G20-00084	2.9	4	17.7	0.53	22	62	•
VDS-0300-0235-06-Z2-5D-VM10	G20-00085	3	6	23.5	0.55	28	66	•
VDS-0310-0234-06-Z2-5D-VM10	G20-00086	3.1	6	23.4	0.56	28	66	•
VDS-0320-0232-06-Z2-5D-VM10	G20-00087	3.2	6	23.2	0.58	28	66	•
VDS-0330-0231-06-Z2-5D-VM10	G20-00088	3.3	6	23.1	0.6	28	66	•
VDS-0340-0229-06-Z2-5D-VM10	G20-00089	3.4	6	22.9	0.62	28	66	•
VDS-0350-0228-06-Z2-5D-VM10	G20-00090	3.5	6	22.8	0.64	28	66	•
VDS-0360-0226-06-Z2-5D-VM10	G20-00091	3.6	6	22.6	0.66	28	66	•
VDS-0370-0225-06-Z2-5D-VM10	G20-00092	3.7	6	22.5	0.67	28	66	•

• In Stock
* Shank DIN 6535HA

VDS 5XD (con't)

V-DRILL
Accurate Drilling Solutions



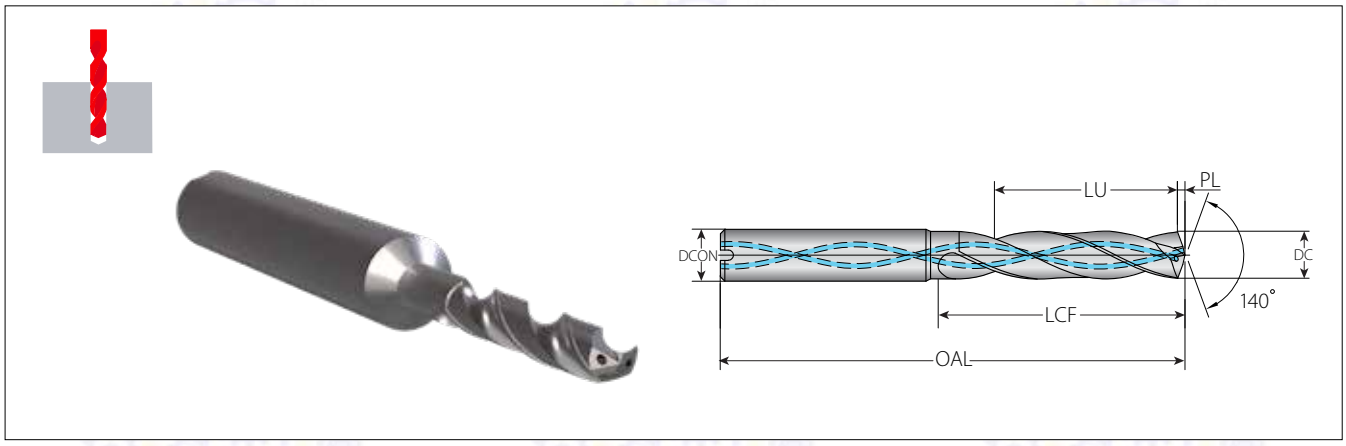
Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0380-0303-06-Z2-5D-VM10	G20-00093	3.8	6	30.3	0.69	36	74	•
VDS-0390-0302-06-Z2-5D-VM10	G20-00094	3.9	6	30.2	0.71	36	74	•
VDS-0400-0300-06-Z2-5D-VM10	G20-00095	4	6	30	0.73	36	74	•
VDS-0410-0299-06-Z2-5D-VM10	G20-00096	4.1	6	29.9	0.75	36	74	•
VDS-0420-0297-06-Z2-5D-VM10	G20-00097	4.2	6	29.7	0.76	36	74	•
VDS-0430-0296-06-Z2-5D-VM10	G20-00098	4.3	6	29.6	0.78	36	74	•
VDS-0440-0294-06-Z2-5D-VM10	G20-00099	4.4	6	29.4	0.8	36	74	•
VDS-0450-0293-06-Z2-5D-VM10	G20-00100	4.5	6	29.3	0.82	36	74	•
VDS-0460-0291-06-Z2-5D-VM10	G20-00101	4.6	6	29.1	0.84	36	74	•
VDS-0470-0290-06-Z2-5D-VM10	G20-00102	4.7	6	29	0.86	36	74	•
VDS-0480-0368-06-Z2-5D-VM10	G20-00103	4.8	6	36.8	0.87	44	82	•
VDS-0490-0367-06-Z2-5D-VM10	G20-00104	4.9	6	36.7	0.89	44	82	•
VDS-0500-0365-06-Z2-5D-VM10	G20-00105	5	6	36.5	0.91	44	82	•
VDS-0510-0364-06-Z2-5D-VM10	G20-00106	5.1	6	36.4	0.93	44	82	•
VDS-0520-0362-06-Z2-5D-VM10	G20-00107	5.2	6	36.2	0.95	44	82	•
VDS-0530-0361-06-Z2-5D-VM10	G20-00108	5.3	6	36.1	0.96	44	82	•
VDS-0540-0359-06-Z2-5D-VM10	G20-00109	5.4	6	35.9	0.98	44	82	•
VDS-0550-0358-06-Z2-5D-VM10	G20-00110	5.5	6	35.8	1	44	82	•
VDS-0560-0356-06-Z2-5D-VM10	G20-00111	5.6	6	35.6	1.02	44	82	•
VDS-0570-0355-06-Z2-5D-VM10	G20-00112	5.7	6	35.5	1.04	44	82	•
VDS-0580-0353-06-Z2-5D-VM10	G20-00113	5.8	6	35.3	1.06	44	82	•
VDS-0590-0352-06-Z2-5D-VM10	G20-00114	5.9	6	35.2	1.07	44	82	•
VDS-0600-0350-06-Z2-5D-VM10	G20-00115	6	6	35	1.09	44	82	•
VDS-0700-0425-08-Z2-5D-VM10	G20-00179	7	8	42.5	1.27	53	91	•
VDS-0800-0410-08-Z2-5D-VM10	G20-00180	8	8	41.0	1.46	53	91	•
VDS-0900-0475-10-Z2-5D-VM10	G20-00181	9	10	47.5	1.64	61	103	•
VDS-1000-0460-10-Z2-5D-VM10	G20-00182	10	10	46.0	1.82	61	103	•
VDS-1100-0545-12-Z2-5D-VM10	G20-00183	11	12	54.5	2.00	71	118	•
VDS-1200-0530-12-Z2-5D-VM10	G20-00184	12	12	53.0	2.18	71	118	•
VDS-1300-0575-14-Z2-5D-VM10	G20-00185	13	14	57.5	2.37	77	124	•
VDS-1400-0560-14-Z2-5D-VM10	G20-00186	14	14	56.0	2.55	77	124	•
VDS-1500-0605-16-Z2-5D-VM10	G20-00187	15	16	60.5	2.73	83	133	•
VDS-1600-0590-16-Z2-5D-VM10	G20-00188	16	16	59.0	2.91	83	133	•
VDS-1700-0675-18-Z2-5D-VM10	G20-00189	17	18	67.5	3.09	93	143	•
VDS-1800-0660-18-Z2-5D-VM10	G20-00190	18	18	66.0	3.28	93	143	•
VDS-1900-0725-20-Z2-5D-VM10	G20-00191	19	20	72.5	3.46	101	153	•
VDS-2000-0710-20-Z2-5D-VM10	G20-00192	20	20	71.0	3.64	101	153	•

• In Stock

* Shank DIN 6535HA

VDS 3XD-C

V-DRILL
Accurate Drilling Solutions



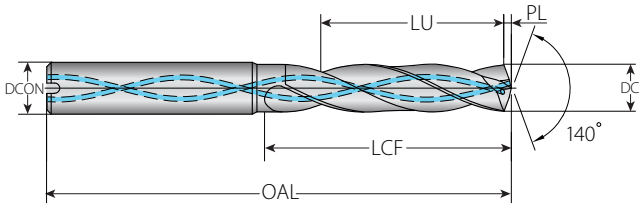
3XD Coated Twist Drills with Coolant Thru

These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.
The coating provides excellent wear resistance.
The table below includes dimensions for pre-drilling and pilot holes for thread mill: M-Coarse, UNF, UNC, NPT and BSP standards.

Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC (h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-0110-0053-04-Z2-3D-C-VM10	G20-00235	1.1	4	5.35	0.2	7	45	•	•
VDS-0125-0051-04-Z2-3D-C-VM10	G20-00236	1.25	4	5.125	0.23	7	45	•	•
VDS-0145-0051-04-Z2-3D-C-VM10	G20-00237	1.45	4	4.825	0.26	7	45	•	•
VDS-0150-0067-04-Z2-3D-C-VM10	G20-00238	1.5	4	6.75	0.27	9	55	•	•
VDS-0155-0067-04-Z2-3D-C-VM10	G20-00239	1.55	4	6.675	0.28	9	55	•	•
VDS-0160-0066-04-Z2-3D-C-VM10	G20-00240	1.6	4	6.6	0.29	9	55	•	•
VDS-0175-0063-04-Z2-3D-C-VM10	G20-00241	1.75	4	6.375	0.32	9	55	•	•
VDS-0180-0063-04-Z2-3D-C-VM10	G20-00242	1.8	4	6.3	0.33	9	55	•	•
VDS-0185-0062-04-Z2-3D-C-VM10	G20-00243	1.85	4	6.225	0.34	9	55	•	•
VDS-0200-0010-04-Z2-3D-C-VM10	G20-00116	2	4	10	0.36	13	55	•	
VDS-0205-0099-04-Z2-3D-C-VM10	G20-00244	2.05	4	9.925	0.37	13	55	•	•
VDS-0210-0098-04-Z2-3D-C-VM10	G20-00245	2.1	4	9.85	0.38	13	55	•	•
VDS-0230-0095-04-Z2-3D-C-VM10	G20-00246	2.3	4	9.55	0.42	13	55	•	•
VDS-0250-0133-04-Z2-3D-C-VM10	G20-00119	2.5	4	13.3	0.45	17	55	•	
VDS-0260-0131-04-Z2-3D-C-VM10	G20-00247	2.6	4	13.1	0.47	17	55	•	•
VDS-0280-0128-04-Z2-3D-C-VM10	G20-00248	2.8	4	12.8	0.51	17	55	•	•
VDS-0290-0126-04-Z2-3D-C-VM10	G20-00249	2.9	4	12.65	0.53	17	55	•	•
VDS-0300-0155-04-Z2-3D-C-VM10	G20-00119	3	4	15.5	0.55	20	62	•	
VDS-0330-0150-06-Z2-3D-C-VM10	G20-00250	3.3	6	15.05	0.6	20	62	•	•
VDS-0340-0149-06-Z2-3D-C-VM10	G20-00251	3.4	6	14.9	0.62	20	62	•	•
VDS-0350-0148-04-Z2-3D-C-VM10	G20-00119	3.5	4	14.8	0.64	20	62	•	
VDS-0370-0144-06-Z2-3D-C-VM10	G20-00252	3.7	6	14.45	0.67	20	62	•	•
VDS-0380-0183-06-Z2-3D-C-VM10	G20-00253	3.8	6	18.3	0.69	24	66	•	•
VDS-0400-0180-06-Z2-3D-C-VM10	G20-00120	4	6	18	0.73	24	66	•	
VDS-0410-0178-06-Z2-3D-C-VM10	G20-00254	4.1	6	17.85	0.75	24	66	•	•
VDS-0420-0177-06-Z2-3D-C-VM10	G20-00255	4.2	6	17.7	0.76	24	66	•	•

• In Stock
* Shank DIN 6535HA

VDS 3XD-C (con't)

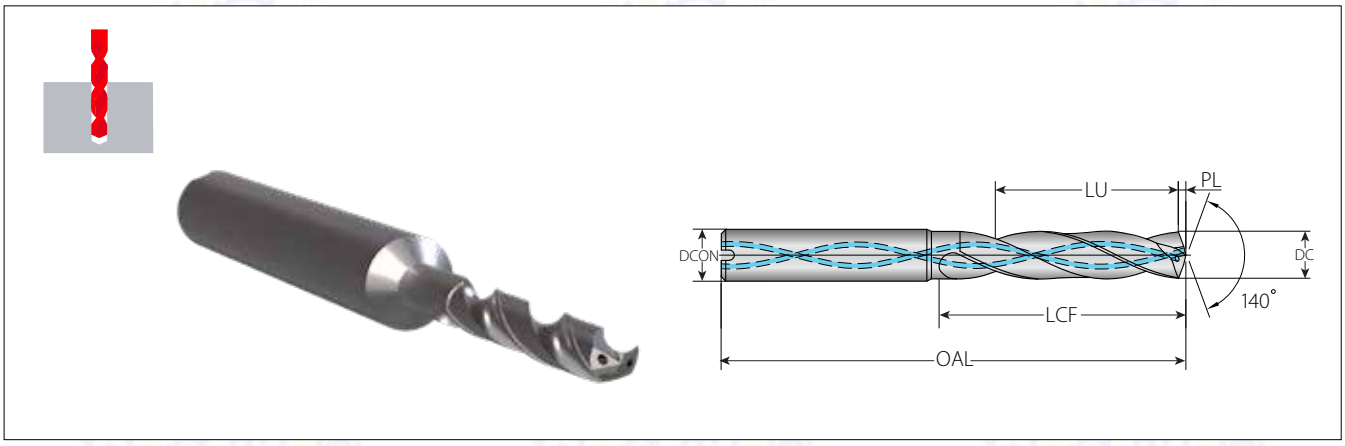


Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC)h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-0450-0173-06-Z2-3D-C-VM10	G20-00121	4.5	6	17.3	0.82	24	66	•	
VDS-0460-0171-06-Z2-3D-C-VM10	G20-00256	4.6	6	17.1	0.84	24	66	•	•
VDS-0500-0205-06-Z2-3D-C-VM10	G20-00122	5	6	20.5	0.91	28	66	•	
VDS-0510-0203-06-Z2-3D-C-VM10	G20-00257	5.1	6	20.35	0.93	28	66	•	•
VDS-0520-0197-06-Z2-3D-C-VM10	G20-00258	5.2	6	20.2	0.95	28	66	•	•
VDS-0550-0198-06-Z2-3D-C-VM10	G20-00123	5.5	6	19.8	1	28	66	•	
VDS-0598-0190-06-Z2-3D-C-VM10	G20-00259	5.98	6	19.03	1.09	28	66	•	•
VDS-0600-0190-06-Z2-3D-C-VM10	G20-00124	6	6	19	1.09	28	66	•	
VDS-0660-0241-08-Z2-3D-C-VM10	G20-00260	6.6	8	24.1	1.2	34	79	•	•
VDS-0670-0239-08-Z2-3D-C-VM10	G20-00261	6.7	8	23.95	1.22	34	79	•	•
VDS-0680-0238-08-Z2-3D-C-VM10	G20-00262	6.8	8	23.8	1.24	34	79	•	•
VDS-0690-0236-08-Z2-3D-C-VM10	G20-00263	6.9	8	23.65	1.26	34	79	•	•
VDS-0700-0235-08-Z2-3D-C-VM10	G20-00165	7	8	23.5	1.27	34	79	•	
VDS-0800-0410-08-Z2-3D-C-VM10	G20-00166	8	8	41.0	1.46	41	79	•	
VDS-0832-0345-10-Z2-3D-C-VM10	G20-00264	8.32	10	34.52	1.51	47	89	•	•
VDS-0850-0342-10-Z2-3D-C-VM10	G20-00265	8.5	10	34.25	1.55	47	89	•	
VDS-0870-0339-10-Z2-3D-C-VM10	G20-00266	8.7	10	33.95	1.58	47	89	•	•
VDS-0900-0475-10-Z2-3D-C-VM10	G20-00167	9	10	47.5	1.64	47	89	•	
VDS-0940-0329-10-Z2-3D-C-VM10	G20-00267	9.4	10	32.9	1.71	47	89	•	•
VDS-0990-0321-10-Z2-3D-C-VM10	G20-00268	9.9	10	32.15	1.8	47	89	•	•
VDS-1000-0320-10-Z2-3D-C-VM10	G20-00168	10	10	32.0	1.82	47	89	•	
VDS-1020-0397-12-Z2-3D-C-VM10	G20-00269	10.2	12	39.7	1.86	55	102	•	•
VDS-1070-0389-12-Z2-3D-C-VM10	G20-00270	10.7	12	38.95	1.95	55	102	•	•
VDS-1080-0388-12-Z2-3D-C-VM10	G20-00271	10.8	12	38.8	1.97	55	102	•	•
VDS-1100-0385-12-Z2-3D-C-VM10	G20-00169	11	12	38.5	2.00	55	102	•	
VDS-1150-0377-12-Z2-3D-C-VM10	G20-00272	11.5	12	37.75	2.09	55	102	•	•
VDS-1170-0374-12-Z2-3D-C-VM10	G20-00273	11.7	12	37.45	2.13	55	102	•	•
VDS-1200-0370-12-Z2-3D-C-VM10	G20-00170	12	12	37.0	2.18	55	102	•	
VDS-1230-0415-14-Z2-3D-C-VM10	G20-00274	12.3	14	41.55	2.24	60	107	•	•
VDS-1290-0406-14-Z2-3D-C-VM10	G20-00275	12.9	14	40.65	2.35	60	107	•	•
VDS-1300-0405-14-Z2-3D-C-VM10	G20-00171	13	14	40.5	2.37	60	107	•	
VDS-1360-0396-14-Z2-3D-C-VM10	G20-00276	13.6	14	39.6	2.47	60	107	•	•
VDS-1400-0390-14-Z2-3D-C-VM10	G20-00172	14	14	39.0	2.55	60	107	•	

• In Stock

* Shank DIN 6535HA

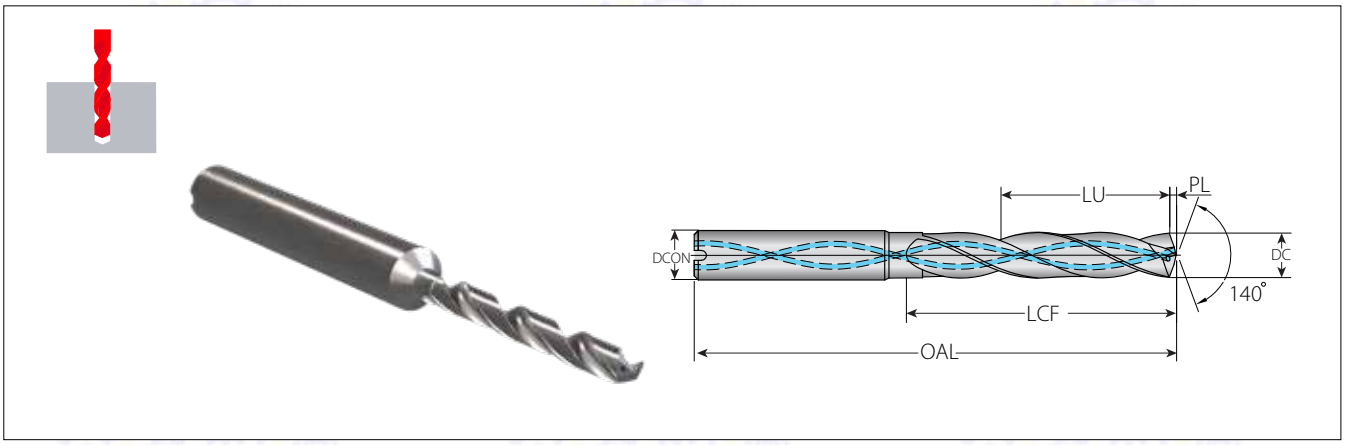
VDS 3XD-C (con't)



Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC (h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-1420-0437-16-Z2-3D-C-VM10	G20-00277	14.2	16	43.7	2.58	65	115	•	•
VDS-1450-0432-16-Z2-3D-C-VM10	G20-00278	14.5	16	43.25	2.64	65	115	•	
VDS-1500-0425-16-Z2-3D-C-VM10	G20-00173	15	16	42.5	2.73	65	115	•	
VDS-1520-0422-16-Z2-3D-C-VM10	G20-00279	15.2	16	42.2	2.77	65	115	•	•
VDS-1550-0417-16-Z2-3D-C-VM10	G20-00280	15.5	16	41.75	2.82	65	115	•	•
VDS-1600-0410-16-Z2-3D-C-VM10	G20-00174	16	16	41.0	2.91	65	115	•	
VDS-1660-0481-18-Z2-3D-C-VM10	G20-00281	16.6	18	48.1	3.02	73	123	•	•
VDS-1700-0475-18-Z2-3D-C-VM10	G20-00175	17	18	47.5	3.09	73	123	•	
VDS-1750-0467-18-Z2-3D-C-VM10	G20-00282	17.5	18	46.75	3.18	73	123	•	•
VDS-1800-0460-18-Z2-3D-C-VM10	G20-00176	18	18	46.0	3.28	73	123	•	
VDS-1900-0505-20-Z2-3D-C-VM10	G20-00177	19	20	50.5	3.46	79	131	•	
VDS-1950-0497-20-Z2-3D-C-VM10	G20-00283	19.5	20	49.75	3.55	79	131	•	•
VDS-2000-0490-20-Z2-3D-C-VM10	G20-00178	20	20	49.0	3.64	79	131	•	
VDS-2050-0482-22-Z2-3D-C-VM10	G20-00284	20.5	22	48.25	3.73	79	131	•	•
VDS-2100-0475-22-Z2-3D-C-VM10	G20-00285	21	22	47.5	3.82	79	131	•	•

• In Stock

* Shank DIN 6535HA



5XD Coated Twist Drills with Coolant Thru

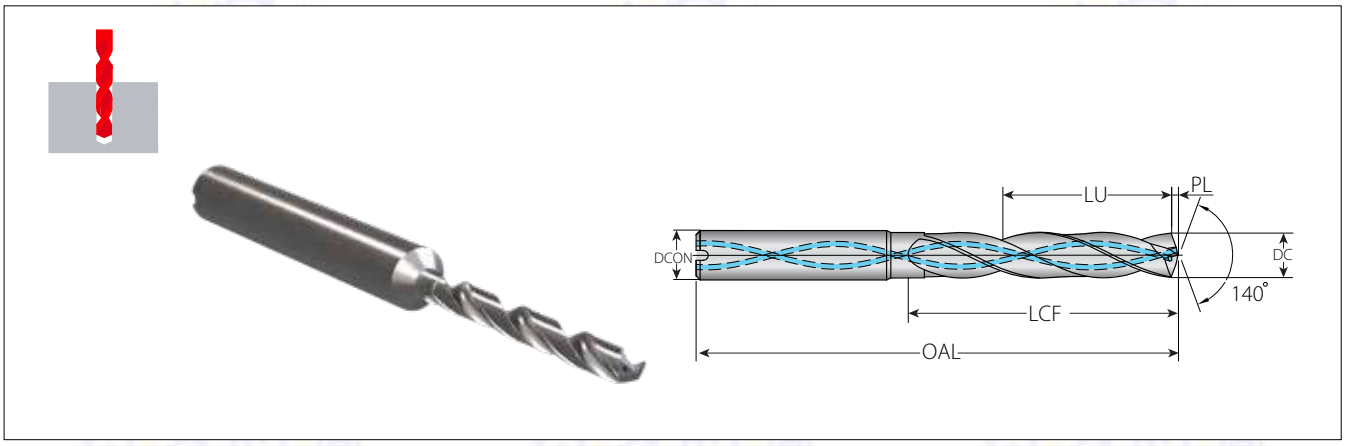
These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel. The coating provides excellent wear resistance.
The table below includes dimensions for pre-drilling and pilot holes for thread mill:
M-Coarse, UNF, UNC, NPT and BSP standards.

Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC (h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-0110-0073-04-Z2-5D-C-VM10	G20-00286	1.1	3	7.35	0.2	9	45	•	•
VDS-0125-0071-04-Z2-5D-C-VM10	G20-00287	1.25	3	7.125	0.23	9	45	•	•
VDS-0145-0068-04-Z2-5D-C-VM10	G20-00288	1.45	4	6.825	0.26	9	45	•	•
VDS-0150-0097-04-Z2-5D-C-VM10	G20-00289	1.5	4	9.75	0.27	12	55	•	•
VDS-0155-0096-04-Z2-5D-C-VM10	G20-00290	1.55	4	9.675	0.28	12	55	•	•
VDS-0160-0096-04-Z2-5D-C-VM10	G20-00291	1.6	4	9.6	0.29	12	55	•	•
VDS-0175-0093-04-Z2-5D-C-VM10	G20-00292	1.75	4	9.375	0.32	12	55	•	•
VDS-0180-0093-04-Z2-5D-C-VM10	G20-00293	1.8	4	9.3	0.33	12	55	•	•
VDS-0185-0092-04-Z2-5D-C-VM10	G20-00294	1.85	4	9.225	0.34	12	55	•	•
VDS-0200-0150-04-Z2-5D-C-VM10	G20-00125	2	4	15	0.36	18	62	•	
VDS-0205-0149-04-Z2-5D-C-VM10	G20-00295	2.05	4	14.925	0.37	18	62	•	•
VDS-0210-0148-04-Z2-5D-C-VM10	G20-00296	2.1	4	14.85	0.38	18	62	•	•
VDS-0230-0145-04-Z2-5D-C-VM10	G20-00297	2.3	4	14.55	0.42	18	62	•	•
VDS-0250-0183-04-Z2-5D-C-VM10	G20-00126	2.5	4	18.3	0.45	22	62	•	
VDS-0260-0181-04-Z2-5D-C-VM10	G20-00298	2.6	4	18.1	0.47	22	62	•	•
VDS-0280-0178-04-Z2-5D-C-VM10	G20-00299	2.8	4	17.8	0.51	22	62	•	•
VDS-0290-0176-04-Z2-5D-C-VM10	G20-00300	2.9	4	17.65	0.53	22	62	•	•
VDS-0300-0235-06Z2-5D-C-VM10	G20-00127	3	6	23.5	0.55	28	66	•	
VDS-0330-0230-06-Z2-5D-C-VM10	G20-00301	3.3	6	23.05	0.6	28	66	•	•
VDS-0340-0229-06-Z2-5D-C-VM10	G20-00302	3.4	6	22.9	0.62	28	66	•	•
VDS-0350-0228-06-Z2-5D-C-VM10	G20-00128	3.5	6	22.8	0.64	28	66	•	
VDS-0370-0224-06-Z2-5D-C-VM10	G20-00303	3.7	6	22.45	0.67	28	66	•	•
VDS-0380-0303-06-Z2-5D-C-VM10	G20-00304	3.8	6	30.3	0.69	36	74	•	•
VDS-0400-0300-06-Z2-5D-C-VM10	G20-00129	4	6	30	0.73	36	74	•	
VDS-0410-0298-06-Z2-5D-C-VM10	G20-00305	4.1	6	29.85	0.75	36	74	•	•
VDS-0420-0297-06-Z2-5D-C-VM10	G20-00306	4.2	6	29.7	0.76	36	74	•	•

• In Stock

* Shank DIN 6535HA

VDS 5XD-C (con't)

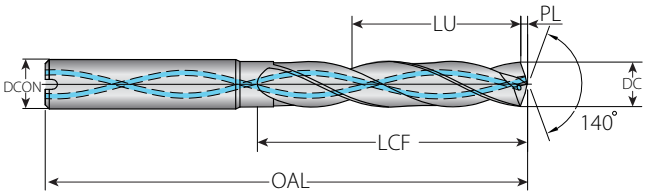


Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC (h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-0450-0293-06-Z2-5D-C-VM10	G20-00130	4.5	6	29.3	0.82	36	74	•	
VDS-0460-0291-06-Z2-5D-C-VM10	G20-00307	4.6	6	29.1	0.84	36	74	•	•
VDS-0500-0365-06-Z2-5D-C-VM10	G20-00131	5	6	36.5	0.91	44	82	•	
VDS-0510-0363-06-Z2-5D-C-VM10	G20-00308	5.1	6	36.35	0.93	44	82	•	•
VDS-0520-0362-06-Z2-5D-C-VM10	G20-00309	5.2	6	36.2	0.95	44	82	•	•
VDS-0550-0358-06-Z2-5D-C-VM10	G20-00132	5.5	6	35.8	1	44	82	•	
VDS-0598-0350-06-Z2-5D-C-VM10	G20-00310	5.98	6	35.03	1.09	44	82	•	•
VDS-0600-0350-06-Z2-5D-C-VM10	G20-00133	6	6	35	1.09	44	82	•	
VDS-0660-0431-08-Z2-5D-C-VM10	G20-00311	6.6	8	43.1	1.2	53	91	•	•
VDS-0670-0429-08-Z2-5D-C-VM10	G20-00312	6.7	8	42.95	1.22	53	91	•	•
VDS-0680-0428-08-Z2-5D-C-VM10	G20-00313	6.8	8	42.8	1.24	53	91	•	•
VDS-0690-0426-08-Z2-3D-C-VM10	G20-00314	6.9	8	42.65	1.26	53	91	•	•
VDS-0700-0425-08-Z2-5D-C-VM10	G20-00193	7	8	42.5	1.27	53	91	•	
VDS-0800-0410-08-Z2-5D-C-VM10	G20-00194	8	8	41.0	1.46	53	91	•	
VDS-0832-0485-10-Z2-5D-C-VM10	G20-00315	8.32	10	48.52	1.51	61	103	•	•
VDS-0850-0482-10-Z2-5D-C-VM10	G20-00316	8.5	10	48.25	1.55	61	103	•	•
VDS-0870-0479-10-Z2-5D-C-VM10	G20-00317	8.7	10	47.95	1.58	61	103	•	•
VDS-0900-0475-10-Z2-5D-C-VM10	G20-00195	9	10	47.5	1.64	61	103	•	
VDS-0940-0469-10-Z2-5D-C-VM10	G20-00318	9.4	10	46.9	1.71	61	103	•	•
VDS-0990-0461-10-Z2-5D-C-VM10	G20-00319	9.9	10	46.15	1.8	61	103	•	•
VDS-1000-0460-10-Z2-5D-C-VM10	G20-00196	10	10	46.0	1.82	61	103	•	
VDS-1020-0557-12-Z2-5D-C-VM10	G20-00320	10.2	12	55.7	1.86	71	118	•	•
VDS-1070-0549-12-Z2-5D-C-VM10	G20-00321	10.7	12	54.95	1.95	71	118	•	•
VDS-1080-0548-12-Z2-5D-C-VM10	G20-00322	10.8	12	54.8	1.97	71	118	•	•
VDS-1100-0545-12-Z2-5D-C-VM10	G20-00197	11	12	54.5	2.00	71	118	•	
VDS-1150-0537-12-Z2-5D-C-VM10	G20-00323	11.5	12	53.75	2.09	71	118	•	•
VDS-1170-0534-12-Z2-5D-C-VM10	G20-00324	11.7	12	53.45	2.13	71	118	•	•
VDS-1200-0530-12-Z2-5D-C-VM10	G20-00198	12	12	53.0	2.18	71	118	•	
VDS-1230-0585-14-Z2-5D-C-VM10	G20-00325	12.3	14	58.55	2.24	77	124	•	•
VDS-1290-0576-14-Z2-5D-C-VM10	G20-00326	12.9	14	57.65	2.35	77	124	•	•
VDS-1300-0575-14-Z2-5D-C-VM10	G20-00199	13	14	57.5	2.37	77	124	•	
VDS-1360-0566-14-Z2-5D-C-VM10	G20-00327	13.6	14	56.6	2.47	77	124	•	•
VDS-1400-0560-14-Z2-5D-C-VM10	G20-00200	14	14	56.0	2.55	77	124	•	
VDS-1420-0617-16-Z2-5D-C-VM10	G20-00328	14.2	16	61.7	2.58	83	133	•	•

• In Stock

* Shank DIN 6535HA

VDS 5XD-C (con't)



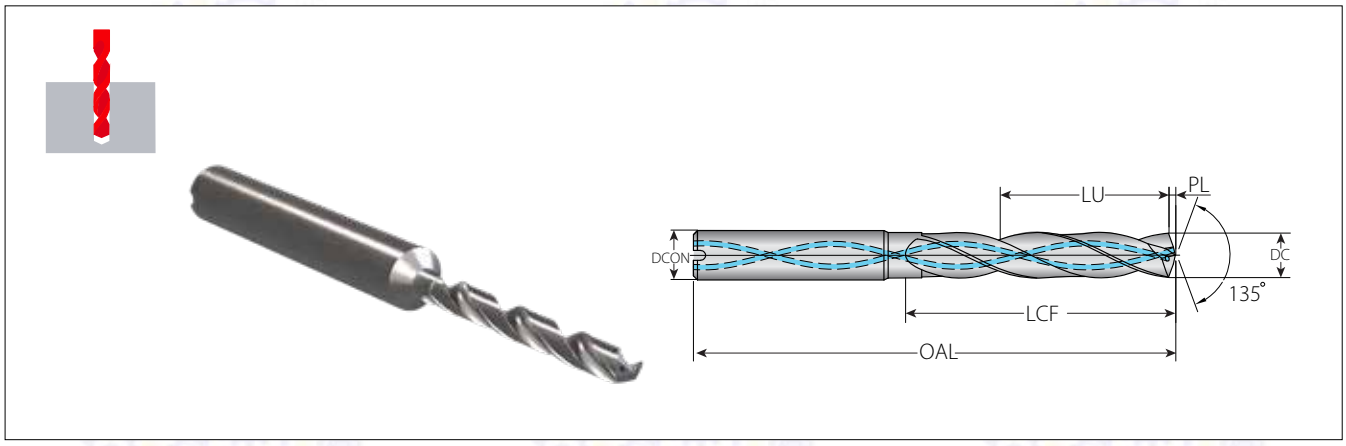
Ordering Code	Item No.	Dimensions mm						Grade	Pre-Drilling
		DC (h7)	DCON (h6) *	LU	PL	LCF	OAL	VM10	for Threading
VDS-1450-0612-16-Z2-5D-C-VM10	G20-00329	14.5	16	61.25	2.64	83	133	•	•
VDS-1500-0605-16-Z2-5D-C-VM10	G20-00201	15	16	60.5	2.73	83	133	•	
VDS-1520-0602-16-Z2-5D-C-VM10	G20-00330	15.2	16	60.2	2.77	83	133	•	•
VDS-1550-0597-16-Z2-5D-C-VM10	G20-00331	15.5	16	59.75	2.82	83	133	•	•
VDS-1600-0590-16-Z2-5D-C-VM10	G20-00202	16	16	59.0	2.91	83	133	•	
VDS-1660-0681-18-Z2-5D-C-VM10	G20-00332	16.6	18	68.1	3.02	93	143	•	•
VDS-1700-0675-18-Z2-5D-C-VM10	G20-00203	17	18	67.5	3.09	93	143	•	
VDS-1750-0667-18-Z2-5D-C-VM10	G20-00333	17.5	18	66.75	3.18	93	143	•	•
VDS-1800-0660-18-Z2-5D-C-VM10	G20-00204	18	18	66.0	3.28	93	143	•	
VDS-1900-0725-20-Z2-5D-C-VM10	G20-00205	19	20	72.5	3.46	101	153	•	
VDS-1950-0717-20-Z2-5D-C-VM10	G20-00334	19.5	20	71.75	3.55	101	153	•	•
VDS-2000-0710-20-Z2-5D-C-VM10	G20-00206	20	20	71.0	3.64	101	153	•	
VDS-2050-0702-22-Z2-5D-C-VM10	G20-00335	20.5	22	70.25	3.73	101	153	•	•
VDS-2100-0695-22-Z2-5D-C-VM10	G20-00336	21	22	69.5	3.82	101	153	•	•

• In Stock

* Shank DIN 6535HA

VDS 8XD-C

V-DRILL
Accurate Drilling Solutions



8XD Coated Twist Drills with Coolant Thru

These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable
for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.
The coating provides excellent wear resistance.

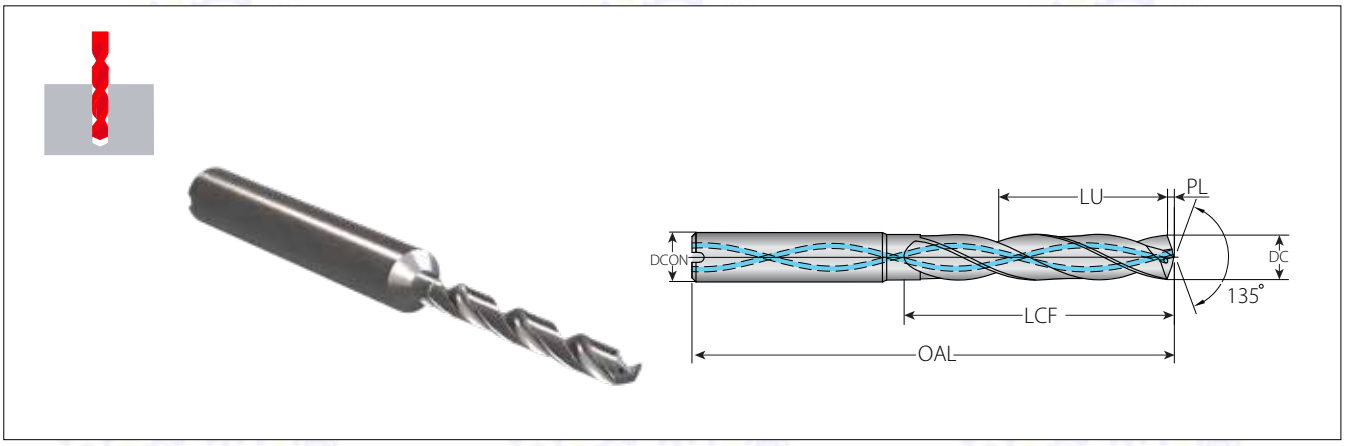
Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0300-0295-06-Z2-8D-C-VM10	G20-00207	3	6	29.5	0.55	34	72	•
VDS-0400-0370-06-Z2-8D-C-VM10	G20-00208	4	6	37	0.73	43	81	•
VDS-0500-0495-06-Z2-8D-C-VM10	G20-00209	5	6	49.5	0.91	57	95	•
VDS-0600-0480-06-Z2-8D-C-VM10	G20-00210	6	6	48	1.09	57	95	•
VDS-0700-0655-08-Z2-8D-C-VM10	G20-00211	7	8	65.5	1.27	76	114	•
VDS-0800-0640-08-Z2-8D-C-VM10	G20-00212	8	8	64	1.46	76	114	•
VDS-0900-0815-10-Z2-8D-C-VM10	G20-00213	9	10	81.5	1.64	95	142	•
VDS-1000-0800-10-Z2-8D-C-VM10	G20-00214	10	10	80	1.82	95	142	•
VDS-1100-0975-12-Z2-8D-C-VM10	G20-00215	11	12	97.5	2	114	162	•
VDS-1200-0960-12-Z2-8D-C-VM10	G20-00216	12	12	96	2.18	114	162	•
VDS-1300-1135-14-Z2-8D-C-VM10	G20-00217	13	14	113.5	2.37	133	182	•
VDS-1400-1120-14-Z2-8D-C-VM10	G20-00218	14	14	112	2.55	133	182	•
VDS-1500-1295-16-Z2-8D-C-VM10	G20-00219	15	16	129.5	2.73	152	203	•
VDS-1600-1280-16-Z2-8D-C-VM10	G20-00220	16	16	128	2.91	152	203	•

• In Stock

* Shank DIN 6535HA

VDS 12XD-C

V-DRILL
Accurate Drilling Solutions



12XD Coated Twist Drills with Coolant Thru

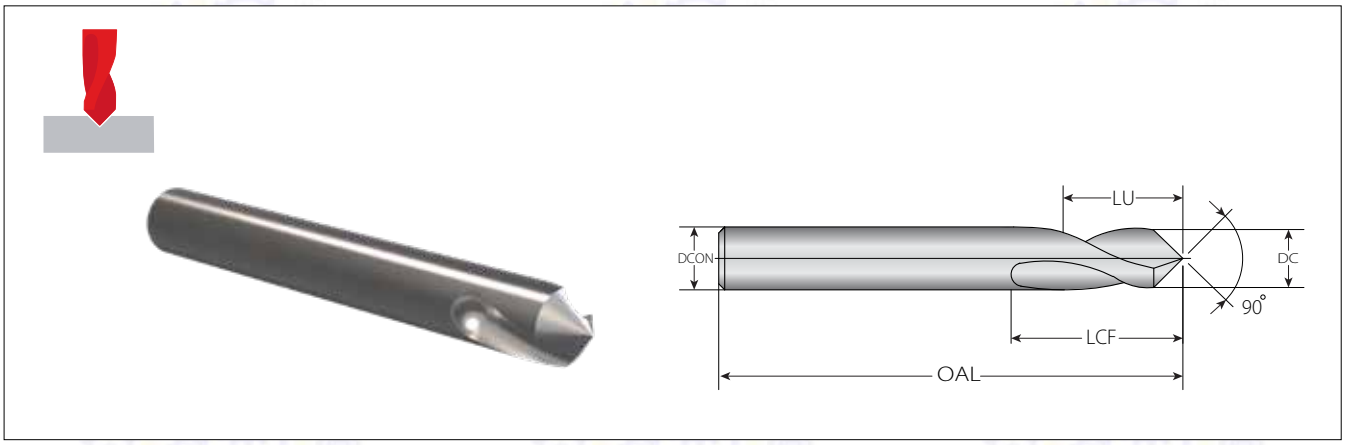
These drills feature a unique point design for high performance and better chip removal.
They have an ultra-fine grain structure and AlTiN coating, making them suitable
for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.
The coating provides excellent wear resistance.

Ordering Code	Item No.	Dimensions mm						Grade
		DC	DCON (h6) *	LU	PL	LCF	OAL	VM10
VDS-0300-0495-06-Z2-12D-C-VM10	G20-00221	3	6	49.5	0.62	54	92	•
VDS-0400-0580-06-Z2-12D-C-VM10	G20-00222	4	6	58	0.83	64	102	•
VDS-0500-0755-06-Z2-12D-C-VM10	G20-00223	5	6	75.5	1.04	83	121	•
VDS-0600-0740-06-Z2-12D-C-VM10	G20-00224	6	6	74	1.24	83	121	•
VDS-0700-0995-08-Z2-12D-C-VM10	G20-00225	7	8	99.5	1.45	110	148	•
VDS-0800-0980-08-Z2-12D-C-VM10	G20-00226	8	8	98	1.66	110	148	•
VDS-0900-1245-10-Z2-12D-C-VM10	G20-00227	9	10	124.5	1.86	138	180	•
VDS-1000-1230-10-Z2-12D-C-VM10	G20-00228	10	10	123	2.07	138	180	•
VDS-1100-1415-12-Z2-12D-C-VM10	G20-00229	11	12	141.5	2.28	158	206	•
VDS-1200-1400-12-Z2-12D-C-VM10	G20-00230	12	12	140	2.49	158	206	•
VDS-1300-1625-14-Z2-12D-C-VM10	G20-00231	13	14	162.5	2.69	182	230	•
VDS-1400-1610-14-Z2-12D-C-VM10	G20-00232	14	14	161	2.9	182	230	•
VDS-1500-1855-16-Z2-12D-C-VM10	G20-00233	15	16	185.5	3.11	208	260	•
VDS-1600-1840-16-Z2-12D-C-VM10	G20-00234	16	16	184	3.31	208	260	•

• In Stock

* Shank DIN 6535HA

VDSC 90



90° NC Center Drills

90° NC Center drills are suitable for chamfering and drilling center holes.
Excellent for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.

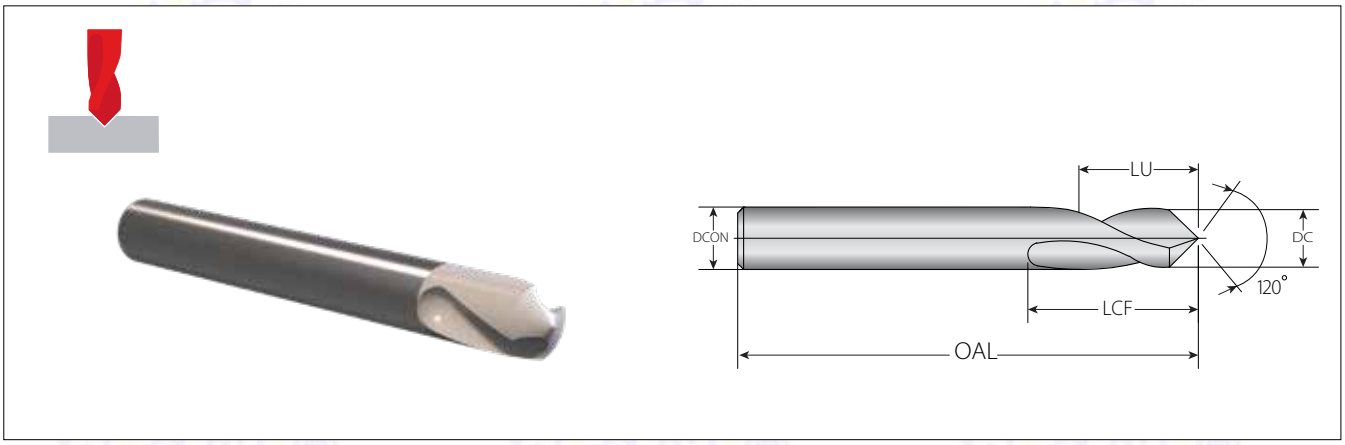
HA | 90° | AlTiN | 2xD | 2 | P | M | K | S

Ordering Code	Item No.	Dimensions mm					Grade
Internal		DC	DCON (h6)	LU	LCF	OAL	VM8
VDSC-090-0005-04-Z2-2D-VM8	G20-00134	4	4	5.33	8	50	•
VDSC-090-0007-05-Z2-2D-VM8	G20-00135	5	5	6.67	10	62	•
VDSC-090-0010-06-Z2-2D-VM8	G20-00136	6	6	10	15	66	•
VDSC-090-0011-08-Z2-2D-VM8	G20-00137	8	8	11.33	17	79	•
VDSC-090-0013-10-Z2-2D-VM8	G20-00138	10	10	13.33	20	89	•
VDSC-090-0017-12-Z2-2D-VM8	G20-00139	12	12	16.67	25	102	•

• In Stock

VDSC 120

V-DRILL
Accurate Drilling Solutions



120° NC Center Drills

120° NC Center drills are suitable for chamfering and drilling center holes.
Excellent for machining Stainless Steel, Titanium Alloys, Alloy Steel, and Carbon Steel.

Ordering Code	Item No.	Dimensions mm					Grade
Internal		DC	DCON (h6)	LU	LCF	OAL	VM8
VDSC-120-0067-05-Z2-2D-VM8	G20-00140	5	5	6.67	10	62	•
VDSC-120-0010-06-Z2-2D-VM8	G20-00141	6	6	10	15	66	•
VDSC-120-0011-08-Z2-2D-VM8	G20-00142	8	8	11.33	17	79	•
VDSC-120-0013-10-Z2-2D-VM8	G20-00143	10	10	13.33	20	89	•
VDSC-120-0017-12-Z2-2D-VM8	G20-00144	12	12	16.67	25	102	•

• In Stock

Recommended Cutting Conditions

V-DRILL
Accurate Drilling Solutions

P Standard Steel (P20, 4140 / 4340)

Cutting Speed Vc (m/min) and Feed F (mm/rev)					
Diameter Range		3×D	5×D	8×D	12×D
1-6 mm	Speed	70-120	60-110	50-90	30-60
	Feed	0.05-0.12	0.04-0.10	0.03-0.08	0.02-0.06
6-12 mm	Speed	90-130	70-110	60-100	40-70
	Feed	0.09-0.18	0.08-0.15	0.06-0.12	0.05-0.1
12-20 mm	Speed	100-140	70-120	60-110	40-70
	Feed	0.12-0.20	0.10-0.18	0.08-0.15	0.06-0.12

M Stainless Steel

Cutting Speed Vc (m/min) and Feed F (mm/rev)					
Diameter Range		3×D	5×D	8×D	12×D
1-6 mm	Speed	40-70	30-70	30-60	30-50
	Feed	0.02-0.07	0.02-0.06	0.02-0.05	0.01-0.04
6-12 mm	Speed	60-80	50-70	40-60	30-50
	Feed	0.03-0.1	0.03-0.09	0.02-0.07	0.02-0.05
12-20 mm	Speed	60-80	50-70	40-70	30-60
	Feed	0.06-0.15	0.05-0.14	0.04-0.13	0.05-0.1

K Cast Iron

Cutting Speed Vc (m/min) and Feed F (mm/rev)					
Diameter Range		3×D	5×D	8×D	12×D
1-6 mm	Speed	70-130	60-120	50-90	30-60
	Feed	0.05-0.12	0.04-0.10	0.03-0.08	0.02-0.06
6-12 mm	Speed	90-130	70-110	60-100	40-70
	Feed	0.09-0.18	0.08-0.15	0.06-0.12	0.05-0.1
12-20 mm	Speed	100-140	70-120	60-110	40-70
	Feed	0.12-0.20	0.10-0.18	0.08-0.15	0.06-0.12

S Titanium Alloys (Ti-6Al-4V)

Cutting Speed Vc (m/min) and Feed F (mm/rev)					
Diameter Range		3×D	5×D	8×D	12×D
1-6 mm	Speed	15-40	15-35	15-35	15-35
	Feed	0.02-0.07	0.02-0.06	0.02-0.05	0.01-0.04
6-12 mm	Speed	15-45	15-40	15-35	15-35
	Feed	0.03-0.09	0.03-0.08	0.02-0.07	0.02-0.05
12-20 mm	Speed	15-45	15-40	15-35	15-35
	Feed	0.06-0.12	0.05-0.1	0.04-0.08	0.05-0.07

Note: Refer to the cutting conditions tables on pages: 75-77.

Recommended Grades and Cutting Speeds Vc [m/min]

V-DRILL Accurate Drilling Solutions

Tool Family Groups: **VDS-3XD | VDS-3XD C**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min] 3xD External Coolant	Vc [m/min] 3xD Internal Coolant	F [mm/rev] Dia. 1.0-3.0	F [mm/rev] Dia. 3.0-6.0	F [mm/rev] Dia. 6.0-12.0	F [mm/rev] Dia. 16.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	80-100	90-130	0.01-0.08	0.04-0.1	0.08-0.14	0.08-0.16
	2		Medium Carbon (C=0.25-0.55%)	150	70-90	80-120				
	3		High Carbon (C=0.55-0.85%)	170						
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	70-90	80-120				
	5		Hardened	275						
	6		Hardened	350						
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	70-90	80-120				
	8		Hardened	325						
	9	Cast Steel	Low Alloy (alloying elements <5%)	200						
	10		High Alloy (alloying elements >5%)	225						
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	20-50	40-70	0.02-0.05	0.02-0.06	0.03-0.08	0.04-0.1
	12		Hardened	330	20-40	40-60				
	13	Stainless Steel Austenitic	Austenitic	180						
	14		Super Austenitic	200						
	15	Stainless Steel Cast Ferritic	Non Hardened	200						
	16		Hardened	330						
	17	Stainless Steel Cast Austenitic	Austenitic	200						
	18		Hardened	330						
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	80-100	90-130	0.01-0.08	0.04-0.1	0.08-0.14	0.08-0.16
	25		Pearlitic (long chips)	230						
	26	Grey Cast Iron	Low Tensile Strength	180						
	27		High Tensile Strength	260						
	28	Nodular Sg Iron	Ferritic	160						
	29		Pearlitic	260						
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	no	15-35	0.01-0.04	0.02-0.05	0.02-0.06	0.03-0.09
	20		Aged (iron based)	280						
	21		Annealed (nickel or cobalt based)	250						
	22		Aged (nickel or cobalt based)	350						
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		25-45				

Recommended Grades and Cutting Speeds Vc [m/min]

V-DRILL Accurate Drilling Solutions

Tool Family Groups: **VDS-5XD | VDS-5XD C**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/rev]			
					5xD		Dia.	Dia.	Dia.	Dia.
					External Coolant	Internal Coolant	1.0-3.0	3.0-6.0	6.0-12.0	16.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	70-90	70-110	0.01-0.08	0.04-0.1	0.08-0.14	0.08-0.16
	2		Medium Carbon (C=0.25-0.55%)	150	60-80	60-100				
	3		High Carbon (C=0.55-0.85%)	170						
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	60-80	60-100				
	5		Hardened	275						
	6		Hardened	350						
	7	High Alloy Steel (alloying elements>5%)	Annealed	200						
	8		Hardened	325						
	9	Cast Steel	Low Alloy (alloying elements <5%)	200						
	10		High Alloy (alloying elements >5%)	225						
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	20-50	40-70	0.02-0.05	0.02-0.06	0.03-0.08	0.04-0.1
	12		Hardened	330	20-40	40-60				
	13	Stainless Steel Austenitic	Austenitic	180						
	14		Super Austenitic	200						
	15	Stainless Steel Cast Ferritic	Non Hardened	200						
	16		Hardened	330						
	17	Stainless Steel Cast Austenitic	Austenitic	200						
	18		Hardened	330						
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	70-90	70-110	0.01-0.08	0.04-0.1	0.08-0.14	0.08-0.16
	25		Pearlitic (long chips)	230						
	26	Grey Cast Iron	Low Tensile Strength	180						
	27		High Tensile Strength	260						
	28	Nodular Sg Iron	Ferritic	160						
	29		Pearlitic	260						
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	no	15-35	0.01-0.04	0.02-0.05	0.02-0.06	0.03-0.09
	20		Aged (iron based)	280						
	21		Annealed (nickel or cobalt based)	250						
	22		Aged (nickel or cobalt based)	350						
	23	Titanium Alloys	Pure 99.5 Ti	400Rm		25-40				

Recommended Grades and Cutting Speeds Vc [m/min]

V-DRILL Accurate Drilling Solutions

Tool Family Groups: **VDS-8XD C | VDS-12XD C**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]		F [mm/rev]		
					8xD	12xD	Dia.	Dia.	Dia.
					Internal Coolant	Internal Coolant	3.0-6.0	6.0-12.0	12.0-20.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	50-100	40-70	0.01-0.08	0.04-0.1	0.08-0.16
	2		Medium Carbon (C=0.25-0.55%)	150	40-90	30-60			
	3		High Carbon (C=0.55-0.85%)	170					
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	40-80	30-50			
	5		Hardened	275					
	6		Hardened	350					
	7	High Alloy Steel (alloying elements>5%)	Annealed	200					
	8		Hardened	325					
	9	Cast Steel	Low Alloy (alloying elements <5%)	200					
	10		High Alloy (alloying elements >5%)	225					
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	40-60	30-50	0.02-0.05	0.02-0.06	0.03-0.1
	12		Hardened	330					
	13	Stainless Steel Austenitic	Austenitic	180					
	14		Super Austenitic	200					
	15	Stainless Steel Cast Ferritic	Non Hardened	200					
	16		Hardened	330					
	17	Stainless Steel Cast Austenitic	Austenitic	200					
	18		Hardened	330					
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	60-110	50-80	0.01-0.08	0.04-0.1	0.08-0.16
	25		Pearlitic (long chips)	230					
	26	Grey Cast Iron	Low Tensile Strength	180					
	27		High Tensile Strength	260					
	28	Nodular Sg Iron	Ferritic	160					
	29		Pearlitic	260					
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	15-35	15-35	0.01-0.04	0.02-0.05	0.02-0.08
	20		Aged (iron based)	280					
	21		Annealed (nickel or cobalt based)	250					
	22		Aged (nickel or cobalt based)	350					
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	25-45	25-40			

V-Drill Center

V-DRILL Accurate Drilling Solutions

Tool Family Groups: **VDSC 90** | **VDSC 120**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	F [mm/rev]		
						Dia.	Dia.	Dia.
						4.0-6.0	8.0-12.0	16
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	90-130	0.1-0.2	0.15-0.3	0.18-0.35
	2		Medium Carbon (C=0.25-0.55%)	150	80-120	0.1-0.18	0.15-0.28	0.18-0.32
	3		High Carbon (C=0.55-0.85%)	170	70-100	0.08-0.15	0.12-0.25	0.15-0.30
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	70-120			
	5		Hardened	275	70-100	0.1-0.2		
	6		Hardened	350	60-80			
	7	High Alloy Steel (alloying elements>5%)	Annealed	200				
	8		Hardened	325				
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	50-70			
	10		High Alloy (alloying elements >5%)	225				
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	40-70	0.08-0.15	0.1-0.22	0.12-025
	12		Hardened	330	40-60			
	13	Stainless Steel Austenitic	Austenitic	180				
	14		Super Austenitic	200				
	15	Stainless Steel Cast Ferritic	Non Hardened	200				
	16		Hardened	330				
	17	Stainless Steel Cast Austenitic	Austenitic	200				
	18		Hardened	330				
K Cast Iron	24	Malleable Cast Iron	Ferritic (short chips)	130	90-150	0.1-0.2	0.15-0.3	0.18-0.35
	25		Pearlitic (long chips)	230				
	26	Grey Cast Iron	Low Tensile Strength	180				
	27		High Tensile Strength	260				
	28	Nodular Sg Iron	Ferritic	160				
	29		Pearlitic	260				
S Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	15-35	0.05-0.12	0.08-0.2	0.1-0.22
	20		Aged (iron based)	280				
	21		Annealed (nickel or cobalt based)	250				
	22		Aged (nickel or cobalt based)	350				
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	25-45			

User Guide for Solid Carbide Drills (1.0 - 20.0 mm)

This guide covers the essential aspects of using solid carbide drills effectively and includes information that directly impacts drilling performance and tool life.

1. Critical Starting Procedures

First Cut Optimization: Run first hole at 50% of recommended Table Feed:

- Chip color - should be light/golden
- Chip formation - should be small, consistent pieces
- Sound - steady, without chatter
- Power consumption - steady curve
- Increase feed gradually in 10% increments
- Document optimal parameters for repeat jobs

2. Critical Success Factors by Length

Tool Holder Requirements:

- **3XD:** Standard hydraulic or collet chuck acceptable
- **5XD:** High-precision hydraulic chuck recommended
- **8XD:** Thermal shrink fit holder mandatory
- **12XD:** Special long-tool shrink fit holder with vibration dampening for high overhang

3. Material-Specific Strategies

P Carbon/Alloy Steels (< 45 HRC)

- **3-5×D:** Pilot holes are typically optional unless high precision is required
- **8×D:** Pilot holes are recommended, depth 1.5×D
- **12×D:** Pilot holes are essential, depth 1.5-2×D
- **Cooling:** 20-40 bar (PSI 290-580) coolant-thru tools are recommended
- **Important:** Maintain consistent chip evacuation

M Stainless Steels

- **3-5×D:** Pilot holes are recommended even at shorter depths due to work hardening
- **8×D:** Essential pilot hole, depth 1.5-2×D
- **12×D:** Mandatory pilot holes, depth 2×D
- **Cooling:** 40-70 bar (PSI 580-1015) minimum for coolant-thru tools
- **Important:** Higher pressure coolant is needed for chip breaking/evacuation

S Titanium Alloys

- **3-5×D:** Pilot holes are strongly recommended due to material properties
- **8×D:** Mandatory pilot holes, depth 1.5-2×D
- **12×D:** Extended pilot depth may be needed, up to 2.5×D
- **Cooling:** 70-100 bar (PSI 1015-1450) coolant-thru is critical
- **Important:** Heat management and chip control

K Gray Cast Iron

- **3-5×D:** Pilot holes are optional, mainly for position accuracy
- **8×D:** Pilot holes are essential, depth 1.5-2×D for improved stability
- **12×D:** Pilot holes are needed, depth 1.5×D typical
- **Cooling:** 20-30 bar (PSI 290-435) is adequate in most cases
- **Important:** Dust/particle management

4. Length-Based Considerations:

3×D Tools:

- Pilot holes are mainly for accuracy rather than stability
- Focus on entry conditions and positioning
- Standard cooling pressures are usually sufficient

5×D Tools:

- Transition point where pilot holes become more important
- Consider material properties more heavily
- Increased cooling pressure may be needed

8×D Tools:

- Pilot holes become critical for most materials
- Increased focus on straightness and alignment
- Higher cooling pressures essential

12×D Tools:

- Pilot holes are mandatory for most applications
- Extended pilot depths are often needed
- Maximum cooling pressure is typically required
- Consider intermediate pilot depths for stepped approach

5. Coolant Management

Pressure Requirements:

- **3XD:** 20-30 bar (PSI-290-435)
- **5XD:** 40-50 bar (PSI 580-725)
- **8XD:** 70-80 bar (PSI 1015-1160)
- **12XD:** 100+ bar (PSI 1450-) or specialized high-pressure system

Flow Rate Adjustments:

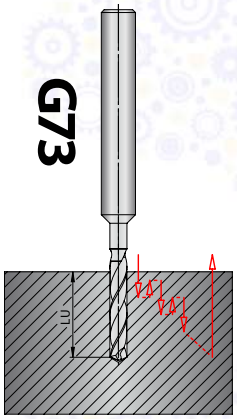
- Increase coolant concentration by 2% for every 3×D length increase
- Monitor coolant temperature more frequently with longer drills
- Consider coolant additives for improved lubricity beyond 8×D

6. G73 and G83 CNC Drilling Cycles

Technical Analysis - G73 and G83 CNC Drilling Cycles - Fundamental Differences

G73- High-Speed Peck Drilling Cycle

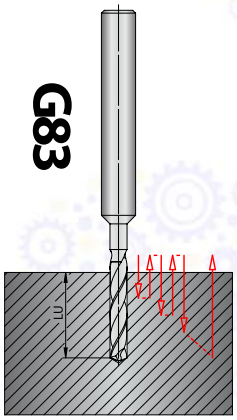
- Optimized for rapid chip breaking with minimal retraction
- Utilizes stepped retraction pattern
- Better for shallow to medium depths
- More efficient for shallow to medium-depth holes
- Faster cycle times due to shorter retractions
- Recommended for cast iron and aluminum alloys



Peck Drilling
Step Retract

G83- Deep Hole Peck Drilling Cycle

- Full retraction to initial point after each peck
- Better chip evacuation
- Ideal for deeper holes
- Better coolant penetration
- Recommended for steel and stainless steel
- More time-consuming but safer for difficult conditions



Peck Drilling
Full Retract

Programming Considerations

- Specify initial clearance point (R-level)
- Define retraction distance
- Set peck depth increments
- Account for coolant pressure requirements
- Include proper G-code format and sequence
- Example format: G73/G83 H2.0 R0.1 Z-50.0 F30.0 Q2.0

Optimization Guidelines

Cutting Parameters

- Reduce speeds by 10-15% for peck drilling
- Increase coolant pressure for deeper holes
- Adjust feed rates based on material hardness
- Monitor chip formation and adjust accordingly

Tool Life Management

- Regular inspection intervals based on material
- Monitor cutting forces and power consumption
- Check for wear patterns on drill points
- Document tool life for process improvement

Peck Drilling Cycle per Material

P Mild Steel and Carbon Steels

- Continuous Drilling: Up to 2-3× drill diameter
- Peck Drilling Required: Beyond 3× drill diameter
- Transition Point: 2.5-3.5× drill diameter
- Peck Interval: 1-3 mm or 0.75-1.25× drill diameter
- G83 recommended for deeper holes

M Stainless Steels

- Continuous Drilling: Up to 2× drill diameter
- Peck Drilling Required: Beyond 2× drill diameter
- Transition Point: 1.5-2.5× drill diameter
- Peck Interval: 0.5-2mm or 0.3-0.75× drill diameter
- G83 cycle mandatory for proper chip control

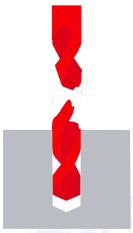
K Cast Iron

- Continuous Drilling: Up to 3-4× drill diameter
- Peck Drilling Required: Beyond 4× drill diameter
- Transition Point: 3.5-4.5× drill diameter
- Peck Interval: 2-4 mm or 0.75-1.25× drill diameter
- G73 preferred for better chip breaking

S Titanium Alloys

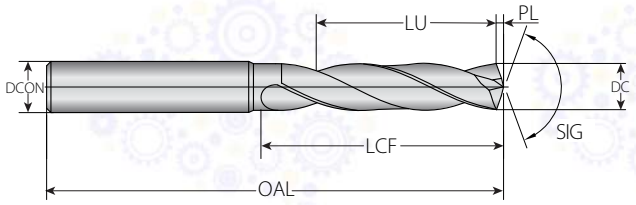
- Continuous Drilling: Up to 1-1.5× drill diameter
- Peck Drilling Required: Beyond 1.5× drill diameter
- Transition Point: 1.2× drill diameter
- Peck Interval: 0.5-1 mm or 0.2-0.5× drill diameter
- G83 mandatory with full retraction

Troubleshooting Guide

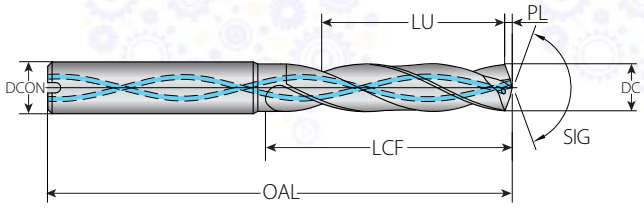
Problem	Possible Causes	Solution
 **Chips not clearing properly during operation**	- Incorrect peck depth - Inadequate coolant flow - Wrong chip breaking parameters	- Adjust peck depth and frequency - Ensure proper coolant pressure and direction - Monitor and adjust cutting parameters as needed
 **Premature tool failure or breakage**	- Incorrect retraction settings - Excessive cutting parameters - Worn tool holder - Poor chip evacuation	- Verify and adjust retraction settings - Check tool holder condition - Reduce cutting parameters if necessary - Ensure proper coolant flow
 **Holes not meeting quality specifications**	- Machine misalignment - Insufficient rigidity - Worn tooling - Improper cutting parameters	- Verify machine alignment - Check and improve workpiece clamping - Replace worn tools - Optimize cutting parameters
 **Tools wearing out faster than expected**	- Aggressive cutting parameters - Insufficient cooling - Incorrect tool coating for application - Poor chip evacuation	- Review and adjust cutting parameters - Check coolant concentration and flow - Select appropriate tool coating - Optimize chip evacuation strategy
 **Parts not meeting specifications**	- Insufficient monitoring - Process drift - Equipment wear - Inadequate documentation	- Implement regular dimensional checks - Monitor surface finish consistently - Verify roundness and straightness - Maintain proper documentation
 **Non-compliance with environmental standards**	- Improper waste handling - Excessive noise levels - Inefficient energy usage	- Follow proper coolant disposal procedures - Implement chip recycling program - Monitor and optimize energy consumption - Maintain workplace safety standards - Implement noise reduction measures

Special Tools

Twist Drills:



Twist Drills with Coolant Thru:



DC- Cutting Diameter: _____

DCON- Connection Diameter: _____

APMX- Depth of Cut Maximum: _____

LU- Usable Length: _____

OAL- Overall Length: _____

LCF- Length Chip Flute: _____

SIG- Point Angle: _____

PL- Point Length: _____

Notes

VARDEX is the company's prominent product line for Thread Turning, Thread Milling, Gear Milling, Tapping, and Whirling Solutions. The revolutionary MACH line for TT and TM applications offers unmatched productivity, machining twice as fast as standard tools.

Thread Turning: The VARDEX TT tools offer an extensive collection of pitches and standards in different grades, IC ranges and types of insert styles.

Thread Milling: The VARDEX TM line provides a wide range of applications and solutions in multi-tooth, single-tooth for deep holes, and solid carbide tools.

Gear Milling: The VARDEX Gear Milling line is an innovative concept for gear, rack, and spline applications, offered in indexable inserts and solid carbide tools.

V-Taps: The VARDEX Advanced Tapping Solutions include the most popular ISO Metric and American UN threading application standards with four different geometries in an assortment of types.

V-Whirling: The new high precision whirling system by VARGUS for Medical and Micromachining applications.

GROOVEX provides advanced solutions for grooving, boring and turning, in a wide range of applications. The Microscope line includes an extensive range of solid carbide internal tools for boring, grooving, chamfering, and threading in bores as small as 0.5 mm (.020").

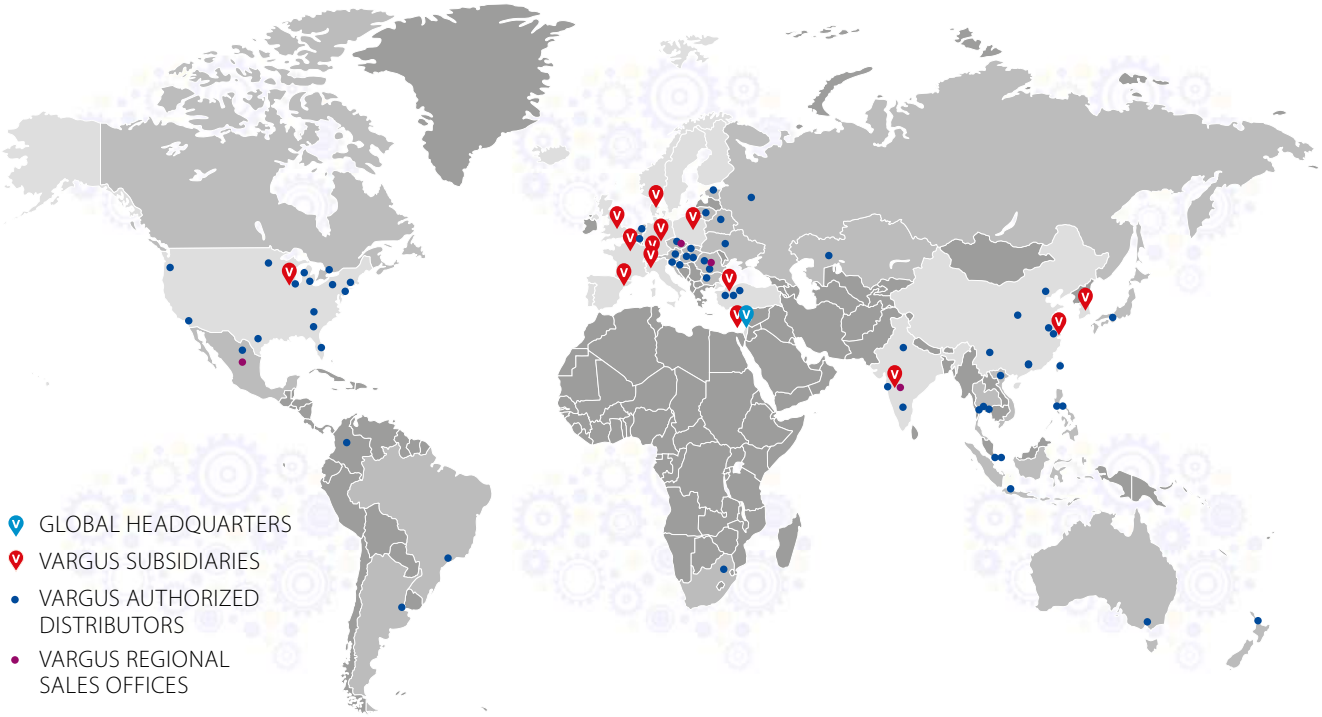
SHAVIV manufactures world leading hand deburring solutions for metals and plastics.

SV Burr: The new line of premium carbide burrs by SHAVIV includes a wide range of Tungsten Carbide tools to remove burrs and smoothen sharp metal edges when cutting or machining processes are completed.

vargus WORLDWIDE

NEUMO Ehrenberg Group

With a network of 14 international companies and hundreds of distributors, warehouses and certified ISO 9001 manufacturing facilities, VARGUS Ltd. serves customers in more than 100 countries around the globe. A customer-focused organization, VARGUS Ltd. is committed to providing innovative products and solutions of the highest quality and excellent value, and is renowned for its technical expertise and uncompromising service.



VARGUS Ltd. - Global Headquarters | ISRAEL +972 4 9855 101 | info@vargus.com

EUROPE

VARGUS Scandinavia
vargus@vargus.dk

VARGUS France
commercial@vargus.fr

VARGUS Germany
info@vargus.de

NEUMO-VARGUS Israel
neumo@neumo-vargus.co.il

VARGUS Novatea Italy
info@novatea.it

VARGUS Poland
vargus@neumo.pl

VARGUS Ibérica
sales@vargus.es

VARGUS Switzerland
info@vargus.ch

VARGUS Tooling UK
tooling.uk@vargustooling.co.uk

Czech Republic & Slovakia - Sales Office
sales-czsk@vargus.com

Hungary - Sales Office
sales-hu@vargus.com

Romania - Sales Office
sales-ro@vargus.com

Turkey - Sales Office
sales-tr@vargus.com

ASIA

VARGUS China
info@varguschina.net

VARGUS India
info@vargusindia.com

VARGUS Korea
info@varguskorea.co.kr

Asia Pacific - Sales Office
sales-seasia@vargus.com

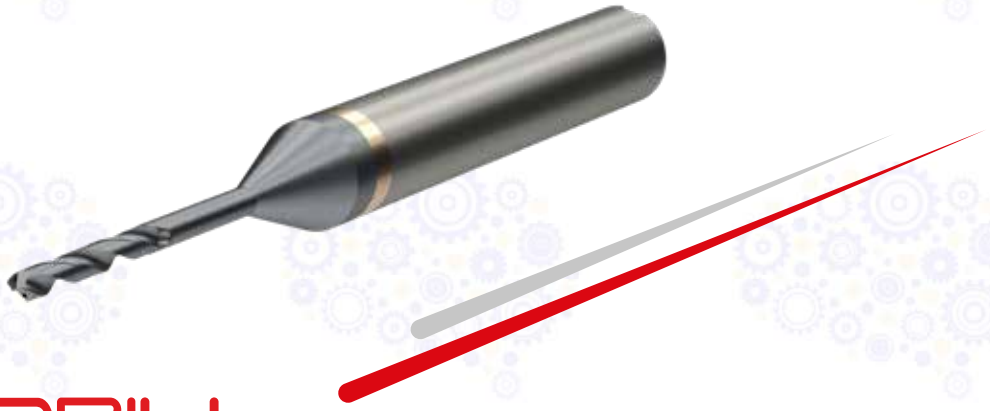
Japan - Sales Office
sales-jp@vargus.com

NORTH AMERICA

VARGUS USA
sales@vargususa.com

Mexico Sales Office
sales-mx@vargus.com

V-MILL
Superior Milling Solutions



V-DRILL
Accurate Drilling Solutions