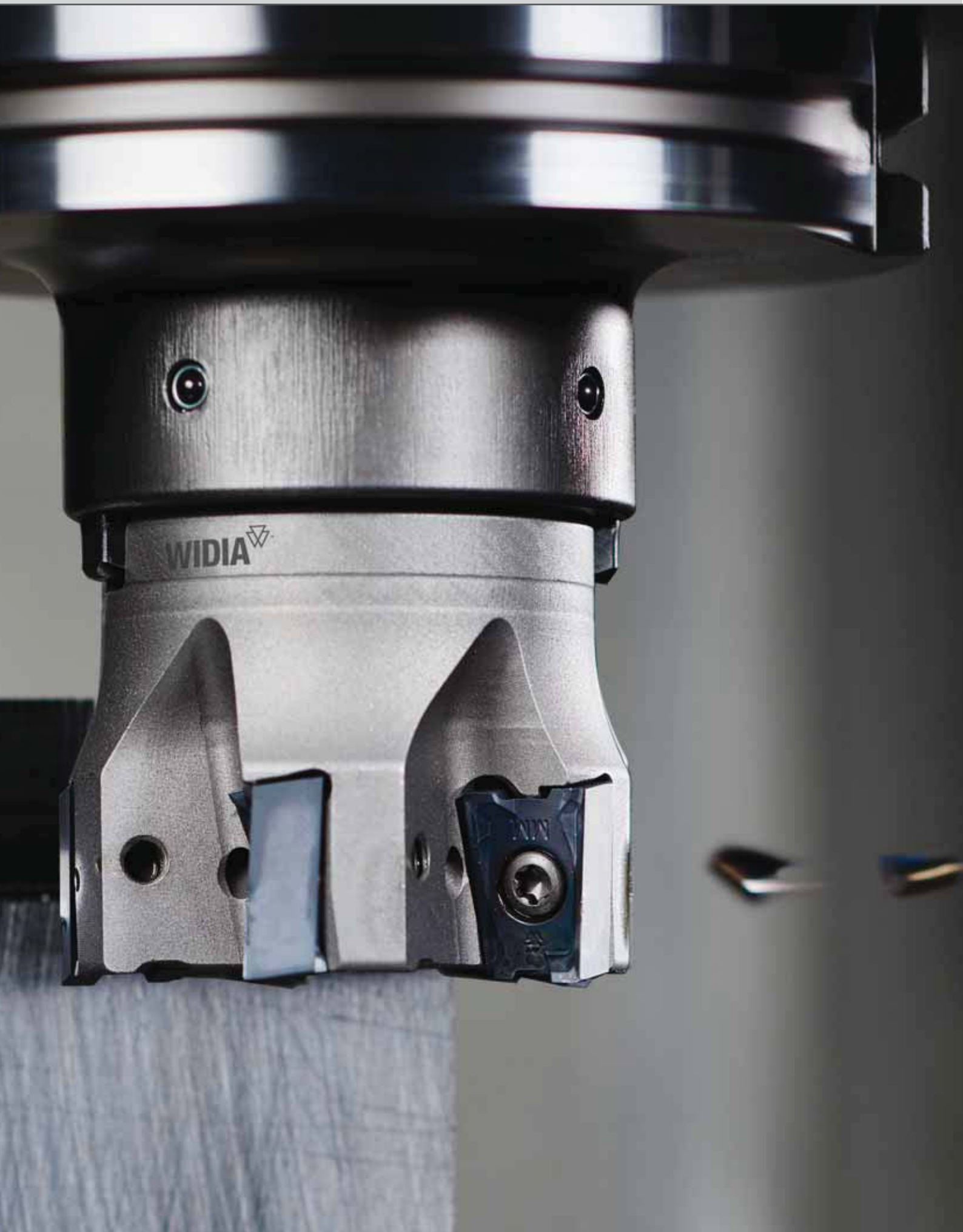




2017 Master Catalog

WIDIA  TM



Indexable Milling • 0° Shoulder Mills

VSM11 • Versatile — Single-Sided 0° Shoulder Mill Platform	I2–I16
VSM17 • Versatile — Single-Sided 0° Shoulder Mill Platform	I18–I29
VSM490-15 • Double-Sided Shoulder Milling Platform with 4 Cutting Edges	I30–I39
M690 • Square Insert Shoulder Mill Platform	I40–I51



VSM11



Victory™ Shoulder Mill 11™ is a high-performance, versatile, robust, 0° square shoulder milling platform. VSM11 is designed for versatility, low horsepower consumption, and easy cutting action. Cutters can be used for profiling, face milling, slotting, ramping, helical interpolation, circular interpolation, and other milling applications. Inserts are specially designed with innovative geometries and features like variable rake angles, negative T-land, small hone, and the latest Victory grades enhancing tool performance and versatility.

Take advantage of the high-performance, advanced carbide substrates, coatings, and surface treatment technologies of the available 6 Victory grades, 5 geometries, and broad range of cutter body product portfolio. This platform works with multiple material types and applications.

- State-of-the-art step down capability.
- Screw-on, end mill, and shell mill cutters with effective internal coolant supply.

Features

- Insert geometries and grades for all workpiece materials.
- Insert corner radius from .016–.122" (0,4–3,1mm).

Benefits

- Achieve 0° wall finish.
- Longer tool life.
- Latest WIDIA Victory milling grades for all workpiece materials.
- Soft cutting action, reduced cycle times, and low horsepower consumption.
- Stability and reliability.

Multiple corner nose radii available.



Optimized cutting edge and positive rake face for reduced cutting forces and softer cutting action.

Innovative cutting geometry provides superior wall and surface finish.

0° Shoulder Mills



VSM11™

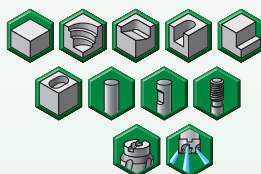
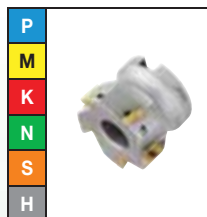
Max depth of cut: .461"

Lead angle: 0°

Indexes per insert: 2

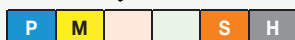
Diameter: .5–4"

Pages: I4–I16



■ Insert Offering

XDCT-ML



Light to medium machining.
First choice for stainless steel
and titanium.
Periphery ground.

XDPT-MM



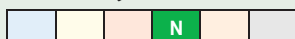
Medium to heavy machining.
First choice for general purpose.
Precision pressed to size.

XDPT-MH



First choice for heavy-duty machining.
Steel and cast iron materials.
Precision pressed to size.

XDCT-ALP



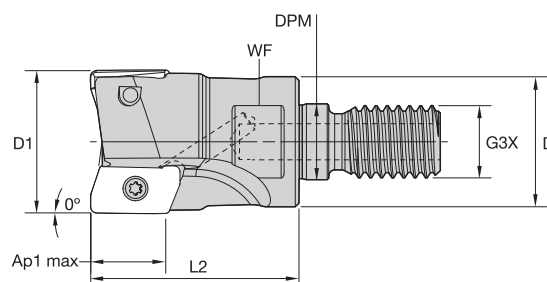
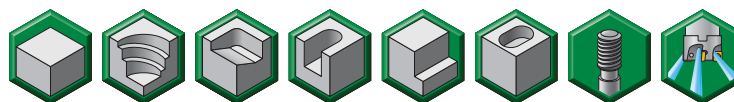
Roughing and finishing
of aluminum alloys.
High precision.
Periphery ground.

XDCW-PCD



Roughing and finishing
of aluminum alloys.
Abrasive non-ferrous materials.
High precision.
Periphery ground.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



■ Screw-On End Mills

order number	catalog number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416990	VSM11D075Z03M10XD11	.750	.710	.410	M10	1.100	.590	.455	3	8.6°	36300	Yes	.09
5416991	VSM11D100Z04M12XD11	1.000	.827	.490	M12	1.250	.670	.453	4	5.1°	29900	Yes	.18
5416992	VSM11D125Z04M16XD11	1.250	1.140	.670	M16	1.500	.940	.451	4	3.6°	25900	Yes	.39
5416993	VSM11D150Z06M16XD11	1.500	1.142	.670	M16	1.500	.940	.449	6	1.9°	23300	Yes	.48

■ Spare Parts



insert
screw



in. lbs.

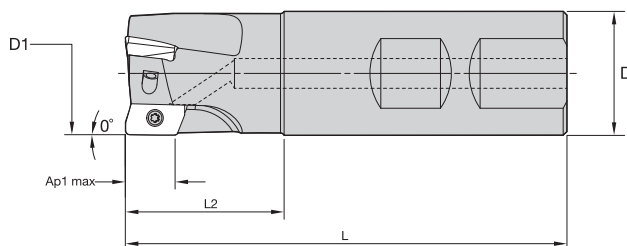
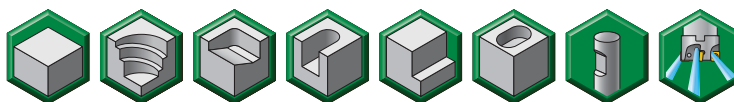


Torx Plus
driver

192.432	9	170.028
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills

Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416416	VSM11D062Z02W062XD11	.625	.625	2.750	.844	.454	2	12.5 °	41700	Yes	.18
5416417	VSM11D075Z02W075XD11	.750	.750	3.200	1.170	.455	2	8.6 °	36300	Yes	.30
5416418	VSM11D075Z03W075XD11	.750	.750	3.200	1.170	.455	3	8.6 °	36300	Yes	.31
6025663	VSM11D100Z03W075XD11	1.000	.750	3.250	1.220	.453	3	5.1 °	29900	Yes	.37
5416419	VSM11D100Z03W100XD11	1.000	1.000	3.500	1.220	.453	3	5.1 °	29900	Yes	.62
5416450	VSM11D100Z04W100XD11	1.000	1.000	3.500	1.220	.453	4	5.1 °	29900	Yes	.64
5416451	VSM11D125Z04W125XD11	1.250	1.250	4.000	1.720	.451	4	3.6 °	25900	Yes	1.12
5416452	VSM11D125Z05W125XD11	1.250	1.250	4.000	1.720	.451	5	3.6 °	25900	Yes	1.12

Spare Parts



insert screw



in. lbs.

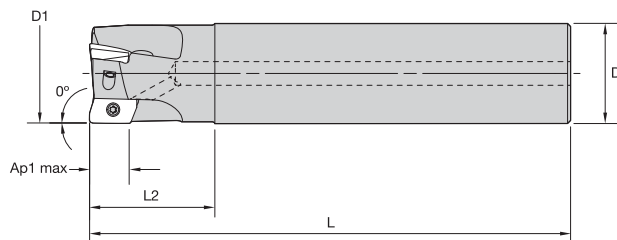
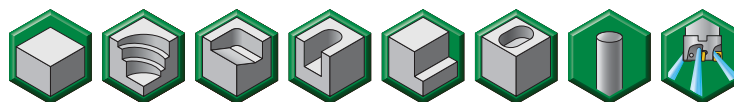


wrench

192.432	9	170.028
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



■ Cylindrical End Mills

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416485	VSM11D050Z01C062XD11L400	.500	.625	4.000	.800	.461	1	4.2 °	50400	Yes	.29
5416486	VSM11D062Z02C062XD11L400	.625	.625	4.000	1.000	.454	2	12.5 °	41700	Yes	.28
5416487	VSM11D075Z02C075XD11L450	.750	.750	4.500	1.100	.455	2	8.6 °	36300	Yes	.46
5416488	VSM11D075Z03C075XD11L450	.750	.750	4.500	1.100	.455	3	8.6 °	36300	Yes	.47
5416489	VSM11D100Z03C100XD11L480	1.000	1.000	4.800	1.250	.453	3	5.1 °	29900	Yes	.90
5416520	VSM11D100Z04C100XD11L480	1.000	1.000	4.800	1.250	.453	4	5.1 °	29900	Yes	.92
5416522	VSM11D125Z05C125XD11L520	1.250	1.250	5.200	1.600	.451	5	3.6 °	25900	Yes	1.56

■ Spare Parts



insert
screw



in. lbs.

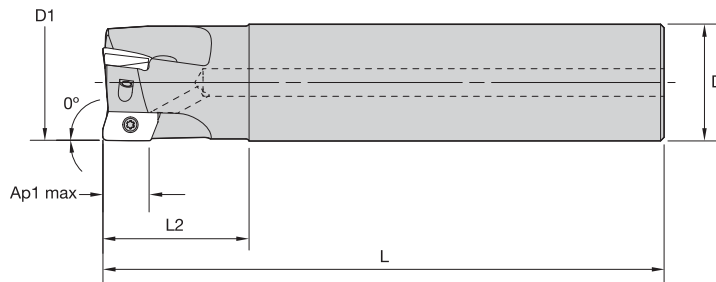
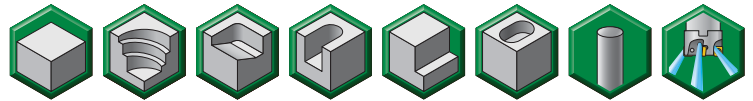


wrench

192.432	9	170.028
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills

■ Cylindrical End Mills • Long Shank

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416726	VSM11D075Z02C075XD11L670	.750	.750	6.700	1.610	.455	2	8.6 °	36300	Yes	.69
5416727	VSM11D075Z03C075XD11L670	.750	.750	6.700	1.610	.455	3	8.6 °	36300	Yes	.70
6025664	VSM11D100Z03C075XD11L480	1.000	.750	4.800	1.282	.453	3	5.1 °	29900	Yes	—
5416728	VSM11D100Z03C100XD11L800	1.000	1.000	8.000	2.100	.453	3	5.1 °	29900	Yes	1.54
5416729	VSM11D100Z04C100XD11L800	1.000	1.000	8.000	2.100	.453	4	5.1 °	29900	Yes	1.56
5416750	VSM11D125Z03C125XD11L980	1.250	1.250	9.800	2.510	.451	3	3.6 °	25900	Yes	3.00

■ Spare Parts



insert
screw



in. lbs.

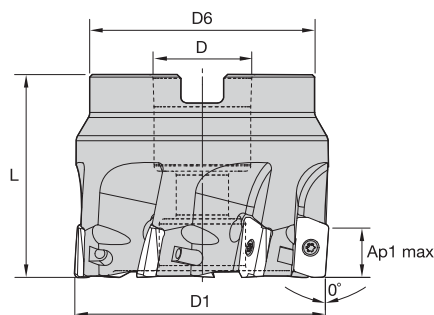
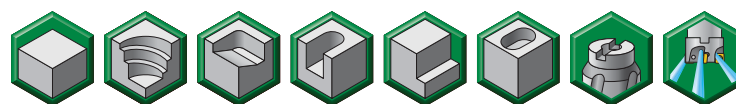


wrench

192.432	9	170.028
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416391	VSM11D150Z04S075XD11	1.500	.750	1.420	1.575	.449	4	2.8 °	23300	Yes	.41
5416392	VSM11D150Z06S075XD11	1.500	.750	1.420	1.575	.449	6	2.8 °	23300	Yes	.42
5416393	VSM11D200Z05S075XD11	2.000	.750	1.750	1.575	.446	5	1.9 °	19700	Yes	.79
5416394	VSM11D200Z08S075XD11	2.000	.750	1.750	1.575	.446	8	1.9 °	19700	Yes	.80
5416395	VSM11D250Z06S075XD11	2.500	.750	1.750	1.575	.446	6	1.5 °	17400	Yes	1.19
5416396	VSM11D250Z09S075XD11	2.500	.750	1.750	1.575	.446	9	1.5 °	17400	Yes	1.21
5416397	VSM11D300Z08S100XD11	3.000	1.000	2.190	1.750	.446	8	1.2 °	15700	Yes	1.96
5416399	VSM11D400Z09S150XD11	4.000	1.500	3.380	2.000	.446	9	.9 °	13500	Yes	3.95
5980393	VSM11D600Z07S150XD11	6.000	1.500	3.380	2.000	.446	7	.9 °	13500	Yes	7.52

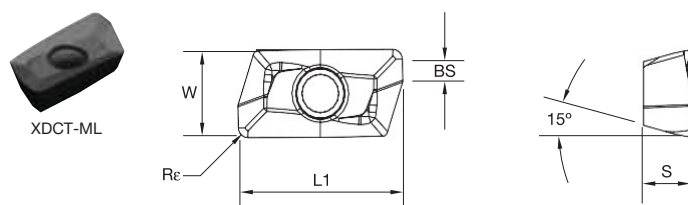
■ Spare Parts

						
D1	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly
2	192.432	9	170.028	S445	S445CG	-
3	192.432	9	170.028	S445	S445CG	-
3	192.432	9	170.028	S458	S458CG	-
4	192.432	9	170.028	-	-	S-2165-C
6	192.432	9	170.028	-	-	S-2165-C

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	WP40PM	.E..MM	WP40PM	.S..MH	WP40PM
P3-P4	.E..ML	WP35CM	.E..MM	WP35CM	.S..MH	WP35CM
P5-P6	.E..MM	WP25PM	.S..MH	WP35CM	.S..MH	WP35CM
M1-M2	.E..ML	WU35PM	.E..MM	WU35PM	.S..MH	WU35PM
M3	.E..ML	WU35PM	.E..MM	WU35PM	.S..MH	WU35PM
K1-K2	.E..ML	WK15CM	.E..MM	WK15CM	.S..MH	WK15CM
K3	.E..ML	WP25PM	.E..MM	WP25PM	.S..MH	WP25PM
N1-N2	.F..ALP	WN25PM	.F..ALP	WN25PM	.E..ML	WP25PM
N3	.F..ALP	WN25PM	.F..ALP	WN25PM	.E..ML	WP25PM
S1-S2	.E..ML	WP25PM	.E..MM	WU35PM	.S..MH	WU35PM
S3	.E..ML	WP25PM	.E..MM	WU35PM	.S..MH	WU35PM
S4	.E..MM	WU35PM	.S..MH	WU35PM	-	-
H1	.E..MM	WP25PM	.E..MM	WP25PM	-	-



- ML is a light- to medium-machining geometry and is the first choice for stainless steel and titanium materials.

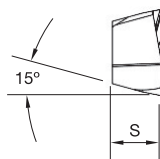
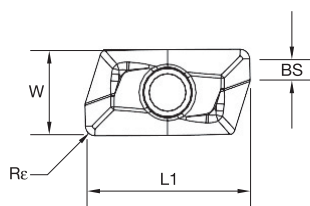
- first choice
- alternate choice

**WIDIA
VICTORY**

P	●				○	●	●		●
M	●				○	○	○	○	●
K	●	●			○	○			
N	●		●						
S				●		○	●	●	
H									

XDCT-ML

catalog number	cutting edges	L1	BS	S	W	Re	hm	WDN10J	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
XDCT1101ERML	2	.529	.082	.157	.272	.016	.002	-	-	-	5536671	5536670	5642230	-	-
XDCT1102ERML	2	.529	.067	.157	.272	.031	.002	5415549	-	-	5415548	5415547	5545065	5517826	5415546



- -MM is a medium- to heavy-machining geometry and is the first choice for general purpose and universal applications.

- first choice
- alternate choice



P								
M								
K								
N								
S								
H								

■ XDPT-MM

catalog number	cutting edges	L1	BS	S	W	Rε	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WI135M
XDPT1101SRMM	2	.529	.081	.157	.272	.016	.003	┌	5415428	┌	5642237	5415450	5642231	┌	
XDPT1102SRMM	2	.529	.066	.157	.272	.031	.003	┌	5415315	┌	5415319	5415318	5545063	5519921	5415317
XDPT1103SRMM	2	.529	.051	.157	.272	.047	.003	┌	5415310	┌	5415314	5415313	5642232	┌	5415312
XDPT1104SRMM	2	.532	.034	.163	.274	.062	.003	┌	5415250	┌	5415254	5415253	5642233	┌	
XDPT1105SRMM	2	.532	.018	.163	.274	.078	.003	┌		┌	5980399	5980400	5980398	┌	
XDPT1106SRMM	2	.526	—	.158	.273	.094	.003	┌		┌	5901355	┌	5901354	┌	
XDPT1108SRMM	2	.508	—	.157	.271	.122	.003	┌	5415422	┌	5415426	5415425	5642234	5517827	

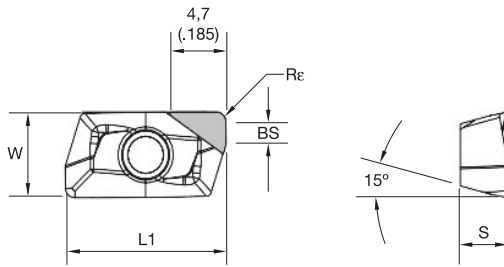
- -MH is a heavy-duty machining geometry and is the first choice for steel and cast iron materials.

■ XDPT-MH

catalog number	cutting edges	L1	BS	S	W	Rε	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WP30PM	WN125DM
XDPT1102SRMH	2	.529	.066	.157	.272	.031	.005	ι	5415255	ι	ι	5415257	5545064	ι	5415266
XDPT1103SRMH	2	.529	.051	.157	.272	.047	.005	ι	5415360	ι	ι	5415362	5642235	ι	ι
XDPT1104SRMH	2	.529	.035	.157	.272	.062	.005	ι	5415364	ι	ι	5415366	5642236	ι	ι



XDCW-PCD



P	
M	
K	
N	●
S	
H	

- first choice
- alternate choice

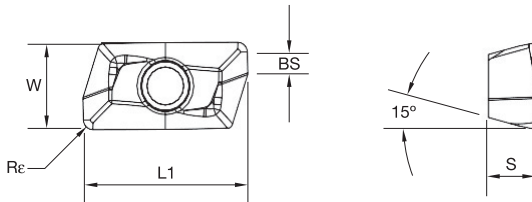
- -PCD is the first choice for roughing and finishing of abrasive non-ferrous materials and aluminum alloys.

■ XDCW-PCD

catalog number	cutting edges	L1	BS	S	W	R _ε	hm	WDN10U
XDCT1101RPCD	1	.529	.083	.157	.272	.016	.001	5415420
XDCT1102RPCD	1	.529	.067	.157	.272	.031	.001	5415421



XDCT-ALP



P	
M	
K	
N	● ●
S	
H	

- first choice
- alternate choice

- -ALP is the first choice for roughing and finishing of aluminum alloys.

■ XDCT-ALP

catalog number	cutting edges	L1	BS	S	W	R _ε	hm	WN10HM	WN25PM
XDCT1101RALP	2	.529	.082	.157	.272	.016	.001	5933940	5417054
XDCT1102RALP	2	.529	.067	.157	.272	.031	.001	5936171	5417053

■ Recommended Starting Speeds [SFM]

Material Group		WP25PM			WU35PM			WP40PM			WK15CM		
P	1	1080	940	890	850	750	710	980	850	820	–	–	–
	2	900	790	660	720	620	520	820	720	590	–	–	–
	3	840	710	570	660	560	460	750	660	520	–	–	–
	4	740	610	490	590	490	390	690	560	460	–	–	–
	5	610	560	490	490	440	390	560	520	460	–	–	–
	6	540	410	330	430	330	260	490	390	300	–	–	–
M	1	670	590	540	560	490	440	660	560	520	–	–	–
	2	610	520	430	510	430	360	590	490	430	–	–	–
	3	460	390	310	380	330	260	430	390	300	–	–	–
K	1	750	670	610	–	–	–	–	–	–	1380	1260	1120
	2	590	520	490	–	–	–	–	–	–	1100	970	900
	3	490	440	390	–	–	–	–	–	–	920	820	750
N	1–2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	130	110	80	110	100	80	130	130	100	–	–	–
	2	130	110	80	110	100	80	130	130	100	–	–	–
	3	160	130	80	150	110	80	160	130	100	–	–	–
	4	230	160	110	200	150	100	230	160	130	–	–	–
H	1	390	300	230	–	–	–	–	–	–	–	–	–

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WS30PM			WP35CM			WN25PM			WDN10U		
P	1	—	—	—	1490	1295	1215	—	—	—	—	—	—
	2	—	—	—	920	835	755	—	—	—	—	—	—
	3	—	—	—	835	755	670	—	—	—	—	—	—
	4	—	—	—	625	575	525	—	—	—	—	—	—
	5	—	—	—	855	755	690	—	—	—	—	—	—
	6	—	—	—	525	445	360	—	—	—	—	—	—
M	1	740	655	605	670	605	510	—	—	—	—	—	—
	2	670	590	475	605	525	460	—	—	—	—	—	—
	3	510	445	345	475	425	375	—	—	—	—	—	—
K	1	—	—	—	970	870	785	—	—	—	—	—	—
	2	—	—	—	770	690	625	—	—	—	—	—	—
	3	—	—	—	640	575	525	—	—	—	—	—	—
N	1-2	—	—	—	—	—	—	3530	3100	2870	9040	8040	7400
	3	—	—	—	—	—	—	3100	2870	2495	7500	5480	4450
S	1	150	130	100	—	—	—	—	—	—	—	—	—
	2	150	130	100	215	165	110	—	—	—	—	—	—
	3	180	150	100	—	—	—	—	—	—	—	—	—
	4	280	195	130	—	—	—	—	—	—	—	—	—
H	1	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: FIRST choice starting speeds are in **bold** type.
As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.F.-PCD	.003	.007	.009	.003	.005	.007	.002	.004	.006	.002	.004	.006	.002	.004	.006	.F.-PCD
.F..ALP	.003	.004	.006	.003	.003	.005	.002	.002	.004	.002	.002	.004	.002	.002	.004	.F..ALP
.E..ML	.004	.007	.012	.003	.005	.009	.002	.005	.008	.002	.004	.007	.002	.004	.007	.E..ML
.S..MM	.007	.008	.014	.005	.006	.010	.004	.005	.009	.004	.005	.008	.004	.005	.008	.S..MM
.S..MH	.007	.010	.016	.005	.007	.012	.004	.006	.010	.004	.006	.009	.004	.006	.009	.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

Achieve True 0° Shoulder Milling with the New
High-Performance WIDIA™ VSM11™ Starter Kits.

Victory™ Shoulder Mill 11™ Starter Kits

Order one of our starter kits and test the performance of our new VSM11 platform. The kits are set up to serve the majority of shoulder milling applications, delivered with a cutter body and the latest WIDIA Victory™ grades. Detailed order information can be found in the table below.

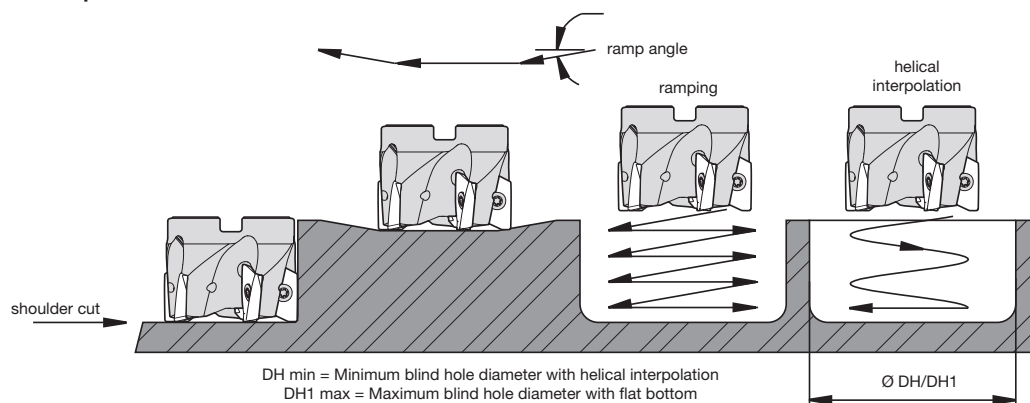


■ VSM11 Starter Kits • Inch

order number	catalog number	diameter D1 (inch)	cutter body type	material group	content				
					cutter	qty	inserts	grade	Z (pocket seats)
5528097	VSM11KITWD062Z02WP40PM	0.62	Weldon	P	VSM11D062Z02W062XD11	10	XDPT1102SRMM	WP40PM	2
5528098	VSM11KITWD075Z03WP40PM	0.75	Weldon	P	VSM11D075Z03W075XD11	10	XDPT1102SRMM	WP40PM	3
5528099	VSM11KITWD100Z04WP40PM	1.00	Weldon	P	VSM11D100Z04W100XD11	10	XDPT1102SRMM	WP40PM	4
5719056	VSM11KITCD075Z03WP40PM	0.75	Cylindrical	P	VSM11D075Z03C075XD11L450	10	XDPT1102SRMM	WP40PM	3
5719057	VSM11KITCD062Z02WP40PM	0.62	Cylindrical	P	VSM11D062Z02C062XD11L400	10	XDPT1102SRMM	WP40PM	2
5719058	VSM11KITCD100Z04WP40PM	1.00	Cylindrical	P	VSM11D100Z04C100XD11L480	10	XDPT1102SRMM	WP40PM	4
5719059	VSM11KITS0200Z05WP40PM	2.00	Shell	P	VSM11D200Z05S075XD11	10	XDPT1102SRMM	WP40PM	5
5719070	VSM11KITS0150Z04WP40PM	1.50	Shell	P	VSM11D150Z04S075XD11	10	XDPT1102SRMM	WP40PM	4

*Starter Kit to be delivered in regular WIDIA™ corrugated box.

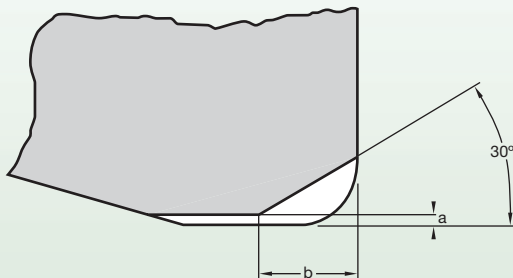
■ Application Examples



order number	catalog number	number of inserts	max RPM	max ramp angle to steel body interference	max flat-bottom hole diameter (DH1 max)	min hole diameter (DH min)
5416990	VSM11D075Z03M10XD11	3	36300	8.600°	1.490	0.980
5416991	VSM11D100Z04M12XD11	4	29900	5.100°	1.990	1.480
5416992	VSM11D125Z04M16XD11	4	25900	3.600°	2.490	1.980
5416993	VSM11D150Z06M16XD11	6	23300	1.900°	2.990	2.480
5416416	VSM11D062Z02W062XD11	2	41700	12.500°	1.240	0.730
5416417	VSM11D075Z02W075XD11	2	36300	8.600°	1.490	0.980
5416418	VSM11D075Z03W075XD11	3	36300	8.600°	1.490	0.980
5416419	VSM11D100Z03W100XD11	3	29900	5.100°	1.990	1.480
5416450	VSM11D100Z04W100XD11	4	29900	5.100°	1.990	1.480
5416451	VSM11D125Z04W125XD11	4	25900	3.600°	2.490	1.980
5416452	VSM11D125Z05W125XD11	5	25900	3.600°	2.490	1.980
5416485	VSM11D050Z01C062XD11L400	1	50400	4.200°	0.990	0.480
5416486	VSM11D062Z02C062XD11L400	2	41700	12.500°	1.240	0.730
5416487	VSM11D075Z02C075XD11L450	2	36300	8.600°	1.490	0.980
5416488	VSM11D075Z03C075XD11L450	3	36300	8.600°	1.490	0.980
5416489	VSM11D100Z03C100XD11L480	3	29900	5.100°	1.990	1.480
5416520	VSM11D100Z04C100XD11L480	4	29900	5.100°	1.990	1.480
5416522	VSM11D125Z05C125XD11L520	5	25900	3.600°	2.490	1.980
5416726	VSM11D075Z02C075XD11L670	2	36300	8.600°	1.490	0.980
5416727	VSM11D075Z03C075XD11L670	3	36300	8.600°	1.490	0.980
5416728	VSM11D100Z03C100XD11L800	3	29900	5.100°	1.990	1.480
5416729	VSM11D100Z04C100XD11L800	4	29900	5.100°	1.990	1.480
5416750	VSM11D125Z03C125XD11L980	3	25900	3.600°	2.490	1.980
5416391	VSM11D150Z04S075XD11	4	23300	2.800°	3.000	2.490
5416392	VSM11D150Z06S075XD11	6	23300	2.800°	3.000	2.490
5416393	VSM11D200Z05S075XD11	5	19700	1.900°	4.000	3.490
5416394	VSM11D200Z08S075XD11	8	19700	1.900°	4.000	3.490
5416395	VSM11D250Z06S075XD11	6	17400	1.500°	5.000	4.490
5416396	VSM11D250Z09S075XD11	9	17400	1.500°	5.000	4.490
5416397	VSM11D300Z08S100XD11	8	15700	1.200°	6.000	5.490
5416399	VSM11D400Z09S150XD11	9	13500	.900°	8.000	7.490

NOTE: For DH1 max, subtract the insert corner radius from the max hole diameter.

Modification Instructions for Use of Larger Radii Inserts
(Shoulder Mills and Helical Mills)



insert corner radius	material to remove	
	a	b
0.122"	0.008"	0.071"



Engineered to Achieve Superior Surface Quality



EXTREME **CHALLENGES.**
EXTREME **RESULTS.**

Victory™ Shoulder Mill Series

The Victory Shoulder Mill (VSM) family of tools provides a comprehensive solution for your most challenging shoulder milling applications. The unique design of the VSM11™, VSM17™, and VSM490™ is capable of producing a true 0° wall in multiple material types. When combined with the latest WIDIA™ Victory™ grades, VSM from WIDIA provides superior performance at high speeds.

- Innovative cutting geometry provides superior wall and surface finish.
- State-of-the-art step-down capability.
- Real soft cutting action results in lower cutting forces and low machine power consumption.
- VSM11 and VSM17 offer aggressive ramping capabilities.
- VSM490 provides outstanding step-down capabilities in applications that require multiple passes.

To learn more about the benefits of the **WIDIA™ Victory Shoulder Mill Series**, contact your local distributor.

WIDIA 

VSM17



WIDIA Victory Shoulder Mill 17 is a high-performance, versatile, robust, 0° square shoulder milling platform. VSM17 is designed for versatility, low horsepower consumption, and easy cutting action. Cutters can be used for shoulder milling, profiling, face milling, slotting, ramping, helical interpolation, and circular interpolation milling applications. Inserts are specially designed with innovative geometries and features like variable rake angles, negative T-land, small hone, and the latest Victory grades enhancing tool performance and versatility.

Take advantage of the high-performance, advanced carbide substrates, coatings, and surface treatment technologies of the available 7 Victory grades, 4 geometries, and a broad-range cutter body product portfolio. This platform works with multiple material types and applications.

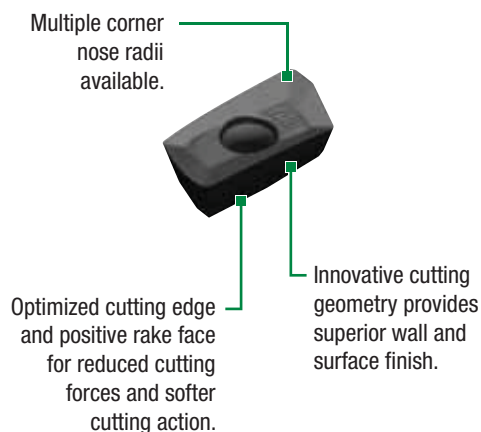
- Up to .65" (16,33mm) depth-of-cut capabilities.
- State-of-the-art step down capability.
- Screw-on, end mill, and shell mill cutters with effective internal coolant supply.

Features

- Insert geometries and grades for all workpiece materials.
- Insert corner radius from .015–.157" (0,4–4mm).
- Max axial depth of cut .65" (16,3mm).

Benefits

- Achieve true 0° wall finish.
- High performance and longer tool life.
- Latest WIDIA Victory milling grades for all workpiece materials.
- High positive geometry, soft cutting action, reduced cycle times, and low horsepower consumption.
- Stability and reliability.



0° Shoulder Mills

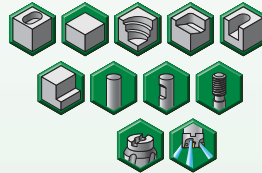
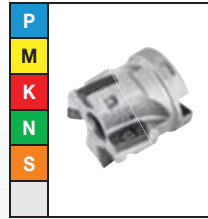


VSM17™

Max depth of cut: .642"

Lead angle: 0°
Indexes per insert: 2
Diameter: 1–6"

Pages: I20–I29



■ Insert Offering

XDPT-MM



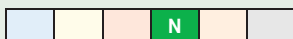
Medium to heavy machining.
First choice for general purpose.
Precision pressed to size.

XDPT-MH



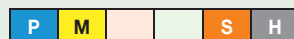
First choice for heavy-duty machining.
Steel and cast iron materials.
Precision pressed to size.

XDCT-ALP

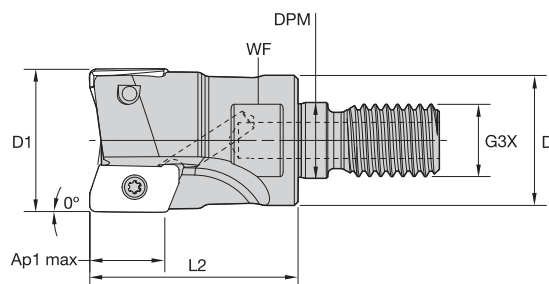
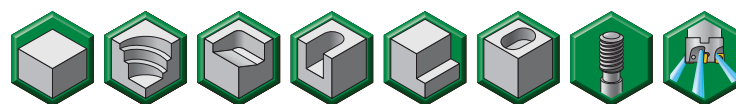


Roughing and finishing
of aluminum alloys.
High precision.
Periphery ground.

XDCT-ML



Light to medium machining.
First choice for stainless steel
and titanium.
Periphery ground.



■ Screw-On End Mills

order number	catalog number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988017	VSM17D100Z02M12XD17	1.000	.827	.492	M12	1.250	.667	.642	2	8.5	41300	Yes	.17
5988046	VSM17D125Z02M16XD17	1.250	1.142	.669	M16	1.500	.943	.641	2	5.8	34700	Yes	.36
5988018	VSM17D125Z03M16XD17	1.250	1.142	.669	M16	1.500	.943	.641	3	5.8	34700	Yes	.35
5988045	VSM17D150Z03M16XD17	1.500	1.142	.669	M16	1.500	.943	.638	3	4.3	30700	Yes	.40
5988019	VSM17D150Z04M16XD17	1.500	1.142	.669	M16	1.500	.943	.638	4	4.3	30700	Yes	.38

■ Spare Parts



insert
screw



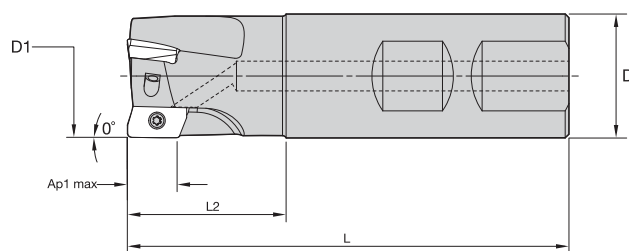
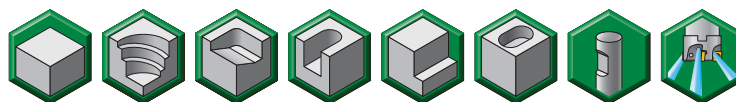
in. lbs.



Torx Plus
driver

191.725	31	170.025
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.



Shoulder Mills

Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988028	VSM17D100Z02W100XD17	1.000	1.000	3.500	1.220	.642	2	8.5°	41300	Yes	.59
5988052	VSM17D125Z02W125XD17	1.250	1.250	4.000	1.720	.641	2	5.8°	34700	Yes	1.06
5988029	VSM17D125Z03W125XD17	1.250	1.250	4.000	1.720	.641	3	5.8°	34700	Yes	1.05
5988051	VSM17D150Z03W150XD17	1.500	1.500	4.500	1.810	.638	3	4.3°	30700	Yes	1.77
5988030	VSM17D150Z04W150XD17	1.500	1.500	4.500	1.810	.638	4	4.3°	30700	Yes	1.77

Spare Parts



insert
screw



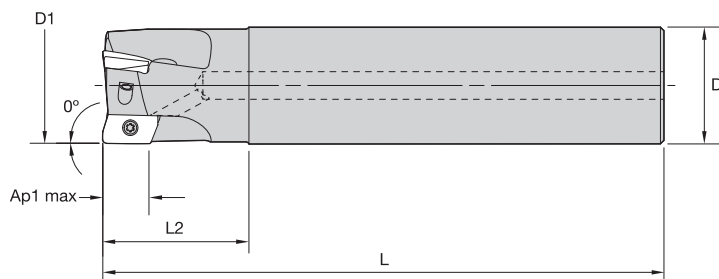
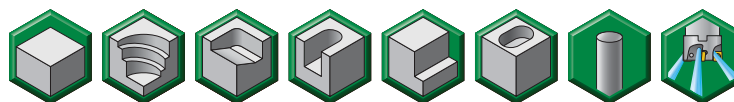
in. lbs.



wrench

191.725	31	170.025
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.



■ Cylindrical End Mills

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988011	VSM17D100Z02C100XD17L450	1.000	1.000	4.500	1.750	.642	2	8.5°	41300	Yes	.78
5988041	VSM17D125Z02C125XD17L480	1.250	1.250	4.800	2.000	.641	2	5.8°	34700	Yes	1.32
5988013	VSM17D125Z03C125XD17L480	1.250	1.250	4.800	2.000	.641	3	5.8°	34700	Yes	1.31
5988043	VSM17D150Z03C150XD17L520	1.500	1.500	5.200	2.000	.638	3	4.3°	30700	Yes	2.11
5988015	VSM17D150Z04C150XD17L520	1.500	1.500	5.200	2.000	.638	4	4.3°	30700	Yes	2.11

■ Spare Parts



insert
screw



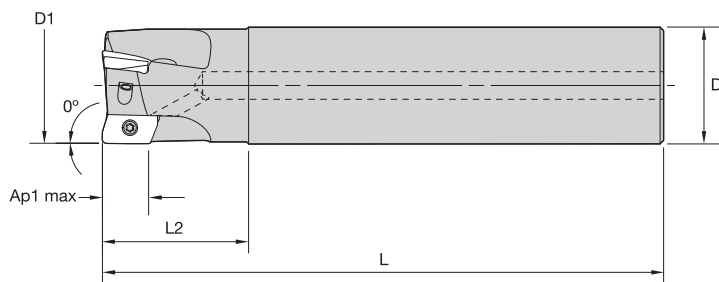
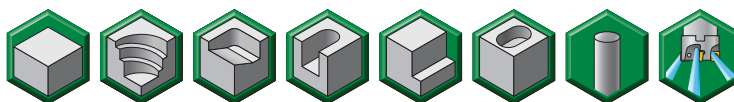
in. lbs.



wrench

191.725	31	170.025
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.



Shoulder Mills

■ Cylindrical End Mills • Long Shank

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988012	VSM17D100Z02C100XD17L670	1.000	1.000	6.700	1.750	.642	2	8.5°	41300	Yes	1.23
5988042	VSM17D125Z02C125XD17L800	1.250	1.250	8.000	2.000	.641	2	5.8°	34700	Yes	2.38
5988014	VSM17D125Z03C125XD17L800	1.250	1.250	8.000	2.000	.641	3	5.8°	34700	Yes	2.36
5988044	VSM17D150Z03C150XD17L980	1.500	1.500	9.800	2.000	.638	3	4.3°	30700	Yes	4.33
5988016	VSM17D150Z04C150XD17L980	1.500	1.500	9.800	2.000	.638	4	4.3°	30700	Yes	4.33

■ Spare Parts



insert
screw



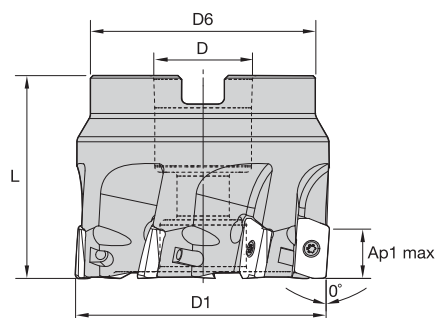
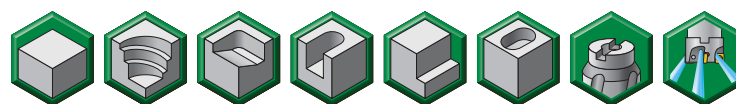
in. lbs.



wrench

191.725	31	170.025
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NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.



Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988020	VSM17D150Z04S075XD17	1.500	.750	1.417	1.575	.638	4	4.3°	30700	Yes	.38
5988021	VSM17D200Z04S075XD17	2.000	.750	1.750	1.575	.635	4	3.0°	25600	Yes	.68
5988022	VSM17D200Z05S075XD17	2.000	.750	1.750	1.575	.635	5	3.0°	25600	Yes	.71
5988050	VSM17D200Z06S075XD17	2.000	.750	1.750	1.575	.635	6	3.0°	25600	Yes	.66
5988023	VSM17D250Z05S075XD17	2.500	.750	1.750	1.575	.629	5	2.1°	22300	Yes	.98
5988048	VSM17D250Z06S075XD17	2.500	.750	1.750	1.575	.629	6	2.1°	22300	Yes	.97
5988024	VSM17D300Z06S100XD17	3.000	1.000	2.188	1.750	.626	6	1.7°	20100	Yes	1.73
5988047	VSM17D300Z07S100XD17	3.000	1.000	2.188	1.750	.626	7	1.7°	20100	Yes	1.68
5988025	VSM17D400Z08S150XD17	4.000	1.500	3.375	2.000	.623	8	1.2°	17100	Yes	3.52
5988026	VSM17D500Z09S150XD17	5.000	1.500	3.375	2.000	.617	9	.9°	15100	Yes	5.07
5988027	VSM17D600Z12S150XD17	6.000	1.500	3.375	2.000	.616	12	.7°	13700	Yes	6.88

Spare Parts



D1	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly
1.500	191.725	31	170.025	S445	S445CG	-
2.000	191.725	31	170.025	S445	S445CG	-
2.500	191.725	31	170.025	S445	S445CG	-
3.000	191.725	31	170.025	S458	S458CG	-
4.000	191.725	31	170.025	-	-	S2165C
5.000	191.725	31	170.025	-	-	S2165C
6.000	191.725	31	170.025	-	-	S2165C

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.
For tool body modification instructions, see page I16.

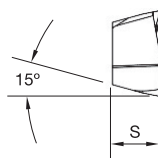
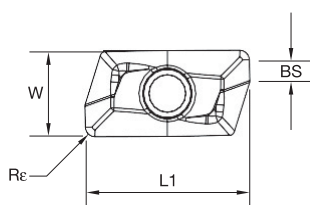
■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	WP40PM	.S..MM	WP40PM	.S..MH	WP40PM
P3-P4	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
P5-P6	.E..ML	WP35CM	.S..MM	WU35PM	.S..MH	WP35CM
M1-M2	.E..ML	WP25PM	.S..MM	WP25PM	.S..MM	WU35PM
M3	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
K1-K2	.S..MM	WK15CM	.S..MM	WK15CM	.S..MH	WK15CM
K3	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
N1-N2	.F..ALP	WN10HM	.F..ALP	WN25PM	.F..ALP	WN25PM
N3	—	—	—	—	—	—
S1-S2	.S..MM	WP25PM	.S..MM	WU35PM	.S..MM	WU35PM
S3	.S..MM	WU35PM	.S..MM	WU35PM	.S..MM	WU35PM
S4	.S..MM	WP25PM	.S..MM	WU35PM	.S..MM	WU35PM
H1	—	—	—	—	—	—

Shoulder Mills



XDCT-ML



- first choice
- alternate choice



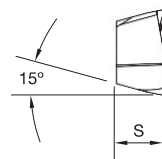
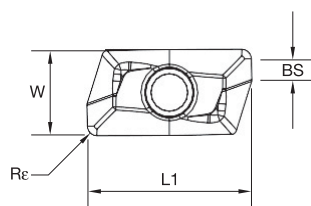
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M	●	○	○	○	○	○
K	●	○	○	○	○	○
N	●	○	○	○	○	○
S	●	○	○	○	○	○
H	●	○	○	○	○	○

■ XDCT-ML

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDCT1701ERML	2	.754	.103	.193	.378	.016	●	●	●	●	●	●
XDCT1702ERML	2	.754	.088	.193	.378	.031	●	●	●	●	●	●
XDCT1703ERML	2	.754	.072	.193	.378	.047	●	●	●	●	●	●
XDCT1704ERML	2	.755	.056	.193	.378	.063	●	●	●	●	●	●
XDCT1705ERML	2	.755	.040	.193	.378	.079	●	●	●	●	●	●
XDCT1706ERML	2	.755	.025	.193	.378	.094	●	●	●	●	●	●
XDCT1708ERML	2	.742	—	.192	.378	.125	●	●	●	●	●	●
XDCT1710ERML	2	.722	—	.192	.377	.157	●	●	●	●	●	●



XDCT-ALP



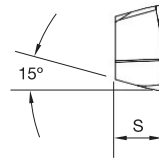
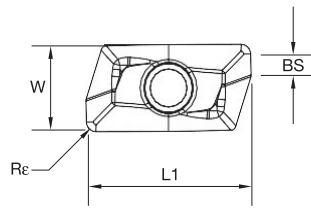
- first choice
- alternate choice



P			
M			
K			
N	●	●	
S			
H			

■ XDCT-ALP

catalog number	cutting edges	L1	BS	S	W	Re	WN10HM	WN25PM
XDCT1701RALP	2	.754	.103	.193	.378	.016	6007341	6007220
XDCT1702RALP	2	.754	.088	.193	.378	.031	6007345	6007344
XDCT1703RALP	2	.755	.072	.193	.378	.047	6007342	6001537
XDCT1704RALP	2	.755	.056	.193	.378	.063	6001256	6001254
XDCT1705RALP	2	.755	.040	.193	.378	.079	6001252	6001254
XDCT1706RALP	2	.755	.025	.193	.378	.094	6001252	6001254
XDCT1708RALP	2	.742	—	.192	.378	.125	6001240	6001238
XDCT1710RALP	2	.722	—	.192	.377	.157	6001238	6001238



● first choice
○ alternate choice

P				○	●	●	●
M				●	○	●	●
K		●		○	○	○	○
N			●				
S				●		○	●
H				●	○		

■ XDPT-MM

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDPT1701SRMM	2	.754	.099	.193	.378	.016	■	■	■	■	■	■
XDPT1702SRMM	2	.754	.085	.193	.378	.031	5987948	■	5987949	5987947	5987946	5987689
XDPT1703SRMM	2	.754	.070	.193	.378	.047	5988138	5988151	5988140	5988139	5988152	■
XDPT1704SRMM	2	.755	.054	.193	.378	.063	5988153	5988155	5988156	5988154	■	■
XDPT1705SRMM	2	.755	.390	.193	.378	.079	■	■	5988158	5988160	5988159	■
XDPT1706SRMM	2	.755	.024	.193	.378	.094	■	■	5988203	■	5988202	■
XDPT1708SRMM	2	.742	—	.192	.378	.125	■	■	5988206	5988204	5988205	■
XDPT1710SRMM	2	.722	—	.192	.377	.157	■	■	5988970	■	5988969	■

■ XDPT-MH

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDPT1702SRMH	2	.754	.083	.193	.378	.031	5989053	■	■	5989054	5989052	■
XDPT1703SRMH	2	.754	.068	.193	.378	.047	5991817	■	■	5991816	5991815	■

■ Recommended Starting Speeds [SFM]

Material Group		WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WN10HM	WU35PM
P	1	- - -	- - -	1080 935 885	1490 1295 1215	970 855 805	- - -	850 750 710
	2	- - -	- - -	900 785 655	920 835 755	820 705 590	- - -	720 620 520
	3	- - -	- - -	835 705 575	835 755 670	755 640 525	- - -	660 560 460
	4	- - -	- - -	740 605 490	625 575 525	670 560 445	- - -	590 490 390
	5	- - -	- - -	605 560 490	855 755 690	560 510 445	- - -	490 440 390
	6	- - -	- - -	540 410 330	525 445 360	490 375 295	- - -	430 330 260
M	1	- - -	- - -	670 590 540	670 605 510	640 560 510	- - -	560 490 440
	2	- - -	- - -	605 525 425	605 525 460	575 490 410	- - -	510 430 360
	3	- - -	- - -	460 395 310	475 425 375	425 375 295	- - -	380 330 260
K	1	1380 1265 1115	- - -	755 670 605	970 870 785	- - -	625 560 490	- - -
	2	1100 970 900	- - -	590 525 490	770 690 625	- - -	- - -	- - -
	3	920 820 755	- - -	490 445 395	640 575 525	- - -	- - -	- - -
N	1	- - -	3525 3100 2870	- - -	- - -	- - -	6560 3935 3280	- - -
	2	- - -	3100 2870 2495	- - -	- - -	- - -	4475 2675 2180	- - -
	3	- - -	3100 2870 2495	- - -	- - -	- - -	2625 1640 1310	- - -
S	1	- - -	- - -	130 115 80	- - -	130 115 100	- - -	110 100 80
	2	- - -	- - -	130 115 80	- - -	130 115 100	- - -	110 100 80
	3	- - -	- - -	165 130 80	- - -	165 130 100	- - -	150 110 80
	4	- - -	- - -	230 165 115	215 165 110	215 165 115	- - -	200 150 100
H	1	- - -	- - -	395 295 230	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..ALP	.005	.009	.023	.003	.007	.017	.003	.005	.013	.002	.004	.011	.002	.004	.010	.F..ALP
.E..ML	.007	.014	.028	.005	.010	.020	.004	.008	.015	.003	.007	.013	.003	.006	.012	.E..ML
.S..MM	.007	.019	.035	.005	.013	.025	.004	.010	.019	.003	.009	.016	.003	.008	.015	.S..MM
.S..MH	.009	.023	.037	.007	.017	.027	.005	.013	.020	.004	.011	.017	.004	.010	.016	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

Order a VSM17™ Kit to achieve true 0°
high-performance shoulder milling!

Victory™ Shoulder Mill 17™ Starter Kits

Order one of our starter kits and test the performance of our new VSM17 platform. The kits are set up to serve the majority of shoulder milling applications, delivered with a cutter body and the latest WIDIA™ Victory™ grades. Detailed order information can be found in the table below.



■ VSM17 Starter Kits • Inch

order number	catalog number	diameter D1 (in)	cutter body type	material group	content					
					cutter	qty	inserts	qty	grade	Z (pocket seats)
6049335	VSM17KITCD100Z2WP40PM	1.00	CYLINDRICAL	P	VSM17D100Z02C100XD17L450	1	XDPT170408PESRMM	10	WP40PM	2
6049334	VSM17KITSW100Z2WP40PM	1.00	SCREW ON	P	VSM17D100Z02M12XD17	1	XDPT170408PESRMM	10	WP40PM	2
6049339	VSM17KITCD125Z2WP40PM	1.25	CYLINDRICAL	P	VSM17D125Z02C125XD17L480	1	XDPT170408PESRMM	10	WP40PM	2
6049338	VSM17KITCD125Z3WP40PM	1.25	CYLINDRICAL	P	VSM17D125Z03C125XD17L480	1	XDPT170408PESRMM	10	WP40PM	3
6049336	VSM17KITSW125Z3WP40PM	1.25	SCREW ON	P	VSM17D125Z03M16XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049337	VSM17KITWD125Z3WP40PM	1.25	WELDON	P	VSM17D125Z03W125XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049340	VSM17KITWD150Z3WP40PM	1.50	WELDON	P	VSM17D150Z03W150XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049352	VSM17KITCD150Z4WP40PM	1.50	CYLINDRICAL	P	VSM17D150Z04C150XD17L520	1	XDPT170408PESRMM	10	WP40PM	4
6049351	VSM17KITSD150Z4WP40PM	1.50	SHELL MILL	P	VSM17D150Z04S075XD17	1	XDPT170408PESRMM	10	WP40PM	4
6049353	VSM17KITSD200Z4WP40PM	2.00	SHELL MILL	P	VSM17D200Z04S075XD17	1	XDPT170408PESRMM	10	WP40PM	4
6049354	VSM17KITSD200Z5WP40PM	2.00	SHELL MILL	P	VSM17D200Z05S075XD17	1	XDPT170408PESRMM	10	WP40PM	5
6049355	VSM17KITSD250Z5WP40PM	2.50	SHELL MILL	P	VSM17D250Z05S075XD17	1	XDPT170408PESRMM	10	WP40PM	5
6049356	VSM17KITSD300Z6WP40PM	3.00	SHELL MILL	P	VSM17D300Z06S100XD17	1	XDPT170408PESRMM	10	WP40PM	6
6049357	VSM17KITSD400Z8WP40PM	4.00	SHELL MILL	P	VSM17D400Z08S150XD17	1	XDPT170408PESRMM	10	WP40PM	8
6049359	VSM17KITCD100Z2WK15CM	1.00	CYLINDRICAL	K	VSM17D100Z02C100XD17L450	1	XDPT170408PESRMM	10	WK15CM	2
6049358	VSM17KITSW100Z2WK15CM	1.00	SCREW ON	K	VSM17D100Z02M12XD17	1	XDPT170408PESRMM	10	WK15CM	2
6049363	VSM17KITCD125Z2WK15CM	1.25	CYLINDRICAL	K	VSM17D125Z02C125XD17L480	1	XDPT170408PESRMM	10	WK15CM	2
6049362	VSM17KITCD125Z3WK15CM	1.25	CYLINDRICAL	K	VSM17D125Z03C125XD17L480	1	XDPT170408PESRMM	10	WK15CM	3
6049360	VSM17KITSW125Z3WK15CM	1.25	SCREW ON	K	VSM17D125Z03M16XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049361	VSM17KITWD125Z3WK15CM	1.25	WELDON	K	VSM17D125Z03W125XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049364	VSM17KITWD150Z3WK15CM	1.50	WELDON	K	VSM17D150Z03W150XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049366	VSM17KITCD150Z4WK15CM	1.50	CYLINDRICAL	K	VSM17D150Z04C150XD17L520	1	XDPT170408PESRMM	10	WK15CM	4
6049365	VSM17KITSD150Z4WK15CM	1.50	SHELL MILL	K	VSM17D150Z04S075XD17	1	XDPT170408PESRMM	10	WK15CM	4
6049367	VSM17KITSD200Z5WK15CM	2.00	SHELL MILL	K	VSM17D200Z04S075XD17	1	XDPT170408PESRMM	10	WK15CM	4
6049368	VSM17KITSD200Z5WK15CM	2.00	SHELL MILL	K	VSM17D200Z05S075XD17	1	XDPT170408PESRMM	10	WK15CM	5
6049369	VSM17KITSD250Z5WK15CM	2.50	SHELL MILL	K	VSM17D250Z05S075XD17	1	XDPT170408PESRMM	10	WK15CM	5
6049370	VSM17KITSD300Z6WK15CM	3.00	SHELL MILL	K	VSM17D300Z06S100XD17	1	XDPT170408PESRMM	10	WK15CM	6
6049371	VSM17KITSD400Z8WK15CM	4.00	SHELL MILL	K	VSM17D400Z08S150XD17	1	XDPT170408PESRMM	10	WK15CM	8

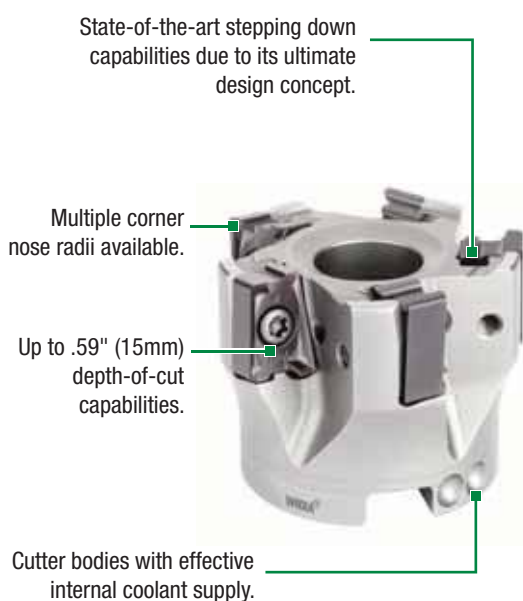
Double-Sided Shoulder Mill •
VSM490™ -15

VSM490-15

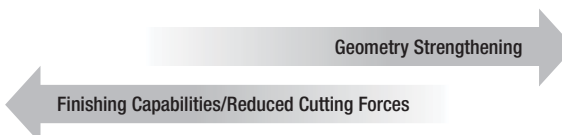
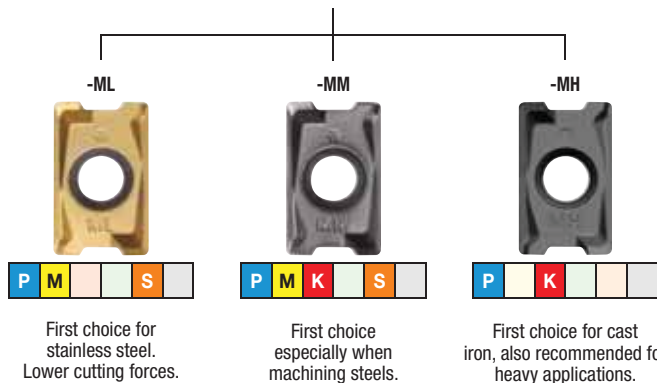


WIDIA™ Victory™ Shoulder Milling Series (VSM series) is specially engineered to achieve excellent surface quality as well as higher material removal rates in shoulder milling applications. The VSM490 series, with its unique design, enables the tool to be applied in multiple passes (stepping down) with outstanding results. VSM490-15 is applicable in a wide range of workpiece materials: steel, cast iron, stainless steel, and titanium, from roughing to finishing applications.

- Double-sided strong insert with 4 cutting edges.
- High positive geometry for lower cutting forces.
- Superior wall and surface finish capabilities.



Three geometries for all material groups in shoulder milling applications.



0° Shoulder Mills

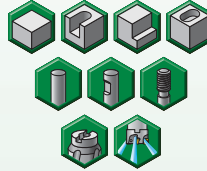


VSM490™-15

Max depth of cut: .590"

Lead angle: 0°
Indexes per insert: 4
Diameter: 1–6"

Pages: I32–I39



VSM490™-15 • Unbeatable Performance in Shoulder Milling

- “Stepless” solution.
- No mismatch when machining walls in different steps.

Innovative cutting geometry provides superior wall and surface finish.

Competitor Tool • Wall Quality



Traditional tools are designed to achieve a 0° wall, but exhibit poor performance when machining walls in multiple passes.

VSM490-15 • Wall Quality

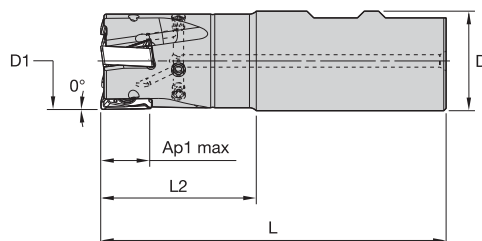
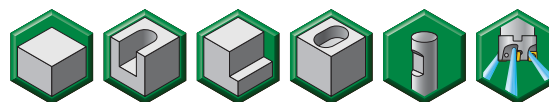


VSM490-15 minimizes the marks left. By increasing wall quality and avoiding a second tool, productivity increases significantly.



Integrated wiper facet for excellent floor finishing.

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	lbs	max RPM
5873069	VSM490D100Z02W075XN15	1.000	.750	3.780	1.750	.591	2	.92	26300
5710590	VSM490D100Z02W100XN15	1.000	1.000	4.030	1.750	.591	2	.73	26300
5710591	VSM490D125Z03W100XN15	1.250	1.000	4.530	2.250	.591	3	.90	22100
5873070	VSM490D150Z03W125XN15	1.500	1.250	4.530	2.250	.591	3	1.41	19500
5710592	VSM490D150Z04W125XN15	1.500	1.250	4.530	2.250	.591	4	1.42	19500

NOTE: Weldon type not recommended for finishing operations.

Spare Parts



insert
screw

MS-2071



in. lbs.

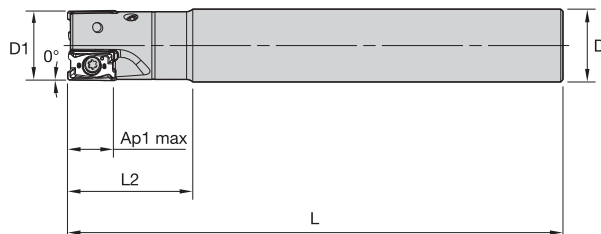
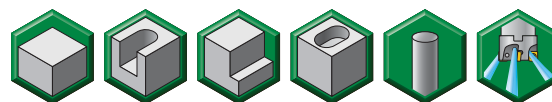
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Torx Plus
driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



Shoulder Mills

Cylindrical End Mills

order number	catalog number	D1	D	L	L2	Ap1 max	Z	lbs	max RPM
5873101	VSM490D100Z02C100XN15L800	1.000	1.000	8.000	1.750	.591	2	1.60	26300
5873102	VSM490D125Z03C125XN15L800	1.250	1.250	8.000	2.250	.591	3	2.50	22100
5873103	VSM490D150Z04C125XN15L800	1.500	1.250	8.000	2.250	.591	4	2.61	19500

Spare Parts



insert
screw

MS-2071



in. lbs.

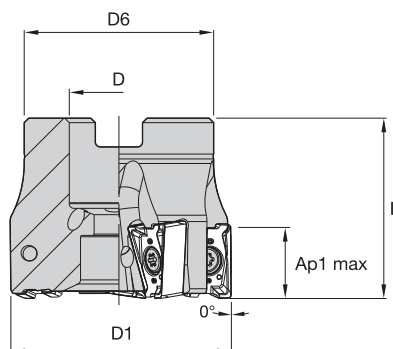
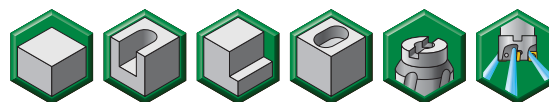
31



Torx Plus
driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	lbs	max RPM
5710593	VSM490D150Z05S050XN15	1.500	.500	1.420	1.575	.591	5	.43	19500
5710594	VSM490D200Z05S075XN15	2.000	.750	1.750	1.575	.591	5	.78	16100
5710595	VSM490D200Z06S075XN15	2.000	.750	1.750	1.575	.591	6	.77	16100
5873104	VSM490D250Z05S075XN15	2.500	.750	1.750	1.575	.591	5	1.11	14100
5710596	VSM490D250Z06S075XN15	2.500	.750	1.750	1.575	.591	6	1.06	14100
5710597	VSM490D250Z07S100XN15	2.500	1.000	2.190	1.750	.591	7	1.31	14100
5710598	VSM490D300Z07S100XN15	3.000	1.000	2.190	1.750	.591	7	1.83	12700
5873105	VSM490D300Z09S100XN15	3.000	1.000	2.190	1.750	.591	9	1.85	12700
5873106	VSM490D400Z08S150XN15	4.000	1.500	3.380	2.000	.591	8	3.31	10800
5710599	VSM490D400Z11S150XN15	4.000	1.500	3.380	2.000	.591	11	3.26	10800
5873107	VSM490D500Z09S150XN15	5.000	1.500	3.907	2.380	.591	9	7.67	9600
5873108	VSM490D500Z12S150XN15	5.000	1.500	3.907	2.380	.591	12	6.83	9600
5873109	VSM490D600Z10S200XN15	6.000	2.000	4.880	2.380	.591	10	10.42	8600

■ Spare Parts

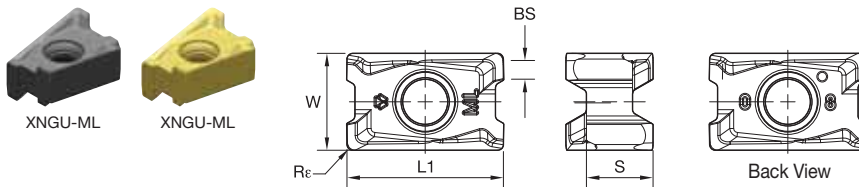
D1	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
1.5	MS-2071	31	DT15IP	S424	—	—	—
2.0	MS-2071	31	DT15IP	S445	S445CG	—	—
2.5	MS-2071	31	DT15IP	S445	S445CG	—	—
2.5	MS-2071	31	DT15IP	S458	S458CG	—	—
3.0	MS-2071	31	DT15IP	S458	S458CG	—	—
4.0	MS-2071	31	DT15IP	—	—	420.201	S2165C
5.0	MS-2071	31	DT15IP	—	—	420.201	S2165C
6.0	MS-2071	31	DT15IP	—	—	420.241	S2192C

NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly need to be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	XNGU-ML	WP40PM	XNPU-ML	WP40PM	XNPU-MM	WP40PM
P3-P4	XNGU-ML	WP25PM	XNPU-MM	WP35CM	XNPU-MM	WP40PM
P5-P6	XNGU-MM	WP25PM	XNPU-MM	WP35CM	XNPU-MM	WP35CM
M1-M2	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
M3	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
K1-K2	XNGU-MH	WK15CM	XNGU-MH	WK15CM	XNGU-MH	WP35CM
K3	XNGU-MH	WK15PM	XNGU-MH	WK15PM	XNGU-MH	WP40PM
N1-N2	—	—	—	—	—	—
N3	—	—	—	—	—	—
S1-S2	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
S3	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
S4	XNGU-ML	WU35PM	XNGU-ML	WU35PM	XNPU-MM	WU35PM
H1	—	—	—	—	—	—

Shoulder Mills



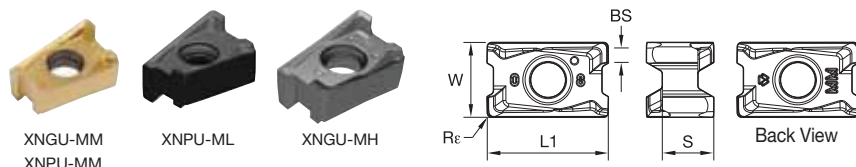
- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.

- first choice
- alternate choice

P	●	○	○	●	●	●	●
M	●	●	●	●	○	○	○
K	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

■ XNGU-ML • Precision Finishing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1501ERML	4	.638	.394	.271	.088	.016	.003	5873481	5890821	5890823	5890822	5873482	5890822
XNGU1502ERML	4	.638	.394	.271	.072	.032	.003	5873481	5890821	5890823	5890822	5873482	5890822



- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.
- -MM is the universal geometry for VSM490-15. First choice when machining steel, as well as stainless steel and high-temp alloys in heavy applications.
- -MH geometry is the first choice for cast iron machining in the medium and heavy applications.

- first choice
- alternate choice

P						
M						
K						
N						
S						
H						

■ XNGU-MM • Precision Finishing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1501SRMM	4	.638	.394	.271	.088	.016	.004	5949204	5949204	5949206	5949205		
XNGU1502SRMM	4	.638	.394	.271	.076	.032	.004	5710527	5710529	5710528			

■ XNPU-ML • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNPU1502ERML	4	.634	.394	.271	.073	.032	.003	5883097	5883099	5883098			

■ XNPU-MM • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNPU1502SRMM	4	.634	.394	.271	.076	.032	.004	5873419	5873415	5873417	5873416	5873420	5873418
XNPU1503SRMM	4	.634	.394	.271	.059	.047	.004	5890762	5890728	5890730	5890729	5890763	5890761
XNPU1504SRMM	4	.634	.394	.271	.045	.063	.004	5883521	5883447	5883449	5883448	5883522	5883450

■ XNGU-MH • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε		WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1502SRMH	4	.638	.394	.271	.069	.031		6003724	6003570	6003722	6003721	6003725	6003723

■ Recommended Starting Speeds [SFM]

Material Group		WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
P	1	- - -	1080 940 880	860 750 700	970 850 800	- - -	1490 1295 1215
	2	- - -	900 790 660	720 630 530	820 710 590	- - -	920 835 755
	3	- - -	830 700 580	660 560 460	750 640 520	- - -	835 755 670
	4	- - -	740 610 490	590 490 390	670 560 440	- - -	625 575 525
	5	- - -	610 550 490	490 440 390	560 510 440	- - -	855 755 690
	6	- - -	540 410 330	430 330 260	490 380 300	- - -	525 445 360
M	1	- - -	670 590 540	560 490 450	640 560 510	- - -	670 605 510
	2	- - -	610 520 430	510 430 360	570 490 410	- - -	605 525 460
	3	- - -	460 400 310	380 330 260	430 380 300	- - -	475 425 375
K	1	880 800 710	750 680 600	- - -	- - -	1380 1255 1115	970 870 785
	2	690 620 580	590 530 490	- - -	- - -	1095 975 910	770 690 625
	3	580 520 470	490 440 400	- - -	- - -	920 815 750	640 575 525
N	1-2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -
S	1	- - -	130 120 90	115 100 80	130 110 100	- - -	- - -
	2	- - -	130 120 90	115 100 80	130 110 100	- - -	- - -
	3	- - -	170 130 90	150 115 80	160 130 100	- - -	- - -
	4	- - -	230 170 120	200 150 100	210 160 110	- - -	215 165 110
H	1	- - -	- - -	- - -	- - -	- - -	- - -

 NOTE: FIRST choice starting speeds are in **bold** type.

As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
XN.U-ML	.007	.011	.018	.005	.008	.013	.004	.006	.010	.003	.005	.008	.003	.005	.008	XN.U-ML
XN.U-MM	.008	.015	.022	.006	.011	.016	.004	.008	.012	.004	.007	.010	.003	.006	.010	XN.U-MM
XNGU-MH	.009	.017	.026	.006	.012	.019	.005	.009	.014	.004	.008	.012	.004	.007	.011	XNGU-MH

NOTE: Use "Light Machining" values as starting feed rate.

Order a VSM490™ Kit and experience
the next level of shoulder milling!

VSM490-15 Starter Kits

Order one of our starter kits and test the performance of our new VSM490-15 platform. The kits are set up to serve the majority of shoulder milling applications and workpiece materials, delivered with a cutter body as well as 20 inserts from a premium WIDIA™ grade. Detailed order information can be found in the table below.



■ VSM490-15 Starter Kits • Inch

order number	catalog number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5964869	VSM490KIT-WD100Z02WP40PM	1.00z2	WELDON	P	▽▽	VSM-490D100Z02W100XN15	1	XNPU15T608SRMM	WP40PM	20
5964870	VSM490KIT-WD125Z03WP40PM	1.25z3	WELDON	P	▽▽	VSM-490D125Z03W100XN15	1	XNPU15T608SRMM	WP40PM	20
5965011	VSM490KIT-WD150Z04WP40PM	1.50z4	WELDON	P	▽▽	VSM-490D150Z04W125XN15	1	XNPU15T608SRMM	WP40PM	20
5965012	VSM490KITS-D150Z05WP40PM	1.50z5	SHELL MILL	P	▽▽	VSM-490D150Z05S050XN15	1	XNPU15T608SRMM	WP40PM	20
5965013	VSM490KITS-D200Z05WP40PM	2.00z5	SHELL MILL	P	▽▽	VSM-490D200Z05S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965014	VSM490KITS-D200Z06WP40PM	2.00z6	SHELL MILL	P	▽▽	VSM-490D200Z06S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965015	VSM490KITS-D250Z06WP40PM	2.50z6	SHELL MILL	P	▽▽	VSM-490D250Z06S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965016	VSM490KITS-D300Z07WP40PM	3.00z7	SHELL MILL	P	▽▽	VSM-490D300Z07S100XN15	1	XNPU15T608SRMM	WP40PM	20
5965017	VSM490KITS-D400Z08WP40PM	4.00z8	SHELL MILL	P	▽▽	VSM-490D400Z08S150XN15	1	XNPU15T608SRMM	WP40PM	20

(continued)

(VSM490-15 Starter Kits • Inch — continued)

order number	catalog number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5965018	VSM490KITC-D100Z02WU35PM	1.00z2	CYLINDRICAL	M+S	▽▽▽	VSM490D100Z02C100X-N15L800	1	XNGU15T608ERML	WU35PM	20
5965019	VSM490KITC-D125Z03WU35PM	1.25z3	CYLINDRICAL	M+S	▽▽▽	VSM490D125Z03C125X-N15L800	1	XNGU15T608ERML	WU35PM	20
5965031	VSM490KITS-D150Z05WU35PM	1.50z5	SHELL MILL	M+S	▽▽▽	VSM-490D150Z05S050XN15	1	XNGU15T608ERML	WU35PM	20
5965032	VSM490KITS-D200Z05WU35PM	2.00z5	SHELL MILL	M+S	▽▽▽	VSM-490D200Z05S075XN15	1	XNGU15T608ERML	WU35PM	20
5965033	VSM490KITS-D200Z06WU35PM	2.00z6	SHELL MILL	M+S	▽▽▽	VSM-490D200Z06S075XN15	1	XNGU15T608ERML	WU35PM	20
5965034	VSM490KITS-D250Z06WU35PM	2.50z6	SHELL MILL	M+S	▽▽▽	VSM-490D250Z06S075XN15	1	XNGU15T608ERML	WU35PM	20
5965035	VSM490KITS-D300Z07WU35PM	3.00z7	SHELL MILL	M+S	▽▽▽	VSM-490D300Z07S100XN15	1	XNGU15T608ERML	WU35PM	20
5965036	VSM490KIT-WD100Z02WK15PM	1.00z2	WELDON	K	▽	VSM-490D100Z02W100XN15	1	XNPU15T608SRMM	WK15PM	20
5965037	VSM490KIT-WD125Z03WK15PM	1.25z3	WELDON	K	▽	VSM-490D125Z03W100XN15	1	XNPU15T608SRMM	WK15PM	20
5965038	VSM490KITS-D150Z05WK15PM	1.50z5	SHELL MILL	K	▽	VSM-490D150Z05S050XN15	1	XNPU15T608SRMM	WK15PM	20
5965039	VSM490KITS-D200Z06WK15PM	2.00z6	SHELL MILL	K	▽	VSM-490D200Z06S075XN15	1	XNPU15T608SRMM	WK15PM	20
5965040	VSM490KITS-D250Z07WK15PM	2.50z7	SHELL MILL	K	▽	VSM-490D250Z07S100XN15	1	XNPU15T608SRMM	WK15PM	20
5965041	VSM490KITS-D300Z09WK15PM	3.00z9	SHELL MILL	K	▽	VSM-490D300Z09S100XN15	1	XNPU15T608SRMM	WK15PM	20
5965042	VSM490KITS-D400Z11WK15PM	4.00z11	SHELL MILL	K	▽	VSM-490D400Z11S150XN15	1	XNPU15T608SRMM	WK15PM	20

▽ Heavy/Roughing
▽▽ Medium
▽▽▽ Light Machining/Finishing

First Choice for Economical Shoulder Milling •

M690 Series 0° Shoulder Mills

M690



Designed to streamline even your most challenging milling operations, the M690 Series provides optimal chip evacuation, excellent shoulder finish, free cutting action, and solid tool design for optimal insert support.

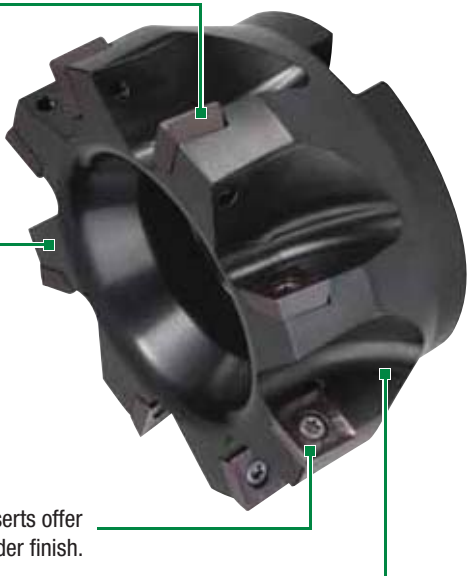
- New SDMX inserts — helical cutting edges for smooth cutting.
- Strong insert and tool design for maximum productivity.
- Four cutting edges enable excellent machining economy.

Positive pockets and geometry for free cutting action.

Strong tool design for optimum insert support.

Accurate PSTS inserts offer excellent shoulder finish.

Designed for optimal chip evacuation.



0° Shoulder Mills



M690 SD1204..

Max depth of cut: .400"

Lead angle: 0°

Indexes per insert: 4

Diameter: 1.50–6"

Pages: I42–I47

P
M
K
S
H



M690 SD1506..

Max depth of cut: .500"

Lead angle: 0°

Indexes per insert: 4

Diameter: 2–10"

Pages: I48–I51

P
M
K
S
H



■ Insert Offering



12mm iC insert



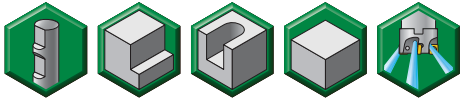
15mm iC insert

Shoulder Mills • M690 Series

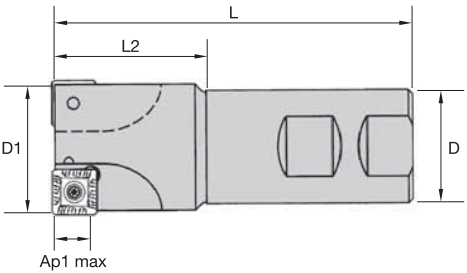
Weldon® Shanks • SD1204..



- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



Shoulder Mills



Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2646782	M690D150Z03W125SD12	1.500	1.250	4.000	1.720	.400	3	22400	Yes	1.40
2646784	M690D200Z04W125SD12	2.000	1.250	4.000	1.720	.400	4	22400	Yes	1.80

Spare Parts



insert
screw



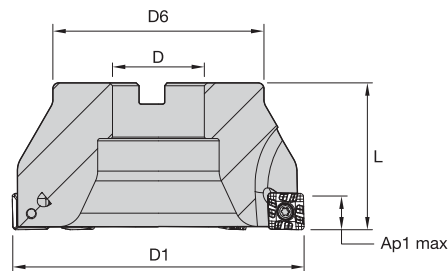
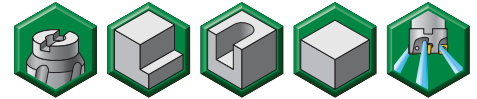
in. lbs.



Torx
wrench

12148037700	32	12148000600
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- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



Shoulder Mills

■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646783	M690D200Z04S075SD12	2.000	.750	1.700	1.500	.400	4	22400	Yes	.50
2646785	M690D200Z05S075SD12	2.000	.750	1.700	1.500	.400	5	22400	Yes	.50
2646788	M690D250Z06S100SD12	2.500	1.000	2.200	1.750	.400	6	20000	Yes	1.35
2646787	M690ID250Z05SD12	2.500	1.000	2.200	1.750	.400	5	20000	Yes	1.00
2646790	M690ID300Z06SD12	3.000	1.000	2.300	2.000	.400	6	17200	No	2.00
2646792	M690ID400Z08SD12	4.000	1.500	3.100	2.000	.400	8	15800	No	2.70
2646794	M690ID500Z09SD12	5.000	1.500	3.500	2.000	.400	9	14200	No	5.25
2646796	M690D600Z10S200SD12	6.000	2.000	4.000	2.500	.400	10	12500	No	8.15

NOTE: Standard milling cutters will accept insert nose radius up to 0.79" without modification.
For larger radii, clearance must be added.

■ Spare Parts



insert
screw



in. lbs.



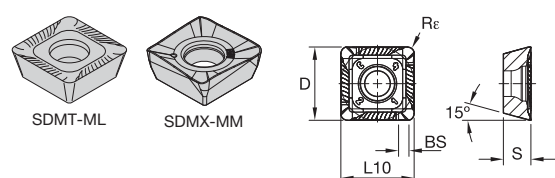
Torx
wrench

12148037700	32	12148000600
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■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
P3-P4	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
P5-P6	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
M1-M2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
M3	.E..ML	TN7535	.S..MM	TN7535	.S..MH	TN7535
K1-K2	.E..ML	WK15CM	.E..ML	WK15CM	.S..MH	WK15CM
K3	.E..ML	WK15CM	.S..MM	TN6525	.S..MH	TN6525
N1-N2	.ALP	THM-U	.E..ML	THM-U	.S..ML	THM-U
N3	.ALP	THM-U	.E..ML	THM-U	.S..ML	THM-U
S1-S2	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S3	.E..ML	TN6540	.S..MM	WS30PM	.S..MM	TN6540
S4	.E..ML	TN6540	.S..MM	WS30PM	.S..MM	TN6540
H1	.S..MM	WS30PM	.S..MM	WS30PM	.S..MM	WS30PM

Inserts • SD1204..



- first choice
- alternate choice

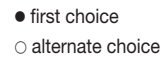
P									
M									
K									
N									
S									
H									

■ SDMT-ML

catalog number	cutting edges	D	L10	S	BS	R _e	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WK20CM
SDMT1204PDRML	4	.500	.500	.188	.043	.047	.003	13094667	13020185	2030439	2030437	5427423			

SDMX-MM

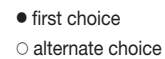
catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN2510		TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM					
								1	2	3950596	3950588	3950597	3950589	3950599	3950590	3950600	3950591	EE40E70	3950601	
SDMX120408RMM	4	.500	.500	.188	.076	.031	.004	1	1		3950596	3950588	3950597	3950589	3950599	3950590	3950600	3950591	EE40E70	3950601
SDMX120412RMM	4	.500	.500	.188	.061	.048	.004	1	1		3950596	3950588	3950597	3950589	3950599	3950590	3950600	3950591	EE40E70	3950601
SDMX120416RMM	4	.500	.500	.188	.059	.063	.004	1	1	4145063	4145064	4145065	4145066	1	1	1				
SDMX120424RMM	4	.500	.500	.188	.024	.095	.004	1	1	1	1	4145072	4145073	1	1	4145093	1	1		
SDMX120432RMM	4	.500	.500	.188	—	.126	.004	1	1	1	1	4145094	4145095	1	1	4145096	1	1		



Shoulder Mills

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN2510	TN6520	TN6525	TN6540	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMX120408RMH	4	.500	.500	.188	.076	.031	.006	▮	▮	▮		3950592	3950594	3950595	5427427	▮
SDMX120412RMH	4	.500	.500	.188	.061	.047	.006	▮	3950614	3950601		3950603	3950605	3950606	5427428	▮
SDMX120416RMH	4	.500	.500	.188	.059	.063	.006	▮	▮	▮		3950607		3950609		▮

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMT1204PDRMH	4	.500	.500	.189	.043	.047	.006	2028314	3094669	3325040	3326330	2030419	2030417	5427422	-



P		
M		
K		
N		●
S		
H		

catalog number	cutting edges	D	L10	S	BS	Rε	hm	THM-U
SDEX120408FRALP	4	.500	.500	.187	.060	.031	.001	5281790

■ Recommended Starting Speeds [SFM]

Shoulder Mills

Material Group		TN2510			TN6520			TN6525			TN6540			TN7525		
P	1	–	–	–	–	–	–	1115	870	770	985	770	655	1115	855	770
	2	–	–	–	–	–	–	870	690	590	690	525	460	855	690	590
	3	–	–	–	–	–	–	770	590	510	590	460	375	770	590	510
	4	–	–	–	–	–	–	640	460	395	490	360	295	640	460	395
	5	–	–	–	–	–	–	855	640	540	655	490	410	855	640	540
	6	–	–	–	–	–	–	560	445	360	445	330	280	560	445	360
M	1	–	–	–	–	–	–	525	330	215	360	215	165	670	605	510
	2	–	–	–	–	–	–	330	215	130	215	130	115	605	525	460
	3	–	–	–	–	–	–	345	215	150	230	130	115	475	425	375
K	1	1150	985	820	1230	870	625	755	670	605	605	560	490	1035	770	655
	2	985	820	690	1065	690	525	590	525	490	475	425	375	885	655	540
	3	820	690	540	820	625	445	490	445	395	425	395	345	655	540	460
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	130	100	80	–	–	–
	2	–	–	–	–	–	–	–	–	–	65	50	35	–	–	–
	3	–	–	–	–	–	–	–	–	–	195	115	80	–	–	–
	4	–	–	–	–	–	–	–	–	–	165	80	65	–	–	–
H	1	380	300	195	–	–	–	–	–	–	–	–	–	–	–	–
	2	380	300	195	–	–	–	–	–	–	–	–	–	–	–	–
	3	280	210	150	–	–	–	–	–	–	–	–	–	–	–	–

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		TN7535			WK15CM			WS30PM			TTI25			THM-U		
P	1	1490	1295	1215	—	—	—	—	—	—	1180	985	820	—	—	—
	2	920	835	755	—	—	—	—	—	—	855	690	590	—	—	—
	3	835	755	670	—	—	—	—	—	—	855	690	590	—	—	—
	4	625	575	525	—	—	—	—	—	—	720	590	490	—	—	—
	5	855	755	690	—	—	—	—	—	—	870	640	540	—	—	—
	6	525	445	360	—	—	—	—	—	—	395	295	245	—	—	—
M	1	670	605	510	—	—	—	740	655	605	1310	855	590	—	—	—
	2	605	525	460	—	—	—	670	590	475	885	560	395	—	—	—
	3	475	425	375	—	—	—	510	445	345	870	575	395	—	—	—
K	1	970	870	785	1380	1265	1115	—	—	—	605	510	425	625	560	490
	2	770	690	625	1100	970	900	—	—	—	490	395	345	—	—	—
	3	640	575	525	920	820	755	—	—	—	395	345	280	—	—	—
N	1	—	—	—	—	—	—	—	—	—	—	—	—	6560	3935	3280
	2	—	—	—	—	—	—	—	—	—	—	—	—	4475	2675	2180
	3	—	—	—	—	—	—	—	—	—	—	—	—	2625	1640	1310
S	1	—	—	—	—	—	—	150	130	100	—	—	—	—	—	—
	2	—	—	—	—	—	—	150	130	100	—	—	—	—	—	—
	3	—	—	—	—	—	—	180	150	100	—	—	—	—	—	—
	4	—	—	—	—	—	—	280	195	130	—	—	—	—	—	—
H	1	—	—	—	—	—	—	445	330	245	—	—	—	—	—	—
	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: FIRST choice starting speeds are in **bold** type.
As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

Recommended Starting Feeds

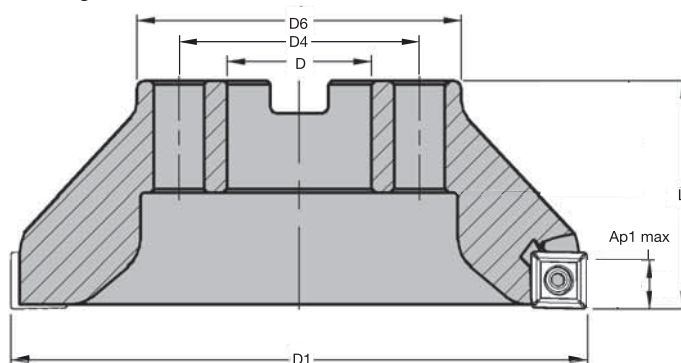
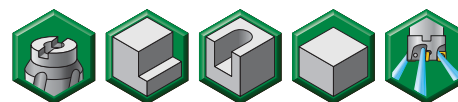
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..ALP	.005	.009	.019	.003	.007	.013	.003	.005	.010	.002	.004	.009	.002	.004	.008	.F..ALP
.E..ML	.005	.014	.022	.003	.010	.016	.003	.007	.012	.002	.006	.010	.002	.006	.010	.E..ML
.S..MM	.005	.016	.027	.003	.012	.020	.003	.009	.015	.002	.008	.013	.002	.007	.012	.S..MM
.S..MH	.009	.021	.033	.007	.015	.024	.005	.011	.018	.004	.010	.016	.004	.009	.014	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



■ Shell Mills

order number	catalog number	D1	D	D4	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646786	M690D200Z04S075SD15	2.000	.750	—	1.700	1.500	.500	4	22400	Yes	.50
2646789	M690D250Z05S100SD15	2.500	1.000	—	2.200	1.750	.500	5	20000	Yes	1.00
2646791	M690D300Z06S100SD15	3.000	1.000	—	2.300	2.000	.500	6	17700	Yes	2.00
2646793	M690D400Z08S150SD15	4.000	1.500	—	3.100	2.000	.500	8	15800	No	2.70
2646795	M690D500Z09S150SD15	5.000	1.500	—	3.500	2.000	.500	9	14200	No	5.25
2646797	M690D600Z10S200SD15	6.000	2.000	—	4.000	2.500	.500	10	12500	No	8.15
2646562	M690D800Z13S250SD15	8.000	2.500	4.000	5.500	2.500	.500	13	7000	No	14.40
2646781	M690D1000Z16S250SD15	10.000	2.500	4.000	6.000	2.500	.500	16	6100	No	22.70

■ Spare Parts



insert
screw

MS2260



in. lbs.

54



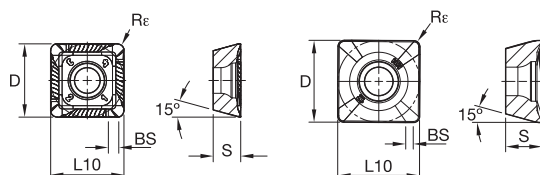
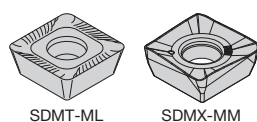
Torx
driver

12148007600

Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
P3-P4	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
P5-P6	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
M1-M2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
M3	.E..ML	TN7535	.S..MM	TN7535	.S..MH	TN7535
K1-K2	.E..ML	WK15CM	.E..ML	WK15CM	.S..MH	WK15CM
K3	.E..ML	WK15CM	.S..MM	WK15CM	.S..MH	WK15CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S3	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S4	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
H1	.S..MM	TN6540	.S..MM	TN6540	.S..MM	TN6540

Inserts • SD1506..



● first choice
○ alternate choice

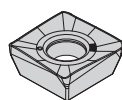
P	●	○	●	●	●	○
M	○	○	○	○	○	○
K	○	○	○	○	○	○
N	○	○	○	○	○	○
S	○	○	○	○	○	○
H	○	○	○	○	○	○

SDMT-ML

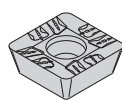
catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMT1506PDRML	4	.625	.625	.249	.043	.047	.003	3378677	2030434	2030420	5427425	

SDMX-MM

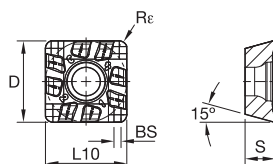
catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMX150612RMM	4	.625	.625	.250	.057	.047	.006	3949807	3949809			



SDMX-MH



SDMT-MH



● first choice

○ alternate choice

P					
M					
K					
N					
S					
H					

■ SDMX-MH

catalog number	cutting edges	D	L10	S	BS	R _ε	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMX150612RMH	4	.625	.625	.250	.057	.047	.008	3949811	3950585	3950583	3950584	5427426
SDMX150616RMH	4	.625	.625	.250	.059	.063	.008	3950585	3950587	6052028		

■ SDMT-MH

catalog number	cutting edges	D	L10	S	BS	R _ε	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMT1506PDRMH	4	.625	.625	.250	.043	.047	.008	2028325	3378676	2030414	2030400	5427424

■ Recommended Starting Speeds [SFM]

Material Group		TN2510	TN6540	TN7525	TN7535	WK15CM
P	1	– – –	985 770 655	1115 855 770	1490 1295 1215	– – –
	2	– – –	690 525 460	855 690 590	920 835 755	– – –
	3	– – –	590 460 375	770 590 510	835 755 670	– – –
	4	– – –	490 360 295	640 460 395	625 575 525	– – –
	5	– – –	655 490 410	855 640 540	855 755 690	– – –
	6	– – –	445 330 280	560 445 360	525 445 360	– – –
M	1	– – –	360 215 165	670 605 510	670 605 510	– – –
	2	– – –	215 130 115	605 525 460	605 525 460	– – –
	3	– – –	230 130 115	475 425 375	475 425 375	– – –
K	1	1150 985 820	605 560 490	1035 770 655	970 870 785	1380 1265 1115
	2	985 820 690	475 425 375	885 655 540	770 690 625	1100 970 900
	3	820 690 540	425 395 345	655 540 460	640 575 525	920 820 755
N	1	– – –	– – –	– – –	– – –	– – –
	2	– – –	– – –	– – –	– – –	– – –
	3	– – –	– – –	– – –	– – –	– – –
S	1	– – –	130 100 80	– – –	– – –	– – –
	2	– – –	65 50 35	– – –	– – –	– – –
	3	– – –	195 115 80	– – –	– – –	– – –
	4	– – –	165 80 65	– – –	– – –	– – –
H	1	380 300 195	– – –	– – –	– – –	– – –
	2	380 300 195	– – –	– – –	– – –	– – –
	3	280 210 150	– – –	– – –	– – –	– – –

NOTE: FIRST choice starting speeds are in **bold** type.
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..ML	.007	.019	.032	.005	.014	.023	.004	.010	.017	.003	.009	.015	.003	.008	.014	.E..ML
.S..MM	.008	.021	.035	.006	.015	.025	.004	.011	.019	.004	.010	.016	.003	.009	.015	.S..MM
.S..MH	.009	.023	.037	.007	.017	.027	.005	.013	.020	.004	.011	.017	.004	.010	.016	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.