

AFFORDABLE PERFORMANCE



WCE 4-Flute End Mill

Versatile Solid Carbide End Mills

WIDIA 

WCE END MILLS



AFFORDABLE PERFORMANCE

The WCE 4-flute solid end milling line features an advanced geometry to enable material versatility for end users seeking a cost-effective solution while machining small batches.

The WCE 4-flute geometry combines the asymmetrical index and variable helix features at an affordable price while ensuring material and application versatility while still performing demanding operations like full slots and heavy cuts.



WCE4

Inch: 1/8"–1"

Metric: 3mm–20mm

- Sharp edges
- Ball nose
- Radiused
- Chamfered

4-Flute End Mill for Versatile Applications

- Asymmetrical pitch to cut harmonics and reduce vibrations
- Variable helix to reduce vibrations and increase overall stability
- Eccentric relief to provide vibration dampening and increase tool life in Stainless Steel applications
- Core taper for improve chip evacuation and tool stability

WCE4

Versatile Solid Carbide End Mills • WCE4

- TiAlN coating in new WU20PE grade
- Designed to perform on Steel, Stainless Steel and Cast Iron applications
- Asymmetrical pitch to cut harmonics and reduce vibrations
- Variable helix to reduce vibrations and increase overall stability
- Eccentric relief to provide vibration dampening and increase tool life in Stainless Steel applications
- Core taper for improve chip evacuation and tool stability

Materials



Versatile

Capable of working on Steel, Stainless Steel and Cast Iron materials

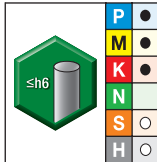
Reliable

Continuous performance due to asymmetrical index between flutes enabling a reduction in vibrations

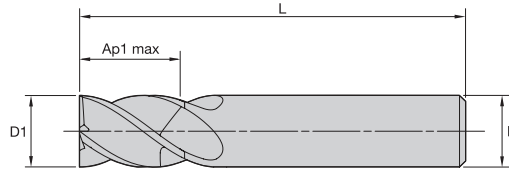
Advanced

Advanced geometry design to provide steady performance

WCE4 • Series W401 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch



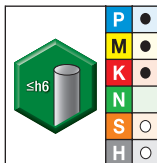
WU20PE



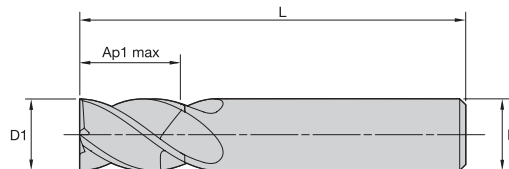
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945540	W401E03000SZT	1/8	1/8	1/4	1 1/2	4
6945591	W401E05001SZT	3/16	3/16	5/16	2	4
6945592	W401E07003SZT	1/4	1/4	3/8	2	4
6945583	W401E08004SZT	5/16	5/16	1/2	2	4
6945584	W401E10005SZT	3/8	3/8	1/2	2	4
6945696	W401E1100DSZT	7/16	7/16	5/8	2 1/2	4

WCE4 • Series W411 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch



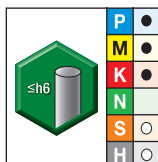
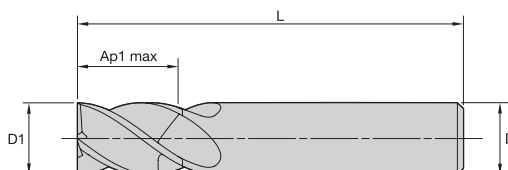
WU20PE



- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945917	W411E03010SZT	1/8	1/8	1/2	2	4
6945593	W411E05011SZT	3/16	3/16	5/8	2 1/4	4
6945595	W411E07013SZT	1/4	1/4	3/4	2 1/2	4
6945585	W411E08014SZT	5/16	5/16	3/4	2 1/2	4
6945586	W411E10015SZT	3/8	3/8	7/8	2 1/2	4
6945711	W411E1101DSZT	7/16	7/16	7/8	2 1/2	4

WCE4 • Series W421 • Sharp Edge • 4 Flute • Cylindrical Shank • Inch

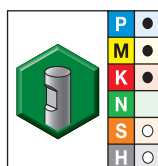
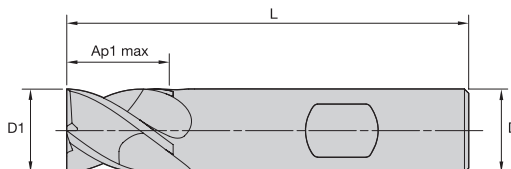


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945918	W421E07023SZT	1/4	1/4	1 1/4	3 1/4	4
6945945	W421E08024SZT	5/16	5/16	1 1/4	3 1/4	4
6945946	W421E10025SZT	3/8	3/8	1 1/2	4	4
6946188	W421E1102DSZT	7/16	7/16	2	4	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Weldon® Shank • Inch

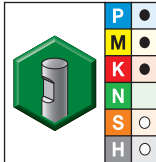
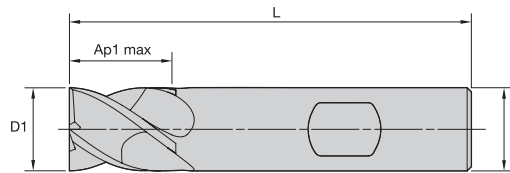


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945697	W401E13006SZW	1/2	1/2	5/8	2 1/2	4
6945698	W401E16008SZW	5/8	5/8	3/4	3	4
6945699	W401E19009SZW	3/4	3/4	7/8	3 1/2	4
6945700	W401E2500ASZW	1	1	1 1/2	4	4

WCE4 • Series W411 • Sharp Edge • 4 Flute • Weldon® Shank • Inch

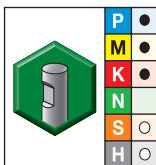
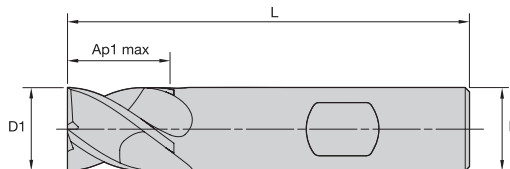


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945712	W411E13016SZW	1/2	1/2	1 1/4	3	4
6945713	W411E16018SZW	5/8	5/8	1 1/4	3 1/2	4
6945714	W411E19019SZW	3/4	3/4	1 1/2	4	4
6945715	W411E2501ASZW	1	1	2	5	4

WCE4 • Series W421 • Sharp Edge • 4 Flute • Weldon Shank • Inch

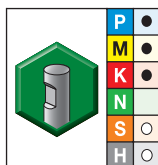
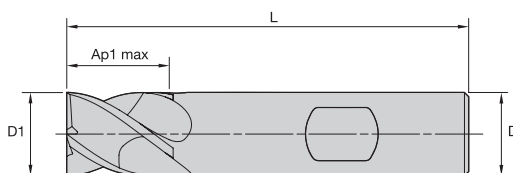
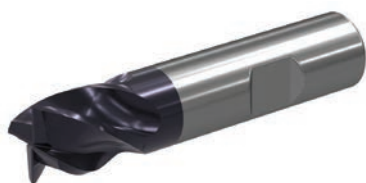


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945716	W421E13026SZW	1/2	1/2	1 1/2	4	4
6945717	W421E16028SZW	5/8	5/8	1 5/8	4 1/8	4
6945718	W421E19029SZW	3/4	3/4	2 1/4	5	4

WCE4 • Series W431 • Sharp Edge • 4 Flute • Weldon® Shank • Inch

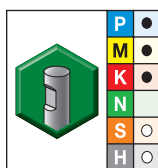
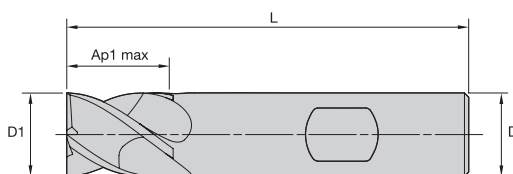


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6946189	W431E13036SZW	1/2	1/2	2	4	4
6946190	W431E19039SZW	3/4	3/4	3	6	4
6946291	W431E2503ASZW	1	1	4	7	4

WCE4 • Series W441 • Sharp Edge • 4 Flute • Weldon Shank • Inch

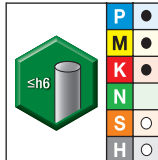
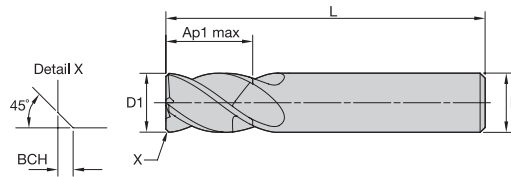


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6946292	W441E13046SZW	1/2	1/2	2 1/2	4 1/2	4

WCE4 • Series W401 • Chamfered • 4 Flute • Cylindrical Shank • Inch

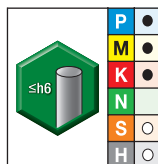
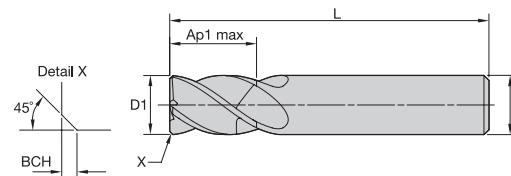


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945596	W401E03000CHT	1/8	1/8	1/4	1 1/2	.010	4
6945597	W401E05001CHT	3/16	3/16	5/16	2	.010	4
6945598	W401E07003CYT	1/4	1/4	3/8	2	.016	4
6945587	W401E08004CYT	5/16	5/16	1/2	2	.016	4
6945588	W401E10005CTT	3/8	3/8	1/2	2	.020	4
6945720	W401E1100DCTT	7/16	7/16	5/8	2 1/2	.020	4

WCE4 • Series W411 • Chamfered • 4 Flute • Cylindrical Shank • Inch

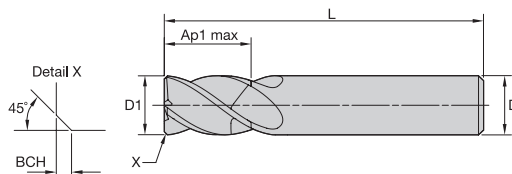
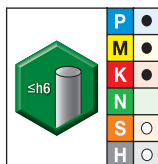


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945919	W411E03010CHT	1/8	1/8	1/2	2	.010	4
6945599	W411E05011CHT	3/16	3/16	5/8	2 1/4	.010	4
6945600	W411E07013CYT	1/4	1/4	3/4	2 1/2	.016	4
6945589	W411E08014CYT	5/16	5/16	3/4	2 1/2	.016	4
6945590	W411E10015CTT	3/8	3/8	7/8	2 1/2	.020	4
6945725	W411E1101DCTT	7/16	7/16	7/8	2 1/2	.020	4

WCE4 • Series W421 • Chamfered • 4 Flute • Cylindrical Shank • Inch

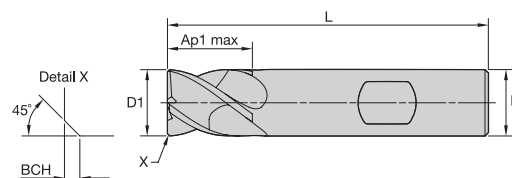
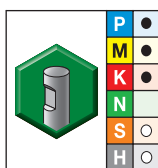
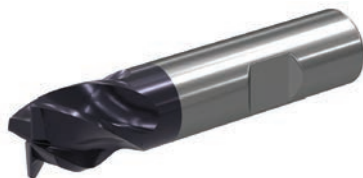


- first choice
- alternate choice

WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945920	W421E07023CYT	1/4	1/4	1 1/4	3 1/4	.016	4
6945947	W421E08024CYT	5/16	5/16	1 1/4	3 1/4	.016	4
6945948	W421E10025CTT	3/8	3/8	1 1/2	4	.020	4
6946293	W421E1102DCTT	7/16	7/16	2	4	.020	4

WCE4 • Series W401 • Chamfered • 4 Flute • Weldon® Shank • Inch

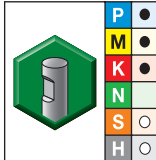
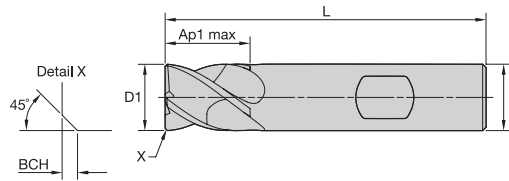


- first choice
- alternate choice

WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945721	W401E13006CTW	1/2	1/2	5/8	2 1/2	.020	4
6945722	W401E16008CTW	5/8	5/8	3/4	3	.020	4
6945723	W401E19009CTW	3/4	3/4	7/8	3 1/2	.020	4
6945724	W401E2500ACTW	1	1	1 1/2	4	.020	4

WCE4 • Series W411 • Chamfered • 4 Flute • Weldon® Shank • Inch

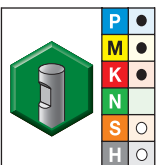
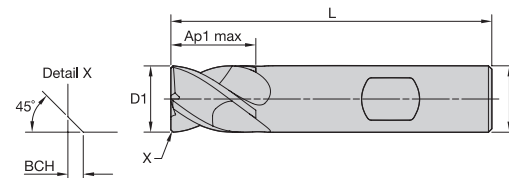


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945726	W411E13016CTW	1/2	1/2	1 1/4	3	.020	4
6945727	W411E16018CTW	5/8	5/8	1 1/4	3 1/2	.020	4
6945728	W411E19019CTW	3/4	3/4	1 1/2	4	.020	4
6945729	W411E2501ACTW	1	1	2	5	.020	4

WCE4 • Series W421 • Chamfered • 4 Flute • Weldon Shank • Inch

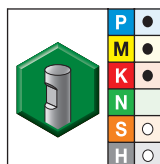
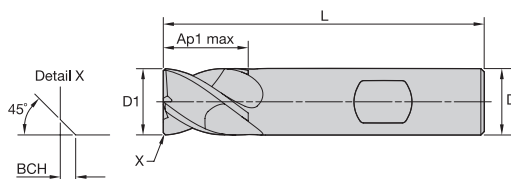
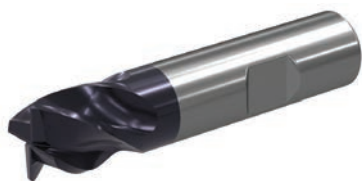


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945730	W421E13026CTW	1/2	1/2	1 1/2	4	.020	4
6945731	W421E16028CTW	5/8	5/8	1 5/8	4 1/8	.020	4
6945732	W421E19029CTW	3/4	3/4	2 1/4	5	.020	4
6945733	W421E2502ACTW	1	1	3	6	.020	4

WCE4 • Series W431 • Chamfered • 4 Flute • Weldon® Shank • Inch

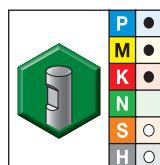
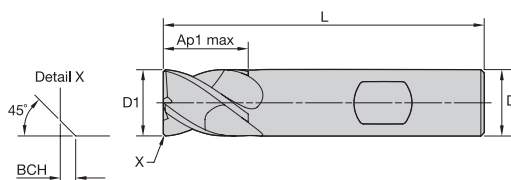
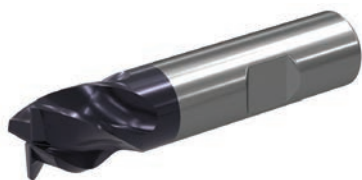


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946294	W431E13036CTW	1/2	1/2	2	4	.020	4
6946295	W431E19039CTW	3/4	3/4	3	6	.020	4
6946296	W431E2503ACTW	1	1	4	7	.020	4

WCE4 • Series W441 • Chamfered • 4 Flute • Weldon Shank • Inch

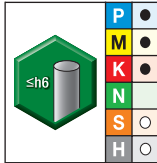
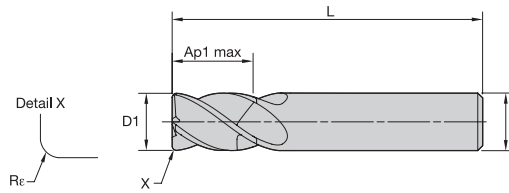


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946297	W441E13046CTW	1/2	1/2	2 1/2	4 1/2	.020	4

WCE4 • Series W401 • Radiused • 4 Flute • Cylindrical Shank • Inch

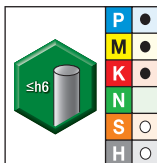
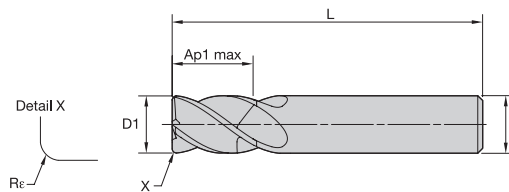


● first choice
○ alternate choice

WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re	Z U
6945648	W401E03000RAT	1/8	1/8	1/4	1 1/2	.015	4
6945649	W401E05001RAT	3/16	3/16	5/16	2	.015	4
6945650	W401E05001RET	3/16	3/16	5/16	2	.030	4
6945651	W401E07003RAT	1/4	1/4	3/8	2	.015	4
6945652	W401E07003RET	1/4	1/4	3/8	2	.030	4
6945653	W401E07003RGT	1/4	1/4	3/8	2	.060	4
6945659	W401E08004RAT	5/16	5/16	1/2	2	.015	4
6945660	W401E08004RET	5/16	5/16	1/2	2	.030	4
6945671	W401E08004RGT	5/16	5/16	1/2	2	.060	4
6945672	W401E10005RAT	3/8	3/8	1/2	2	.015	4
6945673	W401E10005RET	3/8	3/8	1/2	2	.030	4
6945674	W401E10005RGT	3/8	3/8	1/2	2	.060	4
6945675	W401E10005RJT	3/8	3/8	1/2	2	.090	4

WCE4 • Series W411 • Radiused • 4 Flute • Cylindrical Shank • Inch

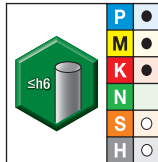
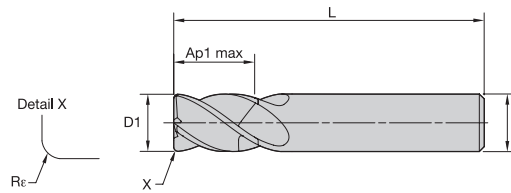


● first choice
○ alternate choice

WU20PE

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re	Z U
6945941	W411E03010RAT	1/8	1/8	1/2	2	.015	4
6945654	W411E05011RAT	3/16	3/16	5/8	2 1/4	.015	4
6945655	W411E05011RET	3/16	3/16	5/8	2 1/4	.030	4
6945656	W411E07013RAT	1/4	1/4	3/4	2 1/2	.015	4
6945657	W411E07013RET	1/4	1/4	3/4	2 1/2	.030	4
6945658	W411E07013RGT	1/4	1/4	3/4	2 1/2	.060	4
6945676	W411E08014RAT	5/16	5/16	3/4	2 1/2	.015	4
6945677	W411E08014RET	5/16	5/16	3/4	2 1/2	.030	4
6945678	W411E08014RGT	5/16	5/16	3/4	2 1/2	.060	4
6945679	W411E10015RAT	3/8	3/8	7/8	2 1/2	.015	4
6945680	W411E10015RET	3/8	3/8	7/8	2 1/2	.030	4
6945681	W411E10015RGT	3/8	3/8	7/8	2 1/2	.060	4
6945682	W411E10015RJT	3/8	3/8	7/8	2 1/2	.090	4

WCE4 • Series W421 • Radiused • 4 Flute • Cylindrical Shank • Inch

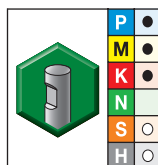
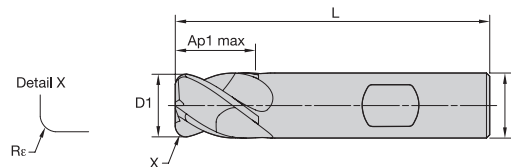


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945942	W421E07023RAT	1/4	1/4	1 1/4	3 1/4	.015	4
6945943	W421E07023RET	1/4	1/4	1 1/4	3 1/4	.030	4
6945944	W421E07023RGT	1/4	1/4	1 1/4	3 1/4	.060	4
6945949	W421E08024RAT	5/16	5/16	1 1/4	3 1/4	.015	4
6945950	W421E08024RET	5/16	5/16	1 1/4	3 1/4	.030	4
6945951	W421E08024RGT	5/16	5/16	1 1/4	3 1/4	.060	4
6945952	W421E10025RAT	3/8	3/8	1 1/2	4	.015	4
6945953	W421E10025RET	3/8	3/8	1 1/2	4	.030	4
6945954	W421E10025RGT	3/8	3/8	1 1/2	4	.060	4
6945955	W421E10025RJT	3/8	3/8	1 1/2	4	.090	4

WCE4 • Series W401 • Radiused • 4 Flute • Weldon® Shank • Inch

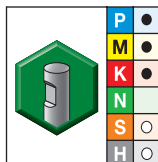
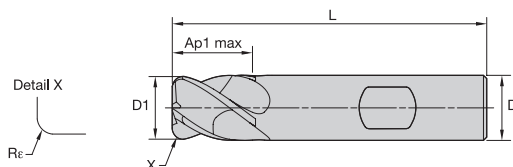


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6945817	W401E13006REW	1/2	1/2	5/8	2 1/2	.030	4
6945818	W401E13006RGW	1/2	1/2	5/8	2 1/2	.060	4
6945819	W401E13006RJW	1/2	1/2	5/8	2 1/2	.090	4
6945820	W401E13006RKW	1/2	1/2	5/8	2 1/2	.120	4
6945841	W401E16008REW	5/8	5/8	3/4	3	.030	4
6945842	W401E16008RGW	5/8	5/8	3/4	3	.060	4
6945843	W401E16008RKW	5/8	5/8	3/4	3	.120	4
6945844	W401E19009REW	3/4	3/4	7/8	3 1/2	.030	4
6945845	W401E19009RGW	3/4	3/4	7/8	3 1/2	.060	4
6945846	W401E19009RJW	3/4	3/4	7/8	3 1/2	.090	4
6945847	W401E19009RKW	3/4	3/4	7/8	3 1/2	.120	4
6945848	W401E2500AREW	1	1	1 1/2	4	.030	4
6945849	W401E2500ARGW	1	1	1 1/2	4	.060	4
6945850	W401E2500ARJW	1	1	1 1/2	4	.090	4
6945851	W401E2500ARKW	1	1	1 1/2	4	.120	4

WCE4 • Series W411 • Radiused • 4 Flute • Weldon® Shank • Inch



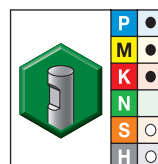
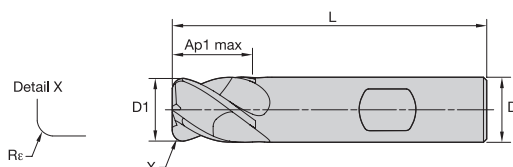
WU20PE

● first choice

○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	R _e	Z U
6945852	W411E13016REW	1/2	1/2	1 1/4	3	.030	4
6945853	W411E13016RGW	1/2	1/2	1 1/4	3	.060	4
6945854	W411E13016RJW	1/2	1/2	1 1/4	3	.090	4
6945855	W411E13016RKW	1/2	1/2	1 1/4	3	.120	4
6945856	W411E16018REW	5/8	5/8	1 1/4	3 1/2	.030	4
6945857	W411E16018RGW	5/8	5/8	1 1/4	3 1/2	.060	4
6945858	W411E16018RKW	5/8	5/8	1 1/4	3 1/2	.120	4
6945859	W411E19019REW	3/4	3/4	1 1/2	4	.030	4
6945860	W411E19019RGW	3/4	3/4	1 1/2	4	.060	4
6945861	W411E19019RJW	3/4	3/4	1 1/2	4	.090	4
6945862	W411E19019RKW	3/4	3/4	1 1/2	4	.120	4
6945863	W411E2501AREW	1	1	2	5	.030	4
6945864	W411E2501ARGW	1	1	2	5	.060	4
6945865	W411E2501ARJW	1	1	2	5	.090	4
6945866	W411E2501ARKW	1	1	2	5	.120	4

WCE4 • Series W421 • Radiused • 4 Flute • Weldon Shank • Inch



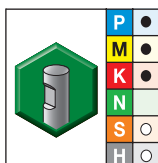
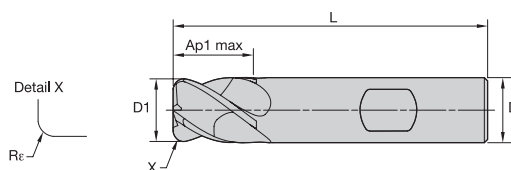
WU20PE

● first choice

○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	R _e	Z U
6945867	W421E13026REW	1/2	1/2	1 1/2	4	.030	4
6945868	W421E13026RGW	1/2	1/2	1 1/2	4	.060	4
6945869	W421E13026RJW	1/2	1/2	1 1/2	4	.090	4
6945870	W421E13026RKW	1/2	1/2	1 1/2	4	.120	4
6945871	W421E16028REW	5/8	5/8	1 5/8	4 1/8	.030	4
6945872	W421E16028RGW	5/8	5/8	1 5/8	4 1/8	.060	4
6945873	W421E16028RKW	5/8	5/8	1 5/8	4 1/8	.120	4
6945874	W421E19029REW	3/4	3/4	2 1/4	5	.030	4
6945875	W421E19029RGW	3/4	3/4	2 1/4	5	.060	4
6945876	W421E19029RJW	3/4	3/4	2 1/4	5	.090	4
6945877	W421E19029RKW	3/4	3/4	2 1/4	5	.120	4
6945878	W421E2502AREW	1	1	3	6	.030	4
6945879	W421E2502ARGW	1	1	3	6	.060	4
6945880	W421E2502ARJW	1	1	3	6	.090	4
6945881	W421E2502ARKW	1	1	3	6	.120	4

WCE4 • Series W431 • Radiused • 4 Flute • Weldon® Shank • Inch



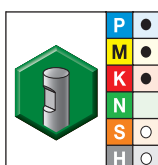
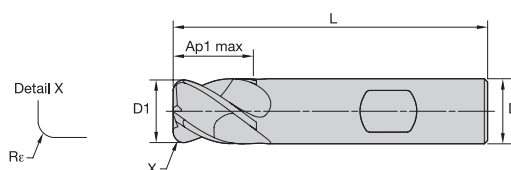
WU20PE

● first choice

○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6946298	W431E13036REW	1/2	1/2	2	4	.030	4
6946299	W431E13036RGW	1/2	1/2	2	4	.060	4
6946300	W431E13036RJW	1/2	1/2	2	4	.090	4
6946301	W431E13036RKW	1/2	1/2	2	4	.120	4
6946302	W431E16038REW	5/8	5/8	2 1/4	5	.030	4
6946303	W431E16038RGW	5/8	5/8	2 1/4	5	.060	4
6946304	W431E16038RKW	5/8	5/8	2 1/4	5	.120	4
6946305	W431E19039REW	3/4	3/4	3	6	.030	4
6946306	W431E19039RGW	3/4	3/4	3	6	.060	4
6946307	W431E19039RJW	3/4	3/4	3	6	.090	4
6946308	W431E19039RKW	3/4	3/4	3	6	.120	4
6946309	W431E2503AREW	1	1	4	7	.030	4
6946310	W431E2503ARGW	1	1	4	7	.060	4
6946321	W431E2503ARJW	1	1	4	7	.090	4
6946322	W431E2503ARKW	1	1	4	7	.120	4

WCE4 • Series W441 • Radiused • 4 Flute • Weldon Shank • Inch



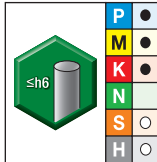
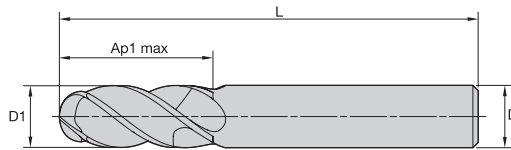
WU20PE

● first choice

○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	Z U
6946323	W441E13046REW	1/2	1/2	2 1/2	4 1/2	.030	4
6946324	W441E13046RGW	1/2	1/2	2 1/2	4 1/2	.060	4
6946325	W441E13046RJW	1/2	1/2	2 1/2	4 1/2	.090	4
6946326	W441E13046RKW	1/2	1/2	2 1/2	4 1/2	.120	4

WCE4 • Series W40B • Ball Nose • 4 Flute • Cylindrical Shank • Inch

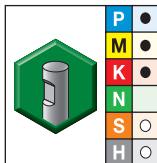
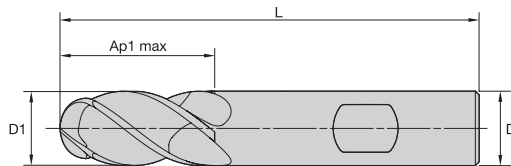
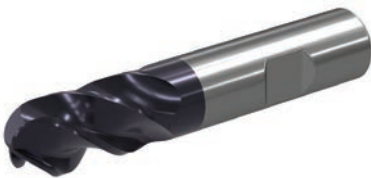


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945890	W40BE03000RBT	1/8	1/8	1/2	2	4
6945891	W40BE05001RBT	3/16	3/16	5/8	2 1/4	4
6945892	W40BE07003RBT	1/4	1/4	3/4	2 1/2	4
6945893	W40BE08004RBT	5/16	5/16	3/4	2 1/2	4
6945894	W40BE10005RBT	3/8	3/8	7/8	2 1/2	4

WCE4 • Series W40B • Ball Nose • 4 Flute • Weldon® Shank • Inch

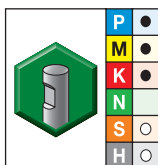
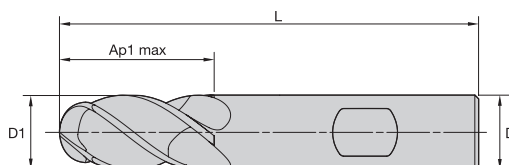


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945911	W40BE13006RBW	1/2	1/2	1	3	4
6945912	W40BE16008RBW	5/8	5/8	1 1/4	3 1/2	4
6945913	W40BE19009RBW	3/4	3/4	1 1/2	4	4
6945914	W40BE2500ARBW	1	1	1 1/2	4	4

WCE4 • Series W41B • Ball Nose • 4 Flute • Weldon® Shank • Inch

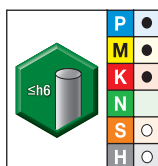
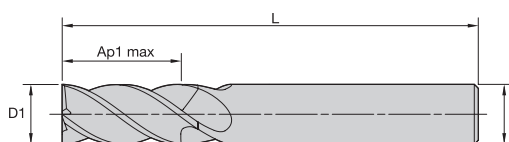


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945915	W41BE13006RBW	1/2	1/2	1 1/4	3	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Cylindrical Shank • Metric

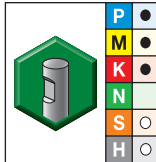
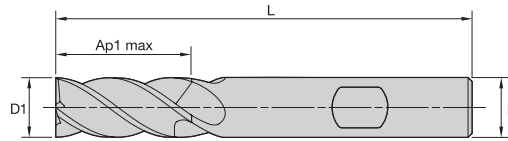


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945502	W401M03003SZT	3,0	6	8,00	57	4
6945503	W401M04003SZT	4,0	6	11,00	57	4
6945504	W401M05003SZT	5,0	6	13,00	57	4
6945505	W401M06003SZT	6,0	6	13,00	57	4
6945548	W401M08004SZT	8,0	8	19,00	63	4
6945549	W401M10005SZT	10,0	10	22,00	72	4
6945684	W401M12006SZT	12,0	12	26,00	83	4
6945685	W401M16008SZT	16,0	16	32,00	92	4
6945686	W401M20009SZT	20,0	20	38,00	104	4

WCE4 • Series W401 • Sharp Edge • 4 Flute • Weldon® Shank • Metric

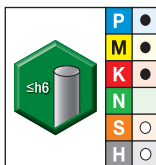
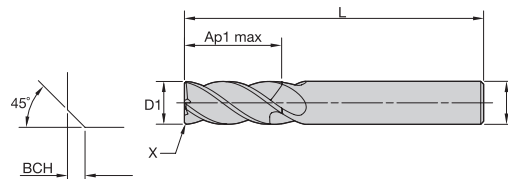


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Z U
6945510	W401M03003SZW	3,0	6	8,00	57	4
6945541	W401M04003SZW	4,0	6	11,00	57	4
6945542	W401M05003SZW	5,0	6	13,00	57	4
6945543	W401M06003SZW	6,0	6	13,00	57	4
6945562	W401M08004SZW	8,0	8	19,00	63	4
6945563	W401M10005SZW	10,0	10	22,00	72	4
6945690	W401M12006SZW	12,0	12	26,00	83	4
6945691	W401M16008SZW	16,0	16	32,00	92	4
6945692	W401M20009SZW	20,0	20	38,00	104	4

WCE4 • Series W401 • Chamfered • 4 Flute • Cylindrical Shank • Metric

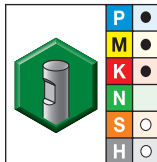
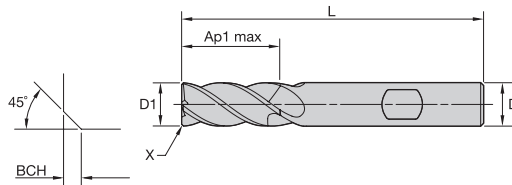


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945506	W401M03003CAT	3,0	6	8,00	57	0,40	4
6945507	W401M04003CAT	4,0	6	11,00	57	0,40	4
6945508	W401M05003CAT	5,0	6	13,00	57	0,40	4
6945509	W401M06003CAT	6,0	6	13,00	57	0,40	4
6945550	W401M08004CAT	8,0	8	19,00	63	0,40	4
6945561	W401M10005CET	10,0	10	22,00	72	0,50	4
6945687	W401M12006CET	12,0	12	26,00	83	0,50	4
6945688	W401M16008CET	16,0	16	32,00	92	0,50	4
6945689	W401M20009CET	20,0	20	38,00	104	0,50	4

WCE4 • Series W401 • Chamfered • 4 Flute • Weldon® Shank • Metric

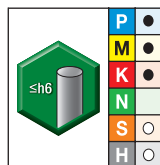
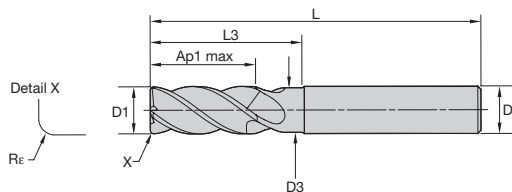


WU20PE

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6945544	W401M03003CAW	3,0	6	8,00	57	0,40	4
6945545	W401M04003CAW	4,0	6	11,00	57	0,40	4
6945546	W401M05003CAW	5,0	6	13,00	57	0,40	4
6945547	W401M06003CAW	6,0	6	13,00	57	0,40	4
6945564	W401M08004CAW	8,0	8	19,00	63	0,40	4
6945565	W401M10005CEW	10,0	10	22,00	72	0,50	4
6945693	W401M12006CEW	12,0	12	26,00	83	0,50	4
6945694	W401M16008CEW	16,0	16	32,00	92	0,50	4
6945695	W401M20009CEW	20,0	20	38,00	104	0,50	4

WCE4 • Series W4N1 • Radiused • 4 Flute • Necked • Cylindrical Shank • Metric



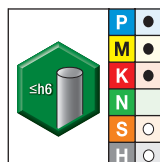
WU20PE

- first choice
- alternate choice

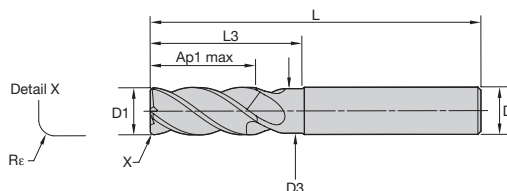
order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Rε	Z U
6945620	W4N1M03003RAT	3,0	6	2,82	8,00	57	15,00	0,20	4
6945631	W4N1M04003RAT	4,0	6	3,76	11,00	57	16,00	0,20	4
6945632	W4N1M04003RET	4,0	6	3,76	11,00	57	16,00	0,50	4
6945633	W4N1M05003RAT	5,0	6	4,70	13,00	57	18,00	0,20	4
6945634	W4N1M05003RET	5,0	6	4,70	13,00	57	18,00	0,50	4
6945635	W4N1M05003RJT	5,0	6	4,70	13,00	57	18,00	1,00	4
6945636	W4N1M06003RET	6,0	6	5,64	13,00	57	21,00	0,50	4
6945638	W4N1M06003RHT	6,0	6	5,64	13,00	57	21,00	1,50	4
6945637	W4N1M06003RJT	6,0	6	5,64	13,00	57	21,00	1,00	4
6945640	W4N1M08004RET	8,0	8	7,52	19,00	63	27,00	0,50	4
6945642	W4N1M08004RHT	8,0	8	7,52	19,00	63	27,00	1,50	4
6945641	W4N1M08004RJT	8,0	8	7,52	19,00	63	27,00	1,00	4
6945643	W4N1M08004RKT	8,0	8	7,52	19,00	63	27,00	2,00	4
6945644	W4N1M10005RET	10,0	10	9,40	22,00	72	32,00	0,50	4
6945646	W4N1M10005RHT	10,0	10	9,40	22,00	72	32,00	1,50	4
6945645	W4N1M10005RJT	10,0	10	9,40	22,00	72	32,00	1,00	4

WCE4 • Series W4N1 • Radiused • 4 Flute • Necked • Cylindrical Shank • Metric

(continued)



WU20PE

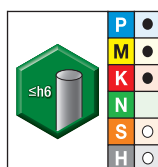


● first choice

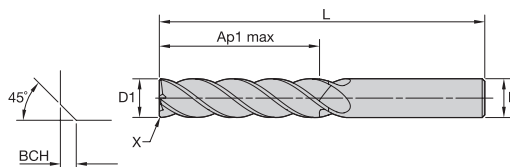
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Re	Z U
6945647	W4N1M10005RKT	10,0	10	9,40	22,00	72	32,00	2,00	4
6945128	W4N1M12006RET	12,0	12	11,28	26,00	83	38,00	0,50	4
6945130	W4N1M12006RHT	12,0	12	11,28	26,00	83	38,00	1,50	4
6945129	W4N1M12006RJT	12,0	12	11,28	26,00	83	38,00	1,00	4
6945481	W4N1M12006RKT	12,0	12	11,28	26,00	83	38,00	2,00	4
6945482	W4N1M12006RQT	12,0	12	11,28	26,00	83	38,00	4,00	4
6945483	W4N1M16008RJT	16,0	16	15,04	32,00	92	44,00	1,00	4
6945484	W4N1M16008RKT	16,0	16	15,04	32,00	92	44,00	2,00	4
6945485	W4N1M16008RPT	16,0	16	15,04	32,00	92	44,00	3,00	4
6945486	W4N1M16008RQT	16,0	16	15,04	32,00	92	44,00	4,00	4
6945487	W4N1M20009RJT	20,0	20	18,80	38,00	104	53,00	1,00	4
6945488	W4N1M20009RKT	20,0	20	18,80	38,00	104	53,00	2,00	4
6945489	W4N1M20009RPT	20,0	20	18,80	38,00	104	53,00	3,00	4
6945490	W4N1M20009RQT	20,0	20	18,80	38,00	104	53,00	4,00	4

WCE4 • Series W411 • Chamfered • 4 Flute • Long Length • Cylindrical Shank • Metric



WU20PE

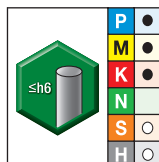
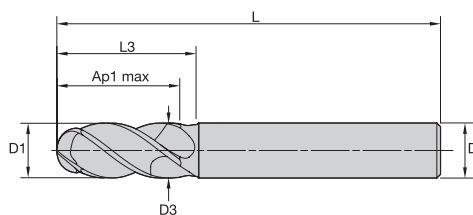


● first choice

○ alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	Z U
6946013	W411M06013CAT	6,0	6	32,00	76	0,40	4
6946014	W411M08014CAT	8,0	8	32,00	87	0,40	4
6946015	W411M10015CET	10,0	10	38,00	89	0,50	4
6946046	W411M12016CET	12,0	12	51,00	100	0,50	4
6946047	W411M16018CET	16,0	16	57,00	125	0,50	4
6946048	W411M20019CET	20,0	20	57,00	125	0,50	4

WCE4 • Series W4NB • Ball Nose • 4 Flute • Cylindrical Shank • Metric

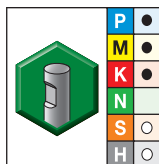
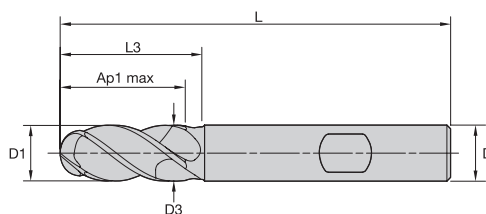


WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6945882	W4NBM05003RBT	5,0	6	4,70	13,00	57	18,00	4
6945883	W4NBM06003RBT	6,0	6	5,64	13,00	57	21,00	4
6945886	W4NBM08004RBT	8,0	8	7,52	19,00	63	27,00	4
6945887	W4NBM10005RBT	10,0	10	9,40	22,00	72	32,00	4
6945895	W4NBM12006RBT	12,0	12	11,28	26,00	83	30,00	4
6945896	W4NBM16008RBT	16,0	16	15,04	32,00	92	38,00	4
6945897	W4NBM20009RBT	20,0	20	18,80	38,00	104	50,00	4

WCE4 • Series W4NB • Ball Nose • 4 Flute • Weldon® Shank • Metric



WU20PE

● first choice
○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	length L	L3	Z U
6945884	W4NBM05003RBW	5,0	6	4,70	13,00	57	18,00	4
6945885	W4NBM06003RBW	6,0	6	5,64	13,00	57	21,00	4
6945888	W4NBM08004RBW	8,0	8	7,52	19,00	63	27,00	4
6945889	W4NBM10005RBW	10,0	10	9,40	22,00	72	32,00	4
6945898	W4NBM12006RBW	12,0	12	11,28	26,00	83	30,00	4
6945899	W4NBM16008RBW	16,0	16	15,04	32,00	92	38,00	4
6945900	W4NBM20009RBW	20,0	20	18,80	38,00	104	50,00	4

Application Data • WCE Side Milling • Slotting • Inch

Material Group																			
		Side Milling	Slotting	WU20PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.												
				Cutting Speed — Vc (SFM)			fraction	D1 — Diameter											
				ap	ae	ap		min	Start	max	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
P	0	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	
	1	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	
	2	ap1max	0.4 x D1	1.0 x D1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	
	3	ap1max	0.4 x D1	1.0 x D1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	
	4	ap1max	0.4 x D1	0.75 x D1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	
	5	ap1max	0.4 x D1	1.0 x D1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036	
M	6	ap1max	0.4 x D1	0.75 x D1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	
	1	ap1max	0.4 x D1	1.0 x D1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	
	2	ap1max	0.4 x D1	1.0 x D1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	
K	3	ap1max	0.4 x D1	1.0 x D1	200	210	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	
	1	ap1max	0.4 x D1	1.0 x D1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	
	2	ap1max	0.4 x D1	1.0 x D1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	
S	3	ap1max	0.4 x D1	1.0 x D1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	
	1	ap1max	0.4 x D1	0.3 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	
	2	ap1max	0.4 x D1	0.3 x D1	160	210	260	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	
	3	ap1max	0.4 x D1	1.0 x D1	80	100	130	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	
H	4	ap1max	0.4 x D1	1.0 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	
	1	ap1max	0.4 x D1	0.75 x D1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	
	2	ap1max	0.4 x D1	0.5 x D1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	

Application Data • WCE Side Milling • Slotting BN • Inch

Material Group																		
		Side Milling	Slotting	WU20PE			Recommended feed per tooth (Fz = IPT) for side milling (A). For slotting (B), reduce Fz by 20%.											
				Cutting Speed – Vc (SFM)				D1 – Diameter										
				ap	ae	ap	min	Start	max	fraction	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8
P	0	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	ap1max	0.4 x D1	1.0 x D1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	ap1max	0.4 x D1	1.0 x D1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	ap1max	0.4 x D1	0.75 x D1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	ap1max	0.4 x D1	1.0 x D1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036
	6	ap1max	0.4 x D1	0.75 x D1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
M	1	ap1max	0.4 x D1	1.0 x D1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	1.0 x D1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	3	ap1max	0.4 x D1	1.0 x D1	200	210	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
K	1	ap1max	0.4 x D1	1.0 x D1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.4 x D1	1.0 x D1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	3	ap1max	0.4 x D1	1.0 x D1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
S	1	ap1max	0.4 x D1	0.3 x D1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.4 x D1	0.3 x D1	160	210	260	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	ap1max	0.4 x D1	1.0 x D1	80	100	130	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	4	ap1max	0.4 x D1	1.0 x D1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	ap1max	0.4 x D1	0.75 x D1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	2	ap1max	0.4 x D1	0.5 x D1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028

Application Data • WCE Side Milling • Long • Inch

Material Group																	
	Side Milling			WU20PE			Recommended feed per tooth (fz = IPT) for side milling. No Slotting operations recommended.										
				Cutting Speed – Vc (SFM)			D1 – Diameter										
				ap	ae	min	Start	max	frac-tion	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8
P	0	ap1max	0.2xD1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	ap1max	0.2xD1	490	580	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.2xD1	460	540	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	ap1max	0.2xD1	390	450	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	ap1max	0.2xD1	300	400	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	ap1max	0.2xD1	200	260	330	IPT	.0006	.0009	.0012	.0017	.0018	.0021	.0023	.0027	.0031	.0036
M	6	ap1max	0.15xD1	160	200	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
	1	ap1max	0.2xD1	300	340	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.2xD1	200	230	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
K	3	ap1max	0.2xD1	200	210	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
	1	ap1max	0.2xD1	390	440	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	ap1max	0.2xD1	360	410	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
S	3	ap1max	0.2xD1	360	390	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	1	ap1max	0.1xD1	160	230	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	ap1max	0.1xD1	160	210	260	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	ap1max	0.15xD1	80	100	130	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
H	4	ap1max	0.15xD1	160	180	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
	1	ap1max	0.15xD1	260	360	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	2	ap1max	0.15xD1	230	310	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028

Application Data • WCE Side Milling • Slotting • Metric

Material Group																						
		Side Milling	Slotting	WU20PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.															
				Cutting Speed – Vc m/min			mm	D1 – Diameter														
				ap	ae	ap		min	Start	max	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124		
	1	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124		
	2	ap1max	0,4 x D1	1,0 x D1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124		
	3	ap1max	0,4 x D1	1,0 x D1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114		
	4	ap1max	0,4 x D1	0,75 x D1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098		
	5	ap1max	0,4 x D1	1,0 x D1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091		
M	6	ap1max	0,4 x D1	0,75 x D1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071		
	1	ap1max	0,4 x D1	1,0 x D1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114		
	2	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091		
K	3	ap1max	0,4 x D1	1,0 x D1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071		
	1	ap1max	0,4 x D1	1,0 x D1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124		
	2	ap1max	0,4 x D1	1,0 x D1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114		
S	3	ap1max	0,4 x D1	1,0 x D1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091		
	1	ap1max	0,4 x D1	0,3 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114		
	2	ap1max	0,4 x D1	0,3 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061		
	3	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091		
H	4	ap1max	0,4 x D1	1,0 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084		
	1	ap1max	0,4 x D1	0,75 x D1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098		
	2	ap1max	0,4 x D1	0,5 x D1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071		

Application Data • WCE Side Milling • Slotting BN • Metric

Material Group																					
	Side Milling		Slotting	WU20PE			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.														
				Cutting Speed – Vc m/min			mm	D1 – Diameter													
	ap	ae	ap	min	Start	max		3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0		
P	0	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	1	ap1max	0,4 x D1	1,0 x D1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	2	ap1max	0,4 x D1	1,0 x D1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	3	ap1max	0,4 x D1	1,0 x D1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	4	ap1max	0,4 x D1	0,75 x D1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098	
	5	ap1max	0,4 x D1	1,0 x D1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
M	6	ap1max	0,4 x D1	0,75 x D1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	
	1	ap1max	0,4 x D1	1,0 x D1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	2	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
K	3	ap1max	0,4 x D1	1,0 x D1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	
	1	ap1max	0,4 x D1	1,0 x D1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	2	ap1max	0,4 x D1	1,0 x D1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
S	3	ap1max	0,4 x D1	1,0 x D1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
	1	ap1max	0,4 x D1	0,3 x D1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	2	ap1max	0,4 x D1	0,3 x D1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061	
	3	ap1max	0,4 x D1	1,0 x D1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
H	4	ap1max	0,4 x D1	1,0 x D1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084	
	1	ap1max	0,4 x D1	0,75 x D1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098	
	2	ap1max	0,4 x D1	0,5 x D1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	

Application Data • WCE Side Milling • Long • Metric

Material Group																				
	Side Milling		WU20PE			Recommended feed per tooth (fz = mm/z) for side milling. No slotting operations recommended.														
			Cutting Speed – Vc m/min			mm	D1 – Diameter													
	ap	ae	min	Start	max		3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0		
P	0	ap1max	0,2xD1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	1	ap1max	0,2xD1	150	175	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	2	ap1max	0,2xD1	140	165	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	3	ap1max	0,2xD1	120	140	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	4	ap1max	0,2xD1	90	120	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098	
	5	ap1max	0,2xD1	60	80	100	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
M	6	ap1max	0,15xD1	50	65	75	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	
	1	ap1max	0,2xD1	90	100	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	2	ap1max	0,2xD1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
K	3	ap1max	0,2xD1	60	65	70	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	
	1	ap1max	0,2xD1	120	135	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114	0,124	
	2	ap1max	0,2xD1	110	125	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
S	3	ap1max	0,2xD1	110	120	130	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
	1	ap1max	0,1xD1	50	70	90	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101	0,114	
	2	ap1max	0,1xD1	25	30	40	fz	0,009	0,013	0,016	0,019	0,026	0,032	0,037	0,042	0,046	0,050	0,054	0,061	
	3	ap1max	0,15xD1	60	70	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081	0,091	
H	4	ap1max	0,15xD1	50	55	60	fz	0,011	0,016	0,021	0,026	0,037	0,045	0,052	0,058	0,064	0,069	0,074	0,084	
	1	ap1max	0,15xD1	80	110	140	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088	0,098	
	2	ap1max	0,15xD1	70	90	120	fz	0,012	0,016	0,020	0,025	0,034	0,040	0,047	0,052	0,057	0,061	0,065	0,071	

WCE • Adjustment Factor Table For Feed Calculation

To calculate application-specific cutting data, please use KV coefficient table to the right for adaptation of cutting speed and KFz for feed, respectively.

$$Vc_{new} = Vc \cdot Kv$$

$$Fz_{new} = IPT \cdot KFz$$

Calculation example:
 Application: D = 20mm; M2 material group;
 Ae = 2mm
 Cutting data recommendation: Vc = 80 m/min;
 fz = 0,089 mm/th
 Adjustment coefficients: Ae = 2mm equals 10,0%;
 Kv = 1,35; KFz = 1,7

Final cutting data recommendation:
 Vc new = 80 * 1,35 = 108 m/min
 Fz new = 0,089 * 1,7 = 0,15 mm/min

Metric

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1,5	1,45	1,4	1,35	1,25	1,2	1	1
Feed factor	KFz	2,4	2,3	2,2	2	1,7	1,25	1,02	1	1

Inch

	Ae/D	2%	4%	5%	8%	10%	20%	30%	40%	50%
Speed factor	Kv	2	1.5	1.45	1.4	1.35	1.25	1.2	1	1
Feed factor	KFz	2.4	2.3	2.2	2	1.7	1.25	1.02	1	1

[illegible]

WCE 4-FLUTE END MILL

VERSATILE SOLID CARBIDE END MILLS

WORLD HEADQUARTERS

WIDIA

Kennametal Inc.
1600 Technology Way
Latrobe, PA 15650 USA
Tel: 1 800 979 4342
w-na.service@widia.com

EUROPEAN HEADQUARTERS

WIDIA

Kennametal Europe GmbH
Rheingoldstrasse 50
CH 8212 Neuhausen am Rheinfall
Switzerland
Tel: +41 52 6750 100
w-ch.service@widia.com

ASIA-PACIFIC HEADQUARTERS

WIDIA

Kennametal (Singapore) Pte. Ltd.
3A International Business Park
Unit #01-02/03/05, ICON@IBP
Singapore 609935
Tel: +65 6265 9222
w-sg.service@widia.com

INDIA HEADQUARTERS

WIDIA

REGD OFFICE: WIDIA India Tooling Pvt Ltd
CIN: U28110KA2018PTC119396
Survey No 11 Nagasandra
Adjacent to Nagasandra Metro Station
Bengaluru - Pune National Highway
Bengaluru - 560073 India
Tel: +91 80 2839 4321
w-in.service@widia.com

