

SGS[®]
Solid Carbide Tools

AHB
TOOLING & MACHINERY

COMPLETE
METALWORKING
SOLUTIONS

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VALUE AT THE SPINDLE[®]

HI-PERCARB[®]
HIGH PERFORMANCE CARBIDE DRILLS

Series 146U / 136U
Flat Bottom Drills



KYOCERA

www.kyocera-sgstool.com

ISO 9001:2015 Certified



NEW SERIES

SERIES 146U / 136U

A ECCENTRIC 4-MARGIN DESIGN

- a unique coolant channel design allows repositioning of the trailing margins for improved stability over conventional two and four margin drills
- eccentric style clearance reduces margin contact with the workpiece without reducing strength

B END GEOMETRY

- the primary only relief allows the trailing margins to help stabilize the drill up to three times faster than conventional designs
- high shear corner geometry minimizes exit bur
- computer controlled edge hone protects against edge chipping in difficult applications

C COOLANT CHANNELS

- the two-channel design provides additional coolant in the hole when thru-tool coolant is not available

D COATING AND CARBIDE

- proprietary SGS Ti-NAMITE®-X coating and post-coat polishing combine to minimize material adhesion and maximize wear resistance in a wide range of workpiece materials
- all Series 146U and 136U drills are manufactured from lab certified premium quality carbide



HIGH PERFORMANCE CARBIDE DRILLS

The key features designed into the Hi-PerCarb® Series 146U and 136U Drills allow the product to offer application benefits not only beyond that of standard carbide drills, but also other High Performance drills. Each feature of the Hi-PerCarb® Series 146U and 136U Drills was uniquely engineered as a solution towards addressing the issues commonly encountered during high production drilling.

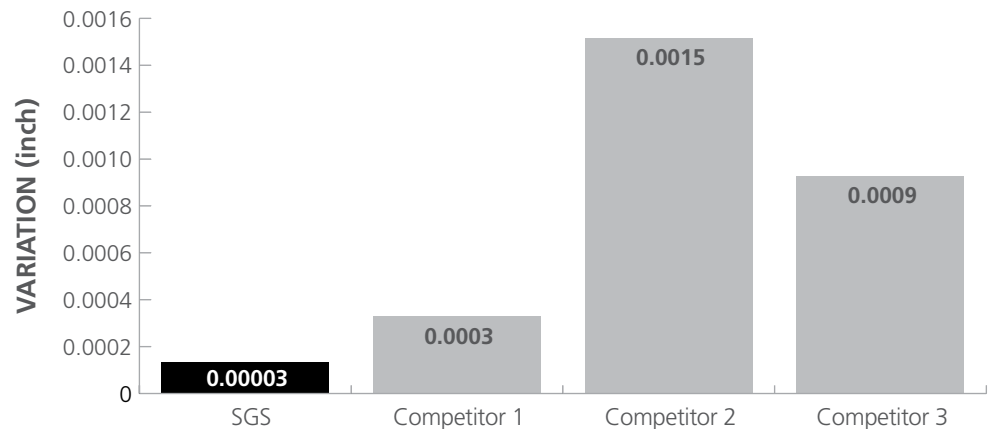
PERFORMANCE. PRECISION. PASSION.
HI-PERCARB® SERIES 146U/136U FLAT BOTTOM DRILLS

PERFORMANCE.

HOLE DIAMETER VARIATION

4140 alloy steel / 19 HRc
2700 rpm / 25.4 ipm
straight blind holes with flood coolant

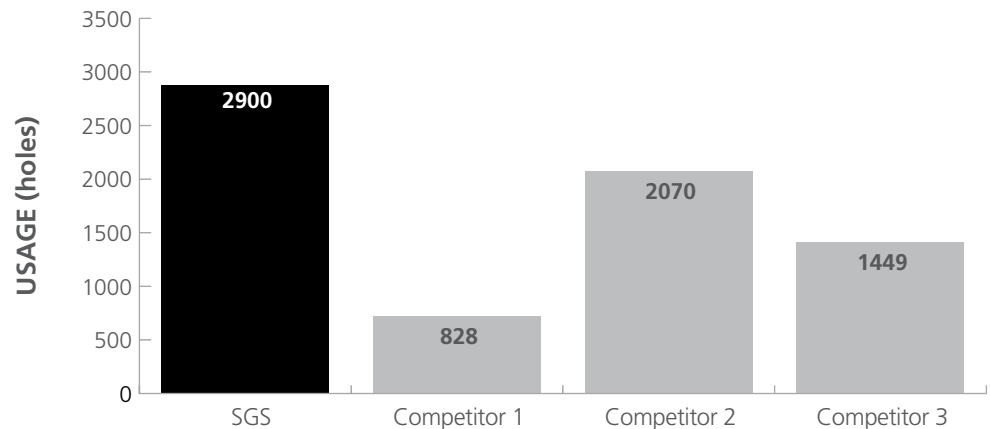
CMM diameter measurement of ten random holes shows the size variation produced by the Series 136U is ten times better than the competition.



TOOL LIFE

4140 alloy steel / 19 HRc
2700 rpm / 25.4 ipm
straight blind holes with flood coolant

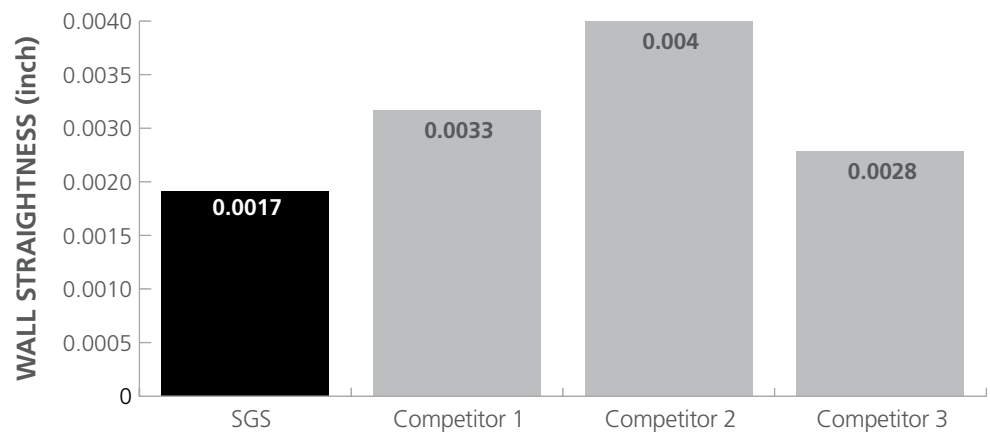
Tool life testing was performed until each drill exhibited sufficient damage to stop the test. Results show the Series 136U lasts 40 percent longer than competitor 2 and 250 percent longer than competitor 1.



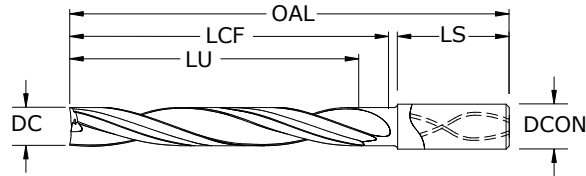
WALL STRAIGHTNESS

4140 alloy steel / 19 HRc
2700 rpm / 25.4 ipm
30° angle with flood coolant

Wall straightness of holes drilled on a 30° angle show the Series 136U produced 39 percent less deflection than competitor 3 and 57 percent less than competitor 2. During this test all tools were extended from the holder at an equal amount.



FRACTIONAL & METRIC Series 146U



146U 3xD FRACTIONAL & METRIC SERIES

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

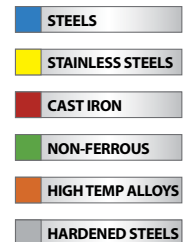
inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)
0.1181	3,000 mm		6,0	55,0	13,0	9,0	34,0	67705
0.1220	3,100 mm		6,0	55,0	14,0	9,0	34,0	67706
0.1250	3,175 mm	1/8	6,0	55,0	14,0	10,0	34,0	58800
0.1260	3,200 mm		6,0	55,0	14,0	10,0	34,0	67707
0.1299	3,300 mm		6,0	55,0	15,0	10,0	34,0	67708
0.1339	3,400 mm		6,0	55,0	15,0	10,0	34,0	67709
0.1360	3,454 mm	#29	6,0	55,0	16,0	10,0	34,0	58801
0.1378	3,500 mm		6,0	55,0	16,0	11,0	34,0	67710
0.1405	3,569 mm	#28	6,0	55,0	16,0	11,0	34,0	58802
0.1406	3,571 mm	9/64	6,0	55,0	16,0	11,0	34,0	58803
0.1417	3,600 mm		6,0	55,0	16,0	11,0	34,0	67711
0.1457	3,700 mm		6,0	60,0	17,0	11,0	34,0	67712
0.1470	3,734 mm	#26	6,0	60,0	17,0	11,0	34,0	58804
0.1495	3,797 mm	#25	6,0	60,0	17,0	11,0	34,0	58805
0.1496	3,800 mm		6,0	60,0	17,0	11,0	34,0	67713
0.1520	3,861 mm	#24	6,0	60,0	17,0	12,0	34,0	58806
0.1535	3,900 mm		6,0	60,0	18,0	12,0	34,0	67714
0.1562	3,967 mm	5/32	6,0	60,0	18,0	12,0	34,0	58807
0.1570	3,988 mm	#22	6,0	60,0	18,0	12,0	34,0	58808
0.1575	4,000 mm		6,0	60,0	18,0	12,0	34,0	67715
0.1590	4,039 mm	#21	6,0	60,0	18,0	12,0	34,0	58809
0.1610	4,089 mm	#20	6,0	60,0	18,0	12,0	34,0	58810
0.1614	4,100 mm		6,0	60,0	18,0	12,0	34,0	67716
0.1654	4,200 mm		6,0	60,0	19,0	13,0	34,0	67717
0.1693	4,300 mm		6,0	60,0	19,0	13,0	34,0	67718
0.1719	4,366 mm	11/64	6,0	60,0	20,0	13,0	34,0	58811
0.1732	4,400 mm		6,0	60,0	20,0	13,0	34,0	67719
0.1770	4,496 mm	#16	6,0	60,0	20,0	13,0	34,0	58812
0.1772	4,500 mm		6,0	60,0	20,0	14,0	34,0	67720
0.1811	4,600 mm		6,0	60,0	21,0	14,0	34,0	67721
0.1850	4,699 mm	#13	6,0	60,0	21,0	14,0	34,0	58813
0.1875	4,763 mm	3/16	6,0	60,0	21,0	14,0	34,0	58814
0.1890	4,801 mm	#12	6,0	65,0	22,0	14,0	33,0	58815
0.1929	4,900 mm		6,0	65,0	22,0	15,0	33,0	67724
0.1935	4,915 mm	#10	6,0	65,0	22,0	15,0	33,0	58816
0.1969	5,000 mm		6,0	65,0	23,0	15,0	33,0	67725
0.2008	5,100 mm		6,0	65,0	23,0	15,0	33,0	67726
0.2010	5,105 mm	#7	6,0	65,0	23,0	15,0	33,0	58817

TOLERANCES (inch)

- ≤.1181 DIAMETER**
DC = +.00008/+0.00047
DCON = h₆
- >.1181-.2362 DIAMETER**
DC = +.00016/+0.00063
DCON = h₆
- >.2362-.3937 DIAMETER**
DC = +.00024/+0.00083
DCON = h₆
- >.3937-.7087 DIAMETER**
DC = +.00028/+0.00098
DCON = h₆
- >.7087-1.1811 DIAMETER**
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

- ≤3 DIAMETER**
DC = +0,002/+0,012
DCON = h₆
- >3-6 DIAMETER**
DC = +0,004/+0,016
DCON = h₆
- >6-10 DIAMETER**
DC = +0,006/+0,021
DCON = h₆
- >10-18 DIAMETER**
DC = +0,007/+0,025
DCON = h₆
- >18-30 DIAMETER**
DC = +0,008/+0,029
DCON = h₆



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For patent information visit www.ksptpatents.com



146U 3xD

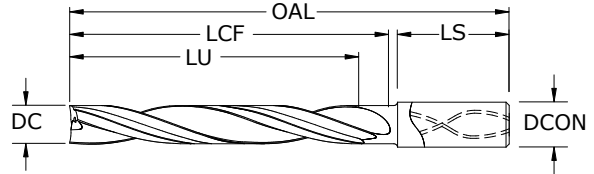
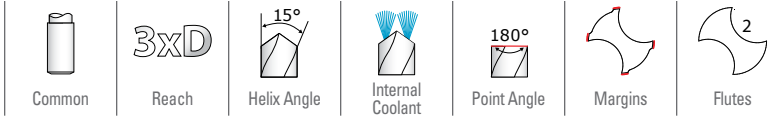
FRACTIONAL & METRIC SERIES

DECIMAL DC	METRIC DC	inch & mm						EDP NO.
		FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)
0.2031	5,159 mm	13/64	6,0	65,0	23,0	15,0	33,0	58818
0.2047	5,200 mm		6,0	65,0	23,0	16,0	33,0	67727
0.2087	5,300 mm		6,0	65,0	24,0	16,0	33,0	67728
0.2090	5,309 mm	#4	6,0	65,0	24,0	16,0	33,0	58819
0.2126	5,400 mm		6,0	65,0	24,0	16,0	33,0	67729
0.2130	5,410 mm	#3	6,0	65,0	24,0	16,0	33,0	58820
0.2165	5,500 mm		6,0	65,0	25,0	16,0	33,0	67730
0.2188	5,558 mm	7/32	6,0	65,0	25,0	17,0	33,0	58821
0.2205	5,600 mm		6,0	65,0	25,0	17,0	33,0	67731
0.2244	5,700 mm		6,0	65,0	26,0	17,0	33,0	67732
0.2283	5,800 mm		6,0	65,0	26,0	17,0	33,0	67733
0.2323	5,900 mm		6,0	65,0	27,0	18,0	33,0	67734
0.2344	5,954 mm	15/64	6,0	65,0	27,0	18,0	33,0	58822
0.2362	6,000 mm		6,0	65,0	27,0	18,0	33,0	67735
0.2402	6,100 mm		8,0	70,0	28,0	19,0	34,0	67736
0.2441	6,200 mm		8,0	70,0	28,0	19,0	34,0	67737
0.2461	6,250 mm		8,0	70,0	28,0	19,0	34,0	67738
0.2480	6,300 mm		8,0	70,0	28,0	19,0	34,0	67739
0.2500	6,350 mm	1/4 E #0	8,0	70,0	29,0	19,0	34,0	58823
0.2520	6,400 mm		8,0	70,0	29,0	19,0	34,0	67740
0.2559	6,500 mm		8,0	70,0	29,0	19,0	34,0	67741
0.2570	6,528 mm	F	8,0	70,0	29,0	20,0	34,0	58824
0.2598	6,600 mm		8,0	70,0	30,0	20,0	34,0	67742
0.2638	6,700 mm		8,0	70,0	30,0	20,0	34,0	67743
0.2656	6,746 mm	17/64	8,0	70,0	30,0	20,0	34,0	58825
0.2677	6,800 mm		8,0	70,0	31,0	20,0	34,0	67744
0.2717	6,900 mm		8,0	70,0	31,0	21,0	34,0	67745
0.2720	6,909 mm	I	8,0	70,0	31,0	21,0	34,0	58826
0.2756	7,000 mm		8,0	75,0	32,0	21,0	34,0	67746
0.2795	7,100 mm		8,0	75,0	32,0	21,0	34,0	67747
0.2812	7,142 mm	9/32	8,0	75,0	32,0	21,0	34,0	58827
0.2835	7,200 mm		8,0	75,0	32,0	22,0	34,0	67748
0.2854	7,250 mm		8,0	75,0	33,0	22,0	34,0	67749
0.2874	7,300 mm		8,0	75,0	33,0	22,0	34,0	67750
0.2913	7,400 mm		8,0	75,0	33,0	22,0	34,0	67751
0.2953	7,500 mm		8,0	75,0	34,0	23,0	34,0	67752
0.2969	7,541 mm	19/64	8,0	75,0	34,0	23,0	34,0	58828
0.2992	7,600 mm		8,0	75,0	34,0	23,0	34,0	67753
0.3031	7,700 mm		8,0	75,0	35,0	23,0	34,0	67754
0.3071	7,800 mm		8,0	75,0	35,0	23,0	34,0	67755
0.3110	7,900 mm		8,0	75,0	36,0	24,0	34,0	67756
0.3125	7,938 mm	5/16	8,0	75,0	36,0	24,0	34,0	58829
0.3150	8,000 mm		8,0	75,0	36,0	24,0	34,0	67757
0.3189	8,100 mm		10,0	80,0	36,0	24,0	34,0	67758
0.3228	8,200 mm		10,0	80,0	37,0	25,0	34,0	67759
0.3268	8,300 mm		10,0	80,0	37,0	25,0	34,0	67760

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FRACTIONAL & METRIC Series 146U



146U 3xD FRACTIONAL & METRIC SERIES

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

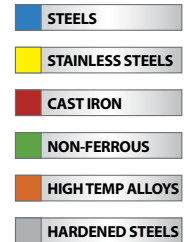
inch & mm									EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)	
0.3281	8,334 mm	21/64	10,0	80,0	38,0	25,0	34,0	58830	
0.3307	8,400 mm		10,0	80,0	38,0	25,0	34,0	67761	
0.3320	8,433 mm	Q	10,0	80,0	38,0	25,0	34,0	58831	
0.3346	8,500 mm		10,0	80,0	38,0	25,0	34,0	67762	
0.3386	8,600 mm		10,0	80,0	39,0	26,0	34,0	67763	
0.3425	8,700 mm		10,0	80,0	39,0	26,0	34,0	67764	
0.3438	8,733 mm	11/32	10,0	80,0	39,0	26,0	34,0	58832	
0.3465	8,800 mm		10,0	80,0	40,0	26,0	34,0	67765	
0.3504	8,900 mm		10,0	80,0	40,0	27,0	34,0	67766	
0.3543	9,000 mm		10,0	80,0	40,0	27,0	34,0	67767	
0.3583	9,100 mm		10,0	80,0	41,0	27,0	34,0	67768	
0.3594	9,129 mm	23/64	10,0	80,0	41,0	27,0	34,0	58833	
0.3622	9,200 mm		10,0	80,0	41,0	28,0	35,0	67769	
0.3661	9,300 mm		10,0	85,0	42,0	28,0	35,0	67770	
0.3680	9,347 mm	U	10,0	85,0	42,0	28,0	35,0	58834	
0.3701	9,400 mm		10,0	85,0	42,0	28,0	35,0	67771	
0.3740	9,500 mm		10,0	85,0	43,0	28,0	35,0	67772	
0.3750	9,525 mm	3/8	10,0	85,0	43,0	29,0	35,0	58835	
0.3780	9,600 mm		10,0	85,0	43,0	29,0	35,0	67773	
0.3819	9,700 mm		10,0	85,0	44,0	29,0	35,0	67774	
0.3858	9,800 mm		10,0	85,0	44,0	29,0	35,0	67775	
0.3898	9,900 mm		10,0	85,0	45,0	30,0	35,0	67776	
0.3906	9,921 mm	25/64	10,0	85,0	45,0	30,0	35,0	58836	
0.3937	10,000 mm		10,0	85,0	45,0	30,0	35,0	67777	
0.3970	10,084 mm	X	12,0	90,0	46,0	31,0	36,0	58837	
0.3976	10,100 mm		12,0	90,0	46,0	31,0	36,0	67778	
0.4016	10,200 mm		12,0	90,0	46,0	31,0	36,0	67779	
0.4040	10,262 mm	Y	12,0	90,0	46,0	31,0	36,0	58838	
0.4055	10,300 mm		12,0	90,0	46,0	31,0	36,0	67780	
0.4062	10,317 mm	13/32	12,0	90,0	46,0	31,0	36,0	58839	
0.4094	10,400 mm		12,0	90,0	47,0	31,0	36,0	67781	
0.4134	10,500 mm		12,0	90,0	47,0	32,0	36,0	67782	
0.4173	10,600 mm		12,0	90,0	48,0	32,0	36,0	67783	
0.4213	10,700 mm		12,0	90,0	48,0	32,0	36,0	67784	
0.4219	10,716 mm	27/64	12,0	90,0	48,0	32,0	36,0	58840	
0.4252	10,800 mm		12,0	90,0	49,0	32,0	36,0	67785	
0.4291	10,900 mm		12,0	90,0	49,0	33,0	36,0	67786	
0.4331	11,000 mm		12,0	95,0	50,0	33,0	36,0	67787	

TOLERANCES (inch)

- ≤.1181 DIAMETER**
DC = +.0008/+0.0047
DCON = h₆
- >.1181-.2362 DIAMETER**
DC = +.00016/+0.00063
DCON = h₆
- >.2362-.3937 DIAMETER**
DC = +.00024/+0.00083
DCON = h₆
- >.3937-.7087 DIAMETER**
DC = +.00028/+0.00098
DCON = h₆
- >.7087-1.1811 DIAMETER**
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

- ≤3 DIAMETER**
DC = +0,002/+0,012
DCON = h₆
- >3-6 DIAMETER**
DC = +0,004/+0,016
DCON = h₆
- >6-10 DIAMETER**
DC = +0,006/+0,021
DCON = h₆
- >10-18 DIAMETER**
DC = +0,007/+0,025
DCON = h₆
- >18-30 DIAMETER**
DC = +0,008/+0,029
DCON = h₆



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FRACTIONAL & METRIC Series 146U

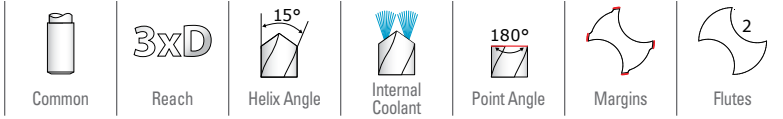
146U 3xD FRACTIONAL & METRIC SERIES

inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)
0.4370	11,100 mm		12,0	95,0	50,0	33,0	36,0	67788
0.4375	11,113 mm	7/16	12,0	95,0	50,0	33,0	36,0	58841
0.4409	11,200 mm		12,0	95,0	50,0	34,0	36,0	67789
0.4449	11,300 mm		12,0	95,0	51,0	34,0	36,0	67790
0.4488	11,400 mm		12,0	95,0	51,0	34,0	36,0	67791
0.4528	11,500 mm		12,0	95,0	52,0	35,0	36,0	67792
0.4531	11,509 mm	29/64	12,0	95,0	52,0	35,0	36,0	58842
0.4567	11,600 mm		12,0	95,0	52,0	35,0	36,0	67793
0.4606	11,700 mm		12,0	95,0	53,0	35,0	36,0	67794
0.4646	11,800 mm		12,0	95,0	53,0	35,0	36,0	67795
0.4685	11,900 mm		12,0	95,0	54,0	36,0	36,0	67796
0.4688	11,908 mm	15/32	12,0	95,0	54,0	36,0	36,0	58843
0.4724	12,000 mm		12,0	95,0	54,0	36,0	36,0	67797
0.4844	12,304 mm	31/64	14,0	105,0	55,0	37,0	37,0	58844
0.4921	12,500 mm		14,0	105,0	56,0	37,0	37,0	67798
0.5000	12,700 mm	1/2	14,0	105,0	57,0	38,0	37,0	58845
0.5039	12,800 mm		14,0	105,0	58,0	38,0	37,0	67799
0.5118	13,000 mm		14,0	105,0	58,0	39,0	37,0	67800
0.5156	13,096 mm	33/64	14,0	105,0	59,0	39,0	37,0	58846
0.5312	13,492 mm	17/32	14,0	105,0	61,0	40,0	37,0	58847
0.5315	13,500 mm		14,0	105,0	61,0	41,0	37,0	67801
0.5469	13,891 mm	35/64	14,0	105,0	63,0	42,0	37,0	58848
0.5512	14,000 mm		14,0	105,0	63,0	42,0	37,0	67802
0.5625	14,288 mm	9/16	16,0	115,0	64,0	43,0	38,0	58849
0.5709	14,500 mm		16,0	115,0	65,0	44,0	38,0	67803
0.5781	14,684 mm	37/64	16,0	115,0	66,0	44,0	38,0	58850
0.5906	15,000 mm		16,0	115,0	68,0	45,0	38,0	67804
0.5938	15,083 mm	19/32	16,0	115,0	68,0	45,0	38,0	58851
0.6094	15,479 mm	39/64	16,0	115,0	70,0	46,0	38,0	58852
0.6102	15,500 mm		16,0	115,0	70,0	46,0	38,0	67805
0.6250	15,875 mm	5/8	16,0	115,0	71,0	48,0	38,0	58853
0.6299	16,000 mm		16,0	115,0	72,0	48,0	38,0	67806
0.6406	16,271 mm	41/64	18,0	130,0	73,0	49,0	44,0	58854
0.6496	16,500 mm		18,0	130,0	74,0	49,0	44,0	67807
0.6562	16,667 mm	21/32	18,0	130,0	75,0	50,0	44,0	58855
0.6693	17,000 mm		18,0	130,0	77,0	51,0	44,0	67808
0.6719	17,066 mm	43/64	18,0	130,0	77,0	51,0	44,0	58856
0.6875	17,463 mm	11/16	18,0	130,0	79,0	52,0	44,0	58857
0.6890	17,500 mm		18,0	130,0	79,0	53,0	44,0	67809
0.7031	17,859 mm	45/64	18,0	130,0	80,0	54,0	44,0	58858
0.7087	18,000 mm		18,0	130,0	81,0	54,0	44,0	67810
0.7188	18,258 mm	23/32	20,0	140,0	82,0	55,0	45,0	58859
0.7283	18,500 mm		20,0	140,0	83,0	55,0	45,0	67811
0.7344	18,654 mm	47/64	20,0	140,0	84,0	56,0	45,0	58860
0.7480	19,000 mm		20,0	140,0	85,0	57,0	45,0	67812
0.7500	19,050 mm	3/4	20,0	140,0	86,0	57,0	45,0	58861

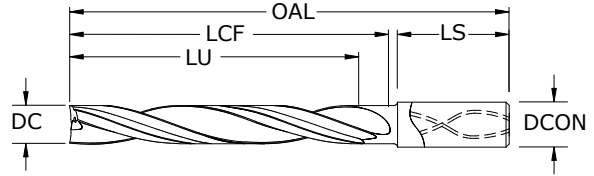
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FRACTIONAL & METRIC Series 146U



146U 3xD FRACTIONAL & METRIC SERIES



- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)
0.7656	19,446 mm	49/64	20,0	140,0	88,0	58,0	45,0	58862
0.7677	19,500 mm		20,0	140,0	88,0	58,0	45,0	67813
0.7812	19,842 mm	25/32	20,0	140,0	89,0	60,0	45,0	58863
0.7874	20,000 mm		20,0	140,0	90,0	60,0	45,0	67814
0.7969	20,241 mm	51/64	22,0	150,0	91,0	61,0	52,0	58864
0.8071	20,500 mm		22,0	150,0	92,0	62,0	52,0	67815
0.8125	20,638 mm	13/16	22,0	150,0	93,0	62,0	52,0	58865

TOLERANCES (inch)

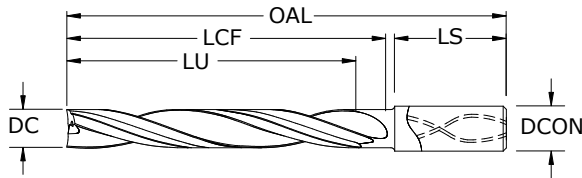
- $\leq .1181$ DIAMETER**
DC = $+0.0008/+0.0047$
DCON = h_6
- $>.1181-.2362$ DIAMETER**
DC = $+0.0016/+0.0063$
DCON = h_6
- $>.2362-.3937$ DIAMETER**
DC = $+0.0024/+0.0083$
DCON = h_6
- $>.3937-.7087$ DIAMETER**
DC = $+0.0028/+0.0098$
DCON = h_6
- $>.7087-1.1811$ DIAMETER**
DC = $+0.0031/+0.0114$
DCON = h_6

TOLERANCES (mm)

- ≤ 3 DIAMETER**
DC = $+0,002/+0,012$
DCON = h_6
- $>3-6$ DIAMETER**
DC = $+0,004/+0,016$
DCON = h_6
- $>6-10$ DIAMETER**
DC = $+0,006/+0,021$
DCON = h_6
- $>10-18$ DIAMETER**
DC = $+0,007/+0,025$
DCON = h_6
- $>18-30$ DIAMETER**
DC = $+0,008/+0,029$
DCON = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- NON-FERROUS
- HIGH TEMP ALLOYS
- HARDENED STEELS

For patent information visit www.ksptpatents.com



146U 5xD
FRACTIONAL & METRIC SERIES

TOLERANCES (inch)

- ≤.1181 DIAMETER**
DC = +.00008/+0.00047
DCON = h₆
- >.1181-.2362 DIAMETER**
DC = +.00016/+0.00063
DCON = h₆
- >.2362-.3937 DIAMETER**
DC = +.00024/+0.00083
DCON = h₆
- >.3937-.7087 DIAMETER**
DC = +.00028/+0.00098
DCON = h₆
- >.7087-1.1811 DIAMETER**
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

- ≤3 DIAMETER**
DC = +0,002/+0,012
DCON = h₆
- >3-6 DIAMETER**
DC = +0,004/+0,016
DCON = h₆
- >6-10 DIAMETER**
DC = +0,006/+0,021
DCON = h₆
- >10-18 DIAMETER**
DC = +0,007/+0,025
DCON = h₆
- >18-30 DIAMETER**
DC = +0,008/+0,029
DCON = h₆

- STEELS**
- STAINLESS STEELS**
- CAST IRON**
- HIGH TEMP ALLOYS**
- NON-FERROUS**

For patent information visit www.ksptpatents.com

		inch & mm						EDP NO.	
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)	
0.1181	3,000 mm		6,0	75,0	19,0	15,0	51,0	67816	
0.1220	3,100 mm		6,0	80,0	20,0	15,0	49,0	67817	
0.1250	3,175 mm	1/8	6,0	80,0	21,0	16,0	49,0	58866	
0.1260	3,200 mm		6,0	80,0	21,0	16,0	49,0	67818	
0.1299	3,300 mm		6,0	80,0	21,0	16,0	49,0	67819	
0.1339	3,400 mm		6,0	80,0	22,0	17,0	49,0	67820	
0.1360	3,454 mm	#29	6,0	80,0	22,0	17,0	49,0	58867	
0.1378	3,500 mm		6,0	80,0	23,0	18,0	49,0	67821	
0.1405	3,569 mm	#28	6,0	80,0	23,0	18,0	49,0	58868	
0.1406	3,571 mm	9/64	6,0	80,0	23,0	18,0	49,0	58869	
0.1417	3,600 mm		6,0	80,0	23,0	18,0	49,0	67822	
0.1457	3,700 mm		6,0	80,0	24,0	19,0	49,0	67823	
0.1470	3,734 mm	#26	6,0	80,0	24,0	19,0	49,0	58870	
0.1495	3,797 mm	#25	6,0	80,0	25,0	19,0	49,0	58871	
0.1496	3,800 mm		6,0	80,0	25,0	19,0	49,0	67824	
0.1520	3,861 mm	#24	6,0	80,0	25,0	19,0	49,0	58872	
0.1535	3,900 mm		6,0	80,0	25,0	19,0	49,0	67825	
0.1562	3,967 mm	5/32	6,0	80,0	26,0	20,0	49,0	58873	
0.1570	3,988 mm	#22	6,0	80,0	26,0	20,0	49,0	58874	
0.1575	4,000 mm		6,0	80,0	26,0	20,0	49,0	67826	
0.1590	4,039 mm	#21	6,0	80,0	26,0	20,0	49,0	58875	
0.1610	4,089 mm	#20	6,0	90,0	27,0	20,0	53,0	58876	
0.1614	4,100 mm		6,0	90,0	27,0	20,0	53,0	67827	
0.1654	4,200 mm		6,0	90,0	27,0	21,0	53,0	67828	
0.1693	4,300 mm		6,0	90,0	28,0	22,0	53,0	67829	
0.1719	4,366 mm	11/64	6,0	90,0	28,0	22,0	53,0	58877	
0.1732	4,400 mm		6,0	90,0	29,0	22,0	53,0	67830	
0.1770	4,496 mm	#16	6,0	90,0	29,0	22,0	53,0	58878	
0.1772	4,500 mm		6,0	90,0	29,0	23,0	53,0	67831	
0.1811	4,600 mm		6,0	90,0	30,0	23,0	53,0	67832	
0.1850	4,699 mm	#13	6,0	90,0	31,0	23,0	53,0	58879	
0.1875	4,763 mm	3/16	6,0	90,0	31,0	24,0	53,0	58880	
0.1890	4,801 mm	#12	6,0	90,0	31,0	24,0	53,0	58881	
0.1929	4,900 mm		6,0	90,0	32,0	24,0	53,0	67835	
0.1935	4,915 mm	#10	6,0	90,0	32,0	25,0	53,0	58882	
0.1969	5,000 mm		6,0	95,0	33,0	25,0	51,0	67836	
0.2008	5,100 mm		6,0	95,0	33,0	26,0	51,0	67837	
0.2010	5,105 mm	#7	6,0	95,0	33,0	26,0	51,0	58883	
0.2031	5,159 mm	13/64	6,0	95,0	34,0	26,0	51,0	58884	
0.2047	5,200 mm		6,0	95,0	34,0	26,0	51,0	67838	
0.2087	5,300 mm		6,0	95,0	34,0	27,0	51,0	67839	
0.2090	5,309 mm	#4	6,0	95,0	35,0	27,0	51,0	58885	

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

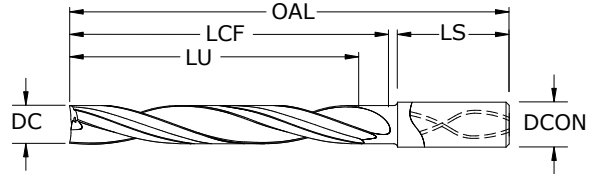
Series 146U 5xD Fractional & Metric

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FRACTIONAL & METRIC Series 146U



146U 5xD FRACTIONAL & METRIC SERIES



Series 146U 5xD Fractional & Metric

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRC (≤ 577 Bhn)

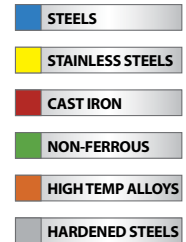
inch & mm									EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)	
0.2126	5,400 mm		6,0	95,0	35,0	27,0	51,0	67840	
0.2130	5,410 mm	#3	6,0	95,0	35,0	27,0	51,0	58886	
0.2165	5,500 mm		6,0	95,0	36,0	27,0	51,0	67841	
0.2188	5,558 mm	7/32	6,0	95,0	36,0	28,0	51,0	58887	
0.2205	5,600 mm		6,0	95,0	36,0	28,0	51,0	67842	
0.2244	5,700 mm		6,0	95,0	37,0	28,0	51,0	67843	
0.2283	5,800 mm		6,0	95,0	38,0	29,0	51,0	67844	
0.2323	5,900 mm		6,0	95,0	38,0	30,0	51,0	67845	
0.2344	5,954 mm	15/64	6,0	95,0	39,0	30,0	51,0	58888	
0.2362	6,000 mm		6,0	95,0	39,0	30,0	51,0	67846	
0.2402	6,100 mm		8,0	100,0	40,0	31,0	49,0	67847	
0.2441	6,200 mm		8,0	100,0	40,0	31,0	49,0	67848	
0.2461	6,250 mm		8,0	100,0	41,0	31,0	49,0	67849	
0.2480	6,300 mm		8,0	100,0	41,0	31,0	49,0	67850	
0.2500	6,350 mm	1/4 E #0	8,0	100,0	41,0	32,0	49,0	58889	
0.2520	6,400 mm		8,0	100,0	42,0	32,0	49,0	67851	
0.2559	6,500 mm		8,0	100,0	42,0	32,0	49,0	67852	
0.2570	6,528 mm	F	8,0	100,0	42,0	33,0	49,0	58890	
0.2598	6,600 mm		8,0	100,0	43,0	33,0	49,0	67853	
0.2638	6,700 mm		8,0	100,0	44,0	34,0	49,0	67854	
0.2656	6,746 mm	17/64	8,0	100,0	44,0	34,0	49,0	58891	
0.2677	6,800 mm		8,0	100,0	44,0	34,0	49,0	67855	
0.2717	6,900 mm		8,0	100,0	45,0	35,0	49,0	67856	
0.2720	6,909 mm	I	8,0	100,0	45,0	35,0	49,0	58892	
0.2756	7,000 mm		8,0	100,0	46,0	35,0	49,0	67857	
0.2795	7,100 mm		8,0	100,0	46,0	35,0	49,0	67858	
0.2812	7,142 mm	9/32	8,0	100,0	46,0	36,0	49,0	58893	
0.2835	7,200 mm		8,0	110,0	47,0	36,0	53,0	67859	
0.2854	7,250 mm		8,0	110,0	47,0	36,0	53,0	67860	
0.2874	7,300 mm		8,0	110,0	47,0	36,0	53,0	67861	
0.2913	7,400 mm		8,0	110,0	48,0	37,0	53,0	67862	
0.2953	7,500 mm		8,0	110,0	49,0	38,0	53,0	67863	
0.2969	7,541 mm	19/64	8,0	110,0	49,0	38,0	53,0	58894	
0.2992	7,600 mm		8,0	110,0	49,0	38,0	53,0	67864	
0.3031	7,700 mm		8,0	110,0	50,0	38,0	53,0	67865	
0.3071	7,800 mm		8,0	110,0	51,0	39,0	53,0	67866	
0.3110	7,900 mm		8,0	110,0	51,0	39,0	53,0	67867	
0.3125	7,938 mm	5/16	8,0	110,0	52,0	40,0	53,0	58895	
0.3150	8,000 mm		8,0	110,0	52,0	40,0	53,0	67868	
0.3189	8,100 mm		10,0	115,0	53,0	41,0	51,0	67869	
0.3228	8,200 mm		10,0	115,0	53,0	41,0	51,0	67870	
0.3268	8,300 mm		10,0	115,0	54,0	42,0	51,0	67871	

TOLERANCES (inch)

- ≤.1181 DIAMETER**
DC = +.00008/+0.00047
DCON = h_6
- >.1181-.2362 DIAMETER**
DC = +.00016/+0.00063
DCON = h_6
- >.2362-.3937 DIAMETER**
DC = +.00024/+0.00083
DCON = h_6
- >.3937-.7087 DIAMETER**
DC = +.00028/+0.00098
DCON = h_6
- >.7087-1.1811 DIAMETER**
DC = +.00031/+0.00114
DCON = h_6

TOLERANCES (mm)

- ≤3 DIAMETER**
DC = +0,002/+0,012
DCON = h_6
- >3-6 DIAMETER**
DC = +0,004/+0,016
DCON = h_6
- >6-10 DIAMETER**
DC = +0,006/+0,021
DCON = h_6
- >10-18 DIAMETER**
DC = +0,007/+0,025
DCON = h_6
- >18-30 DIAMETER**
DC = +0,008/+0,029
DCON = h_6



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FRACTIONAL & METRIC
Series 146U

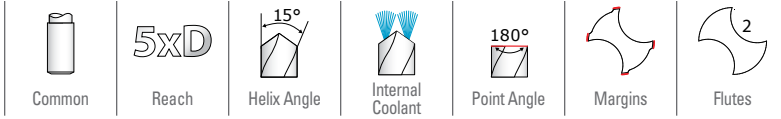
146U 5xD
 FRACTIONAL & METRIC SERIES

inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE [®] -X (TX)
0.3281	8,334 mm	21/64	10,0	115,0	54,0	42,0	51,0	58896
0.3307	8,400 mm		10,0	115,0	55,0	42,0	51,0	67872
0.3320	8,433 mm	Q	10,0	115,0	55,0	42,0	51,0	58897
0.3346	8,500 mm		10,0	115,0	55,0	42,0	51,0	67873
0.3386	8,600 mm		10,0	115,0	56,0	43,0	51,0	67874
0.3425	8,700 mm		10,0	115,0	57,0	43,0	51,0	67875
0.3438	8,733 mm	11/32	10,0	115,0	57,0	44,0	51,0	58898
0.3465	8,800 mm		10,0	115,0	57,0	44,0	51,0	67876
0.3504	8,900 mm		10,0	115,0	58,0	45,0	51,0	67877
0.3543	9,000 mm		10,0	115,0	58,0	45,0	51,0	67878
0.3583	9,100 mm		10,0	115,0	59,0	46,0	51,0	67879
0.3594	9,129 mm	23/64	10,0	115,0	59,0	46,0	51,0	58899
0.3622	9,200 mm		10,0	125,0	60,0	46,0	55,0	67880
0.3661	9,300 mm		10,0	125,0	60,0	46,0	55,0	67881
0.3680	9,347 mm	U	10,0	125,0	61,0	47,0	55,0	58900
0.3701	9,400 mm		10,0	125,0	61,0	47,0	55,0	67882
0.3740	9,500 mm		10,0	125,0	62,0	47,0	55,0	67883
0.3750	9,525 mm	3/8	10,0	125,0	62,0	48,0	55,0	58901
0.3780	9,600 mm		10,0	125,0	62,0	48,0	55,0	67884
0.3819	9,700 mm		10,0	125,0	63,0	49,0	55,0	67885
0.3858	9,800 mm		10,0	125,0	64,0	49,0	55,0	67886
0.3898	9,900 mm		10,0	125,0	64,0	50,0	55,0	67887
0.3906	9,921 mm	25/64	10,0	125,0	64,0	50,0	55,0	58902
0.3937	10,000 mm		10,0	125,0	65,0	50,0	55,0	67888
0.3970	10,084 mm	X	12,0	135,0	66,0	50,0	57,0	58903
0.3976	10,100 mm		12,0	135,0	66,0	50,0	57,0	67889
0.4016	10,200 mm		12,0	135,0	66,0	51,0	57,0	67890
0.4040	10,262 mm	Y	12,0	135,0	67,0	51,0	57,0	58904
0.4055	10,300 mm		12,0	135,0	67,0	51,0	57,0	67891
0.4062	10,317 mm	13/32	12,0	135,0	67,0	52,0	57,0	58905
0.4094	10,400 mm		12,0	135,0	68,0	52,0	57,0	67892
0.4134	10,500 mm		12,0	135,0	68,0	53,0	57,0	67893
0.4173	10,600 mm		12,0	135,0	69,0	53,0	57,0	67894
0.4213	10,700 mm		12,0	135,0	70,0	54,0	57,0	67895
0.4219	10,716 mm	27/64	12,0	135,0	70,0	54,0	57,0	58906
0.4252	10,800 mm		12,0	135,0	70,0	54,0	57,0	67896
0.4291	10,900 mm		12,0	135,0	71,0	54,0	57,0	67897
0.4331	11,000 mm		12,0	135,0	72,0	55,0	57,0	67898
0.4370	11,100 mm		12,0	135,0	72,0	55,0	57,0	67899
0.4375	11,113 mm	7/16	12,0	135,0	72,0	56,0	57,0	58907
0.4409	11,200 mm		12,0	135,0	73,0	56,0	57,0	67900
0.4449	11,300 mm		12,0	135,0	73,0	57,0	57,0	67901
0.4488	11,400 mm		12,0	145,0	74,0	57,0	62,0	67902
0.4528	11,500 mm		12,0	145,0	75,0	58,0	62,0	67903
0.4531	11,509 mm	29/64	12,0	145,0	75,0	58,0	62,0	58908
0.4567	11,600 mm		12,0	145,0	75,0	58,0	62,0	67904
0.4606	11,700 mm		12,0	145,0	76,0	58,0	62,0	67905
0.4646	11,800 mm		12,0	145,0	77,0	59,0	62,0	67906
0.4685	11,900 mm		12,0	145,0	77,0	59,0	62,0	67907
0.4688	11,908 mm	15/32	12,0	145,0	77,0	60,0	62,0	58909

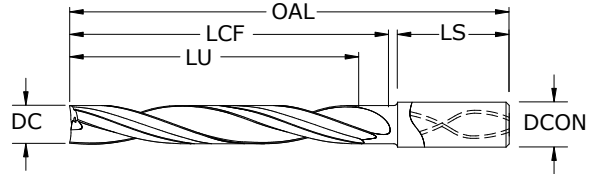
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FRACTIONAL & METRIC Series 146U



146U 5xD FRACTIONAL & METRIC SERIES



Series 146U 5xD Fractional & Metric

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

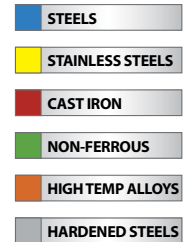
DECIMAL DC	METRIC DC	inch & mm		OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	EDP NO.
		FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON					
0.4724	12,000 mm		12,0	145,0	78,0	60,0	62,0	67908
0.4844	12,304 mm	31/64	14,0	155,0	80,0	62,0	59,0	58910
0.4921	12,500 mm		14,0	155,0	81,0	62,0	59,0	67909
0.5000	12,700 mm	1/2	14,0	155,0	83,0	64,0	59,0	58911
0.5039	12,800 mm		14,0	155,0	83,0	64,0	59,0	67910
0.5118	13,000 mm		14,0	155,0	84,0	65,0	59,0	67911
0.5156	13,096 mm	33/64	14,0	155,0	85,0	65,0	59,0	58912
0.5312	13,492 mm	17/32	14,0	155,0	88,0	67,0	59,0	58913
0.5315	13,500 mm		14,0	155,0	88,0	68,0	59,0	67912
0.5469	13,891 mm	35/64	14,0	155,0	90,0	69,0	59,0	58914
0.5512	14,000 mm		14,0	155,0	91,0	70,0	59,0	67913
0.5625	14,288 mm	9/16	16,0	175,0	93,0	71,0	66,0	58915
0.5709	14,500 mm		16,0	175,0	94,0	73,0	66,0	67914
0.5781	14,684 mm	37/64	16,0	175,0	95,0	73,0	66,0	58916
0.5906	15,000 mm		16,0	175,0	98,0	75,0	66,0	67915
0.5938	15,083 mm	19/32	16,0	175,0	98,0	75,0	66,0	58917
0.6094	15,479 mm	39/64	16,0	175,0	101,0	77,0	66,0	58918
0.6102	15,500 mm		16,0	175,0	101,0	77,0	66,0	67916
0.6250	15,875 mm	5/8	16,0	175,0	103,0	79,0	66,0	58919
0.6299	16,000 mm		16,0	175,0	104,0	80,0	66,0	67917
0.6406	16,271 mm	41/64	18,0	195,0	106,0	81,0	73,0	58920
0.6496	16,500 mm		18,0	195,0	107,0	82,0	73,0	67918
0.6562	16,667 mm	21/32	18,0	195,0	108,0	83,0	73,0	58921
0.6693	17,000 mm		18,0	195,0	111,0	85,0	73,0	67919
0.6719	17,066 mm	43/64	18,0	195,0	111,0	85,0	73,0	58922
0.6875	17,463 mm	11/16	18,0	195,0	114,0	87,0	73,0	58923
0.6890	17,500 mm		18,0	195,0	114,0	88,0	73,0	67920
0.7031	17,859 mm	45/64	18,0	195,0	116,0	89,0	73,0	58924
0.7087	18,000 mm		18,0	195,0	117,0	90,0	73,0	67921
0.7188	18,258 mm	23/32	20,0	215,0	119,0	91,0	80,0	58925
0.7283	18,500 mm		20,0	215,0	120,0	92,0	80,0	67922
0.7344	18,654 mm	47/64	20,0	215,0	121,0	93,0	80,0	58926
0.7480	19,000 mm		20,0	215,0	123,0	95,0	80,0	67923
0.7500	19,050 mm	3/4	20,0	215,0	124,0	95,0	80,0	58927
0.7656	19,446 mm	49/64	20,0	215,0	126,0	97,0	80,0	58928
0.7677	19,500 mm		20,0	215,0	127,0	97,0	80,0	67924
0.7812	19,842 mm	25/32	20,0	215,0	129,0	99,0	80,0	58929
0.7874	20,000 mm		20,0	215,0	130,0	100,0	80,0	67925
0.7969	20,241 mm	51/64	22,0	220,0	132,0	101,0	81,0	58930
0.8071	20,500 mm		22,0	220,0	133,0	103,0	81,0	67926
0.8125	20,638 mm	13/16	22,0	220,0	134,0	103,0	81,0	58931

TOLERANCES (inch)

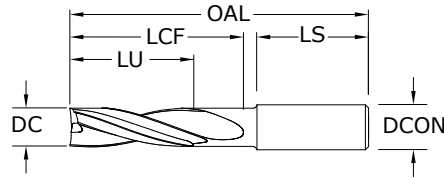
- ≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆
- >.1181-.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆
- >.2362-.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆
- >.3937-.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆
- >.7087-1.1811 DIAMETER
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆
- >3-6 DIAMETER
DC = +0,004/+0,016
DCON = h₆
- >6-10 DIAMETER
DC = +0,006/+0,021
DCON = h₆
- >10-18 DIAMETER
DC = +0,007/+0,025
DCON = h₆
- >18-30 DIAMETER
DC = +0,008/+0,029
DCON = h₆



For patent information visit www.ksptpatents.com



136U 2xD
FRACTIONAL & METRIC SERIES

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆

>.1181-.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362-.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937-.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087-1.1811 DIAMETER
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3-6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6-10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10-18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

>18-30 DIAMETER
DC = +0,008/+0,029
DCON = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

NON-FERROUS

For patent information visit www.ksptpatents.com

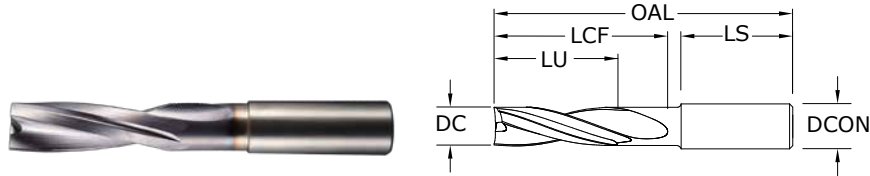
inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE®-X (TX)
0.0591	1,500 mm		6,0	45,0	5,0	3,0	33,0	67060
0.0625	1,588 mm	1/16	6,0	45,0	6,0	3,0	33,0	58480
0.0630	1,600 mm		6,0	45,0	6,0	3,0	33,0	67061
0.0669	1,700 mm		6,0	45,0	6,0	3,0	33,0	67062
0.0709	1,800 mm		6,0	45,0	6,0	4,0	33,0	67063
0.0748	1,900 mm		6,0	45,0	7,0	4,0	33,0	67064
0.0781	1,984 mm	5/64	6,0	45,0	7,0	4,0	33,0	58481
0.0787	2,000 mm		6,0	45,0	7,0	4,0	33,0	67065
0.0827	2,100 mm		6,0	45,0	7,0	4,0	33,0	67066
0.0866	2,200 mm		6,0	50,0	8,0	4,0	31,0	67067
0.0906	2,300 mm		6,0	50,0	8,0	5,0	31,0	67068
0.0938	2,383 mm	3/32	6,0	50,0	8,0	5,0	31,0	58482
0.0945	2,400 mm		6,0	50,0	8,0	5,0	31,0	67069
0.0984	2,500 mm		6,0	50,0	9,0	5,0	31,0	67070
0.1015	2,578 mm	#38	6,0	50,0	9,0	5,0	31,0	58483
0.1024	2,600 mm		6,0	50,0	9,0	5,0	31,0	67071
0.1040	2,642 mm	#37	6,0	50,0	9,0	5,0	31,0	58484
0.1063	2,700 mm		6,0	50,0	9,0	5,0	31,0	67072
0.1065	2,705 mm	#36	6,0	50,0	9,0	5,0	31,0	58485
0.1094	2,779 mm	7/64	6,0	50,0	10,0	6,0	31,0	58486
0.1102	2,800 mm		6,0	50,0	10,0	6,0	31,0	67073
0.1130	2,870 mm	#33	6,0	50,0	10,0	6,0	31,0	58487
0.1142	2,900 mm		6,0	50,0	10,0	6,0	31,0	67074
0.1181	3,000 mm		6,0	50,0	10,0	6,0	31,0	67075
0.1220	3,100 mm		6,0	50,0	11,0	6,0	31,0	67076
0.1250	3,175 mm	1/8	6,0	50,0	11,0	6,0	31,0	58488
0.1260	3,200 mm		6,0	50,0	11,0	6,0	31,0	67077
0.1299	3,300 mm		6,0	50,0	12,0	7,0	31,0	67078
0.1339	3,400 mm		6,0	50,0	12,0	7,0	31,0	67079
0.1360	3,454 mm	#29	6,0	50,0	12,0	7,0	31,0	58489
0.1378	3,500 mm		6,0	50,0	12,0	7,0	31,0	67080
0.1405	3,569 mm	#28	6,0	50,0	12,0	7,0	31,0	58490
0.1406	3,571 mm	9/64	6,0	50,0	12,0	7,0	31,0	58491
0.1417	3,600 mm		6,0	50,0	13,0	7,0	31,0	67081
0.1457	3,700 mm		6,0	50,0	13,0	7,0	31,0	67082
0.1470	3,734 mm	#26	6,0	50,0	13,0	7,0	31,0	58492
0.1495	3,797 mm	#25	6,0	50,0	13,0	8,0	31,0	58493
0.1496	3,800 mm		6,0	50,0	13,0	8,0	31,0	67083

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRC (≤ 577 Bhn)

Series 136U 2xD Fractional & Metric

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FRACTIONAL & METRIC Series 136U



136U 2xD FRACTIONAL & METRIC SERIES

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

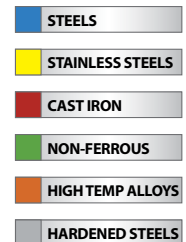
inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE [®] -X (TX)
0.1520	3,861 mm	#24	6,0	50,0	14,0	8,0	31,0	58494
0.1535	3,900 mm		6,0	50,0	14,0	8,0	31,0	67084
0.1562	3,967 mm	5/32	6,0	50,0	14,0	8,0	31,0	58495
0.1570	3,988 mm	#22	6,0	50,0	14,0	8,0	31,0	58496
0.1575	4,000 mm		6,0	50,0	14,0	8,0	31,0	67085
0.1590	4,039 mm	#21	6,0	50,0	14,0	8,0	31,0	58497
0.1610	4,089 mm	#20	6,0	50,0	14,0	8,0	31,0	58498
0.1614	4,100 mm		6,0	50,0	14,0	8,0	31,0	67086
0.1654	4,200 mm		6,0	60,0	15,0	8,0	34,0	67087
0.1693	4,300 mm		6,0	60,0	15,0	9,0	34,0	67088
0.1719	4,366 mm	11/64	6,0	60,0	15,0	9,0	34,0	58499
0.1732	4,400 mm		6,0	60,0	15,0	9,0	34,0	67089
0.1770	4,496 mm	#16	6,0	60,0	16,0	9,0	34,0	58500
0.1772	4,500 mm		6,0	60,0	16,0	9,0	34,0	67090
0.1811	4,600 mm		6,0	60,0	16,0	9,0	34,0	67091
0.1850	4,699 mm	#13	6,0	60,0	16,0	9,0	34,0	58501
0.1875	4,763 mm	3/16	6,0	60,0	17,0	10,0	34,0	58502
0.1890	4,801 mm	#12	6,0	60,0	17,0	10,0	34,0	58503
0.1929	4,900 mm		6,0	60,0	17,0	10,0	34,0	67094
0.1935	4,915 mm	#10	6,0	60,0	17,0	10,0	34,0	58504
0.1969	5,000 mm		6,0	60,0	18,0	10,0	34,0	67095
0.2008	5,100 mm		6,0	60,0	18,0	10,0	34,0	67096
0.2010	5,105 mm	#7	6,0	60,0	18,0	10,0	34,0	58505
0.2031	5,159 mm	13/64	6,0	60,0	18,0	10,0	34,0	58506
0.2047	5,200 mm		6,0	60,0	18,0	10,0	34,0	67097
0.2087	5,300 mm		6,0	60,0	19,0	11,0	34,0	67098
0.2090	5,309 mm	#4	6,0	60,0	19,0	11,0	34,0	58507
0.2126	5,400 mm		6,0	60,0	19,0	11,0	34,0	67099
0.2130	5,410 mm	#3	6,0	60,0	19,0	11,0	34,0	58508
0.2165	5,500 mm		6,0	60,0	19,0	11,0	34,0	67100
0.2188	5,558 mm	7/32	6,0	60,0	19,0	11,0	34,0	58509
0.2205	5,600 mm		6,0	60,0	20,0	11,0	34,0	67101
0.2244	5,700 mm		6,0	60,0	20,0	11,0	34,0	67102
0.2283	5,800 mm		6,0	60,0	20,0	12,0	34,0	67103
0.2323	5,900 mm		6,0	60,0	21,0	12,0	34,0	67104
0.2344	5,954 mm	15/64	6,0	60,0	21,0	12,0	34,0	58510
0.2362	6,000 mm		6,0	60,0	21,0	12,0	34,0	67105
0.2402	6,100 mm		8,0	70,0	22,0	13,0	37,0	67106
0.2441	6,200 mm		8,0	70,0	22,0	12,0	37,0	67107
0.2461	6,250 mm		8,0	70,0	22,0	13,0	37,0	67108

TOLERANCES (inch)

- $\leq .1181$ DIAMETER**
DC = $+0.0008/+0.0047$
DCON = h_6
- $>.1181-.2362$ DIAMETER**
DC = $+0.0016/+0.0063$
DCON = h_6
- $>.2362-.3937$ DIAMETER**
DC = $+0.0024/+0.0083$
DCON = h_6
- $>.3937-.7087$ DIAMETER**
DC = $+0.0028/+0.0098$
DCON = h_6
- $>.7087-1.1811$ DIAMETER**
DC = $+0.0031/+0.0114$
DCON = h_6

TOLERANCES (mm)

- ≤ 3 DIAMETER**
DC = $+0,002/+0,012$
DCON = h_6
- $>3-6$ DIAMETER**
DC = $+0,004/+0,016$
DCON = h_6
- $>6-10$ DIAMETER**
DC = $+0,006/+0,021$
DCON = h_6
- $>10-18$ DIAMETER**
DC = $+0,007/+0,025$
DCON = h_6
- $>18-30$ DIAMETER**
DC = $+0,008/+0,029$
DCON = h_6



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FRACTIONAL & METRIC Series 136U

136U 2xD

FRACTIONAL & METRIC SERIES

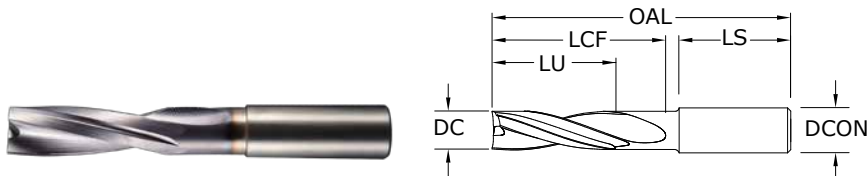
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	inch & mm					SHANK LENGTH LS	EDP NO. Ti-NAMITE [®] -X (TX)
			SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU			
0.2480	6,300 mm		8,0	70,0	22,0	13,0	37,0	67109	
0.2500	6,350 mm	1/4 E #0	8,0	70,0	22,0	13,0	37,0	58511	
0.2520	6,400 mm		8,0	70,0	22,0	13,0	37,0	67110	
0.2559	6,500 mm		8,0	70,0	23,0	13,0	37,0	67111	
0.2570	6,528 mm	F	8,0	70,0	23,0	13,0	37,0	58512	
0.2598	6,600 mm		8,0	70,0	23,0	13,0	37,0	67112	
0.2638	6,700 mm		8,0	70,0	23,0	13,0	37,0	67113	
0.2656	6,746 mm	17/64	8,0	70,0	24,0	13,0	37,0	58513	
0.2677	6,800 mm		8,0	70,0	24,0	14,0	37,0	67114	
0.2717	6,900 mm		8,0	70,0	24,0	14,0	37,0	67115	
0.2720	6,909 mm	I	8,0	70,0	24,0	14,0	37,0	58514	
0.2756	7,000 mm		8,0	70,0	25,0	14,0	37,0	67116	
0.2795	7,100 mm		8,0	70,0	25,0	14,0	37,0	67117	
0.2812	7,142 mm	9/32	8,0	70,0	25,0	14,0	37,0	58515	
0.2835	7,200 mm		8,0	70,0	25,0	14,0	37,0	67118	
0.2854	7,250 mm		8,0	70,0	25,0	14,0	37,0	67119	
0.2874	7,300 mm		8,0	70,0	26,0	15,0	37,0	67120	
0.2913	7,400 mm		8,0	70,0	26,0	15,0	37,0	67121	
0.2953	7,500 mm		8,0	70,0	26,0	15,0	37,0	67122	
0.2969	7,541 mm	19/64	8,0	70,0	26,0	15,0	37,0	58516	
0.2992	7,600 mm		8,0	70,0	27,0	15,0	37,0	67123	
0.3031	7,700 mm		8,0	70,0	27,0	15,0	37,0	67124	
0.3071	7,800 mm		8,0	70,0	27,0	16,0	37,0	67125	
0.3110	7,900 mm		8,0	70,0	28,0	16,0	37,0	67126	
0.3125	7,938 mm	5/16	8,0	70,0	28,0	16,0	37,0	58517	
0.3150	8,000 mm		8,0	70,0	28,0	16,0	37,0	67127	
0.3189	8,100 mm		10,0	80,0	29,0	17,0	40,0	67128	
0.3228	8,200 mm		10,0	80,0	29,0	16,0	40,0	67129	
0.3268	8,300 mm		10,0	80,0	29,0	17,0	40,0	67130	
0.3281	8,334 mm	21/64	10,0	80,0	29,0	17,0	40,0	58518	
0.3307	8,400 mm		10,0	80,0	29,0	17,0	40,0	67131	
0.3320	8,433 mm	Q	10,0	80,0	30,0	17,0	40,0	58519	
0.3346	8,500 mm		10,0	80,0	30,0	17,0	40,0	67132	
0.3386	8,600 mm		10,0	80,0	30,0	17,0	40,0	67133	
0.3425	8,700 mm		10,0	80,0	30,0	17,0	40,0	67134	
0.3438	8,733 mm	11/32	10,0	80,0	31,0	17,0	40,0	58520	
0.3465	8,800 mm		10,0	80,0	31,0	18,0	40,0	67135	
0.3504	8,900 mm		10,0	80,0	31,0	18,0	40,0	67136	
0.3543	9,000 mm		10,0	80,0	31,0	18,0	40,0	67137	
0.3583	9,100 mm		10,0	80,0	32,0	18,0	40,0	67138	
0.3594	9,129 mm	23/64	10,0	80,0	32,0	18,0	40,0	58521	
0.3622	9,200 mm		10,0	80,0	32,0	18,0	40,0	67139	
0.3661	9,300 mm		10,0	80,0	33,0	19,0	40,0	67140	
0.3680	9,347 mm	U	10,0	80,0	33,0	19,0	40,0	58522	
0.3701	9,400 mm		10,0	80,0	33,0	19,0	40,0	67141	
0.3740	9,500 mm		10,0	80,0	33,0	19,0	40,0	67142	

CONTINUED

continued on next page

Series 136U 2xD | Fractional & Metric

FRACTIONAL & METRIC Series 136U



136U 2xD FRACTIONAL & METRIC SERIES

- 4-margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

inch & mm								EDP NO.
DECIMAL DC	METRIC DC	FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE [®] -X (TX)
0.3750	9,525 mm	3/8	10,0	80,0	33,0	19,0	40,0	58523
0.3780	9,600 mm		10,0	80,0	34,0	19,0	40,0	67143
0.3819	9,700 mm		10,0	80,0	34,0	19,0	40,0	67144
0.3858	9,800 mm		10,0	80,0	34,0	20,0	40,0	67145
0.3898	9,900 mm		10,0	80,0	35,0	20,0	40,0	67146
0.3906	9,921 mm	25/64	10,0	80,0	35,0	20,0	40,0	58524
0.3937	10,000 mm		10,0	80,0	35,0	20,0	40,0	67147
0.3970	10,084 mm	X	12,0	90,0	36,0	21,0	43,0	58525
0.3976	10,100 mm		12,0	90,0	36,0	21,0	43,0	67148
0.4016	10,200 mm		12,0	90,0	36,0	20,0	43,0	67149
0.4040	10,262 mm	Y	12,0	90,0	36,0	21,0	43,0	58526
0.4055	10,300 mm		12,0	90,0	36,0	21,0	43,0	67150
0.4062	10,317 mm	13/32	12,0	90,0	36,0	21,0	43,0	58527
0.4094	10,400 mm		12,0	90,0	36,0	21,0	43,0	67151
0.4134	10,500 mm		12,0	90,0	37,0	21,0	43,0	67152
0.4173	10,600 mm		12,0	90,0	37,0	21,0	43,0	67153
0.4213	10,700 mm		12,0	90,0	37,0	21,0	43,0	67154
0.4219	10,716 mm	27/64	12,0	90,0	38,0	21,0	43,0	58528
0.4252	10,800 mm		12,0	90,0	38,0	22,0	43,0	67155
0.4291	10,900 mm		12,0	90,0	38,0	22,0	43,0	67156
0.4331	11,000 mm		12,0	90,0	39,0	22,0	43,0	67157
0.4370	11,100 mm		12,0	90,0	39,0	22,0	43,0	67158
0.4375	11,113 mm	7/16	12,0	90,0	39,0	22,0	43,0	58529
0.4409	11,200 mm		12,0	90,0	39,0	22,0	43,0	67159
0.4449	11,300 mm		12,0	90,0	40,0	23,0	43,0	67160
0.4488	11,400 mm		12,0	90,0	40,0	23,0	43,0	67161
0.4528	11,500 mm		12,0	90,0	40,0	23,0	43,0	67162
0.4531	11,509 mm	29/64	12,0	90,0	40,0	23,0	43,0	58530
0.4567	11,600 mm		12,0	90,0	41,0	23,0	43,0	67163
0.4606	11,700 mm		12,0	90,0	41,0	23,0	43,0	67164
0.4646	11,800 mm		12,0	90,0	41,0	24,0	43,0	67165
0.4685	11,900 mm		12,0	90,0	42,0	24,0	43,0	67166
0.4688	11,908 mm	15/32	12,0	90,0	42,0	24,0	43,0	58531
0.4724	12,000 mm		12,0	90,0	42,0	24,0	43,0	67167
0.4844	12,304 mm	31/64	14,0	100,0	43,0	25,0	46,0	58532
0.4921	12,500 mm		14,0	100,0	44,0	25,0	46,0	67168
0.5000	12,700 mm	1/2	14,0	100,0	44,0	25,0	46,0	58533
0.5039	12,800 mm		14,0	100,0	45,0	26,0	46,0	67169

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TOLERANCES (inch)

$\leq .1181$ DIAMETER

DC = +.0008/+0.0047
DCON = h_6

>.1181-.2362 DIAMETER

DC = +.00016/+0.00063
DCON = h_6

>.2362-.3937 DIAMETER

DC = +.00024/+0.00083
DCON = h_6

>.3937-.7087 DIAMETER

DC = +.00028/+0.00098
DCON = h_6

>.7087-1.1811 DIAMETER

DC = +.00031/+0.00114
DCON = h_6

TOLERANCES (mm)

≤ 3 DIAMETER

DC = +0,002/+0,012
DCON = h_6

>3-6 DIAMETER

DC = +0,004/+0,016
DCON = h_6

>6-10 DIAMETER

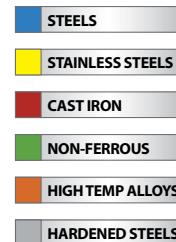
DC = +0,006/+0,021
DCON = h_6

>10-18 DIAMETER

DC = +0,007/+0,025
DCON = h_6

>18-30 DIAMETER

DC = +0,008/+0,029
DCON = h_6



For patent information visit www.ksptpatents.com



FRACTIONAL & METRIC
Series 136U

136U 2xD

FRACTIONAL & METRIC SERIES

DECIMAL DC	METRIC DC	inch & mm						EDP NO.
		FRACTIONAL/ LETTER/WIRE DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	USABLE LENGTH LU	SHANK LENGTH LS	Ti-NAMITE [®] -X (TX)
0.5118	13,000 mm		14,0	100,0	45,0	26,0	46,0	67170
0.5156	13,096 mm	33/64	14,0	100,0	46,0	26,0	46,0	58534
0.5312	13,492 mm	17/32	14,0	100,0	47,0	27,0	46,0	58535
0.5315	13,500 mm		14,0	100,0	47,0	27,0	46,0	67171
0.5469	13,891 mm	35/64	14,0	100,0	49,0	28,0	46,0	58536
0.5512	14,000 mm		14,0	100,0	49,0	28,0	46,0	67172
0.5625	14,288 mm	9/16	16,0	110,0	50,0	29,0	49,0	58537
0.5709	14,500 mm		16,0	110,0	51,0	29,0	49,0	67173
0.5781	14,684 mm	37/64	16,0	110,0	51,0	29,0	49,0	58538
0.5906	15,000 mm		16,0	110,0	53,0	30,0	49,0	67174
0.5938	15,083 mm	19/32	16,0	110,0	53,0	30,0	49,0	58539
0.6094	15,479 mm	39/64	16,0	110,0	54,0	31,0	49,0	58540
0.6102	15,500 mm		16,0	110,0	54,0	31,0	49,0	67175
0.6250	15,875 mm	5/8	16,0	110,0	56,0	32,0	49,0	58541
0.6299	16,000 mm		16,0	110,0	56,0	32,0	49,0	67176
0.6406	16,271 mm	41/64	18,0	125,0	57,0	33,0	57,0	58542
0.6496	16,500 mm		18,0	125,0	58,0	33,0	57,0	67177
0.6562	16,667 mm	21/32	18,0	125,0	58,0	33,0	57,0	58543
0.6693	17,000 mm		18,0	125,0	60,0	34,0	57,0	67178
0.6719	17,066 mm	43/64	18,0	125,0	60,0	34,0	57,0	58544
0.6875	17,463 mm	11/16	18,0	125,0	61,0	35,0	57,0	58545
0.6890	17,500 mm		18,0	125,0	61,0	35,0	57,0	67179
0.7031	17,859 mm	45/64	18,0	125,0	63,0	36,0	57,0	58546
0.7087	18,000 mm		18,0	125,0	63,0	36,0	57,0	67180
0.7188	18,258 mm	23/32	20,0	135,0	64,0	37,0	60,0	58547
0.7283	18,500 mm		20,0	135,0	65,0	37,0	60,0	67181
0.7344	18,654 mm	47/64	20,0	135,0	65,0	37,0	60,0	58548
0.7480	19,000 mm		20,0	135,0	66,0	38,0	60,0	67182
0.7500	19,050 mm	3/4	20,0	135,0	67,0	38,0	60,0	58549
0.7656	19,446 mm	49/64	20,0	135,0	68,0	39,0	60,0	58550
0.7677	19,500 mm		20,0	135,0	68,0	39,0	60,0	67183
0.7812	19,842 mm	25/32	20,0	135,0	69,0	40,0	60,0	58551
0.7874	20,000 mm		20,0	135,0	70,0	40,0	60,0	67184
0.7969	20,241 mm	51/64	22,0	145,0	71,0	40,0	68,0	58552
0.8071	20,500 mm		22,0	145,0	72,0	41,0	68,0	67185
0.8125	20,638 mm	13/16	22,0	145,0	72,0	41,0	68,0	58553

CONTINUED

Series 136U 2xD | Fractional & Metric

Series 146U • Series 136U



Series 136U & 146U Speed & Feed Recommendations

Series 146U, 136U Fractional	Hardness	Vc (sfm)	DC • in								
			1/16	1/8	1/4	3/8	1/2	5/8	3/4	13/16	
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	285 (228-342)	RPM	17419	8710	4355	2903	2177	1742	1452	1340
			Fr	0.0016	0.0031	0.0062	0.0093	0.0124	0.0155	0.0186	0.0202
			Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
	≤ 275 Bhn or ≤ 28 HRc	255 (204-306)	RPM	15586	7793	3896	2598	1948	1559	1299	1199
			Fr	0.0013	0.0027	0.0054	0.0081	0.0108	0.0135	0.0162	0.0175
			Feed (ipm)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
	≤ 425 Bhn or ≤ 45 HRc	145 (116-174)	RPM	8862	4431	2216	1477	1108	886	739	682
			Fr	0.0011	0.0023	0.0045	0.0068	0.0090	0.0113	0.0135	0.0147
			Feed (ipm)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	220 (176-264)	RPM	13446	6723	3362	2241	1681	1345	1121	1034
			Fr	0.0015	0.0030	0.0059	0.0089	0.0119	0.0149	0.0178	0.0193
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
	≤ 375 Bhn or ≤ 40 HRc	135 (108-162)	RPM	8251	4126	2063	1375	1031	825	688	635
			Fr	0.0013	0.0027	0.0053	0.0080	0.0107	0.0133	0.0160	0.0173
			Feed (ipm)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	125 (100-150)	RPM	7640	3820	1910	1273	955	764	637	588
			Fr	0.0012	0.0025	0.0050	0.0075	0.0099	0.0124	0.0149	0.0162
			Feed (ipm)	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
≤ 375 Bhn or ≤ 40 HRc	90 (72-108)	RPM	5501	2750	1375	917	688	550	458	423	
		Fr	0.0005	0.0011	0.0022	0.0033	0.0044	0.0055	0.0065	0.0071	
		Feed (ipm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	265 (212-318)	RPM	16197	8098	4049	2699	2025	1620	1350	1246
			Fr	0.0008	0.0016	0.0032	0.0048	0.0064	0.0080	0.0096	0.0104
			Feed (ipm)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
	≤ 275 Bhn or ≤ 28 HRc	170 (136-204)	RPM	10390	5195	2598	1732	1299	1039	866	799
			Fr	0.0006	0.0013	0.0025	0.0038	0.0050	0.0063	0.0075	0.0081
			Feed (ipm)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	130 (104-156)	RPM	7946	3973	1986	1324	993	795	662	611
			Fr	0.0006	0.0013	0.0025	0.0038	0.0050	0.0063	0.0076	0.0082
			Feed (ipm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
≤ 375 Bhn or ≤ 40 HRc	95 (76-114)	RPM	5806	2903	1452	968	726	581	484	447	
		Fr	0.0006	0.0011	0.0023	0.0034	0.0045	0.0057	0.0068	0.0074	
		Feed (ipm)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	
GRAY CAST IRONS	≤ 220 Bhn or ≤ 19 HRc	250 (200-300)	RPM	15280	7640	3820	2547	1910	1528	1273	1175
			Fr	0.0016	0.0031	0.0063	0.0094	0.0126	0.0157	0.0188	0.0204
			Feed (ipm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DUCTILE CAST IRONS	≤ 260 Bhn or ≤ 26 HRc	220 (176-264)	RPM	13446	6723	3362	2241	1681	1345	1121	1034
			Fr	0.0015	0.0030	0.0059	0.0089	0.0119	0.0149	0.0178	0.0193
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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	Series 146U, 136U Fractional	Hardness	Vc (sfm)	DC • in								
				1/16	1/8	1/4	3/8	1/2	5/8	3/4	13/16	
N	ALUMINUM ALLOYS (WROUGHT) 2024, 6061, 7075	≤ 150 Bhn or ≤ 88 HRb	475	RPM	29032	14516	7258	4839	3629	2903	2419	2233
				Fr	0.0016	0.0031	0.0062	0.0093	0.0124	0.0155	0.0186	0.0202
			(380-570)	Feed (ipm)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	ALUMINUM ALLOYS (CAST) A356, A380, 390	≤ 140 Bhn or ≤ 3 HRc	380	RPM	23226	11613	5806	3871	2903	2323	1935	1787
				Fr	0.0014	0.0028	0.0055	0.0083	0.0110	0.0138	0.0165	0.0179
			(304-456)	Feed (ipm)	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	175	RPM	10696	5348	2674	1783	1337	1070	891	823
				Fr	0.0007	0.0014	0.0028	0.0042	0.0055	0.0069	0.0083	0.0090
			(140-210)	Feed (ipm)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
		≤ 350 Bhn or ≤ 38 HRc	130	RPM	7946	3973	1986	1324	993	795	662	611
				Fr	0.0006	0.0013	0.0025	0.0038	0.0050	0.0063	0.0076	0.0082
			(104-156)	Feed (ipm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	≤ 440 Bhn or ≤ 47 HRc	70	RPM	4278	2139	1070	713	535	428	357	329	
			Fr	0.0005	0.0009	0.0019	0.0028	0.0037	0.0047	0.0056	0.0061	
		(56-84)	Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
H	Alloy Steels 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 450 Bhn or ≤ 48 HRc	95	RPM	5806	2903	1452	968	726	581	484	447
				Fr	0.0008	0.0016	0.0031	0.0047	0.0062	0.0078	0.0093	0.0101
			(76-114)	Feed (ipm)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	80	RPM	4890	2445	1222	815	611	489	407	376
				Fr	0.0007	0.0014	0.0029	0.0043	0.0057	0.0072	0.0086	0.0093
			(64-96)	Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

reduce rates when material is harder than listed, when drilling conditions are not optimum, or coolant is not available
 rates shown are for drilling into a flat surface and should be lowered using the reduction multiplier when the workpiece is angled or curved
 reduce rates 10 to 20 percent when using drills without internal coolant
 always use the shortest overhang possible
 longer drills may require a spot drill operation to avoid walking on entry
 internal coolant required in ISO S and M material groups or when drilling depth exceeds 3xD
 Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = Vc \times 3.82 / DC$
 $ipm = Fr \times rpm$
 speed and feed for materials harder than listed
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstoool.com)

angle °	reduction multiplier	
	speed x	feed x
up to 30	1.0	0.6
over 30	0.7	0.4

Series 146U • Series 136U



Series 136U & 146U Speed & Feed Recommendations

Series 146U, 136U Metric	Hardness	Vc (m/mm)	DC • mm								
			1.5	3	6	8	10	12	16	20	
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	87	RPM	18419	9209	4605	3454	2763	2302	1727	1381
		(69-104)	Fr	0.037	0.074	0.149	0.199	0.248	0.298	0.397	0.496
			Feed (mm/min)	686	686	686	686	686	686	686	686
	≤ 275 Bhn or ≤ 28 HRc	78	RPM	16480	8240	4120	3090	2472	2060	1545	1236
		(62-93)	Fr	0.032	0.065	0.129	0.173	0.216	0.259	0.345	0.432
			Feed (mm/min)	533	533	533	533	533	533	533	533
	≤ 425 Bhn or ≤ 45 HRc	44	RPM	9371	4686	2343	1757	1406	1171	879	703
		(35-53)	Fr	0.027	0.054	0.108	0.145	0.181	0.217	0.289	0.361
			Feed (mm/min)	254	254	254	254	254	254	254	254
ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	67	RPM	14218	7109	3555	2666	2133	1777	1333	1066
		(54-80)	Fr	0.036	0.071	0.143	0.191	0.238	0.286	0.381	0.476
			Feed (mm/min)	508	508	508	508	508	508	508	508
	≤ 375 Bhn or ≤ 40 HRc	41	RPM	8725	4362	2181	1636	1309	1091	818	654
		(33-49)	Fr	0.032	0.064	0.128	0.171	0.213	0.256	0.342	0.427
			Feed (mm/min)	279	279	279	279	279	279	279	279
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	38	RPM	8078	4039	2020	1515	1212	1010	757	606
		(30-46)	Fr	0.030	0.060	0.119	0.159	0.199	0.239	0.319	0.398
			Feed (mm/min)	241	241	241	241	241	241	241	241
	≤ 375 Bhn or ≤ 40 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436
		(22-33)	Fr	0.013	0.026	0.052	0.070	0.087	0.105	0.140	0.175
			Feed (mm/min)	76	76	76	76	76	76	76	76
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	81	RPM	17126	8563	4282	3211	2569	2141	1606	1284
		(65-97)	Fr	0.019	0.039	0.077	0.103	0.129	0.154	0.206	0.257
			Feed (mm/min)	330	330	330	330	330	330	330	330
	≤ 275 Bhn or ≤ 28 HRc	52	RPM	10987	5493	2747	2060	1648	1373	1030	824
		(41-62)	Fr	0.015	0.030	0.060	0.080	0.100	0.120	0.160	0.200
			Feed (mm/min)	165	165	165	165	165	165	165	165
STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	40	RPM	8402	4201	2100	1575	1260	1050	788	630
		(32-48)	Fr	0.015	0.030	0.060	0.081	0.101	0.121	0.161	0.202
			Feed (mm/min)	127	127	127	127	127	127	127	127
	≤ 375 Bhn or ≤ 40 HRc	29	RPM	6140	3070	1535	1151	921	767	576	460
		(23-35)	Fr	0.014	0.027	0.055	0.073	0.091	0.109	0.146	0.182
			Feed (mm/min)	84	84	84	84	84	84	84	84
GRAY CAST IRONS	≤ 220 Bhn or ≤ 19 HRc	76	RPM	16157	8078	4039	3029	2424	2020	1515	1212
		(61-91)	Fr	0.038	0.075	0.151	0.201	0.252	0.302	0.402	0.503
			Feed (mm/min)	610	610	610	610	610	610	610	610
DUCTILE CAST IRONS	≤ 260 Bhn or ≤ 26 HRc	67	RPM	14218	7109	3555	2666	2133	1777	1333	1066
		(54-80)	Fr	0.036	0.071	0.143	0.191	0.238	0.286	0.381	0.476
			Feed (mm/min)	508	508	508	508	508	508	508	508

continued on next page

Series 146U, 136U Metric	Hardness	Vc (m/mm)		DC • mm								
				1.5	3	6	8	10	12	16	20	
N	ALUMINUM ALLOYS (WROUGHT) 2024, 6061, 7075	≤ 150 Bhn	145	RPM	30698	15349	7675	5756	4605	3837	2878	2302
		or	(116-174)	Fr	0.037	0.074	0.149	0.199	0.248	0.298	0.397	0.496
		≤ 88 HRb		Feed (mm/min)	1143	1143	1143	1143	1143	1143	1143	1143
	ALUMINUM ALLOYS (CAST) A356, A380, 390	≤ 140 Bhn	116	RPM	24559	12279	6140	4605	3684	3070	2302	1842
		or	(93-139)	Fr	0.033	0.066	0.132	0.177	0.221	0.265	0.353	0.441
		≤ 3 HRc		Feed (mm/min)	813	813	813	813	813	813	813	813
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn	53	RPM	11310	5655	2827	2121	1696	1414	1060	848
		or	(43-64)	Fr	0.017	0.033	0.066	0.089	0.111	0.133	0.177	0.222
		≤ 28 HRc		Feed (mm/min)	188	188	188	188	188	188	188	188
		≤ 350 Bhn	40	RPM	8402	4201	2100	1575	1260	1050	788	630
		or	(32-48)	Fr	0.015	0.030	0.060	0.081	0.101	0.121	0.161	0.202
		≤ 38 HRc		Feed (mm/min)	127	127	127	127	127	127	127	127
		≤ 440 Bhn	21	RPM	4524	2262	1131	848	679	565	424	339
		or	(17-26)	Fr	0.011	0.022	0.045	0.060	0.075	0.090	0.120	0.150
		≤ 47 HRc		Feed (mm/min)	51	51	51	51	51	51	51	51
H	Alloy Steels 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 450 Bhn	29	RPM	6140	3070	1535	1151	921	767	576	460
		or	(23-35)	Fr	0.019	0.037	0.074	0.099	0.124	0.149	0.199	0.248
		≤ 48 HRc		Feed (mm/min)	114	114	114	114	114	114	114	114
	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn	24	RPM	5170	2585	1293	969	776	646	485	388
		or	(20-29)	Fr	0.017	0.034	0.069	0.092	0.115	0.138	0.183	0.229
		≤ 50 HRc		Feed (mm/min)	89	89	89	89	89	89	89	89

reduce rates when material is harder than listed, when drilling conditions are not optimum, or coolant is not available
 rates shown are for drilling into a flat surface and should be lowered using the reduction multiplier when the workpiece is angled or curved
 reduce rates 10 to 20 percent when using drills without internal coolant
 always use the shortest overhang possible
 longer drills may require a spot drill operation to avoid walking on entry
 internal coolant required in ISO S and M material groups or when drilling depth exceeds 3xD
 Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = (Vc \times 1000) / (DC \times 3.14)$
 $mm/min = Fr \times rpm$
 speed and feed for materials harder than listed
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

angle °	reduction multiplier	
	speed x	feed x
up to 30	1.0	0.6
over 30	0.7	0.4

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