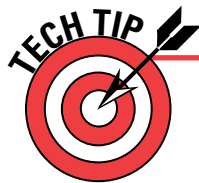


Style HD-4C • HSS, Double End, 4-Flute, Center Cutting (continued)
 formerly style 582

Cutting Diameter	Decimal Equiv.	Metric Equiv.	Shank Diameter		Length of Cut		Overall Length		No. of Flutes	Bright	Order Number	
			in	mm	in	mm	in	mm			TiN	TiCN
3/4	.7500	19.05	.750	19.05	1.625	41.28	5.625	142.88	4	C41223	C33091	C33132
25/32	.7812	19.84	.875	22.23	1.875	47.63	6.125	155.58	4	C33053	C33092	–
13/16	.8125	20.64	.875	22.23	1.875	47.63	6.125	155.58	4	C33054	C33093	C33134
27/32	.8438	21.43	.875	22.23	1.875	47.63	6.125	155.58	4	C33055	C33094	C33135
7/8	.8750	22.23	.875	22.23	1.875	47.63	6.125	155.58	4	C41227	C33095	C33136
29/32	.9062	23.02	1.000	25.40	1.875	47.63	6.375	161.93	4	C33056	C33096	C33137
15/16	.9375	23.81	1.000	25.40	1.875	47.63	6.375	161.93	4	C33057	C33097	–
31/32	.9688	24.61	1.000	25.40	1.875	47.63	6.375	161.93	4	C33058	C33098	–
1	1.0000	25.40	1.000	25.40	1.875	47.63	6.375	161.93	4	C41231	C33099	C33140



End Mill Finishes and Their Applications

- Cleveland's cutting tools with TiN or TiCN coatings provide exceptional performance benefits. Coatings are matched with designs which are intended for aggressive material removal with significant increases in tool life and machining rates.
 - Coatings reduce heat and abrasion to increase tool life.
 - The increased lubricity of the coating surface reduces material adhesion and built-up edge, enabling even higher feed rates.
 - Coatings reduce the amount of torque required for machining to allow more efficient use of equipment.
 - Increase machining speeds to achieve optimum performance when using Cleveland coatings.
- Straw finish
 - bronze color
 - for general machining
 - operate at conventional cobalt speeds and heavier feed rates.
- TiN (titanium nitride) coating
 - gold color
 - intended for aggressive machining
 - increase machining speed 25% to 30% versus bright speeds
- TiCN (titanium carbonitride) coating
 - blue-gray color
 - for very aggressive machining of stainless steels and non-ferrous materials
 - extremely hard, wear resistant
 - increase machining speeds 35% to 50% versus bright speeds
- TiAlN (titanium aluminum nitride) coating
 - violet/blue-gray color
 - for aggressive machining of stainless steels, high alloy carbon steels, nickel-based high-temperature alloys, and titanium alloys
 - increase machining speeds 75% to 100% versus bright speeds.

General Application End Mills

Single End Finishers

Style HGA-2 • HSS, Single End, 2-Flute, Center Cutting, High-Helix
formerly styles 665, 666, 667

FEATURES

ANSI SIZES	HSS SUBSTRATE
GENERAL PURPOSE	BRIGHT
2 FLUTE CC	TiN
37°	TiCN

APPLICATIONS

ALUMINUM
COPPER ALLOYS
MAGNESIUM
BRASS



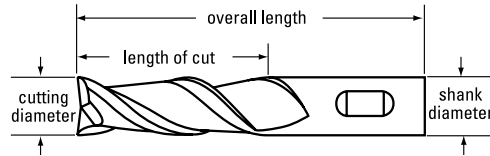
Style HGA-2 Bright



Style HGA-2 TiN-coated



Style HGA-2 TiCN-coated



Cutting Diameter	Decimal Equiv.	Metric Equiv.	Shank Diameter		Length of Cut		Overall Length		No. of Flutes	Order Number		
			in	mm	in	mm	in	mm		Bright	TiN	TiCN
1/4	.2500	6.35	.375	9.53	.625	15.88	2.437	61.89	2	C41843	C33476	C33488
1/4	.2500	6.35	.375	9.53	1.250	31.75	3.063	77.79	2	C41888	C33500	C33511
1/4	.2500	6.35	.375	9.53	1.750	44.45	3.563	90.49	2	C41930	C33524	C33535
5/16	.3125	7.94	.375	9.53	.750	19.05	2.500	63.50	2	C41845	C33477	C33489
5/16	.3125	7.94	.375	9.53	1.375	34.93	3.125	79.38	2	C41890	C33501	C33512
5/16	.3125	7.94	.375	9.53	2.000	50.80	3.250	82.55	2	C41932	C33525	C33536
3/8	.3750	9.53	.375	9.53	.750	19.05	2.500	63.50	2	C41848	C33478	C33490
3/8	.3750	9.53	.375	9.53	1.500	38.10	3.250	82.55	2	C41893	C33502	C33513
3/8	.3750	9.53	.375	9.53	2.500	63.50	4.250	107.95	2	C41935	C33526	C33537
7/16	.4375	11.11	.375	9.53	1.000	25.40	2.688	68.26	2	C41851	C33479	C33491
7/16	.4375	11.11	.500	12.70	1.750	44.45	3.250	82.55	2	C41896	C33503	C33514
7/16	.4375	11.11	.375	9.53	2.750	69.85	4.500	114.30	2	C33522	C33527	C33538
1/2	.5000	12.70	.500	12.70	1.250	31.75	3.250	82.55	2	C41853	C33480	C33492
1/2	.5000	12.70	.500	12.70	2.000	50.80	4.000	101.60	2	C41898	C33504	C33515
1/2	.5000	12.70	.500	12.70	3.000	76.20	5.000	127.00	2	C41939	C33528	C33539
5/8	.6250	15.88	.875	22.23	1.625	41.28	3.250	82.55	2	C41856	C33481	C33493
5/8	.6250	15.88	.875	22.23	2.500	63.50	4.625	117.48	2	C41901	C33505	C33516
5/8	.6250	15.88	.875	22.23	4.000	101.60	6.125	155.58	2	C41942	C33529	C33540
3/4	.7500	19.05	.750	19.05	1.625	41.28	3.875	98.43	2	C41859	C33482	C33494
3/4	.7500	19.05	.750	19.05	3.000	76.20	5.250	133.35	2	C41904	C33506	C33517
3/4	.7500	19.05	.750	19.05	4.000	101.60	6.250	158.75	2	C41945	C33530	C33541
7/8	.8750	22.23	.875	22.23	1.875	47.63	4.125	104.78	2	C41863	C33483	C33495
7/8	.8750	22.23	.875	22.23	3.500	88.90	5.750	146.05	2	C32066	C33507	C33518
7/8	.8750	22.23	.875	22.23	5.000	127.00	7.250	184.15	2	C33523	C33531	C33542
1	1.0000	25.40	1.000	25.40	2.000	50.80	4.500	114.30	2	C41867	C33484	C33496
1	1.0000	25.40	1.000	25.40	4.000	101.60	6.500	165.10	2	C41911	C33508	C33519
1	1.0000	25.40	1.000	25.40	6.000	152.40	8.500	215.90	2	C41952	C33532	C33543
1-1/4	1.2500	31.75	1.250	31.75	2.000	50.80	4.500	114.30	2	C41871	C33485	C33497
1-1/4	1.2500	31.75	1.250	31.75	4.000	101.60	6.500	165.10	2	-	C33509	C33520
1-1/4	1.2500	31.75	1.250	31.75	6.000	152.40	8.500	215.90	2	C41956	C33533	C33544
1-1/2	1.5000	38.10	1.250	31.75	2.000	50.80	4.500	114.30	2	C41877	C33486	C33498
1-1/2	1.5000	38.10	1.250	31.75	4.000	101.60	6.500	165.10	2	C41921	C33510	C33521
1-1/2	1.5000	38.10	1.250	31.75	8.000	203.20	10.500	266.70	2	C41962	C33534	C33545
2	2.0000	50.80	1.250	31.75	2.000	50.80	4.500	114.30	2	C41882	C33487	C33499
2	2.0000	50.80	1.250	31.75	4.000	101.60	6.500	165.10	2	C41925	C32067	C32068

DRILLING

HOLE FINISHING

THREADING

MILLING

OTHER TOOLS