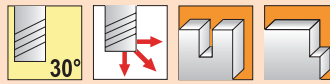


**220MA (820MA metric) / z = 2**  
**223MA (823MA metric) / z = 3**  
**230MA (830MA metric) / z = 4**  
 .0312" - .3594"  
 (0,79mm - 9,13mm)

Technical information:  
 page 200, 202



**TOLERANCES**

$d_1$	+0,000 -0,050mm (+.000" -.002")
$d_2$	3mm - 6mm -0,0000 -0,0075mm (+.0000" -.0003")
	1/4" - 1-1/4" -0,0025 -0,0100mm (-.0001" -.0004")

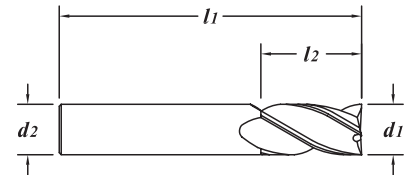
**Standard Length - TiALN Coated**  
**Standard Länge - TiALN-Beschichtet**  
**Longitud Estándar - Recubrimiento de TiALN**  
**Longueur Standart - Revêtement TiALN**  
**Lunghezza Standard - Rivestimento in TiALN**  
**标准长度 - TiALN 涂层**



END MILLS



Solid submicron grain carbide end mill - center cutting  
 Dry or semi-dry machining  
 Up to 40% faster than uncoated  
 Extremely versatile  
 Uncoated - page 131  
 TiN Coated - page 133  
 TiCN Coated - page 134



Vollhartmetallfräser aus Feinkornhartmetall - Zentrumschnitt  
 Trocken oder Halbtrockene Bearbeitung  
 Bis zu 40% schneller als unbeschichtete Werkzeuge  
 Extrem Vielseitig  
 Unbeschichtet - Seite 131  
 TiN-Beschichtet - Seite 133  
 TiCN-Beschichtet - Seite 134



Fresa de submicrograno sólido carburo - corte centrado  
 Mecanizado seco o semisecco  
 Hasta un 40% más rápido que sin recubrimiento  
 Extremadamente versátil  
 Sin recubrimiento - Página 131  
 Recubrimiento de TiN - Página 133  
 Recubrimiento de TiCN - Página 134



Fraises carbure submicrograin - coupe au centre  
 Usinage a sec ou avec l'air  
 40% plus rapide que le non revetu  
 Utilisations variables  
 Sans revêtement - Page 131  
 Revêtement TiN - Page 133  
 Revêtement TiCN - Page 134



Super sub-micrograno metallo duro - taglio al centro  
 Lavorazione a secco o a umido  
 40% più veloce rispetto non rivestito  
 Estremamente versatile  
 Non Rivestito - Pagina 131  
 Rivestimento in TiN - Pagina 133  
 Rivestimento in TiCN - Pagina 134



超细晶粒整体硬质合金立铣刀 - 中心切削  
 干式或半干式机加工  
 跟无涂层刀具相比可提高速度高达40%  
 功能极多  
 未涂层 - 131页  
 TiN 涂层 - 133页  
 TiCN 涂层 - 134页

z = 2 EDP#	z = 3 EDP#	z = 4 EDP#	$d_1$ † Diameter		$d_2$ Shank Diameter	$l_1$ Overall Length	$l_2$ Flute Length	
			Decimal	Metric				
11017	12017	13017	.0312	1/32"	0,79	1/8"	1-1/2"	3/32"
45017	37017	46017	.0394		<b>1,00</b>	<b>3,0</b>	<b>38</b>	<b>4</b>
11027	12027	13027	.0469	3/64"	1,19	1/8"	1-1/2"	1/8"
45027	37027	46027	.0591		<b>1,50</b>	<b>3,0</b>	<b>38</b>	<b>6</b>
11037	12037	13037	.0625	1/16"	1,59	1/8"	1-1/2"	1/4"
11047	12047	13047	.0781	5/64"	1,98	1/8"	1-1/2"	1/4"
45037	37037	46037	.0787		<b>2,00</b>	<b>3,0</b>	<b>38</b>	<b>8</b>
11057	12057	13057	.0938	3/32"	2,38	1/8"	1-1/2"	3/8"
45047	37047	46047	.0984		<b>2,50</b>	<b>3,0</b>	<b>38</b>	<b>12</b>
11067	12067	13067	.1094	7/64"	2,78	1/8"	1-1/2"	3/8"
45057	37057	46057	.1181		<b>3,00</b>	<b>3,0</b>	<b>38</b>	<b>12</b>
11077	12077	13077	.1250	1/8"	3,17	1/8"	1-1/2"	1/2"
45067	37067	46067	.1378		<b>3,50</b>	<b>4,0</b>	<b>50</b>	<b>12</b>
11087	12087	13087	.1406	9/64"	3,57	3/16"	2"	9/16"
11097	12097	13097	.1562	5/32"	3,97	3/16"	2"	9/16"
45077	37077	46077	.1575		<b>4,00</b>	<b>4,0</b>	<b>50</b>	<b>14</b>
11107	12107	13107	.1719	11/64"	4,37	3/16"	2"	9/16"
45087	37087	46087	.1772		<b>4,50</b>	<b>5,0</b>	<b>50</b>	<b>14</b>
11117	12117	13117	.1875	3/16"	4,76	3/16"	2"	5/8"
45097	37097	46097	.1969		<b>5,00</b>	<b>5,0</b>	<b>65</b>	<b>16</b>
11127	12127	13127	.2031	13/64"	5,16	1/4"	2-1/2"	5/8"
11137	12137	13137	.2188	7/32"	5,56	1/4"	2-1/2"	5/8"
11147	12147	13147	.2344	15/64"	5,95	1/4"	2-1/2"	3/4"
45107	37107	46107	.2362		<b>6,00</b>	<b>6,0</b>	<b>65</b>	<b>19</b>
11157	12157	13157	.2500	1/4"	6,35	1/4"	2-1/2"	3/4"
11167	12167	13167	.2656	17/64"	6,75	5/16"	2-1/2"	7/8"
45117	37117	46117	.2756		<b>7,00</b>	<b>7,0</b>	<b>65</b>	<b>22</b>
11177	12177	13177	.2812	9/32"	7,14	5/16"	2-1/2"	7/8"
11187	12187	13187	.2969	19/64"	7,54	5/16"	2-1/2"	7/8"
11197	12197	13197	.3125	5/16"	7,94	5/16"	2-1/2"	7/8"
45127	37127	46127	.3150		<b>8,00</b>	<b>8,0</b>	<b>65</b>	<b>22</b>
11207	12207	13207	.3281	21/64"	8,33	3/8"	2-1/2"	7/8"
11217	12217	13217	.3438	11/32"	8,73	3/8"	2-1/2"	7/8"
45137	37137	46137	.3543		<b>9,00</b>	<b>9,0</b>	<b>65</b>	<b>22</b>
11227	12227	13227	.3594	23/64"	9,13	3/8"	2-1/2"	7/8"

continued →

**220MA (820MA metric) / z = 2 (continued)**

**223MA (823MA metric) / z = 3 (continued)**

**230MA (830MA metric) / z = 4 (continued)**

.3750" - 1.250"  
(9,52mm - 31,75mm)

z = 2 EDP#	z = 3 EDP#	z = 4 EDP#	<i>d1</i> † Diameter		<i>d2</i> Shank Diameter	<i>l1</i> Overall Length	<i>l2</i> Flute Length	
			Decimal	Metric				
11237	12237	13237	.3750	3/8"	9,52	3/8"	2-1/2"	7/8"
11247	12247	13247	.3906	25/64"	9,92	7/16"	2-3/4"	7/8"
45147	37147	46147	.3937		<b>10,00</b>	<b>10,0</b>	<b>70</b>	<b>25</b>
11257	12257	13257	.4062	13/32"	10,32	7/16"	2-3/4"	7/8"
11267	12267	13267	.4219	27/64"	10,72	7/16"	2-3/4"	7/8"
45157	37157	46157	.4331		<b>11,00</b>	<b>11,0</b>	<b>75</b>	<b>25</b>
11277	12277	13277	.4375	7/16"	11,11	7/16"	2-3/4"	1"
11287	12287	13287	.4531	29/64"	11,51	1/2"	3"	1"
11297	12297	13297	.4688	15/32"	11,91	1/2"	3"	1"
45167	37167	46167	.4724		<b>12,00</b>	<b>12,0</b>	<b>75</b>	<b>25</b>
11307	12307	13307	.4844	31/64"	12,30	1/2"	3"	1"
11317	12317	13317	.5000	1/2"	12,70	1/2"	3"	1"
45177	37177	46177	.5512		<b>14,00</b>	<b>14,0</b>	<b>88</b>	<b>32</b>
11327	12327	13327	.5625	9/16"	14,29	9/16"	3-1/2"	1-1/4"
11337	12337	13337	.6250	5/8"	15,87	5/8"	3-1/2"	1-1/4"
45187	37187	46187	.6299		<b>16,00</b>	<b>16,0</b>	<b>88</b>	<b>38</b>
11347	12347	13347	.6875	11/16"	17,46	3/4"	4"	1-1/2"
45197	37197	46197	.7087		<b>18,00</b>	<b>18,0</b>	<b>100</b>	<b>38</b>
11357	12357	13357	.7500	3/4"	19,05	3/4"	4"	1-1/2"
45207	37207	46207	.7874		<b>20,00</b>	<b>20,0</b>	<b>100</b>	<b>38</b>
45217	37217	46217	.8661		<b>22,00</b>	<b>22,0</b>	<b>100</b>	<b>38</b>
11367	12367	13367	.8750	7/8"	22,22	7/8"	4"	1-1/2"
45227	37227	46227	.9843		<b>25,00</b>	<b>25,0</b>	<b>100</b>	<b>38</b>
11377	12377	13377	1.000	1"	25,40	1"	4"	1-1/2"
-	-	13397	1.250	1-1/4"	31,75	1-1/4"	4-1/2"	2"