Z-Carb™ Original End Mills

Revolutionizes Milling

Design Benefits

The **Z-CARB** end mill maximizes stock removal and improves productivity in most milling operations. Chatter is the most common problem associated with aggressive milling. The SGS **Z-CARB** design features reduce chatter, increase tool life and optimize performance. **Z-CARB** tools are coated with SGS Ti-NAMITE-A® coating that resists heat generated in aggressive cutting operations.

Chatter Reduction By Design

The unique patented design of the SGS **Z-CARB** decreases chatter, which improves work piece finish. Less tuning (manually adjusting speed & feed rates) increases operator confidence and productivity. Increases in axial depth of cut to 275% have been realized without chatter. SGS **Z-CARB** can achieve a 100% increase in radial width of cut over standard geometry end mills.

Patented Unequal Helix Geometry

Chatter-Resistant Design:

- Improves Surface Finish

Optimum Material Removal:

- Increases Cutting Depth
- Increases Feed Rates

Increased Tool Life:

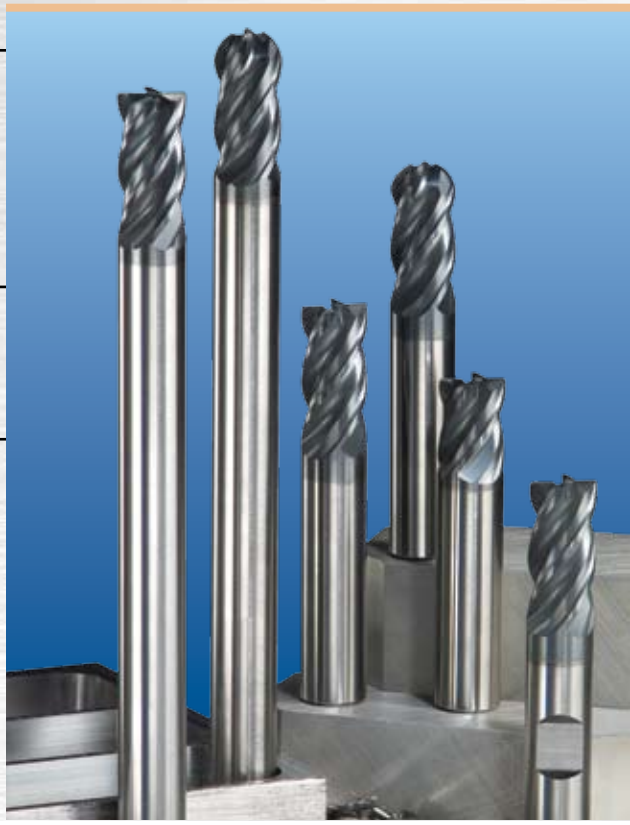
- Ti-NAMITE-A®(AlTiN Coated)
- Corner Radius
- Special Gash Break Out Grind
- Eccentric Relief

Minimum Tool Deflection:

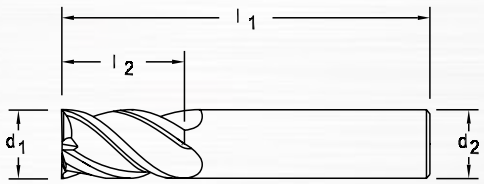
- Reduces Harmful Machine Vibration
- Improves Dimensional Control

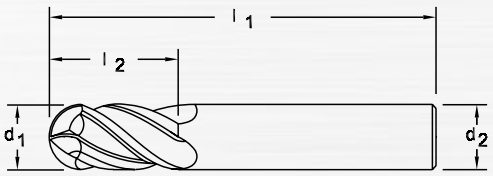
Material Applications Include:

- Low Carbon Steels
- Tool Steels
- Cast Iron
- Stainless Steels
- Titanium/High Temp Alloys



Fractional





Z-CARB™ SERIES Z1
4 FLUTE – SINGLE END – SQUARE END

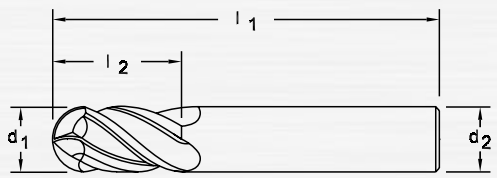
Cutting Diameter d1	Length of Cut l2	Overall Length l1	Shank Diameter d2	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat
1/8	3/8	1-1/2	1/8	36404	
5/32	7/16	2	3/16	36406	
3/16	7/16	2	3/16	36408	
7/32	7/16	2-1/2	1/4	36410	
1/4	1/2	2-1/2	1/4	36416	
9/32	5/8	2-1/2	5/16	36418	
5/16	13/16	2-1/2	5/16	36420	
11/32	13/16	2-1/2	3/8	36422	
3/8	7/8	2-1/2	3/8	36424	36530
13/32	15/16	2-3/4	7/16	36426	36531
7/16	1	2-3/4	7/16	36428	36532
15/32	1	3	1/2	36430	36533
1/2	1	3	1/2	36432	36534
9/16	1-1/8	3-1/2	9/16	36436	36535
5/8	1-1/4	3-1/2	5/8	36440	36536
3/4	1-1/2	4	3/4	36442	36537
1	1-1/2	4	1	36444	36538

Z-CARB™ SERIES Z1B
4 FLUTE – SINGLE END – BALL END

Cutting Diameter d1	Length of Cut l2	Overall Length l1	Shank Diameter d2	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat
1/8	3/8	1-1/2	1/8	36358	
5/32	7/16	2	3/16	36357	
3/16	7/16	2	3/16	36359	
7/32	7/16	2-1/2	1/4	36361	
1/4	1/2	2-1/2	1/4	36344	
9/32	5/8	2-1/2	5/16	36353	
5/16	13/16	2-1/2	5/16	36345	
11/32	13/16	2-1/2	3/8	36354	
3/8	7/8	2-1/2	3/8	36346	36539
13/32	15/16	2-3/4	7/16	36355	36540
7/16	1	2-3/4	7/16	36347	36541
15/32	1	3	1/2	36356	36542
1/2	1	3	1/2	36348	36543
9/16	1-1/8	3-1/2	9/16	36349	36544
5/8	1-1/4	3-1/2	5/8	36350	36545
3/4	1-1/2	4	3/4	36351	36546
1	1-1/2	4	1	36352	36547

FRACTIONAL TOLERANCES	
Cutting Diameter d1	Shank Diameter d2
1/8 - 1/4 = +.0000/-.0012	1/8 - 3/8 = -.0001/-.0003
>1/4 - 3/8 = +.0000/-.0016	>3/8 - 1 = -.0001/-.0004
>3/8 - 1 = +.0000/-.002	

Fractional



Z-CARB™ SERIES Z1LB
4 FLUTE – SINGLE END – BALL END – LONG REACH

Cutting Diameter d1	Length of Cut l2	Overall Length l1	Shank Diameter d2	Ti-NAMITE-A (AlTiN) EDP No.
1/4	1/2	4	1/4	36480
5/16	13/16	4	5/16	36482
3/8	7/8	5	3/8	36486
7/16	1	6	7/16	38490
1/2	1	6	1/2	38492
9/16	1 1/8	6	9/16	38496
5/8	1 1/4	6	5/8	36500
3/4	1 1/2	6	3/4	36502
1	1 1/2	6	1	36504

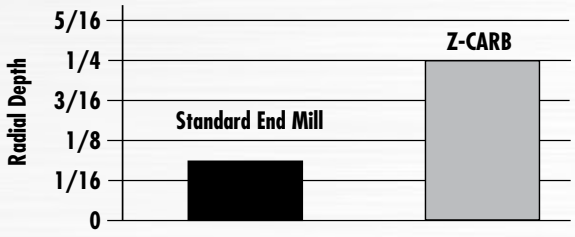
FRACTIONAL TOLERANCES	
Cutting Diameter d1	Shank Diameter d2
1/8 - 1/4 = +.0000/-.0012	1/8 - 3/8 = -.0001/-.0003
>1/4 - 3/8 = +.0000/-.0016	>3/8 - 1 = -.0001/-.0004
>3/8 - 1 = +.0000/-.002	

APPLICATION TIPS

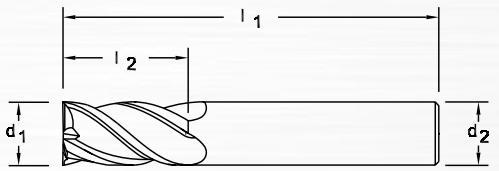
- Tool holders with adequate gripping pressure are required
- Stub length solid holders are recommended for heavy stock removal
- Avoid remilling chips
- Avoid straight plunging - ramp or spiral plunge into pockets
- Regrind and recondition services are available from SGS
- Set-up rigidity critical during heavy roughing

RADIAL CAPABILITY

Material: 316 SS @ 24Rc, Tool Diameter: 1/2", Axial Depth: 1/2"

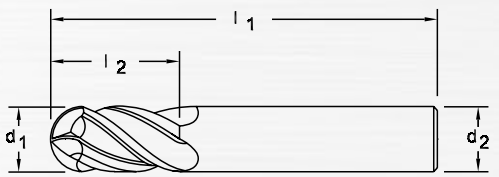


Metric



Z-CARB™ SERIES Z1M
4 FLUTE – SINGLE END – SQUARE END

Cutting Diameter d1 mm	Length of Cut l2 mm	Overall Length l1 mm	Shank Diameter d2 mm	Ti-NAMITE-A (AlTiN) EDP No.
3	8	57	6	46357
4	11	57	6	46358
5	13	57	6	46359
6	13	57	6	46360
8	19	63	8	46362
10	22	72	10	46364
12	26	83	12	46366
14	26	83	14	46368
16	32	92	16	46370
18	32	92	18	46372
20	38	104	20	46374
25	38	104	25	46376



Z-CARB™ SERIES Z1MB
4 FLUTE – SINGLE END – BALL END

Cutting Diameter d1 mm	Length of Cut l2 mm	Overall Length l1 mm	Shank Diameter d2 mm	Ti-NAMITE-A (AlTiN) EDP No.
3	8	57	6	46354
4	11	57	6	46355
5	13	57	6	46356
6	13	57	6	46343
8	19	63	8	46344
10	22	72	10	46345
12	26	83	12	46346
14	26	83	14	46347
16	32	92	16	46348
18	32	92	18	46349
20	38	104	20	46350
25	38	104	25	46351

METRIC TOLERANCES	
Cutting Diameter d1	Shank Diameter d2
3 - 6 = +0 / -0,030	6 - 10 = -0,0025 / -0,0075
6 = +0 / -0,030	6 - 10 = -0,0025 / -0,0075
> 6 - 10 = +0 / -0,040	> 10 - 20 = -0,0025 / -0,010
> 10 - 20 = +0 / -0,050	