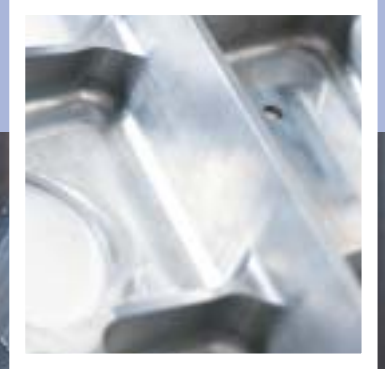
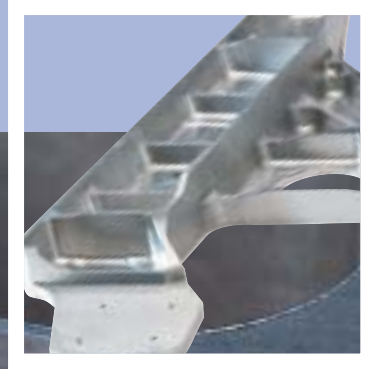


**STELLRAM**<sup>®</sup>

# New! 5702VZ High Speed Aluminum Machining



## THE MATERIAL

Aluminum alloys and composites.

## THE APPLICATION

Aerospace frame components and die and mold deep cavities.

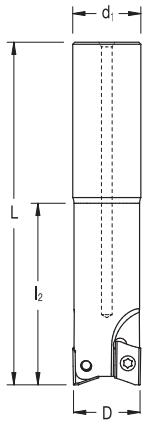
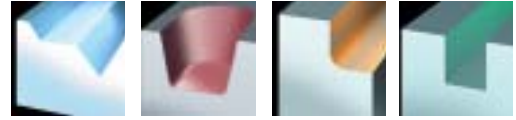
## THE ADVANTAGES

- Extreme metal removal
  - Up to 45,000 RPM
  - Up to 470 IPM
- Low cutting forces due to insert geometry
- Geometry design excellent for thin-wall machining
- Cutter design ensures security during high speed machining
- Standard radii from 2.0mm to 6.0mm (0.079" – 0.236")
- Balanced to EN ISO Standard 15641:2001

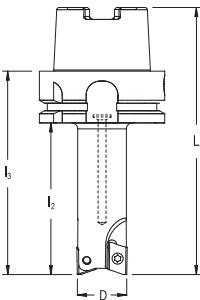


Stellram<sup>®</sup> tooling systems for all your milling requirements.

# 5702VZ – High Speed Aluminum Machining



Cylindrical Shank



HSK

## 5702 VZD14 Cylindrical Shank (Insert ZDCX14...)

EDP #	Part Number	Dimensions inches						No. of inserts	Insert radius range	Max. RPM	Spares			Screw tightening lb/in	
		D	L	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	a max.				EDP #	EDP #	EDP #		
028995	C5702VZD14CA.75R2.25-2	0.750	4.281	2.250	-	0.750	g4 0.472	2	<0.079	45,000	015060	F2505T	018488	T7	7.08
029008	C5702VZD14CA.75R2.25-4	0.750	4.281	2.250	-	0.750	g4 0.472	2	>0.079 - 0.157	45,000	015060	F2505T	018488	T7	7.08

## 5702 VZP14 Cylindrical Shank (Insert ZPCX14...)

EDP #	Part Number	Dimensions inches						No. of inserts	Insert radius range	Max. RPM	Spares			Screw tightening lb/in	
		D	L	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	a max.				EDP #	EDP #	EDP #		
029009	C5702VZP14CA1.00R2.75-2	1.000	5.031	2.750	-	1.000	g4 0.472	2	<0.079	40,000	018481	D4006T	015240	T15	27.43
029010	C5702VZP14CA1.00R2.75-4	1.000	5.031	2.750	-	1.000	g4 0.472	2	>0.079 - 0.157	40,000	018481	D4006T	015240	T15	27.43
029011	C5702VZP14CA1.00R3.75-6	1.000	5.031	2.750	-	1.000	g4 0.472	2	>0.157 - 0.236	40,000	018481	D4006T	015240	T15	27.43
029012	C5702VZP14CA1.25R3.00-2	1.250	5.281	3.000	-	1.250	g4 0.472	2	<0.079	37,500	015260	D4008T	015240	T15	27.43
029013	C5702VZP14CA1.25R3.00-4	1.250	5.281	3.000	-	1.250	g4 0.472	2	>0.079 - 0.157	37,500	015260	D4008T	015240	T15	27.43
029014	C5702VZP14CA1.25R3.00-6	1.250	5.281	3.000	-	1.250	g4 0.472	2	>0.157 - 0.236	37,500	015260	D4008T	015240	T15	27.43
029015	C5702VZP14CA1.50R3.75-2	1.500	6.437	3.750	-	1.500	g4 0.472	2	<0.079	33,000	015260	D4008T	015240	T15	27.43
029016	C5702VZP14CA1.50R3.75-4	1.500	6.437	3.750	-	1.500	g4 0.472	2	>0.079 - 0.157	33,000	015260	D4008T	015240	T15	27.43
029017	C5702VZP14CA1.50R3.75-6	1.500	6.437	3.750	-	1.500	g4 0.472	2	>0.157 - 0.236	33,000	015260	D4008T	015240	T15	27.43

## 5702 VZP14 HSK-63A (Insert ZPCX14...)

EDP #	Part Number	Dimensions inches						No. of inserts	Insert radius range	Max. RPM	Spares			Screw tightening lb/in	
		D	L	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	a max.				EDP #	EDP #	EDP #		
029018	C5702VZP14HA1.00R3.00-2	1.000	5.284	3.000	4.024	-	0.472	2	<0.079	40,000	018481	D4006T	015240	T15	27.43
029019	C5702VZP14HA1.00R3.00-4	1.000	5.284	3.000	4.024	-	0.472	2	>0.079 - 0.157	40,000	018481	D4006T	015240	T15	27.43
029020	C5702VZP14HA1.00R3.00-6	1.000	5.284	3.000	4.024	-	0.472	2	>0.157 - 0.236	40,000	018481	D4006T	015240	T15	27.43
029021	C5702VZP14HA1.25R3.00-2	1.250	5.284	3.000	4.024	-	0.472	2	<0.079	37,500	015260	D4008T	015240	T15	27.43
029022	C5702VZP14HA1.25R3.00-4	1.250	5.284	3.000	4.024	-	0.472	2	>0.079 - 0.157	37,500	015260	D4008T	015240	T15	27.43
029023	C5702VZP14HA1.25R3.00-6	1.250	5.284	3.000	4.024	-	0.472	2	>0.157 - 0.236	37,500	015260	D4008T	015240	T15	27.43
029024	C5702VZP14HA1.50R3.75-2	1.500	6.034	3.750	4.774	-	0.472	2	<0.079	33,000	015260	D4008T	015240	T15	27.43
029025	C5702VZP14HA1.50R3.75-4	1.500	6.034	3.750	4.774	-	0.472	2	>0.079 - 0.157	33,000	015260	D4008T	015240	T15	27.43
029026	C5702VZP14HA1.50R3.75-6	1.500	6.034	3.750	4.774	-	0.472	2	>0.157 - 0.236	33,000	015260	D4008T	015240	T15	27.43

\*Always replace the screw when the insert is changed. All cutters supplied with ten extra screws. Customer must purchase additional screws. Radial depth of cut = 0.008" up to cutter diameter. These tools have been designed, manufactured and tested in accordance with EN ISO Standard 15641 and stocked balanced at G = 2.5 at 30,000 RPM. Cylindrical shank tools mounted in a shrink fit holder or hydraulic chuck must be re-inspected for balance by the end user. These tools are stocked without an electronic chip.

## 5702VZ Technical Advice

Milling Cutter Order Example: **C5702VZD14CA.75R2.25-2**

Milling Insert Order Example: **ZDCX1403PDFR-701 GH1**

### Ramp angle

Cutter Ø	Radius (inch)						
	Facet	0.079"	0.098"	0.118"	0.157"	0.197"	0.236"
0.75	11°	9.8°	9°	8°	6.3°	-	-
1.00	11°	10.5°	9.9°	9.3°	8°	6.7°	5°
1.25	7.2°	6.8°	6.4°	5.9°	4.9°	3.9°	2.8°
1.50	5.1°	4.8°	4.4°	4°	3.3°	2.6°	1.8°

The chart below shows total metal removal capability (based on 24,000 RPM) and maximum RPM by diameter. The maximum RPM is engraved on all cutter bodies.

### Metal Removal

Cutter Ø	Max RPM	Qmax – in <sup>3</sup> /min
0.750	45,000	44
1.000	40,000	59
1.250	37,500	207
1.500	33,000	250

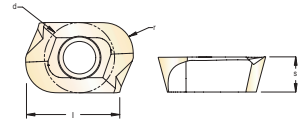
### \*Screw Fixation

It is important to change the screw each time the insert is changed to ensure the highest security. The right torque value is important. The correct torque information is shown with the cutter body dimensions.



Depth of Cut (a)

# Inserts for 5702VZ



EDP #	Part Number	Grade	Application & Material			Dimensions (inch)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d	l	s	r	h <sub>m</sub> min
029027	ZDCX1403PDFR-701	GH1	◆	◆	◆	0.299	0.663	0.125	Facet	0.0008
029028	ZDCX140320FR-701	GH1	◆	◆	◆	0.299	0.663	0.125	0.079	0.0008
026019	ZDCX140325FR-701	GH1	◆	◆	◆	0.299	0.663	0.125	0.098	0.0008
029029	ZDCX140330FR-701	GH1	◆	◆	◆	0.299	0.663	0.125	0.118	0.0008
026020	ZDCX140340FR-701	GH1	◆	◆	◆	0.299	0.663	0.125	0.157	0.0008



025771	ZPCX1404PDFR-701	GH1	◆	◆	◆	0.375	0.663	0.187	Facet	0.0008
029030	ZPCX140420FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.079	0.0008
026021	ZPCX140425FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.098	0.0008
029031	ZPCX140430FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.118	0.0008
026022	ZPCX140440FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.157	0.0008
029032	ZPCX140450FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.197	0.0008
029033	ZPCX140460FR-701	GH1	◆	◆	◆	0.375	0.663	0.187	0.236	0.0008



## GRADE

GH1: Micrograin grade designed for machining aluminum.

## GEOMETRY

-701: Very high positive rake for free cutting action. Excellent performance on thin-walled components.

# Recommended Cutting Conditions

Material	▼ Roughing			▼▼ Semi-finishing			▼▼▼ Finishing		
	Speed V <sub>C</sub> (SFM)	Feed f <sub>Z</sub> (IPT)	D.O.C a <sub>p</sub> (in)	Speed V <sub>C</sub> (SFM)	Feed f <sub>Z</sub> (IPT)	D.O.C a <sub>p</sub> (in)	Speed V <sub>C</sub> (SFM)	Feed f <sub>Z</sub> (IPT)	D.O.C a <sub>p</sub> (in)
◆ Unalloyed Steels	-	-	-	-	-	-	-	-	-
◆ Alloyed Steels	-	-	-	-	-	-	-	-	-
◆ Stainless Steels	-	-	-	-	-	-	-	-	-
◆ PH Stainless	-	-	-	-	-	-	-	-	-
◆ Cast Irons	-	-	-	-	-	-	-	-	-
◆ Aluminum & Alloys	655 - *	0.0008 - 0.0098	0.008 - 0.433	655 - *	0.0008 - 0.0098	0.008 - 0.433	655 - *	0.0008 - 0.0098	0.008 - 0.433
◆ High Temp. Alloys	-	-	-	-	-	-	-	-	-
◆ Hard Steels (52-56 HRc)	-	-	-	-	-	-	-	-	-

\*Maximum cutting speed (RPM) is in relation to the diameter of the cutter. See table on page 1.

Above specifications are general parameters for aluminum.

Please refer to page 3 for specific feeds and speeds for specific types of aluminum.

## Star Guide

## Key to Recommended Inserts

Material Designations				
	<b>P</b> ◆ Unalloyed Steels	<b>M</b> ◆ Stainless Steels	<b>K</b> ◆ Cast Irons	<b>S</b> ◆ High Temp. Alloys
	<b>P</b> ◆ Alloyed Steels	<b>M</b> ◆ PH Stainless	<b>N</b> ◆ Aluminum & Alloys	<b>H</b> ◆ Hard Materials



# Machinability by materials



Alloy group	Alloy designation	CHEMICAL COMPOSITION LIMITS (WT%)														Typical temper	Rm (Mpa)	Machinability Chip formation	Machinability Abrasion	Typical applications	V <sub>c</sub> fpm min-max	f <sub>t</sub> ipt max	
		Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others										
Al	1050	0.05	0.25	0.4	0.5	0.05	0.05	-	-	-	-	-	-	-	99.50min	-	H14	105	D	A	Chemical equipment Sheet metal work Coiled tube	1970 9840	0.0079
	1100	0.05-0.20	Si+Fe1.0max	0.05	0.05	-	0.1	-	-	-	99.00min	-	-	-	-	-	H14	90	D	A			
Al-Cu	2011	50.-60.	0.4	0.7	-	-	0.3	-	0.2	0.6	remaining	-	-	-	310	A	T3	310	A	A	Screw machine products. Tuck frame. Aircraft structure. Jet engine impellers. Aircraft engine cylinder heads.		
	2014	3.9-5.0	0.5-1.2	0.7	0.4-1.2	0.2-0.8	0.25	0.1	0.15	-	remaining	-	-	-	430	B	T6	430	B	A			
	2017	3.5-4.5	0.2-0.8	0.7	0.4-1.0	0.4-0.8	0.25	0.1	0.15	-	remaining	-	-	-	390	B	T4	390	B	A			
	2024	3.8-4.9	0.5	0.5	0.3-0.9	1.2-1.8	0.25	0.1	0.15	-	remaining	-	-	-	465	B	T4	465	B	A			
	2218	3.5-4.5	0.9	1	0.2	1.2-1.8	0.25	0.1	-	-	remaining	Ni1.7-2.3	-	-	331	B	T72	331	B	B			
	2224	3.8-4.4	0.12	0.15	0.30-0.9	1.2-1.8	0.25	0.1	0.15	-	remaining	-	-	-	140	A	H14	140	D	B	Cooking utensils, Chemical equipment.	655 8200	0.0079
Al-Mn	3003	0.05-0.20	0.6	0.7	1.0-1.5	-	0.1	-	-	-	remaining	-	-	-	-	-	H14	140	D	B			
Al-Si	4032	0.5-1.3	11.0-13.5	1	-	0.8-1.3	0.25	0.1	-	-	remaining	Ni0.5-1.3	-	-	379	B	T6	379	B	D	Pistons.	655 3280	0.0071
	5052	0.1	0.25	0.4	0.1	2.2-2.8	0.1	0.15-0.35	-	-	remaining	-	-	-	260	C	H14	260	C	A			
Al-Mg	5056	0.1	0.3	0.4	0.05-0.20	4.5-5.6	0.1	0.05-0.20	-	-	remaining	H34	-	-	300	C	H12	300	C	A	Architectural. Cable Sheating. Welded pressure vessels. Hydraulic tubes. Transportation equipment.	1310 9840	0.0098
	5083	0.1	0.4	0.4	0.4-1.0	4.0-4.9	0.25	0.05-0.25	0.15	-	remaining	H32	-	-	335	C	H112	335	C	A			
	5086	0.1	0.4	0.5	0.20-0.7	3.5-4.5	0.25	0.05-0.25	0.15	-	remaining	-	-	-	300	C	H32	300	C	A			
	6061	0.15-0.40	0.4-0.8	0.7	0.15	0.8-1.2	0.25	0.04-0.35	0.15	-	remaining	H116	-	-	300	C	T6	300	C	B			
Al-Mg-Si	6063	0.1	0.2-0.6	0.35	0.1	0.45-0.9	0.1	0.1	0.1	-	remaining	-	-	200	C	T5	200	C	B				
	6070	0.15-0.40	1.0-1.7	0.5	0.40-1.0	0.50-1.2	0.25	0.1	0.15	-	remaining	-	-	379	C	T6	379	C	C				
	6151	0.35	0.6-1.2	1	0.2	0.45-0.8	0.25	0.15-0.35	0.15	-	remaining	-	-	400	C	T6	400	C	C				
	6262	0.15-0.40	0.4-0.8	0.7	0.15	0.8-1.2	0.25	0.04-0.14	0.15	0.40	0.7	remaining	-	-	400	B	T9	400	B	B	Heavy duty welded structure. Pipeline. Heat Sink.	1310 8200	0.0079
	6351	0.1	0.7-1.3	0.5	0.4-0.8	0.40-0.8	0.2	-	0.2	-	remaining	-	-	310	D	T6	310	D	C				
	6463	0.2	0.20-0.6	0.15	0.05	0.45-0.9	0.05	-	-	-	remaining	-	-	241	C	T6	241	C	B				
	7001	1.6-2.6	0.35	0.4	0.2	2.6-3.4	6.8-8.0	0.18-0.35	0.2	-	remaining	-	-	400	B	O	400	B	A				
	7003	0.2	0.3	0.35	0.3	0.50-1.0	5.0-6.5	0.2	0.2	-	remaining	Zr0.05-0.25	-	-	400	B	T5	400	B	A			
Al-Zn	7050	2.0-2.6	0.12	0.15	0.1	1.9-2.6	5.7-6.7	0.04	0.06	-	remaining	Zr0.08-0.15	-	-	530	B	T73	530	B	A	High strength structure. Aircraft structure. Bat.	1310 9840	0.0098
	7075	1.2-2.0	0.4	0.5	0.3	2.1-2.9	5.1-6.1	0.18-0.28	0.2	-	remaining	-	-	570	B	T6	570	B	A				
	7178	1.6-2.4	0.4	0.5	0.3	2.4-3.1	6.3-7.3	0.18-0.35	0.2	-	remaining	-	-	600	B	T6	600	B	A				
	7475	1.2-1.9	0.1	0.12	0.06	1.9-2.6	5.2-6.2	0.18-0.25	0.06	-	remaining	-	-	565	B	T61	565	B	A				

$$V_C = (\pi \times D \times N) / 12$$

$$N = (12 \times V_C) / (\pi \times D)$$

## Machinability

- A EXCELLENT
- B GOOD-TO-EXCELLENT
- C GOOD
- D NOT GOOD

D: Tool diameter, N: Rotation (RPM), V<sub>C</sub>: Cutting speed π = 3.1416

You need to choose a cutting speed in the range of values, compatible with the cutter max rotation capacity (engraved on the body) and your spindle stability.

5702 cutters are capable of machining composites and copper alloys, such as C95800(Cu 79%, Fe 4%, Ni 5%, Al 9%, Mn 1%).

Minimum feed is in relation with the edge profile: 0.00078 IPT.

# Recommendations for High Speed Machining

- Check spindle condition: Runout  
Balancing  
Clamping of the attachment in traction  
Marking and cleanliness
- Check that the tool is suitable for the required use.
- Inserts must be locked positively in the pocket and secured using the torx screw provided. The screw must be torqued to the correct value as indicated in our chart. For security use a new screw each time you change an insert.
- Check the balancing of the assembled tool: cutter body, inserts and attachment.
- Before start up, note the maximum RPM engraved on the tool or in our technical documents. The maximum RPM is linked to a precise balancing value.
- Ensure that the field of application of the tool shown in our technical documents and technological parameters is observed:

$a_e$ (in)	width of cut, lateral engagement (radial)
$a_p$ (in)	Axial depth of cut
$f_z$ (IPT)	Feed per tooth
n (rpm)	RPM

## Stellram cannot accept responsibility for misuse of this product:

- Non observance of the above instructions
- Machine without casing
- Incorrect clamping of workpieces
- No safety device on the machine
- Any misuse or incorrect clamping

The optimum rotation must be determined by condition of the spindle. The spindle must be rigid to run at these higher RPMs.

Under no circumstances must any attempt be made to repair this tool. The only permitted maintenance is the indexing or replacement of the inserts. Use a new screw for each insert replacement.

When assembling the cutter to a shrink fit holder, the maximum protrusion cannot exceed 10% of the reach of tool.  
Example: C5702VZD14CA.75R2.25-2 has a reach of 2.25", therefore the maximum protrusion = 2.48".

The cutter nomenclature code is made per the following key:

Example: C5702VZD14CA.75R2.25-2

- C = Inch diameter and shank
- 5702 = Stellram Product Family
- V = Screw fixation
- Z = Insert shape
- D = ISO insert clearance (D=15°, P=20°)
- 14 = Insert edge length (14mm)
- C = Shank type (C=cylindrical, HSK=HSK63A)
- A = Through the tool coolant
- .75 = Cutting diameter (in)
- R = Right hand tool
- 2.25 = Reach of tool in inches
- 2 = Maximum allowable insert radius in 0.1mm increments (0.2=0.008")

This tool must only be used for profiling, slotting and pocketing.

## Test report: Roughing

<i>Material:</i>	Aluminum
<i>Tool:</i>	C5702VZP14CA1.00R2.75-4
<i>Insert:</i>	ZPCX140440R-701 GH1
<i>Cutting speed (<math>V_c</math>):</i>	6170 SFM
<i>Spindle speed <math>n</math>:</i>	24,000 RPM
<i>Feed per tooth (<math>f_z</math>):</i>	0.007"
<i>Feedrate:</i>	340 IPM
<i>Depth of cut (<math>a_p</math>):</i>	0.236"

## Test report: Finishing

<i>Material:</i>	Aluminum
<i>Tool:</i>	C5702VZPCA.75R2.25-4
<i>Insert:</i>	ZDCX140440R-701 GH1
<i>Cutting speed (<math>V_c</math>):</i>	6170 SFM
<i>Spindle speed <math>n</math>:</i>	20,500 RPM
<i>Feed per tooth (<math>f_z</math>):</i>	0.004"
<i>Feedrate:</i>	157 IPM
<i>Depth of cut (<math>a_p</math>):</i>	0.236"

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