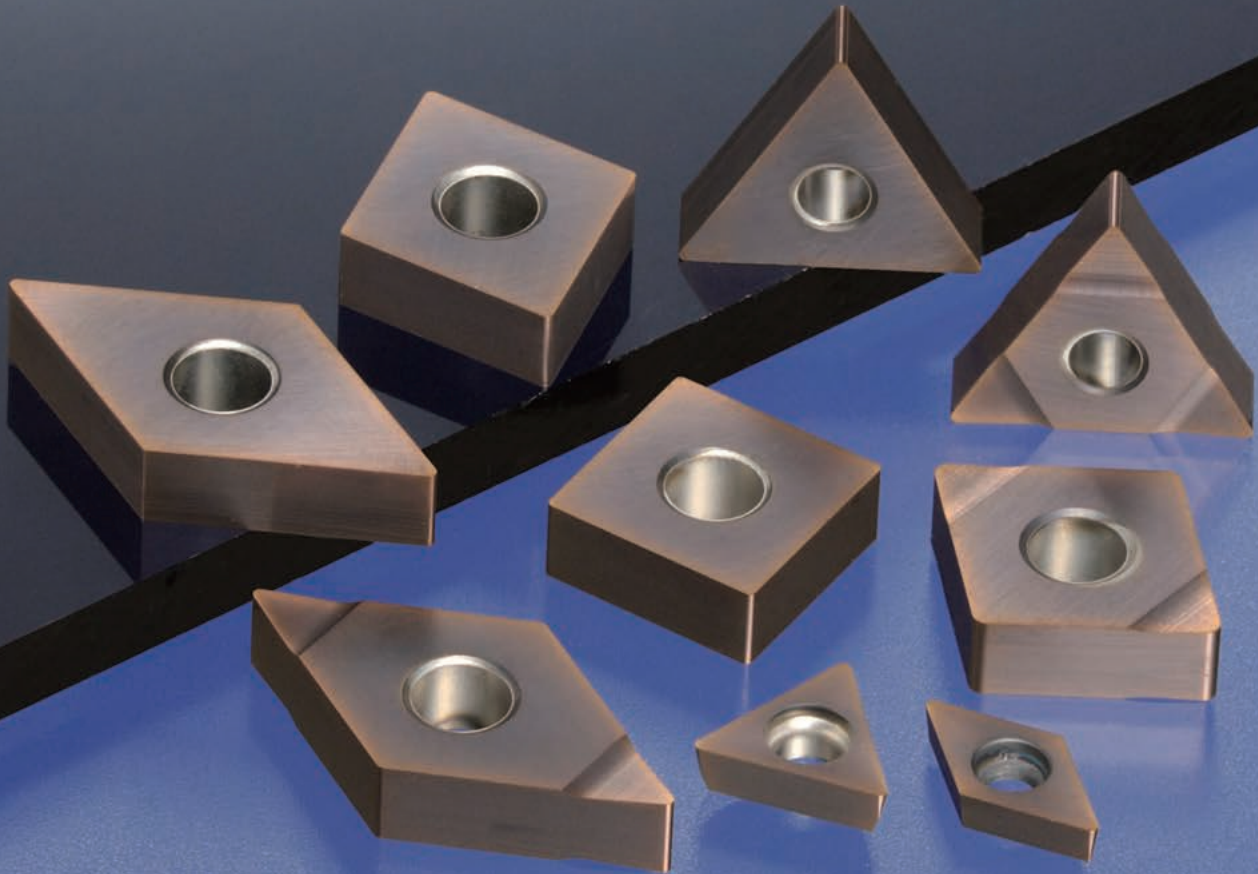


高硬度材料车削用涂层刀片  
Coating Grade for Turning of Hardened Steel

# ACE涂层 AC503U

ACE-COAT AC503U 第5版



## 最适合淬火钢的精车！

适用于模具凸模零件等高硬度材料(50 ~ 62HRC)

Ideal for fine finish turning of hardened steel!

Applicable for mold punches and parts, and other hardened steel materials (50 to 62HRC)

### ●采用强韧型超级ZX涂层！

采用K01硬质合金母材和TiAlN/AlCrN的超多层膜结构，实现高可靠性和长寿命

### ●刃尖锋利且加工面良好！

表面粗糙度可达Ra=0.2μm以下

### ●GH型断屑槽系列化

锋利刃型无方向断屑槽，实现淬火钢的中粗加工 $a_p$ (最大切深量3.0mm)

#### • SUPER ZX COAT for excellent toughness!

K01 carbide substrate and super multi-layer structure of TiAlN/AlCrN has achieved high reliability and long tool life.

#### • Sharp edge for excellent finish!

Achieving surface roughness of Ra = 0.2μm or less

#### • GH type chipbreaker series

Neutral wide chipbreaker with sharp edge. Realizing medium roughing of hardened steel with maximum depth of cut 3.0 mm.



## ■特性与用途 Characteristics and Application

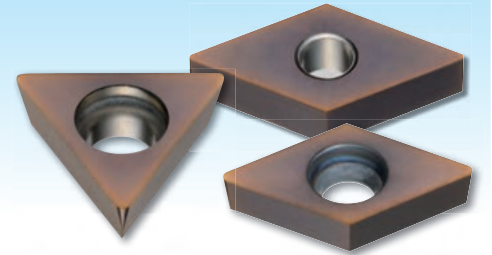
材质 Grades	硬度 Hardness (HRA)	抗折力 Transverse Rupture Strength (GPa)	主要膜构成 Main Coating Components	膜厚 Coating Thickness ( $\mu\text{m}$ )	用途 Application
<b>AC503U</b>	<b>93.2</b>	<b>1.7</b>	超级 ZX涂层 SUPER ZX COAT	<b>3</b>	<ul style="list-style-type: none"> <li>高硬度材料的精车应用</li> <li>最适于CBN刀具初始成本较高或切削锋利性较差等场合</li> <li>用车削加工代替磨削加工(降低加工成本、实现工序精简、节约设备费用)</li> <li>Fine finish turning of high hardness materials</li> <li>Ideal for cases where CBN tools require high initial cost or result in low cutting performance</li> <li>Replace grinding with turning (for cost reduction, process streamlining, and equipment cost savings)</li> </ul>

## 精加工时无断屑槽 (切深量 $a_p < 1\text{mm}$ )

No Chipbreaker Inserts for Finishing (Small Depth of Cut of  $a_p < 1\text{mm}$ )

### ●特点 Features

- 刀尖强度优异, 在精加工中实现稳定的长寿命
- 通过锋利刃实现 $Ra=0.2\mu\text{m}$ 以下的精加工面粗糙度
- 新增正型刀片, 内径加工亦可对应
- Excellent cutting edge strength with stable and long tool life in finishing applications
- Sharp edge achieves surface finish of  $Ra = 0.2\mu\text{m}$  or less
- Range of positive inserts expanded for use in boring applications



### ●切削性能 Cutting Performance

被削材: SKH51(63HRC)

Work material

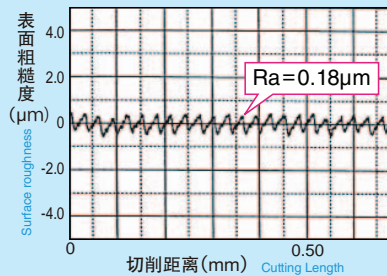
刀片: TNGA160404(AC503U)

Insert

切削条件:  $v_c = 80\text{m/min}$ ,

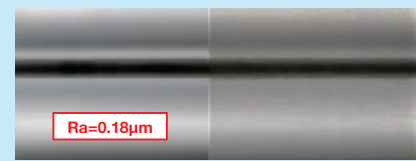
Cutting conditions

$f = 0.03\text{mm/rev}$ ,  $a_p = 0.03\text{mm}$ , Dry



### 出众的精加工面质量!!

Superb Surface Finish Quality



AC503U 无断屑槽  
AC503U No Chipbreaker

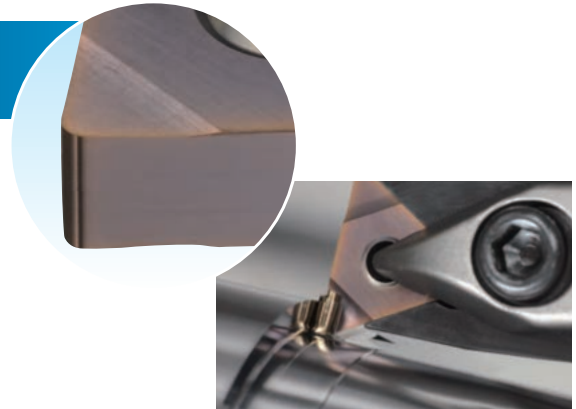
以往产品 Conventional

## 中粗加工时GH型断屑槽 (切深量 $a_p=1\sim 3\text{mm}$ )

GH Chipbreaker for Medium Roughing (Depth of Cut of  $a_p = 1\text{ to }3\text{mm}$ )

### ●特点 Features

- 无方向的研磨加宽型断屑槽
- 通过加宽型断屑槽(前角 $4^\circ$ )和锋利刃尖, 降低切削温度, 可进行淬火钢的大切深加工( $a_p = 1\sim 3\text{mm}$ )
- 可实现流畅的切屑排出
- Neutral, ground-type wide chipbreaker
- Wide chipbreaker(Rake angle $4^\circ$ ) and sharp edge reduces heat and enables cutting of hardened steel with large depth of cut ( $a_p = 1\text{ to }3\text{mm}$ )
- Makes smooth chip evacuation possible



### ●切削性能 Cutting Performance

被削材: SKD11(61HRC)

Work material

刀片: TNGG160404N-GH(AC503U)

Insert

切削条件:  $v_c = 50\text{m/min}$ ,

Cutting conditions

$f = 0.05\text{mm/rev}$ ,  $a_p = 3\text{mm}$ , Dry

### 中粗加工时锋利度出众!!

Excellent Cutting Performance in Medium Roughing

#### GH型断屑槽 GH type



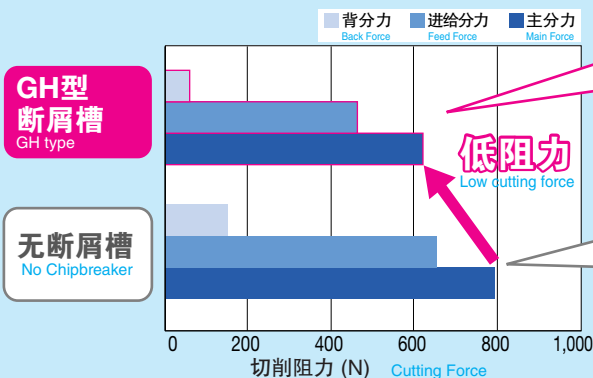
稳定的  
切屑形状  
Stable Chip Shape

40分钟加工后亦磨损小 Low wear even after cutting for 40 minutes

#### 无断屑槽 No Chipbreaker



20分钟磨损大 High wear after 20 minutes



## 推荐切削条件 Recommended Cutting Conditions

\*淬火钢(50 ~ 62HRC)时  
\*For hardened steel (50 to 62HRC)

被削材 Work Material	切削状态 Cutting State	切削速度 $v_c$ (m/min) Cutting Speed	进给速度 $f$ (mm/rev) Feed Rate	切深 $a_p$ (mm) Depth of Cut	推荐断屑槽 Recommended Chipbreaker
<b>H</b> 淬火钢(50 ~ 62HRC) Hardened Steel (50 to 62HRC) SKD11, SKD61, SKH51 粉末高速钢、高速钢 SKD11, SKD61, SKH51 Die Steels, High Speed Steels	精加工 Finishing	40 ~ 100	0.02 ~ 0.10	<1	无断屑槽 No Chipbreaker
	中粗加工 Medium Roughing	20 ~ 60	0.02 ~ 0.05	1 ~ 3	GH型 GH type

※切深量1mm以上时推荐Dry加工。  
\*Dry cutting is recommended for cutting depths of 1 mm or more.

## 库存表 Stock

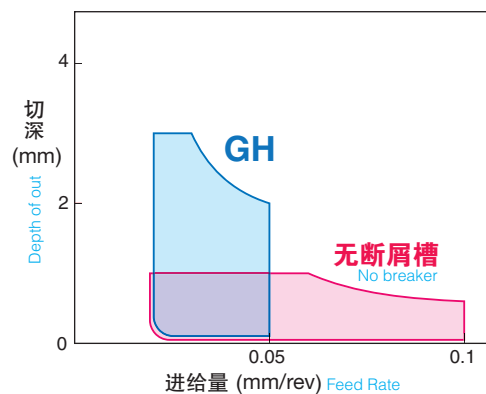
### 负型 Negative

形状 Appearance	型号 Cat. No.	库存 Stock	尺寸(mm) Dimensions				刀尖规格 Cutting edge specification
		AC503U	内切圆 Inscribed Circle	厚度 Thickness	孔径 Hole Diameter	刀尖半径 Nose Radius	
	CNGA 120402	●				0.2	锋利刃 Sharp Edge
	120404	●	12.7	4.76	5.16	0.4	
	120408	●				0.8	
	CNGG 120402N-GH	●				0.2	
	120404N-GH	●	12.7	4.76	5.16	0.4	
	120408N-GH	●				0.8	
	DNGA 150402	●				0.2	
	150404	●	12.7	4.76	5.16	0.4	
	150408	●				0.8	
	DNGG 150402N-GH	●				0.2	
	150404N-GH	●	12.7	4.76	5.16	0.4	
	150408N-GH	●				0.8	
	SNGA 120404	●	12.7	4.76	5.16	0.4	
	120408	●				0.8	
	-----						
	TNGA 160402	●				0.2	
	160404	●	9.525	4.76	5.16	0.4	
	160408	●				0.8	
	TNGG 160402N-GH	●				0.2	
	160404N-GH	●	9.525	4.76	5.16	0.4	
	160408N-GH	●				0.8	
	VNGA 160404 <i>New</i>	●	9.525	4.76	3.81	0.4	
	160408 <i>New</i>	●				0.8	

### 正型 Positive

形状 Appearance	后角 Relief Angle	型号 Cat. No.	库存 Stock	尺寸(mm) Dimensions				刀尖规格 Cutting edge specification
			AC503U	内切圆 Inscribed Circle	厚度 Thickness	孔径 Hole Diameter	刀尖半径 Nose Radius	
	7°	DCGW 070202	●				0.2	锋利刃 Sharp Edge
		070204	●	6.35	2.38	2.8	0.4	
		070208	●				0.8	
		DCGW 11T302	●				0.2	
		11T304	●	9.525	3.97	4.4	0.4	
		11T308	●				0.8	
	11°	TPGW 110302	●				0.2	
		110304	●	6.35	3.18	3.4	0.4	
		110308	●				0.8	

## 适用领域 Application Range

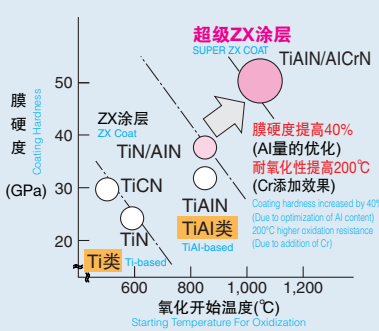


## 超级ZX涂层的特长

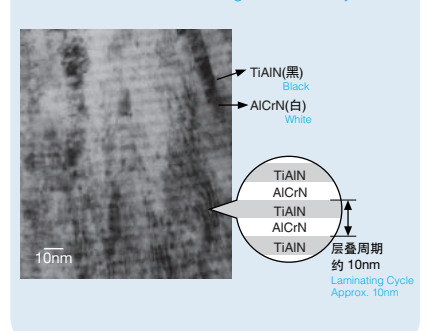
### SUPER ZX COAT Features

- 5纳米TiAlN和AlCrN的超薄膜相互交叠约1,000层, 形成超多层膜
  - 与以往材质相比, 膜硬度提高40%, 同时氧化开始温度也提升了200°C, 提高了耐磨损性
  - 实现以往材质1.5倍以上的高速、高效率加工
  - 在以往切削条件下, 实现了以往材质2倍以上的长寿命
- Super multi-layered structure formed from around 1,000 alternating ultra-thin, 5nm layers of TiAlN and AlCrN
  - Enhanced wear resistance with coating hardness increased by 40% and starting temperature for oxidation increased by 200°C compared to conventional grades
  - At least 1.5x improvement in high-speed and high-efficiency cutting compared to conventional grades
  - Achieves more than double the tool life of conventional grades under conventional cutting conditions

### 涂膜的特长 Characteristics of films



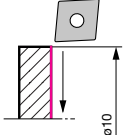
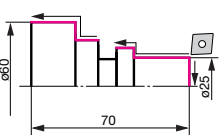
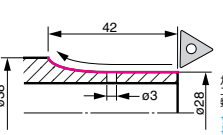
### 截面TEM图像与膜构造 Cross sectional TEM Image of Coated layer

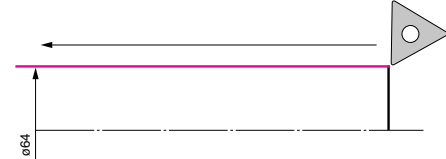
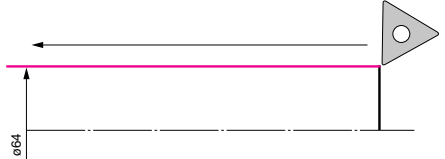


●印: 标准库存品 ●印: 标准库存品(新增产品)  
●Mark: Standard Stock Item ●mark: Standard stock item(expanded)

## 使用实例

### Application Examples

<p>● 模具快削加工 Remake of dies SKD61(52HRC)</p>	<p>● 铝合金压铸模零件加工 Machining of die-cast aluminium products SKD61(55HRC)</p>	<p>● 冲压模凸模加工 Machining of mold punch products SKD61(50HRC)</p>
 <p>刀具型号: CNGA120404(AC503U) Insert 切削条件: <math>v_c=80\text{m/min}</math>, <math>f=0.1\text{mm/rev}</math>, <math>a_p=0.2\text{mm}</math>, Wet(油性) (Oil based)</p> <p>5个/C 稳定加工 5 pcs/C Stable cutting</p> <p>2个/C 表面粗糙度降低 2 pcs/C Poorer surface roughness</p> <p>AC503U 其他公司硬质合金 Competitor's carbide</p>	 <p>刀具型号: CNGA120404(AC503U) Insert 切削条件: <math>v_c=80\text{m/min}</math>, <math>f=0.07\text{mm/rev}</math>, <math>a_p=0.3\text{mm}</math>, Wet(油性) (Oil based)</p> <p>13个/C 稳定加工 13 pcs/C Stable cutting</p> <p>6个/C 表面粗糙度降低 6 pcs/C Poorer surface roughness</p> <p>AC503U 其他公司硬质合金 Competitor's carbide</p>	 <p>刀具型号: TNGA160408(AC503U) Insert 切削条件: <math>v_c=40\text{m/min}</math>, <math>f=0.05\text{mm/rev}</math>, <math>a_p=0.05\text{mm}</math>, Wet(油性) (Oil based)</p> <p>20个/C 稳定加工 20 pcs/C Stable cutting</p> <p>10个/C 表面粗糙度降低 10 pcs/C Poorer surface roughness</p> <p>AC503U 其他公司硬质合金 Competitor's carbide</p>
<p>提高耐崩损性, 可对应切深变化, 使用寿命为其他公司产品的2.5倍。 Improved chipping resistance, adaptable to the variation in the depth of cut, and 2.5 times longer life compared with competitors' products</p>	<p>保持优异的切削锋利性, 改善加工面精度的同时, 使用寿命为其它公司产品的2.2倍。 Sharp cutting edge maintained for better surface accuracy, and 2.2 times longer life compared with competitors' products</p>	<p>提高加工面精度的同时, 不仅可实现带小孔的断续切削, 使用寿命也高达其它公司产品的2倍。 Improved surface accuracy and 2 times longer life compared with competitors' products despite interrupted cutting with a hole</p>

<p>● 冲压模凸模加工 Machining of mold punch products SKH51(66HRC)</p>	<p>● 冲压模凸模加工 Machining of mold punch products SKD11(62HRC)</p>
 <p>刀具型号: TNGG160404N-GH(AC503U) Insert 切削条件: <math>v_c=20\text{m/min}</math>, <math>f=0.05\text{mm/rev}</math> <math>a_p=1.0\text{mm}</math>, Dry</p>	 <p>刀具型号: TNGG160404N-GH(AC503U) Insert 切削条件: <math>v_c=20\text{m/min}</math>, <math>f=0.05\text{mm/rev}</math> <math>a_p=3.0\text{mm}</math>, Dry</p>
<p>提高切屑处理性能的同时, 35分钟加工后的精加工面粗糙度可达 <math>Ra &lt; 0.5\mu\text{m}</math>。 Offers improved chip control and achieves surface finish of <math>Ra &lt; 0.5\mu\text{m}</math> after cutting for 35 minutes.</p>	<p>切深量3mm的粗加工中可实现45分钟加工, 并可延长使用寿命。 Allows 45 minutes roughing with depth of cut of 3 mm. Tool life can be extended further.</p>

### 安全使用注意事项



- 加工时会出现高温切屑飞散、排出切屑过长等情况, 请使用安全罩壳及防护眼镜等防护具, 并务必注意防火、防灾。  
● Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.
- 使用时请务必小心锋利刀尖。  
● 使用方法错误、使用条件不当时, 会造成刀具崩损、飞散, 请在推荐的范围内使用。  
● Please handle with care as this product has sharp edges.  
● Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.
- 使用非水溶性切削油的情况下, 为防止火灾意外, 请配置自动灭火装置。  
● When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.

## 住友电工硬质合金贸易(上海)有限公司

### 华北地区

住友电工硬质合金贸易(上海)有限公司北京分公司  
住友电工硬质合金贸易(上海)有限公司青岛分公司  
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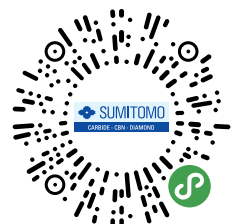
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电话: 0519-8622-0306(分机: 224)



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