



**Carmex**  
*Precision Tools Ltd.*

**Carmex-2019**

## **螺纹车削软件 使用方法补充**

这个补充说明，是根据客户来电询问车削的问题而制作。将原使用说明未及的螺纹标准举例说明，限于篇幅，仍然不能全面说明，有问题请来电。

之前接到客户电话，他要加工直径90mm，螺距5mm的，Sagengwinde - DIN 513锯齿螺纹，因为找不到螺纹规格而无法操作下载车削程序。我们告诉他按照下面的说明，再继续就可以了。我们在选择螺纹规格时，常常会遇到你要选择的螺纹规格系统里没有，这时可以点击其它“**Other**”，然后填写你要加工的螺纹大径（**Diameter DO**），有效长度（**Length**），再选择内（**Internal**）或外螺纹（**External**）。系统将自动生成螺纹大径、螺纹中径、螺纹底径和螺旋升角角度。螺旋升角至关重要，千万注意。

Requirements 



Requirements



Materials



Tool Data



CNC Post Processor



CNC Settings



Program

### Basic Requirements

Thread Profile **螺纹标准**

Please select thread profile...

- ISO
- UN - Unified UNC,UNF,UNEF,UNS
- Whitworth - 55° BSF,BSW
- BSP(G)
- NPT
- NPTF - Dryseal
- BSPT
- ACME

可提供的  
所有螺纹  
车削标准

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Requirements



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Program

## Basic Requirements

Thread Profile 螺纹标准

Please select thread profile...

- Trapez - DIN 103
- PG - DIN 40430
- Sagengewinde - DIN 513
- Round - DIN 405
- Round - DIN 20400
- UNJ - UNJC,UNJF,UNJEF,UNJS
- MJ - ISO 5855
- American Buttress

可提供的  
所有螺纹  
车削标准

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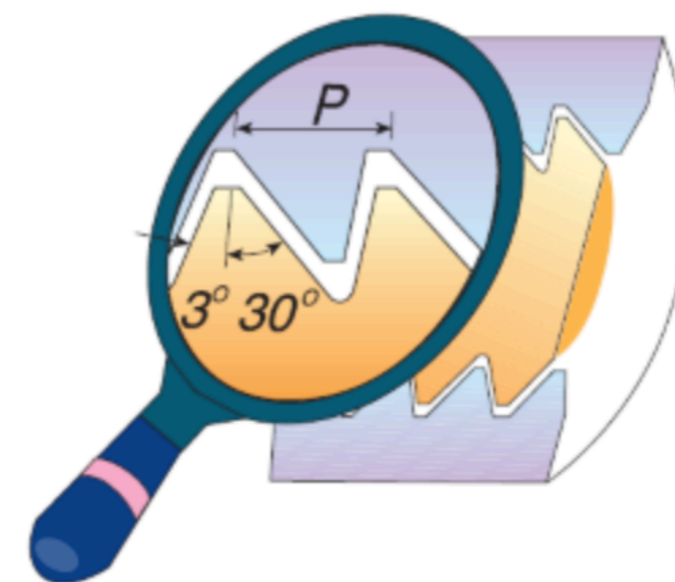
Program

### Basic Requirements

Thread Profile 螺纹标准 Sagengewinde - DIN 513 德国DIN 513锯齿螺纹

Pitch 螺距 Please select pitch... 请选择螺距 mm

### Profile 螺纹形状



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### Basic Requirements

Thread Profile 螺纹标准 Sagengewinde - DIN 513 德国DIN 513锯齿螺纹

Pitch 螺距 Please select pitch... 请选择螺距 mm

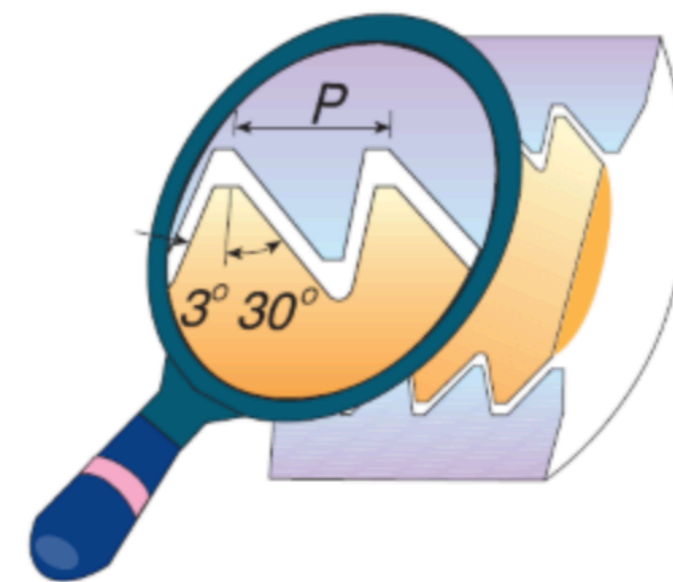
Please select pitch... 请选择螺距

- 2
- 3
- 4
- 5 选择5mm螺距
- 6

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### Profile 螺纹形状



Requirements

Requirements Materials Tool Data CNC Post Processor CNC Settings Program

### Basic Requirements

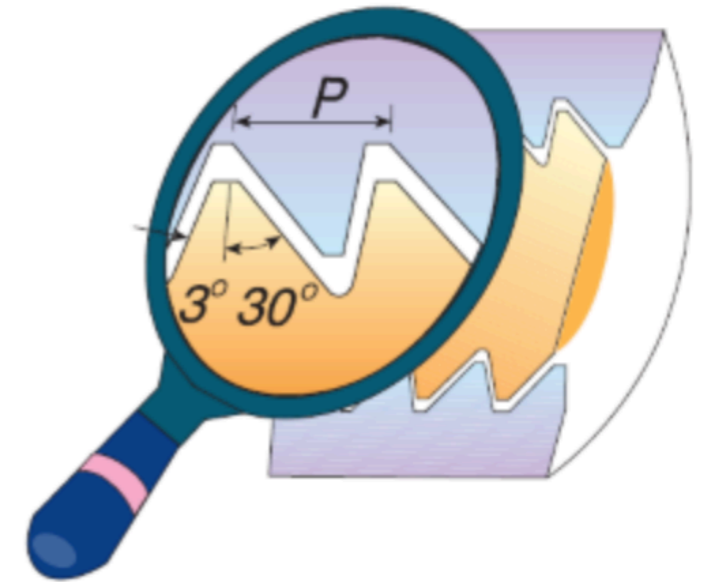
Thread Profile **螺纹标准** Sagengewinde - DIN 513

Pitch **螺距** 5 mm

Number of Starts 1 Lead: 5.00

Standard **螺纹规格** Please select standard... **请选择螺纹规格**

### Profile



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- Please select standard... **请选择螺纹规格**
- S 22 x 5
- S 24 x 5
- S 26 x 5
- S 28 x 5
- Other...

所要加工的螺纹规格没有，请点击“Other（其它）”

Requirements

Requirements Materials Tool Data CNC Post Processor CNC Settings Program

Basic Requirements

Thread Data 螺纹数据自动生成

Thread Profile 螺纹标准 Sagengewinde - DIN 513

Pitch 螺距 5 mm

Number of Starts 起始数 1 Lead: 5.0

Standard 螺纹规格 Other...所要加工的螺纹规格没有, 请点击“Other (其它)”

Diameter (Do) 螺纹大径 90 填写螺纹大径 mm

Length (Lo) 有效长度 60 填写有效螺纹长度 mm

Internal/External 内/外 Please select thread type... 请选择内或外螺纹

螺纹大径	Major Diameter (Do):	90.000 mm
螺纹中径	Pitch Diameter (Dp):	86.960 mm
螺纹小径	Minor Diameter (Dm):	82.500 mm
螺旋升角	Helix Angle ( $\beta$ ):	1.0°
钻孔直径	Drill Diameter:	82.5 mm

请特别、特别注意螺旋升角，刀杆和垫片出厂标准螺旋升角为 1.5°，可满足被加工零件的螺旋升角为 1° 至 2° 范围的加工。大于 1° 至 2° 的螺旋升角需要更换垫片或特殊订货，否则会导致螺纹牙型失真，影响螺纹旋合和大大降低刀具寿命。

Requirements



Requirements



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Program

### Basic Requirements

### Thread Data 螺纹数据

Thread Profile 螺纹标准 Sagengewinde - DIN 513

Pitch 螺距 5 mm

Number of Starts 起始数 1 Lead: 5.00

Standard 螺旋规格 Other...

Diameter (Do) 螺纹大径 90 mm

Length (Lo) 有效长度 60 mm

Internal/External 内/外 Please select thread type... 请选择内、外螺纹

螺纹大径	Major Diameter (Do):	90.000 mm
螺纹中径	Pitch Diameter (Dp):	86.960 mm
螺纹小径	Minor Diameter (Dm):	82.500 mm
螺旋升角	Helix Angle ( $\beta$ ):	1.0°
钻孔直径	Drill Diameter:	82.5 mm

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Please select thread type...

Internal 内

External 外

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### Basic Requirements

Thread Profile 螺纹小径

Pitch 螺距

Number of Starts 起始数

Standard 螺纹规格

Diameter (Do) 螺纹大径

Length (Lo) 有效长度

Internal/External 内/外

### Hand/Direction 螺纹朝向

Cutting Hand 螺纹方向

Cutting Direction 切削朝向

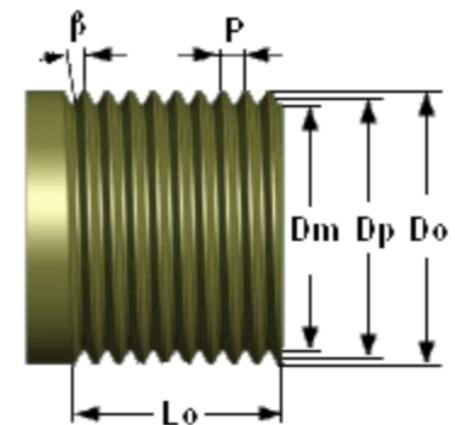
### Catalog Selection 目录选择

[Catalog](#)

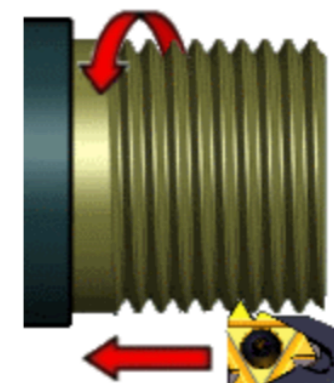
### Thread Data 螺纹数据

螺纹大径	Major Diameter (Do):	90.000 mm
螺纹中径	Pitch Diameter (Dp):	86.250 mm
螺纹小径	Minor Diameter (Dm):	81.322 mm
螺旋升角	Helix Angle ( $\beta$ ):	1.1°

### Thread Drawing 螺纹图示



### Operation Drawing 操作图示



Tool Selection

Tool Family Selection: 刀杆选择

Regular (Thread turning toolholders)

常规刀杆

Toolholders: 刀杆

Ordering Code: 订货标识	
SER 25 25 M22U <span style="float: right;">已选择</span>	
SER 32 32 P22U	
SER 40 40 R22U	

Inserts: 螺纹刀片

Ordering Code: 订货标识	
22U ER 5 SAGE <span style="float: right;">已选择</span>	Full

Grade Selection: 刀片材质 BMA

Tool Data

  **Tool Data**  CNC Post  CNC Settings  Program

Toolholder Data: 刀杆数据

Ordering Code: 订货标识 SER 25 25 M22U  
 Barcode: 代码 0030400042  
 Anvil Code: 垫片标识 AER 22U-1.5 SAGE 5/6 (1.5° helix angle)  
 Anvil Barcode: 刀片代码 0110100615  
 Overall Length (L): 总长 150 mm  
 B/H: 高/宽 25 mm  
 F: 含刀片宽度 28 mm  
 Internal/External: 内/外 External  
 Cutting Hand: 螺纹方向 Right  
 Cooling: 冷却 No  
 Insert Size(s): 刀片规格 22U  
 Ins. screw/Torx Key: S22/K22 螺丝扳手  
 Anvil Screw: 垫片螺丝 A22

Insert Data: 刀片数据

Ordering Code: 订货标识 22U ER 5 SAGE  
 Barcode: 代码 0020501117  
 Profile: 螺纹标准 Sagengewinde - DIN 513  
 Pitch (P): 螺纹牙数 5 TPI  
 Profile Type: 刀片类型 Full  
 Size (L): 刀片规格 22U  
 Size (I.C): 刀片内切圆 1/2U  
 Internal/External: 内/外 External  
 Cutting Hand: 螺纹方向 Right  
 Available Grade(s): 刀片材质 HBA, BLU, BMA, P25C, MXC, K20, P30  
 X: 1.2 mm  
 Y: 11.6 mm

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## 举例二

客户来电反映，他们加工的M12×1.75mm的内螺纹时，刀片寿命降低。加工M12内螺纹，公制M12的螺距是1.75mm，软件显示它的螺旋升角变化巨大。而我们的刀杆配置的螺旋升角角度是1.5°（带或不带垫片的刀杆螺旋升角均是1.5°，满足螺旋升角在1° - 2°之间的加工）。系统显示M12的螺旋升角是2.9°，而这个内螺纹刀杆直径小于25mm，不带垫片，刀杆无法解决螺旋升角问题。所以，加工中可能会出现螺旋升角干涉，轻则牙型失真，重则刀片寿命大幅降低。遇到螺旋升角大于1.5°的情况时，建议选择BLU材质刀片，不建议选择范围牙AG60刀片（G60可以）。

Carmex Tool Wizard / Turning beta Carmex刀具螺纹车削的行家里手 [Main Website](#) [Help](#) [Settings](#) [English](#)

### Basic Requirements

Thread Profile 螺纹标准

Pitch 螺距

Number of Starts

Standard 螺纹规格

Diameter (Do) 螺纹大径

Length (Lo) 有效长度

Internal/External 内/外  内螺纹

### Hand/Direction 螺纹朝向

Cutting Hand 螺纹方向  右手

Cutting Direction 切削朝向  螺纹自尾座向卡盘方向

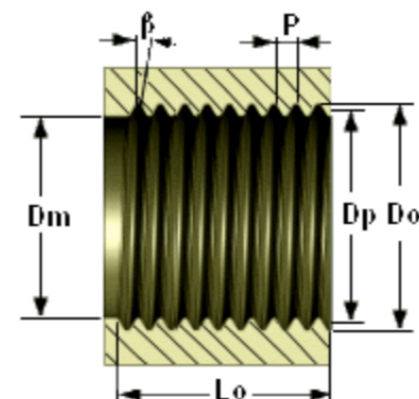
### Catalog Selection 目录选择

[Catalog](#)  公制

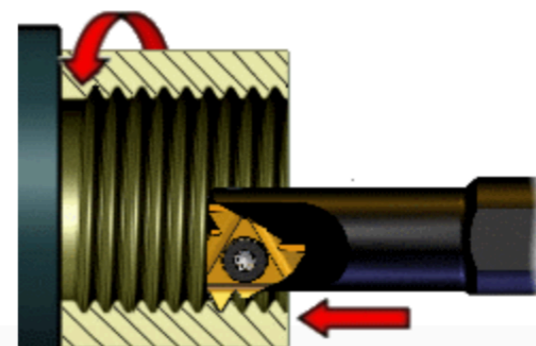
### Thread Data 螺纹数据

螺纹大径	Major Diameter (Do):	<b>12.000 mm</b>
螺纹中径	Pitch Diameter (Dp):	<b>10.863 mm</b>
螺纹小径	Minor Diameter (Dm):	<b>10.106 mm</b>
螺旋升角	Helix Angle (β):	<b>2.9°</b>
钻孔直径	Drill Diameter:	<b>10.2 mm</b>

### Thread Drawing 螺纹图示



### Operation Drawing 操作图示



Tool Selection

Tool Family Selection: 刀杆选择

Regular (Thread turning toolholders)

**Indexable Tools 可转位刀杆**

- Regular (Thread turning toolholders) 常规型刀杆**
- Carbide Shank (Threading bars for deep small bores)
- Tiny Tools (Solid carbide tools for working in small bores)
- Mini Tools (Vertical inserts and toolholders)

SIR 0008 K08U

Inserts: 刀片

Ordering Code: 订货标识

08 IR 1.75 ISO

完整牙 Full

Grade Selection: 材质

BMA

常规型刀杆 (深蓝色是勾选常规型刀杆)  
硬质合金刀杆 (深孔)  
微型小刀杆 (整体硬质合金)  
迷你型刀杆 (立装刀片和刀杆) T8/T10

Tool Data

Tool Data

Holder Data: 刀杆数据

Ordering Code: 订货标识 SIR 0007 K08

Code: 代码 0030100240

Bore Diam.: 最小孔径 7.8 mm

Shank Diameter (D): 柄径 16 mm

Overall Length (L): 总长 125 mm

Neck Diameter (D1): 缩径 6.6 mm

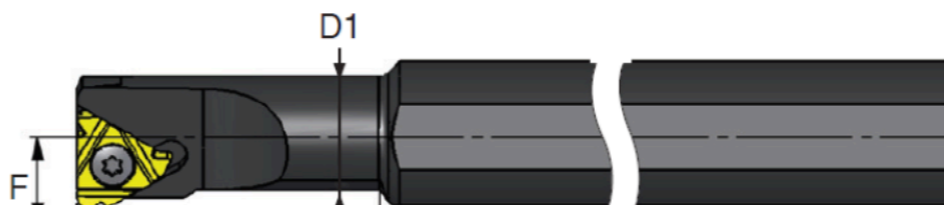
Neck Length (L1): 有效长度 18 mm

F: 5.3 mm

More:

Images

图示是常规型刀杆



Insert Data: 刀片数据

Ordering Code: 订货标识 08 IR 1.75 ISO

Barcode: 代码 0020200034

Profile: 螺纹标准 ISO

Pitch (P): 螺距 1.75 mm

Profile Type: 牙型 Full 完整牙

Size (L): 刀片规格 8

Size (I.C): 内切圆 3/16

Internal/External: 内/外 Internal

More:

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Tool Family

3D Animation

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也可以选择钢制T8系列内螺纹车刀杆，这个刀杆配置的刀片，BLU材质更好，且是最顶级的涂层，可以大幅增加刀片寿命。

Tool Selection

Tool Family Selection: 刀杆选择

Mini Tools (Vertical inserts and toolholder)

立装迷你刀杆

Toolholders: 刀杆

Ordering Code: 订货标识	Icon
ST 0008 L20 F08C 带内冷	
ST 0008 L30 G08C	
ST 0008 L40 H08C	

Inserts: 刀片

Ordering Code: 订货标识	Icon
T8 I 1.75 ISO 完整牙 Full	

Grade Selection: 材质

BLU

蓝色表示已勾选

Tool Data

Toolholder Data: 刀杆数据

**Ordering Code:** 订货标识 **ST 0008 L20 F08C**  
**Barcode:** 订货代码 **0030100313**  
 Shank Diameter (D): 柄径 **8 mm**  
 Overall Length (L): 总长 **80 mm**  
 Neck Diameter (D1): 缩径 **7 mm**  
 Neck Length (L1): 有效长度 **20 mm**  
 Internal/External: 内/外 **Internal / External**  
 Cutting Hand: 切削方向 **Both**  
 Cooling: 冷却 **Yes (through bore)**  
 Insert Type(s): 刀片型号 **T8**  
 Ins. screw/Torx Key: 螺丝扳手 **S5/K5**

Insert Data: 刀片数据

**Ordering Code:** 订货标识 **T8 I 1.75 ISO**  
**Barcode:** 订货代码 **0020301468**  
 Profile: 螺纹标准 **ISO**  
 Pitch (P): 螺距 **1.75 mm**  
 Profile Type: 刀片类型 **Full 完整牙**  
 Type: 刀片号 **T8**  
 Internal/External: 内/外 **Internal**  
 Cutting Hand: 切削方向 **Both**  
 Available Grade(s): 材质 **BLU**

Images

Links

Tool Selection -

Tool Family Selection: 刀杆选择

Mini Tools (Vertical inserts and toolholder) ▾

立装迷你刀杆

Toolholders: 刀杆

Ordering Code: 订货标识	
ST 0008 L20 F08C	带内冷
ST 0008 L30 G08C	
ST 0008 L40 H08C	

蓝色表示已勾选

Inserts: 刀片

Ordering Code: 订货标识	
T8 I 1.75 ISO	完整牙 Full

Grade Selection: 材质

BLU ▴

Tool Data +

Tool Data
 CNC Post
  CNC Settings
  Program

Tool Family

3D Animation

Product Image Coming Soon

图示是迷你型刀杆和刀片

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选择侧面进给方式!

### Tool Selection

**Tool Family Selection:** 刀杆选择  
Mini Tools (Vertical inserts and toolholders)   
立装迷你刀杆

**Toolholders:** 刀杆

Ordering Code: 订货标识	
ST 0008 L20 F08C	带内冷
ST 0008 L30 G08C	
ST 0008 L40 H08C	

**Inserts:** 刀片

Ordering Code: 订货标识	
T8 I 1.75 ISO	完整牙 Full

**Grade Selection:** 材质 BLU

### CNC Post Processor

Tool Data
CNC Post
CNC Settings
Program

Vc 线速度  m/min    N 机床转速  RPM

**Operation Settings** 操作设置

Method 方法 Flank Infeed 侧面进给

Angle 角度 N/A

**Infeed Methods** 进给方法

螺距大于1.5mm, 系统默认侧面进给

需要操作系统支持

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CNC Settings



Requirements



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Tool Data



CNC Post Processor



CNC Settings



Program

CNC Control / Units **CNC控制/单元**

Control Type **操作系统** Okuma

Program Name **程序代码** A2003

Units **单位** Metric

Passes **进给次数**

Number Of Passes **次数** 31

Type of Passes **进给类型**  $V_1 = V_2$

Add a Finish Pass **追加精车** Yes

Finish Pass **精车进给** 0.02 mm

Positioning

Offsets/coords. **偏移/坐标** **T (Tool No)** 01

**Offset No 偏移** 01

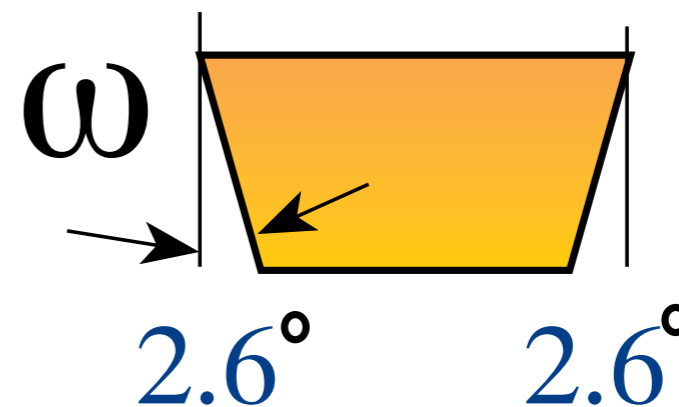
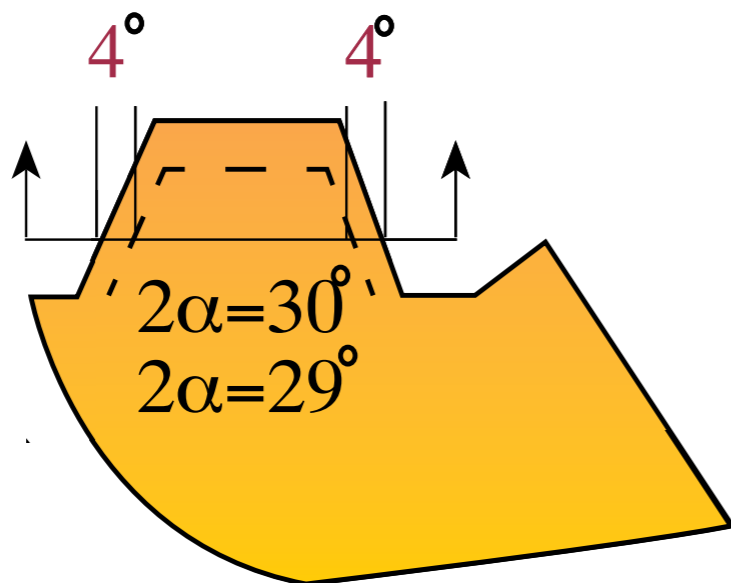
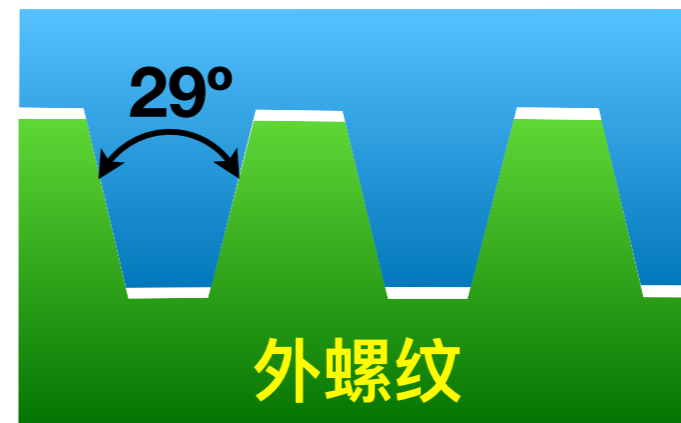
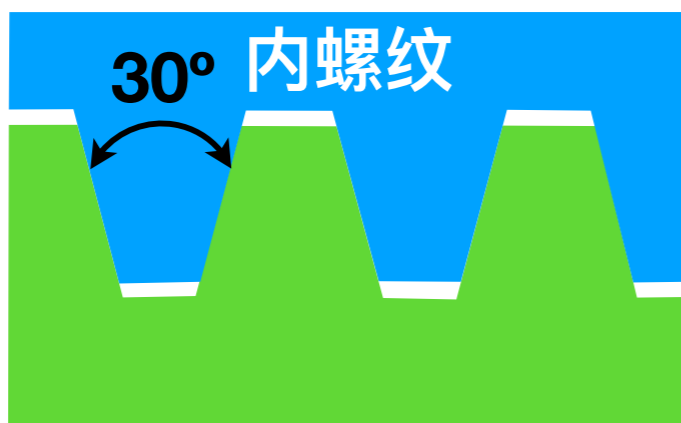
**Z coordinates Z 坐标** 0 mm

Pass Values

### 举例三

客户来电反映，在加工Tr32×6mm, DIN 103 / 30° 刀片走一刀即磨损不能使用。梯形螺纹的螺纹规格变化大，螺距变化也大，螺旋升角变化更大，加工前请做足功课，否则事倍功半。另外说明，梯形螺纹刀片（包括29°美制ACME）外螺纹两侧切削刃的后角仅2.6°，内螺纹两侧切削刃后角4°，当螺旋升角大于2°或3°时，即便更换垫片，也不能排除螺旋升角产生干涉的风险。

## DIN 103 - 30°梯形螺纹 / 美国ACME - 29°梯形螺纹



内螺纹两侧切削刃后角

外螺纹两侧切削刃后角

**螺旋升角 $3.8^\circ$**

假如我们要加工TR 32×6的梯形螺纹，先选择 Trapez - DIN 103, 再选择螺距6mm, 填写螺纹规格Tr32×6, 选择内螺纹, 系统自动生成螺旋升角 (Helix Angle)  $3.8^\circ$ 。刀杆自带的螺旋升角是 $1.5^\circ$ ，不能更换垫片，螺旋升角超过近2倍。

Requirements

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Tool Data

CNC Post Processor

CNC Settings

Program

Basic Requirements

Thread Profile **螺纹标准** Trapez - DIN 103

Pitch **螺距** 6 mm

Number of Starts 1 Lead: 6 mm

Standard **规格** Tr 32 x 6

Diameter (Do) **螺纹大径** 33 mm

Length (Lo) **螺纹长度** 30 mm

Internal/External **内/外** Internal

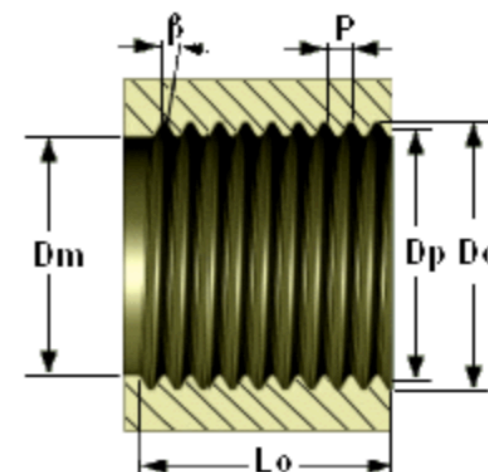
Hand/Direction **螺纹旋向**

Cutting Hand Right **右**

Thread Data

<b>螺纹大径</b>	Major Diameter (Do):	<b>33.000 mm</b>
<b>螺纹中径</b>	Pitch Diameter (Dp):	<b>29.000 mm</b>
<b>螺纹小径</b>	Minor Diameter (Dm):	<b>26.000 mm</b>
<b>螺旋升角</b>	Helix Angle ( $\beta$ ):	<b><math>3.8^\circ</math></b>
<b>钻孔直径</b>	Drill Diameter:	<b>26.0 mm</b>

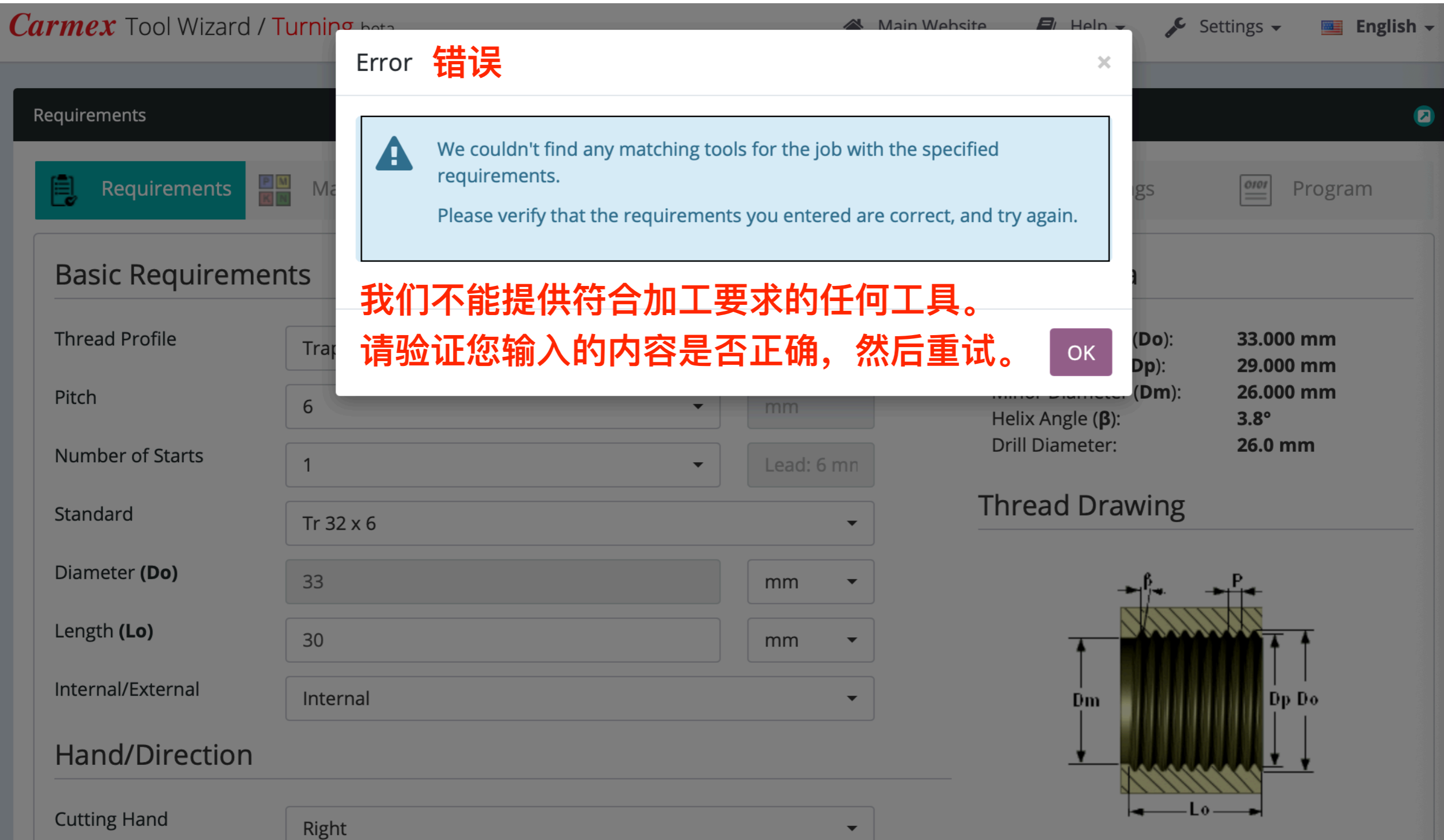
Thread Drawing **螺纹图示**



Error (错误)

选刀软件显示“错误”，“我们不能提供符合加工要求的任何刀具，请验证您输入的内容是否正确，然后重试”。不用重试，没有合适加工这个Tr32×6内螺纹的刀具。

Carmex刀具螺纹车削的行家里手



The screenshot shows the Carmex Tool Wizard interface for turning operations. A modal error dialog is displayed in the center, with the title "Error 错误" and a close button. The dialog contains a warning icon and the following text: "We couldn't find any matching tools for the job with the specified requirements. Please verify that the requirements you entered are correct, and try again." Below the dialog, the user's input for a Tr32 x 6 internal thread is visible, including a pitch of 6 mm and 1 start. To the right, a "Thread Drawing" section shows a technical diagram of the thread with labels for  $\beta$ , P, Dm, Dp, Do, and Lo. A purple "OK" button is located at the bottom right of the dialog.

**Error 错误**

We couldn't find any matching tools for the job with the specified requirements.  
Please verify that the requirements you entered are correct, and try again.

**我们不能提供符合加工要求的任何工具。  
请验证您输入的内容是否正确，然后重试。**

OK

Requirements

Basic Requirements

Thread Profile: Tr 32 x 6

Pitch: 6 mm

Number of Starts: 1

Standard: Tr 32 x 6

Diameter (Do): 33 mm

Length (Lo): 30 mm

Internal/External: Internal

Hand/Direction: Right

Thread Drawing

Labels:  $\beta$ , P, Dm, Dp, Do, Lo

下图是加工 Tr32×6mm, 梯形内螺纹, 切削刃左侧切削刃只走了一刀, 显然是因为螺旋升角干涉而磨损。



如果选择加工外螺纹，仍然是Tr36×6，我们可看到螺旋升角垫片的选择。

Carmex Tool Wizard / Turning beta

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### Basic Requirements

Thread Profile **螺纹标准** Trapez - DIN 103

Pitch **螺距** 6 mm

Number of Starts **起始数** 1 Lead: 6 mm

Standard **螺纹规格** Tr 32 x 6

Diameter (Do) **螺纹大径** 32 mm

Length (Lo) **有效长度** 30 mm

Internal/External **内/外** External **外**

### Hand/Direction

Cutting Hand Right **右**

Cutting Direction Threading towards the chuck **自尾座向卡盘方向**

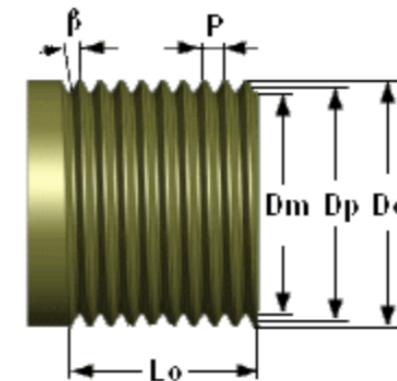
### Catalog Selection

Catalog Metric **公制**

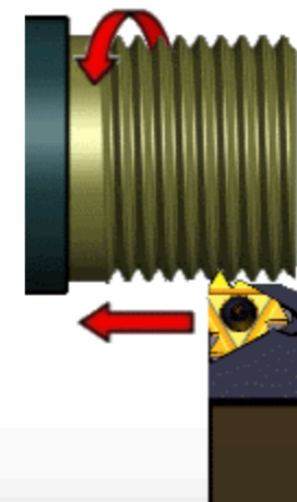
### Thread Data

<b>螺纹大径</b>	Major Diameter (Do):	<b>32.000 mm</b>
<b>螺纹中径</b>	Pitch Diameter (Dp):	<b>29.000 mm</b>
<b>螺纹小径</b>	Minor Diameter (Dm):	<b>25.000 mm</b>
<b>螺旋升角</b>	Helix Angle (β):	<b>3.8°</b>

### Thread Drawing **螺纹图示**



### Operation Drawing **操作图示**




**AE 22+2.5(2.5°)**

请注意红框内垫片；AE 22+2.5 (2.5°)，这个螺旋升角距离3.8°螺旋升角仍然差1.3°。从刀片两侧切削刃后角2.6°来看，干涉的风险仍然很大。这就是我们不断提示螺旋升角至关重要的原因，因为轻则齿形面会失真，重则刀片寿命大幅降低。


**Tool Selection**

Tool Family Selection: 刀具选择  
Regular (Thread turning toolholders) ← 常规刀杆

Toolholders:

Ordering Code: 订货标识	
SER 25 25 M22	
SER 25 25 M22U	

Inserts: 刀片

Ordering Code: 订货标识	
22 ER 6 TR	Full

Grade Selection: 材质 BMA

**Tool Data**

Toolholder Data: 刀杆数据

Ordering Code: 订货标识 SER 25 25 M22  
Barcode: 代码 0030400064

Anvil Code: 垫片标识 AE 22+2.5 (2.5°  
垫片螺旋升角 helix angle)  
Anvil Barcode: 垫片代码 0010200031

Overall Length (L): 总长 150 mm  
B/H: 高/宽 25 mm  
F: 含刀片宽 25 mm

Internal/External: 内/外 External  
Cutting Hand: 螺纹方向 Right  
Cooling: 冷却 No  
Insert Size(s): 刀片规格 22  
Ins. screw/Torx Key: S22/K22 螺丝/扳手  
Anvil Screw: 垫片螺丝 A22

Insert Data: 刀片数据

Ordering Code: 订货标识 22 ER 6 TR  
Barcode: 代码 0020500383

Profile: 螺纹标准 Trapez - DIN 103  
Pitch (P): 螺距 6 mm  
Profile Type: 完整牙 Full  
Size (L): 边长 22  
Size (I.C): 内切圆 1/2

Internal/External: 内/外 External  
Cutting Hand: 切削方向 Right  
Available Grade(s): 材质 HBA, BLU, BMA, P25C, MXC, K20, P30

X: 2 mm  
Y: 2.4 mm

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