Features that must be programmed

(N4, N5, N8) Threaded hole & Chamfer 4x

(N9) Radiused Keyway/Keyseat 2x

(N3, N8) Close Pocket & Chamfer

(N3) Open Pocket 2x

(N2, N8) Island & Chamfer

(N6, N7) Reamed Hole

(N10) Radius Slot

(N1) Face Mill Top

SkillsUSA 2017 CNC Milling
Features that must be programmed

(N2) Drilled hole
(N4) OD
(N1, N4) Face
(N6) ID Thread
(N3, N5) IDs
(N7) ODs, Face
(N9) OD Thread

SkillsUSA 2017 CNC Turning
Notes:
1. Break all edges .015 max
2. All fillets .03 max
3. 125 RA max all machined surfaces
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<thead>
<tr>
<th>Sequence:</th>
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<th>Features</th>
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<tbody>
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<td>Tool Number:</td>
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<tr>
<td>Tool Description:</td>
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<td>Coding Instructions:</td>
<td>Face mill top of part</td>
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<td>Tool Description:</td>
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<td>Coding Instructions:</td>
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<td>Dia. Offset: .625&quot;</td>
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<thead>
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<td>Speed: 6000 RPM</td>
<td>Open pocket 1</td>
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<tr>
<td>Tool Description:</td>
<td>.375 Dia. End Mill</td>
<td>Feed: 40 IPM</td>
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<tr>
<td>Coding Instructions:</td>
<td>Mill both open pockets and closed pocket</td>
<td>Dia. Offset: .375&quot;</td>
<td>Closed pocket</td>
<td>20</td>
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<tr>
<td></td>
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<td>.3125 Dia. Drill</td>
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<td>Pre-drill (tap drill) for threaded holes</td>
<td>Hole 3</td>
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<td>Hole 4</td>
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## Milling Score Card

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<td>N8</td>
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### Sequence: N9

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<tr>
<td>Tool Description:</td>
<td>16 WD x 4.00 Dia. Slot Mill</td>
</tr>
<tr>
<td>Coding Instructions:</td>
<td>Mill keyway/keyseat (slots)</td>
</tr>
<tr>
<td>Cutting Parameters:</td>
<td>Features</td>
</tr>
<tr>
<td>Speed: 1500 RPM</td>
<td>Dia. Offset: 4.000&quot;</td>
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<td>Feed: 20 IPM</td>
<td>Points: 20</td>
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**Followed Instructions?** 5

### Sequence: N10

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<thead>
<tr>
<th>Tool Number:</th>
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<tbody>
<tr>
<td>Tool Description:</td>
<td>3/4 Dia. Ball End Mill</td>
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<tr>
<td>Coding Instructions:</td>
<td>This sequence ball mills the slots at bottom of pockets. This is a supported sequence. Fill in the missing codes as indicated in the NC Program template. <strong>Length offset is set to center of ball (no cutter compensation).</strong></td>
</tr>
<tr>
<td>Cutting Parameters:</td>
<td>Features</td>
</tr>
<tr>
<td>Speed: 6000 RPM</td>
<td>Slot</td>
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<td>Feed: 25 IPM</td>
<td>Points: 30</td>
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</tbody>
</table>

**Followed Instructions?** 5

### Sequence: 

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<th>Tool Number:</th>
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<tbody>
<tr>
<td>Tool Description:</td>
</tr>
<tr>
<td>Coding Instructions:</td>
</tr>
<tr>
<td>Cutting Parameters:</td>
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**Followed Instructions?**
<table>
<thead>
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<th>Cutting Parameters</th>
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<tbody>
<tr>
<td>Tool Number:</td>
<td>T1</td>
<td>Speed: 3000 RPM</td>
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<td>Tool Description:</td>
<td>2.000 Dia. Shell Mill</td>
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</tr>
<tr>
<td>Coding Instructions:</td>
<td>Face mill top of part</td>
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<tr>
<td>Tool Number:</td>
<td>T2</td>
<td>Speed: 6000 RPM</td>
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<tr>
<td>Tool Description:</td>
<td>.625 Dia. End Mill</td>
<td>Feed: 50 IPM</td>
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<tr>
<td>Coding Instructions:</td>
<td>Mill island</td>
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<tr>
<th>Sequence:</th>
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<td>Tool Number:</td>
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<tr>
<td>Tool Description:</td>
<td>.375 Dia. End Mill</td>
<td>Feed: 20 IPM</td>
</tr>
<tr>
<td>Coding Instructions:</td>
<td>Mill both open pockets and closed pocket</td>
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<table>
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<tr>
<th>Sequence:</th>
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<td>Tool Number:</td>
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<td>Speed: 6000 RPM</td>
</tr>
<tr>
<td>Tool Description:</td>
<td>.3125 Dia. Drill</td>
<td>Feed: 40 IPM</td>
</tr>
<tr>
<td>Coding Instructions:</td>
<td>Pre-drill (tap drill) for threaded holes</td>
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<td>Tool Number:</td>
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<td>Tool Description:</td>
<td>3/8-16 Tap</td>
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<tr>
<td>Coding Instructions:</td>
<td>Tap holes</td>
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## CNC Milling Sequences

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</tr>
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<td>Tool Number: T6</td>
<td>Speed: 6000 RPM</td>
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<tr>
<td>Tool Description: .2657 Dia Drill</td>
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</tr>
<tr>
<td>Coding Instructions: Pre-drill for reaming</td>
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<table>
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<td>Tool Number: T7</td>
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<tr>
<td>Tool Description: .275 Dia. Reamer</td>
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</tr>
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<td>Coding Instructions: Ream hole</td>
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<table>
<thead>
<tr>
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<tr>
<td><strong>N8</strong></td>
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</tr>
<tr>
<td>Tool Number: T8</td>
<td>Speed: 6000 RPM</td>
</tr>
<tr>
<td>Tool Description: .500 Chamfer Mill</td>
<td>Pocket</td>
</tr>
<tr>
<td>Coding Instructions: Chamfer mill around island and pockets; chamfer for tapped holes. <strong>NOTE</strong>: Offset # 8 is set to .250 Dia. Programming to the geometry (profile) of island and pockets at a Z depth of (negative) -.200 will machine the chamfer to size.</td>
<td>Feed: 75 IPM</td>
</tr>
<tr>
<td></td>
<td>Holes</td>
</tr>
<tr>
<td></td>
<td>Speed: 4000 RPM</td>
</tr>
<tr>
<td></td>
<td>Feed: 25 IPM</td>
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<table>
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<td>Tool Number: T9</td>
<td>Speed: 1500 RPM</td>
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<tr>
<td>Tool Description: .16 WD x 4.00 Dia. Slot Mill</td>
<td>Feed: 20 IPM</td>
</tr>
<tr>
<td>Coding Instructions: Mill keyway/keyseat (slots)</td>
<td>D9 - Dia. Offset: 4.00&quot;</td>
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</tr>
<tr>
<td>Tool Description: .375 Dia. Ball End Mill</td>
<td>Feed: 25 IPM</td>
</tr>
<tr>
<td>Coding Instructions: This sequence ball mills the slots at bottom of pocket. This is a supported sequence. Fill in the missing codes as indicated in the NC Program template. <strong>Length offset is set to center of ball</strong> (no cutter compensation).</td>
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## CNC Turning Sequences

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<td>Tool Number: T0101</td>
<td>Tip #3: .031R</td>
</tr>
<tr>
<td>Tool Description: OD Turn</td>
<td>Speed: 1200 SFPM</td>
</tr>
<tr>
<td>Coding Instructions: Face part and leave .010&quot; for finish</td>
<td>Feed: .006 IPR</td>
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<td>Tool Number: T1010</td>
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<td>Tool Description: .750 Dia. Drill</td>
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<td>Coding Instructions: Drill hole</td>
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<td>Tool Number: T0202</td>
<td>Tip #2: .015R</td>
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<tr>
<td>Tool Description: ID Bore</td>
<td>Speed: 1000 SFPM</td>
</tr>
<tr>
<td>Coding Instructions: Rough turn all IDs; thread minor diameter 1.160 (min), 1.178 (max)</td>
<td>Feed: .006</td>
</tr>
<tr>
<td></td>
<td>Depth of Cut: .05</td>
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<tr>
<td></td>
<td>X Stock to Leave: .020&quot;</td>
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<tr>
<td></td>
<td>Z Stock to Leave: .002&quot;</td>
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<td>Tool Number: T0101</td>
<td>Tip #3: .031R</td>
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<tr>
<td>Tool Description: OD Turn</td>
<td>Speed: 1200 SFPM</td>
</tr>
<tr>
<td>Coding Instructions: Finish face and OD; turn back 2.250 (max)</td>
<td>Feed: .006 IPR</td>
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<table>
<thead>
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<td>Tool Number: T0202</td>
<td>Tip #2: .015R</td>
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<tr>
<td>Tool Description: ID Bore</td>
<td>Speed: 1000 SFPM</td>
</tr>
<tr>
<td>Coding Instructions: Finish turn all IDs; thread minor diameter = 1.160 (min) 1.178 (max)</td>
<td>Feed: .006</td>
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<td>Sequence</td>
<td>Tool Number</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SkillsUSA 2017: Setup Sheet

Operation 1

**Part Number**: T2017  
**Operation**: 1 of 2  
**Machine**: Haas ST-10  
**Material**: 6061 Aluminum  
**Stock Size**: 2" Dia. x 4" Lg.  
**Workholding**: 6" Chuck  
**Fixture**: Hard Jaws

### Diagram

- 2.50 Minimum  
- Program Zero (G54)

- Clamped Ø (Stock)

This operation finishes all internal diameters and turns outside diameter 2.250 back (see diagram).

**Note:**  
* 6 inch chuck  
* Hard jaws are permissible

Sequence numbers N1 - N6

---

**Dimensions are in inches**  
TOLERANCES:  
FRACTIONAL ± .015  
ANGULAR ± 1°  
TWO PLACE DECIMAL ± .010  
THREE PLACE DECIMAL ± .005  
FOUR PLACE DECIMAL ± .0005
SkillsUSA 2017: Setup Sheet

Operation 2

<table>
<thead>
<tr>
<th>Part Number</th>
<th>T2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>2 of 2</td>
</tr>
<tr>
<td>Machine</td>
<td>Haas ST-10</td>
</tr>
<tr>
<td>Material</td>
<td>6061 Aluminum</td>
</tr>
<tr>
<td>Stock Size</td>
<td>Op 1</td>
</tr>
<tr>
<td>Workholding</td>
<td>6&quot; Chuck</td>
</tr>
<tr>
<td>Fixture</td>
<td>Bored Jaws</td>
</tr>
</tbody>
</table>

Set to finish overall length at center of ball

Program Zero (G55)

This operation finishes all external feature except finished diameter clamped in bored jaws. (see diagram).

Clamped \( \phi \)

Sequence numbers N7 - N9

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± .015
ANGULAR ± 1°
TWO PLACE DECIMAL ± .010
THREE PLACE DECIMAL ± .005
FOUR PLACE DECIMAL ± .0005
SkillsUSA 2017: Setup Sheet

<table>
<thead>
<tr>
<th>Part Number</th>
<th>M2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>1 of 1</td>
</tr>
<tr>
<td>Machine</td>
<td>Haas Mini Mill</td>
</tr>
<tr>
<td>Material</td>
<td>6061 Aluminum</td>
</tr>
<tr>
<td>Stock Size</td>
<td>1&quot; x 3&quot; x 4&quot;</td>
</tr>
<tr>
<td>Workholding</td>
<td>6&quot; Vise</td>
</tr>
<tr>
<td>Fixture</td>
<td>Step Jaws</td>
</tr>
</tbody>
</table>

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±.015
ANGULAR ± 1°
TWO PLACE DECIMAL ±.010
THREE PLACE DECIMAL ±.005
FOUR PLACE DECIMAL ±.0005
% 000001

(SKILLSUSA CNC MILLING 2017)

(ENTER YOUR CONTESTANT ID HERE)

G17 G40 G80 G90

N1
T01 M6 (2.0 INCH FACEMILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S3000 M3
G43 H01 Z.25 M8

(ENTER TOOLPATH CODE)

M9
M5
G0 G28 G91 Z0
M1

N2
T02 M6 (0.625 ENDMILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S6000 M3
G43 H02 Z.25 M8

(ENTER TOOLPATH CODE)

M9
M5
G0 G28 G91 Z0
M1

N3
T3 M6 (EM 0.375 INCH ENDMILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S6000 M3
G43 H3 Z1. M8

(ENTER TOOLPATH CODE)

M5
G0 G28 G91 Z0
M1

N4
T04 M6 (.3125 DIA DRILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S6000 M3
G43 H04 Z.4739 M8

(ENTER TOOLPATH CODE)
M9
M5
G0 G28 G91 Z0
M1

N5
T05 M6 (3/8 - 16 UNC TAP)
(SOLIDMILL - TAPPING)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S1000 M3
G43 H05 Z.4739 M8

(ENTER TOOLPATH HERE)

M5
G0 G28 G91 Z0
M1

N6
T06 M6 (0.265 DIA DRILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S6000 M3
G43 H06 Z.235 M8

(ENTER TOOLPATH CODE)

M9
M5
G0 G28 G91 Z0
M1

N7
T07 M6 (.2750 DIA REAMER)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S1000 M3
G43 H07 Z.235 M8

(ENTER TOOLPATH CODE)

M9
M5
G0 G28 G91 Z0
M1

N8
T08 M6 (.500 DIA CHAMFER MILL)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S6000 M3
G43 H08 Z.25 M8

(ENTER TOOLPATH CODE)

M5
G0 G28 G91 Z0
M1

N9
T9 M6 (4.0 DIA SLOT CUTTER)
G0 G90 G54 (ENTER INITIAL X & Y COORDINATES)
S1500 M3
G43 H09 Z1. M8

(ENTER TOOLPATH CODE)
M9
M5
G0 G28 G91 Z0

N10
T10 M06 (3/8 DIA BALL ENDMILL)
(SOLIDMILL - SWEEP CUT)
G00 G90 G54 S6000 M03
G43 H10 Z0.8 M8
M09
G00 Z1.
G91 G28 Z0

G53 G90 Y0.
M30
%

%  
O00789  
(SKILLSUSA CNC TURNING 2017)  

(ENTER YOUR CONTESTANT NUMBER HERE)  

N1  
G00 G53 X0  
G53 Z0  
G54  
T101 (Face TURN)  
G50 S5000  
G96 S1200 M03  
M08  

(ENTER TOOLPATH CODE)  

M09  
G97 S1500  
G00 G53 X0  
G53 Z0  
M01  

N2  
G00 G53 X0  
G53 Z0  
G54  
T1010 (.750 DIA. DRILL)  
G97 S2500 M03  
M08  

(ENTER TOOLPATH CODE)  

M09  
G00 G53 X0  
G53 Z0  
M01  

N3  
G00 G53 X0  
G53 Z0  
G54  
T202 (ID BORE)  
G50 S6000  
G96 S1000 M03  
M08
(ENTER TOOLPATH CODE)

M09
G97 S1500
G00 G53 X0
G53 Z0
M01

N4
G00 G53 X0
G53 Z0
T101 (OD TURN)
G54
G50 S6000
G96 S1200 M03
M08

(ENTER TOOLPATH CODE)

M09
G97 S1500
G00 G53 X0
G53 Z0
M01

N5
G00 G53 X0
G53 Z0
G54
T202 (ID BORE)
G50 S6000
G96 S1000 M03
M08

(ENTER TOOLPATH CODE)

M09
G97 S1500
G00 G53 X0
G53 Z0
M01

N6
G00 G53 X0
G53 Z0
T606 (ID THREAD)
G54
G97 S1800 M03
M08

(ENTER TOOLPATH CODE)

M09
G00 G53 X0
G53 Z0
M01

M00 (FLIP PART FOR OP#2)

N7
G00 G53 X0
G53 Z0
G55
T101 (OD TURN)
G50 S6000
G96 S900 M03
M08

(ENTER TOOLPATH CODE)

M09
G97 S1500
G00 G53 X0
G53 Z0
M01

N8
G00 G53 X0
G53 Z0
G55
T101 (OD TURN)
G50 S6000
G96 S900 M03
M08

(ENTER TOOLPATH CODE)

M09
G97 S1500
G00 G53 X0
G53 Z0
M01
M09
G97 S1500
G00 G53 X0
G53 Z0
M01

N10
G00 G53 X0
G53 Z0
T1212 (OD THREAD)
G55
G97 S1800 M03
M08

(ENTER TOOLPATH CODE)

M09
G00 G53 X0
G53 Z0
M30
%

CNC Milling Cutters

T1

Product information
Ordering code
ISO RA245-051R19-12H
ANSI RA245-051R19-12H
Material ID 5738674
Bar code 80015629

Product Description
CoroMill® 245 face milling cutter

tool cutting edge angleKAPR 45 deg
cutting diameterDC 2 inch
maximum cutting diameterDCX 2.49201 inch
cutting item countCICTP1 5
cutting item countCICTTOT 5
part2 of cutting item interface identifiersCUTINT_MASTERP1 COR: CoroMill 245 -size 12 (R245-12T3)
depth of cut maximumAPMX 0.24 inch
depth of cut maximumAPMXFFW 0.24 inch
tool style codeTSYC RA245..Rxx
maximum ramping angleRMPX 0 deg
cutting pitch differentialCPDF 0
peripheral effective cutting edge countZEFPH 5
CNC Milling Cutters

T2

Product information
Ordering code
ISO                    A316-16SL442-06208P 1730
ANSI                   A316-16SL442-06208P 1730
Material ID            6874253
Bar code               7.32322E+12

Product Description
CoroMill® 316 solid carbide head for square shoulder milling

cutting diameter DC        0.625 inch
cutting diameter face contact DCF 0.565 inch
Corner radius RE           0.03 inch
depth of cut maximum APMX  0.751968 inch
maximum ramping angle RMPX 5 deg
center cutting capability CCC 0
tool style code TSYC     A316..SL..P
peripheral effective cutting edge count ZEFP 4
adaptive interface machine direction ADINTMS Coromant EH -inch - E16
grade GRADE               1730
basic standard group BSG  COROMANT
coolant entry style code CNSC 0: without coolant

---

2017 SkillsUSA
CNC Milling Cutters

T3

Product information
Ordering code
ISO
ANSI
Material ID
Bar code
ISO
ANSI
RA216.24-2450AAK18P 1620
RA216.24-2450AAK18P 1620
5739458
11560651

Product Description
CoroMill® Plura solid carbide square shoulder end mill

cutting diameterDC
0.375 inch
cutting diameter face contactDCF
0.34374 inch
Corner radiusRE
0.01563 inch
depth of cut maximumAPMX
1.1252 inch
maximum ramping angleRMPX
5 deg
center cutting capabilityCCC
1
tool style codeTSYC
RA216.2x..AK..P
usable lengthLU
1.1252 inch
peripheral effective cutting edge countZEFP
4
adaptive interface machine directionADINTMS
Cylindrical shank without clamping features -inch: 3/8
connection diameter toleranceTCDCON
h6
gradeGRADE
1620

Holder Assembly
extension out of holder
1.5 inch minimum
CNC Milling Cutters

T4

Product information
Ordering code
ISO 860.1-0794-064A1-NM H10F
ANSI 860.1-0794-064A1-NM H10F
Material ID 6253770
Bar code 26253770

Product Description
CoroDrill® 860 solid carbide drill

cutting diameter DC 0.312598 inch
achievable hole tolerance TCHA H7
usable length LU 2.54331 inch
usable length diameter ratio ULDR 8.13602
adaptive interface machine direction ADINTMS Cylindrical shank (DIN1835-A / DIN6535-HA) -metric: 8
connection diameter tolerance TCDCON h6
grade GRADE H10F
Substrate SUBSTRATE HM
coating COATING Uncoated
tool style code TSYC 860.1..A1-NM (8xD)
basic standard group BSG COROMANT
coolant entry style code CNSC 4: axial concentric entry on circle

Holder Assembly
extension out of holder 3.0 inch minimum
CNC Milling Cutters

T5

Product information
Ordering code
ISO E8863/8
ANSI E8863/8
Material ID 6182751
Bar code 26182751

Product Description
CoroTap™ 300 cutting tap with spiral flutes

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>thread diameter sizeTDZ</td>
<td>UNC 3/8-16</td>
</tr>
<tr>
<td>threads per inchTPI</td>
<td>16</td>
</tr>
<tr>
<td>thread diameterTD</td>
<td>0.375 inch</td>
</tr>
<tr>
<td>premachined hole diameterPHD</td>
<td>0.314961 inch</td>
</tr>
<tr>
<td>blind hole function propertyBHFP</td>
<td>1</td>
</tr>
<tr>
<td>thread tolerance classTCTR</td>
<td>2B</td>
</tr>
<tr>
<td>basic standard groupBSG</td>
<td>DIN/ANSI</td>
</tr>
<tr>
<td>usable lengthLU</td>
<td>1.2915 inch</td>
</tr>
<tr>
<td>adaptive interface machine directionADINTMS</td>
<td>Tap shank ANSI -inch: 0.381 x 0.286</td>
</tr>
<tr>
<td>gradeGRADE</td>
<td>HSS-E-PM</td>
</tr>
<tr>
<td>tool style codeTSYC</td>
<td>E886</td>
</tr>
<tr>
<td>SubstrateSUBSTRATE</td>
<td>HSS-E-PM</td>
</tr>
</tbody>
</table>

Holder Assembly
extension out of holder 2.0 inch minimum
**CNC Milling Cutters**

**T6**

**Product Information**
Ordering code
- ISO: 460.1-0675-020A0-XM GC34
- ANSI: 460.1-0675-020A0-XM GC34
- Material ID: 6241404
- Bar code: 26241404

**Product Description**
CoroDrill® 460 solid carbide drill

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Cutting diameter (DC)</td>
<td>0.265748 inch</td>
</tr>
<tr>
<td>Achievable hole tolerance</td>
<td>H9</td>
</tr>
<tr>
<td>Usable length (LU)</td>
<td>0.834646 inch</td>
</tr>
<tr>
<td>Usable length diameter ratio (ULDR)</td>
<td>3.14074</td>
</tr>
<tr>
<td>Adaptive interface machine direction (ADINTMS)</td>
<td>Cylindrical shank (DIN1835-A / DIN6535-HA) - metric: 8</td>
</tr>
<tr>
<td>Connection diameter tolerance (TCDCON)</td>
<td>h6</td>
</tr>
<tr>
<td>Grade (GRADE)</td>
<td>GC34</td>
</tr>
<tr>
<td>Substrate (SUBSTRATE)</td>
<td>HM</td>
</tr>
<tr>
<td>Coating (COATING)</td>
<td>PVD</td>
</tr>
<tr>
<td>Tool style code (TSYC)</td>
<td>460.1..A0-XM (3xD)</td>
</tr>
<tr>
<td>Basic standard group (BSG)</td>
<td>DIN 6537 K</td>
</tr>
<tr>
<td>Coolant entry style code (CNSC)</td>
<td>0: without coolant</td>
</tr>
</tbody>
</table>
CNC Milling Cutters

T7

Product information
Ordering code
ANSI 435.T-0700-A1-XF H10F
Material ID 6266842
Bar code 26266842

Product Description
CoroReamer™ 435 solid carbide reamer

basic standard group BSG
Substrate SUBSTRATE CARBIDE
coating COATING Uncoated
adaptive interface machine direction ADINTMS Cylindrical shank (DIN1835-A / DIN6535-HA) - metric: 8
connection size code CZC 8
connection diameter DCON 0.314961 inch
functional length LF 3.89567 inch
cutting edge length L 0.629921 inch
usable length LU 2.51969 inch
hand HAND R
flute count NOF 6
achievable hole tolerance TCHA H7
diameter DC .275 inch
CNC Milling Cutters

T8

Product information
Ordering code
ISO A316-12CM600-05045G 1030
ANSI A316-12CM600-05045G 1030
Material ID 5722559
Bar code 12422244

Product Description
CoroMill® 316 solid carbide head for chamfer milling

tool cutting edge angleKAPR 45 deg
cutting diameterDC 0.11811 inch
maximum cutting diameterDCX 0.5 inch
depth of cut maximumAPMX 0.190945 inch
peripheral effective cutting edge countZEFP 6
adaptive interface machine directionADINTMS Coromant EH -inch - E12
gradeGRADE 1030
SubstrateSUBSTRATE H10F
coatingCOATING PVD
basic standard groupBSG COROMANT
tool style codeTSYC A316..CM..G
coolant entry style codeCNSC 0: without coolant

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2017 SkillsUSA
CNC Milling Cutters

T9

Product information
Ordering code
ISO A329-102R19-H
ANSI A329-102R19-H
Material ID 5722494
Bar code 12440120

Product Description
CoroMill® 329 groove milling cutter

- insert seat size code SSCM: H
- insert seat size code SSCN: H
- adaptive interface machine direction ADINTMS: Arbor -ISO 6462 -A (hexagon socket head cap screw) -inch: 3/4
- connection size code CZC: 42433
- cutting diameter DC: 4 inch
- cutting depth maximum CDX: 0.590984 inch
- connection diameter DCON: 0.75 inch
- cutting width CW: 0.15748 inch
- peripheral effective cutting edge count ZEFP: 6
- functional length LF: 1.96902 inch
- maximum overhang OHX: 1.96902 inch
- body half taper angle BHTA: 0 deg
CNC Milling Cutters

T10

Product information
Ordering code
ISO 1B232-0953-XA 1620
ANSI 1B232-0953-XA 1620
Material ID 6259446
Bar code 26259446

Product Description
CoroMill® Plura solid carbide ball nose end mill

cutting diameter DC 0.375039 inch
corner radius RE1 0.18752 inch
depth of cut maximum APMX 0.75 inch
maximum ramping angle RMPX 15 deg
usable length LU 0.75 inch
peripheral effective cutting edge count ZEFP 2
adaptive interface machine direction ADINTMS Cylindrical shank without clamping features -inch: 3/8
tool style code TSYNC 1B232-XA (2)
connection diameter tolerance TCDCON h6
grade GRADE 1620
Substrate SUBSTRATE H10F
coating COATING PVD

Holder Assembly
extension out of holder 1.5 inch minimum
CNC Turning Cutters

T0101 Insert

Product information
Ordering code
ISO CCGX 09 T3 08-AL H10
ANSI CCGX 3(2.5)2-AL H10
Material ID 5723245
Bar code 10545010

Product Description
CoroTurn® 107 insert for turning

chip breaker manufacturer's designation CBMD AL
operation type CTPT Medium
insert size and shape CUTINT_SIZESHAPE ISO: CC09T3
inscribed circle diameter IC 0.375 inch
insert shape code SC C
cutting edge effective length LE 0.349291 inch
Corner radius RE 0.03126 inch
wiper edge property WEP FALSE
tool style code TSYC CCGX-AL
hand HAND N
grade GRADE H10
Substrate SUBSTRATE HM
CNC Turning Cutters

T0101 Holder

Product information
Ordering code
ISO: SCLCR 12 3BHP
ANSI: SCLCR 12 3BHP
Material ID: 6188592
Bar code: 26188592

Product Description
CoroTurn® 107 shank tool for turning

tool cutting edge angle: 95 deg
tool lead angle: -5 deg
part 2 of cutting item interface identifiers: ISO: CCMT 09T308
adaptive interface machine direction: Rectangular shank -inch: 3/4 x 3/4
maximum ramping angle: 0 deg
workpiece side body angle: 0 deg
machine side body angle: 0 deg
maximum overhang: 1.04331 inch
tool style code: SCLCR/L..HP (INCH)
hand: R
damping property: FALSE
coolant entry style code: 1: axial concentric entry
T0202 Insert

Product information
Ordering code
ISO CCGX 06 02 04-AL H10
ANSI CCGX 2(1.5)1-AL H10
Material ID 5723233
Bar code 10109385

Product Description
CoroTurn® 107 insert for turning

chip breaker manufacturer's designation CBMD AL
operation type CTPT Medium
insert size and shape CUTINT_SIZESHAPE ISO: CC0602
inscribed circle diameter IC 0.25 inch
insert shape code SC C
cutting edge effective length LE 0.23811 inch
Corner radius RE 0.01563 inch
wiper edge property WEP FALSE
tool style code TSYC CCGX-AL
hand HAND N
grade GRADE H10
Substrate SUBSTRATE HM
CNC Turning Cutters

**T0202 Holder**

**Product information**

Ordering code

ISO: A08M-SCLCR 2-R

ANSI: A08M-SCLCR 2-R

Material ID: 5721313

Bar code: 12162986

**Product Description**

CoroTurn® 107 boring bar for turning

tool cutting edge angle \( \text{KAPR} \), 95 deg

tool lead angle \( \text{PSIR} \), -5 deg

part 2 of cutting item interface identifiers \( \text{CUTINT_MASTER} \)

adaptive interface machine direction \( \text{ADINTMS} \)

maximum ramping angle \( \text{RMPX} \), 0 deg

minimum bore diameter \( \text{DMIN1} \), 0.598425 inch

workpiece side body angle \( \text{BAWS} \), 0 deg

machine side body angle \( \text{BAMS} \), 0 deg

minimum overhang \( \text{OHN} \), 0.75 inch

maximum overhang \( \text{OHX} \), 2 inch

tool style code \( \text{TSYC} \), A..SCLCR/L -R (INCH)

hand \( \text{HAND} \), R
CNC Turning Cutters

T0606 Insert

Product information
Ordering code
ISO 266RL-16UN01A120M 1125
ANSI 266RL-16UN01A120M 1125
Material ID 5757954
Bar code 12375252

Product Description
CoroThread® 266 insert for thread turning

insert seat size codeSSCM 3/8
insert seat size codeSSCN 3/8
thread form typeTHFT UN60
Thread standard referenceTHFTSR1 ISO 5864-1978
threads per inchTPI 12
tooth countNT 1
theoretical thread heightHA 0.052362 inch
thread height differenceHB 0.005118 inch
profile distance exPDX 0.055118 inch
thread tolerance classTCTR 2B
thread typeTTP INT
handHAND R
T0606 Holder

Product information
Ordering code
ISO 266RKF-D16-3
ANSI 266RKF-D16-3
Material ID 5758091
Bar code 12387675

Product Description
CoroThread® 266 boring bar for thread turning

- insert seat size codeSSCM 3/8
- insert seat size codeSSCN 3/8
- adaptive interface machine directionADINTMS Cylindrical shank w/ 3 flats -inch: 1
- connection size codeCZC 1
- minimum bore diameterDMIN1 1.26 inch
- shank heightH 0.905984 inch
- functional widthWF 0.669016 inch
- functional lengthLF 12 inch
- usable lengthLU 3 inch
- minimum overhangOHN 1.14 inch
- axial clearance angleALP -15 deg
- master insert identificationMIIDM 266.RL-16..
CNC Turning Cutters

T0808 Insert

Product information
Ordering code
ISO N123H2-0400-0002-CM 1125
ANSI N123H2-0400-0002-CM 1125
Material ID 5735975
Bar code 12290471

Product Description
CoroCut® 1-2 insert for parting

insert seat size codeSSCM H
insert seat size codeSSCN H
cutting widthCW 0.15748 inch
handHAND N
cutting depth maximumCDX 0.948819 inch
operation typeCTPT Medium
clearance angle majorAN 7 deg
Corner radius leftREL 0.007874 inch
Corner radius rightRER 0.007874 inch
tool style codeTSYC N123x2-CM
insert thicknessS 0.17126 inch
gradeGRADE 1125
CNC Turning Cutters

T0808 Holder

Product information
Ordering code
ISO RF123H051-12BM
ANSI RF123H051-12BM
Material ID 5740824
Bar code 12091354

Product Description
CoroCut® 1-2 shank tool for parting and grooving

- cutting depth maximum: 0.51 inch
- part 2 of cutting item interface identifiers: CUTINT_MASTER
- adaptive interface machine direction: ADINTMS
- Rectangular shank -inch: 3/4 x 3/4
- workpiece side body angle: 0 deg
- maximum overhang: 1.33799 inch
- hand: R
- coolant entry style code: CNSC
  0: without coolant
- coolant exit style code: CXSC
  0: no coolant exit
- tool style code: TSYC
  R/LF123..B (INCH)
- shank width: 0.75 inch
- shank height: 0.75 inch
- tool cutting edge angle: 90 deg
CNC Turning Cutters

T1010 Inserts

Product information
Ordering code
ISO 880-03 03 W06H-P-LM H13A
ANSI 880-03 03 W06H-P-LM H13A
Material ID 5765671
Bar code 12179731

Product Description
CoroDrill® 880 insert for drilling

insert usage code INSUC P
chip breaker manufacturer’s designation CBMD LM
operation type CTPT Medium feed
insert size and shape CUTINT_SHAPE COR: CoroDrill 880 -0303-P
inscribed circle diameter IC 0.23622 inch
insert shape code SC S
Corner radius RE 0.023622 inch
wiper edge property WEP TRUE
grade GRADE H13A
Substrate SUBSTRATE HM
coating COATING Uncoated
tool style code TSYC 880..P-LM

Product information
Ordering code
ISO 880-03 03 05H-C-LM H13A
ANSI 880-03 03 05H-C-LM H13A
Material ID 5765612
Bar code 12179720

insert usage code INSUC C
chip breaker manufacturer’s designation CBMD LM
operation type CTPT Medium feed
insert size and shape CUTINT_SHAPE COR: CoroDrill 880 -0303-C
inscribed circle diameter IC 0.224409 inch
Corner radius RE 0.019685 inch
wiper edge property WEP FALSE
grade GRADE H13A
Substrate SUBSTRATE HM
coating COATING Uncoated
tool style code TSYC 880..C-LM
insert thickness S 0.102362 inch
CNC Turning Cutters

T1010 Holder

Product information
Ordering code
ISO A880-D0750P25-03
ANSI A880-D0750P25-03
Material ID 5723690
Bar code 12075803

Product Description
CoroDrill® 880 indexable insert drill

cutting diameter DC 0.75 inch
achievable hole tolerance lower TCHAL 0 inch
achievable hole tolerance upper TCHAU 0.009843 inch
usable length LU 2.25 inch
usable length diameter ratio ULDR 3
maximum adjustment limit ADJLX 0.009843 inch
tool style code TSYC A880..Pxx-03
adaptive interface machine direction ADINTMS Cylindrical shank/clamping (US P shank) 1-inch: 1
coolant entry style code CNSC0 7: decentral over flange and axial
coolant pressure CP 145.038 lbf/in²
connection diameter DCN0 1 inch
tool cutting edge angle KAPR 88 deg
T1212 Insert

Product information
Ordering code
ISO 266RG-16UN01A120M 1125
ANSI 266RG-16UN01A120M 1125
Material ID 5757932
Bar code 12374946

Product Description
CoroThread® 266 insert for thread turning

insert seat size codeSSCM 3/8
insert seat size codeSSCN 3/8
thread form typeTHFT UN60
Thread standard referenceTHFTSR1 ISO 5864-1978
threads per inchTPI 12
tooth countNT 1
theoretical thread heightHA 0.062205 inch
thread height differenceHB 0.011024 inch
profile distance exPDX 0.055118 inch
thread tolerance classTCTR 2A
thread typeTTP EXT
handHAND R
CNC Turning Cutters

T1212 Holder

Product information
Ordering code
ISO 266RFG-123B
ANSI 266RFG-123B
Material ID 5757851
Bar code 12387546

Product Description
CoroThread® 266 shank tool for thread turning

- insert seat size codeSSCM 3/8
- insert seat size codeSSCN 3/8
- adaptive interface machine directionADINTMS Rectangular shank -inch: 3/4 x 3/4
- connection size codeCZC 3/4 x 3/4
- shank widthB 0.75 inch
- shank heightH 0.75 inch
- functional widthWF 1 inch
- functional lengthLF 4.5 inch
- axial clearance angleALP -10 deg
- master insert identificationMIIDM 266 RG-16..
- master insert identificationMIIDN 266 RG-16..
- torqueTQ 2.21269 ft lbs

[Diagram of T1212 Holder]
Notes:
1. Break all edges .015
2. All fillets .03 max
3. 125 RA max all over
4. All Surfaces must be machined
5. Unless otherwise specified, all coaxial diameters .008 B

DETAIL C
SCALE 2 : 1

DETAIL B
SCALE 3 : 1

1 3/4-12 UNF - 2A
.005 BA
(.250)

DETAIL A
SCALE 2 : 1

30° 2x
.100

SkillsUSA CNC Turning

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± .015
ANGULAR ± 1°
TWO PLACE DECIMAL ± .010
THREE PLACE DECIMAL ± .005
FOUR PLACE DECIMAL ± .0005

INTERORET GEOMETRIC TOL PER:
ASME Y14.5M 1994

MATERIAL:
6061 ALUMINUM

FINISH:
SEE NOTES

DO NOT SCALE DRAWING

TITLE
2017

SIZE
A

DWG NO
T2017

REV
-

SCALE
1:1

SHEET 1 OF 1
<table>
<thead>
<tr>
<th>Sequence</th>
<th>Cutting Parameters</th>
<th>Features</th>
<th>Points</th>
<th>Y</th>
<th>Results</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td><strong>N1</strong></td>
<td>Tool Number: T0101</td>
<td>Tip #3: .031R</td>
<td>Face</td>
<td>10</td>
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<tr>
<td></td>
<td>Tool Description: OD Turn</td>
<td>Speed: 1200 SFPM</td>
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<tr>
<td></td>
<td>Coding Instructions: Face part and leave .010&quot; for finish</td>
<td>Feed: .006 IPR</td>
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<td>Followed Instructions?</td>
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<tr>
<td><strong>N2</strong></td>
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<td>Tip #2: .015R</td>
<td>Hole</td>
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<td>Tool Description: .750 Dia. Drill</td>
<td>Speed: 2500 RPM</td>
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<td>Coding Instructions: Drill hole</td>
<td>Feed: .005 IPR</td>
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<td><strong>N3</strong></td>
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<td>Tip #2: .015R</td>
<td>ID 1 (incl radius)</td>
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<tr>
<td></td>
<td>Tool Description: ID Bore</td>
<td>Speed: 1000 SFPM</td>
<td>ID 2 (incl chamf)</td>
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<td>Coding Instructions: Rough turn all IDs; thread minor diameter 1.160 (min), 1.178 (max)</td>
<td>Feed: .006</td>
<td>ID 3 (incl chamf)</td>
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<td>Depth of Cut: .05</td>
<td>Shoulder 1</td>
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<td>X Stock to Leave: .020&quot;</td>
<td>Shoulder 2</td>
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<td>Z Stock to Leave: .002&quot;</td>
<td>Shoulder 3</td>
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<td>Tip #3: .031R</td>
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<td>Tool Description: OD Turn</td>
<td>Speed: 1200 SFPM</td>
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<td>Coding Instructions: Finish face and OD; turn back 2.250 (max)</td>
<td>Feed: .006 IPR</td>
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<td>Followed Instructions?</td>
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# Turning Score Card

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<tr>
<th>Sequence</th>
<th>Cutting Parameters</th>
<th>Features</th>
<th>Points</th>
<th>Y</th>
<th>Results</th>
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<td>N5</td>
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<td>Tool Number: T0202</td>
<td>ID Bore</td>
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<td>Coding Instructions: Finish turn all IDs; thread minor diameter 1.160 (min), 1.178 (max)</td>
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<td>Feed: .006</td>
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<td>Shoulder 1</td>
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<td>Shoulder 2</td>
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<td>Shoulder 3</td>
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<td>N6</td>
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<td>Tool Number: T0606</td>
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<td>Coding Instructions: Thread ID</td>
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<tr>
<td></td>
<td>Speed: 1800 RPM</td>
<td>Tool Description: ID Thread</td>
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<tr>
<td></td>
<td>Feed: .08333 IPR</td>
<td>I.D Thread</td>
<td>20</td>
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<td></td>
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<td>Thread Height: .0417</td>
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<td>Depth of 1st Pass: .015</td>
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<td></td>
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<td>Major Dia: 1.250</td>
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<td>Followed Instructions?</td>
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<tr>
<td>N7</td>
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<td>Tool Number: T0101</td>
<td>OD Turn</td>
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<tr>
<td></td>
<td></td>
<td>Tool Description: OD Turn</td>
<td>Part is flipped!</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Coding Instructions: Face part to length; rough and finish all ODs; thread major diameter = 1.7482 (max) 1.7368 (min)</td>
<td>Note: Part will have a minimum of .050” excess material; do not turn clamped diameter</td>
<td></td>
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<tr>
<td></td>
<td>Tip #3: .031R</td>
<td>Tool Description: OD Turn</td>
<td>Part is flipped!</td>
<td></td>
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<tr>
<td></td>
<td>Speed: 900 SFPM</td>
<td>O.A.L (face)</td>
<td>15</td>
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<tr>
<td></td>
<td>Feed: .008 IPR</td>
<td>Half ball</td>
<td>25</td>
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<tr>
<td></td>
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<td>OD 1</td>
<td>15</td>
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<td>OD 2 (taper)</td>
<td>25</td>
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<td></td>
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<td>OD 3 (incl chamf)</td>
<td>15</td>
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<td>Followed Instructions?</td>
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<tr>
<td>N8</td>
<td></td>
<td>Tool Number: T0808</td>
<td>OD Groove</td>
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<td></td>
<td></td>
<td>Tool Description: OD Groove</td>
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<tr>
<td></td>
<td></td>
<td>Coding Instructions: Turn OD groove, thread relief, and .125 radius. This is a managed sequence and does not require programming. The code is provided for you.</td>
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<tr>
<td></td>
<td>Speed: 800 SFPM</td>
<td>Tool Description: OD Groove</td>
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<td>Feed: .004 IPR</td>
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<td>Tool Number: T1212</td>
<td>Speed: 1800 RPM</td>
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<td>Tool Description: OD Thread</td>
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<td>Coding Instructions: Thread OD</td>
<td>Thread Height: .0544</td>
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<td>Depth of 1st Pass: .015</td>
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<tr>
<td></td>
<td>Minor Dia: 1.649</td>
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