### Operations List

<table>
<thead>
<tr>
<th></th>
<th>Operation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trak CNC Lathe</td>
<td>Turn radiuses, Cutoff Program 810</td>
</tr>
<tr>
<td>2</td>
<td>Trak CNC Lathe</td>
<td>Face Cleanup, Drill DRO</td>
</tr>
<tr>
<td>3</td>
<td>Buffer</td>
<td>Polish</td>
</tr>
<tr>
<td>3</td>
<td>Sherline CNC Mill</td>
<td>Mill Flutes</td>
</tr>
<tr>
<td>4</td>
<td>Trak CNC Mill</td>
<td>Engrave Name Optional</td>
</tr>
<tr>
<td>5</td>
<td>Buffer</td>
<td>Polish</td>
</tr>
</tbody>
</table>

---

**Prog 810 notes**

- **Dimensions**:
  - Fractional: 1/32
  - Angular: Mach .5 Bend ± .01
  - Two place decimal: .01
  - Three place decimal: .005

- **Material**: Clear Acrylic
- **Finish**: None
- **Comments**: Remove all sharp edges and burrs

---

**Engineering Notes**

- **Scale**: 1:2
- **Weight**:
- **Sheet**: 2 of 6
<table>
<thead>
<tr>
<th>OPERATIONS LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

**Prog 710 notes**

**DETAIL C**

SCALE 2 : 1

**CENTER DRILL**

**CHAMFER 60 DEG X.040**

**7/16-20 UNF THREAD**

**.062 GROOVE .360 DIA**

**.062 GROOVE .360 DIA (TO AID MILLING)**

**UNLESS OTHERWISE SPECIFIED:**

- Dimensions are in inches
- Tolerances: Fractional ± 1/32“, Angular: Mach .5 Bend ± .01 Two place decimal ± .005 Three place decimal ± .0005
- Interpret drawing per: ASME Y14.5-1994
- Material: Steel
- Finish: 
- Comments: Remove all sharp edges and burrs

**CNC turned shaft**

**SCALE: 1:1**

**Sheet 3 of 6**

**SIZE**

**Part A**

**PART REV**

**DOC REV**

**QUAL APPR.**

**ENG APPR.**

**MFG APPR.**

**CHECKED**

**D&G**

**DRAWN**

**EJJ**

**DATE**

**7/16/09**

**7/16/09**
OPERATIONS LIST

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<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trak Mill Machine blade shape/trim end</td>
</tr>
<tr>
<td>2</td>
<td>Torch/casenite Heat treat and temper blade</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; belt sander Polish blade faces</td>
</tr>
<tr>
<td>4</td>
<td>emery cloth Polish</td>
</tr>
</tbody>
</table>

4.37°  .040

.125 REMOVE CENTERDRILL MATL

1.38  .50

.25

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/32"
ANGULAR: MACH ± .5 BEND ± .01
TWO PLACE DECIMAL ± .005
THREE PLACE DECIMAL ± .000

INTERPRET DRAWING PER: ASME Y14.5-1994

MATERIAL: Steel
FINISH
REMOVE ALL SHARP EDGES AND BURRS

Finished Blade Shaft

SMITH COLLEGE

SIZE Part   PART REV DOC REV
A 3   3

SCALE: 1:1 WEIGHT:  SHEET 4 OF 6

DRAWN EJJ  7/16/09
CHECKED D&G  7/16/09
ENG APPR. D&G  7/16/09
MFG APPR.
QUAL APPR.

COMMENTS:
**OPERATIONS LIST**

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<tbody>
<tr>
<td>1</td>
<td>Saw</td>
<td>Cut stock to 5 inch length</td>
</tr>
<tr>
<td>2</td>
<td>Engine Lathe</td>
<td>Face end/Countersink</td>
</tr>
<tr>
<td>3</td>
<td>Engine Lathe</td>
<td>Drill</td>
</tr>
<tr>
<td>4</td>
<td>Engine Lathe</td>
<td>Tap (Use tap guide, tailstock)</td>
</tr>
<tr>
<td>5</td>
<td>Engine Lathe</td>
<td>Turn Diameter (use tailstock)</td>
</tr>
<tr>
<td>6</td>
<td>Engine Lathe</td>
<td>Cutoff (use spacer blocks)</td>
</tr>
</tbody>
</table>

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**UNLESS OTHERWISE SPECIFIED:**

- **DIMENSIONS ARE IN INCHES**
- **TOLERANCES:**
  - FRACTIONAL: ± 1/32"
  - ANGULAR: MACH ± 0.5 BEND ± 0.01
  - TWO PLACE DECIMAL ± 0.01
  - THREE PLACE DECIMAL ± 0.005

**INTERPRET DRAWING PER:** ASME Y14.5-1994

**MATERIAL:**

Black Water Pipe

**FINISH:**

- REMOVE ALL SHARP EDGES AND BURRS

---

**NAME**

<table>
<thead>
<tr>
<th>DRAWN</th>
<th>CHECKED</th>
<th>ENG APPR.</th>
<th>MFG APPR.</th>
<th>QUAL APPR.</th>
<th>COMMENTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>EJJ</td>
<td>D&amp;G</td>
<td></td>
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<tr>
<td></td>
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**DATE**

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<th>DRAWN</th>
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<th>ENG APPR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/16/09</td>
<td>7/16/09</td>
<td></td>
</tr>
</tbody>
</table>

**SIZE**

A

**SCALE:** 1:1

**WEIGHT:**

---

**DOC REV**

1

**PART REV**

3

**SHEET:** 5 of 6

---

**Smith College**

**Tube**

- Ø .391 THRU ALL
- 7/16-20 UNF
- Ø .481 X 60°, NEAR SIDE
OPERATIONS LIST

1. Saw
   Cutoff 2-5/8 inch length

2. Engine Lathe
   Face/chamfer one end

3. Engine Lathe
   Turn Grooves

4. Engine Lathe
   Knurl

5. Trak CNC Lathe
   Radius head, Program 910

6. Bridgeport
   Drill/Ream (use fixture block to locate centers)

UNLESS OTHERWISE SPECIFIED:

- MATERIAL: Steel
- FINISH: Remove all sharp edges and burrs

DIMENSIONS ARE IN INCHES
TOLERANCES:
- FRACTIONAL: ± 1/32
- ANGULAR: MACH ± .5 BEND ± .01
- TWO PLACE DECIMAL: ± .005
- THREE PLACE DECIMAL: ± .000

INTERPRET DRAWING PER: ASME Y14.5-1994

QUAL APPR.
MFG APPR.
ENG APPR.
CHECKED
DRAWN

Hammer Head

A

1/16/09
7/16/09
7/16/09

D&G
EJJ

SAE SCALE: 1:1
WEIGHT:
SHEET 6 OF 6