Customer: [redacted]
Machine Used: TensileMill CNC – Classic Upgrade Model
Date: [redacted]
Prepared By: [redacted]

Supplied Material:
[redacted] provided the following components for machining:

1. 73 mm OD round pipe with a 2 mm wall thickness
2. 100 mm x 100 mm square tube with a 3.4 mm wall thickness

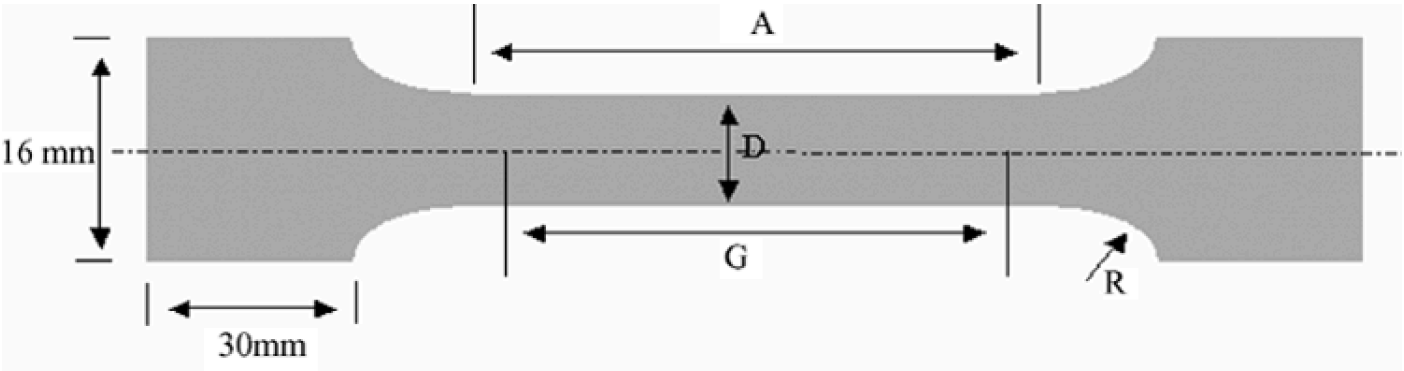
Machining Conditions:
The demo machine was operated without coolant. All parts were machined dry, using compressed air to cool the end mill and remove chips from both the cutting tool and the workpiece. Although acceptable results were achieved, the use of coolant may yield improved performance and surface quality.
All parts were machined using the PLATE system within the TensileMill CNC Software, using a custom program for Type 7 rectangular specimens.

Process Notes:

- The primary machining challenge was the low rigidity of the thin-walled tubes, which resulted in considerable chatter during cutting.
- To address this, a 1/8” diameter tool was used in combination with the Full Depth Milling technique. This method reduces vibration by using shallow lateral cuts rather than multi-stage grooving. The approach involves first drilling a hole using helical machining, then widening it laterally.
- Standard cutting parameters were used during testing. However, the customer may reduce machining time and improve results by optimizing feeds, speeds, and tooling for continuous production.
- The round specimen was successfully machined, though further refinement is possible to improve cut tolerances. The part tended to flex during cutting, affecting consistency along the 1” width.
- The square tube could not be successfully machined due to its insufficient length. The required specimen length was 12.25” (311.15 mm), but the part lacked the necessary support at both ends. For future operations, it is recommended to have at least 1.5” of additional material at each end to prevent deformation and tool damage.

Machining Parameters:

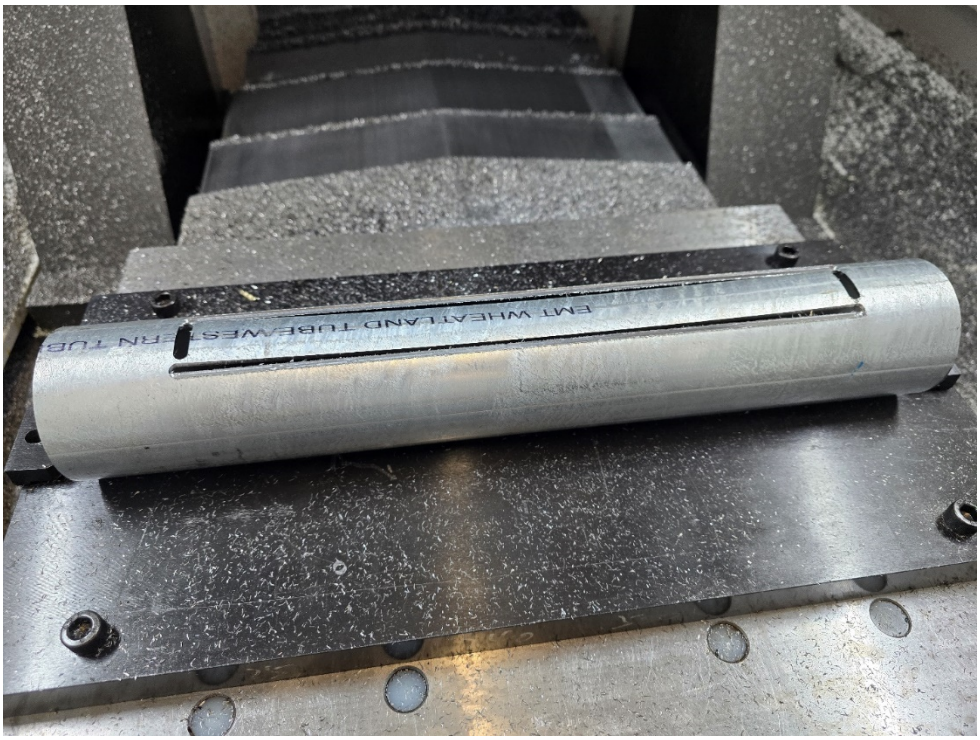
- **Tool:** 1/8" x 1/2" x 1-1/2" WISP-R-MILL, 3-Flute, ZrN Coated End Mill
- **Cutting Surface Speed:** 230 m/min (23,000 RPM)
- **Feed Rate:** 0.09 mm/rev (2000 mm/min)
- **Width of Cut (per pass):** 0.25 mm
- **Specimen Dimensions:** 311.15 mm (L) x 25.4 mm (W)
- **Cycle Time:** Approximately 20 minutes per specimen
- **Standard:** ASTM E8

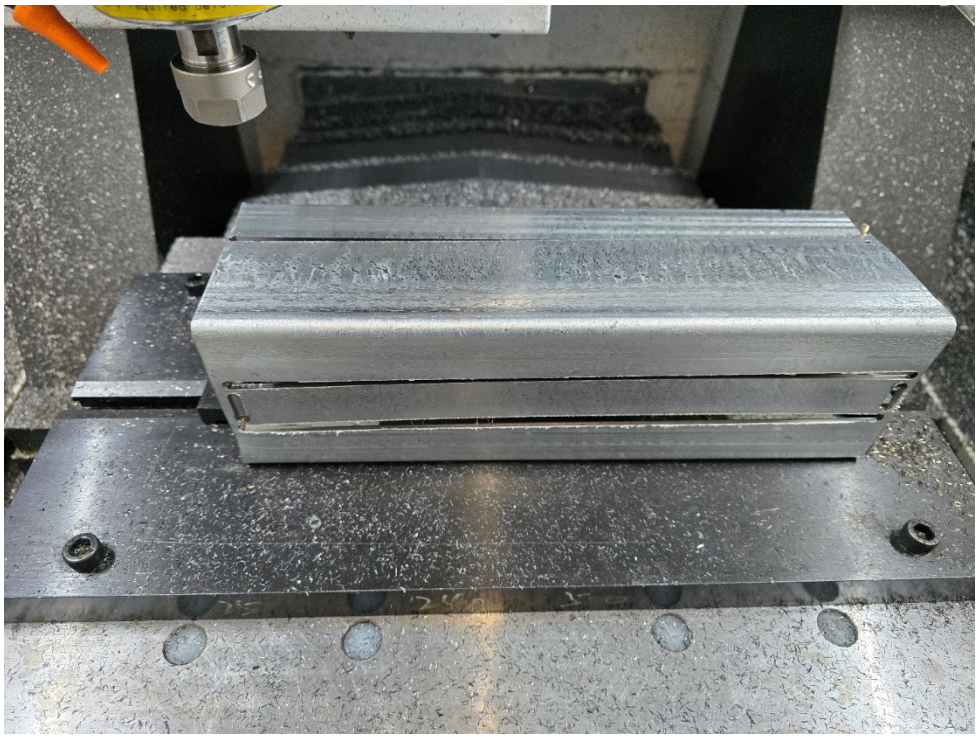


ASTM E8 Schematic Representation

Photographic Documentation:

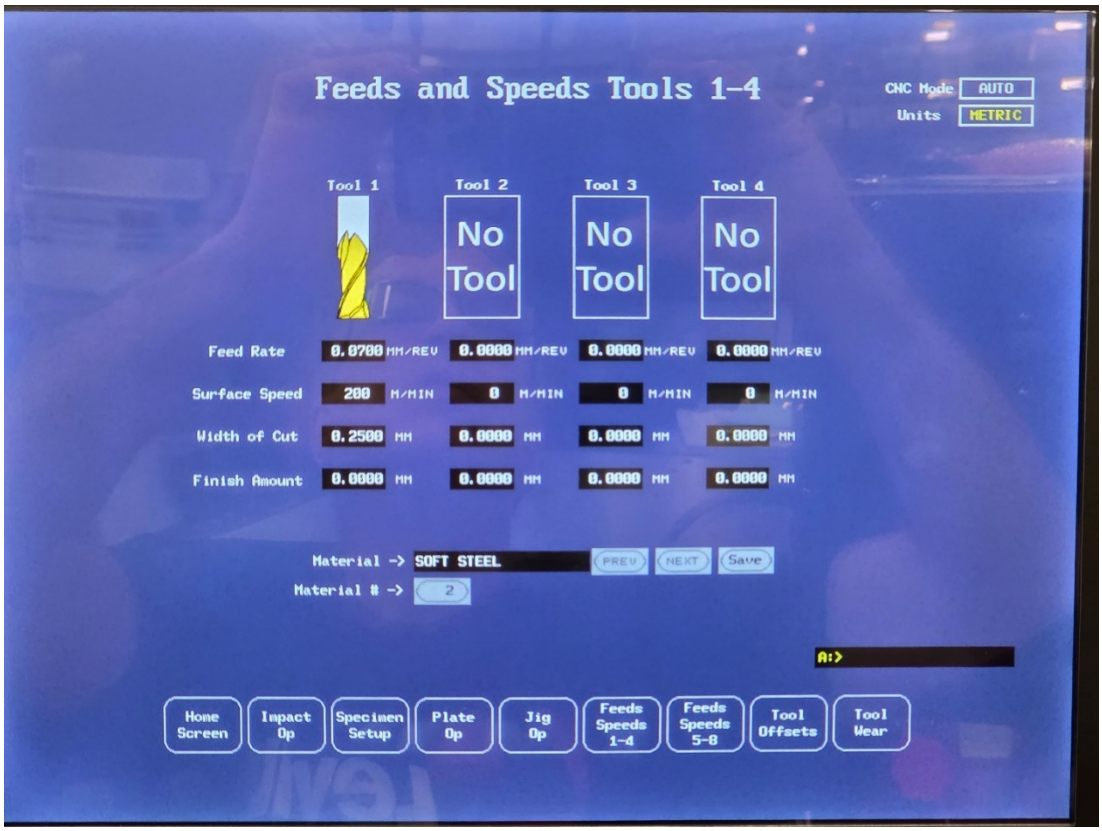
The following section includes various images capturing different stages of the machining process.

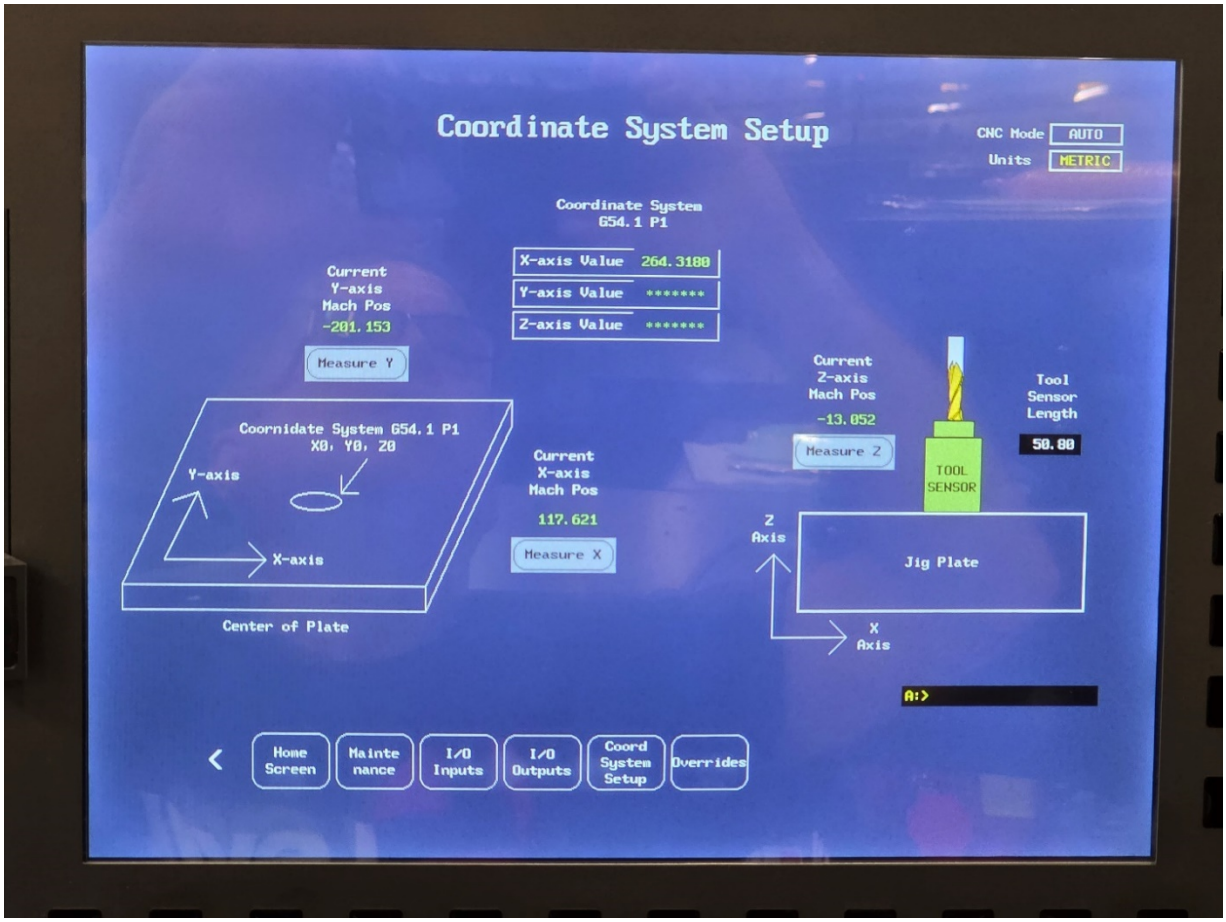




Machining Instructions:
Set up Cutting Conditions:

- Feed Rate = 0.09
- Surface Speed = 230
- Width of Cut = 0.25
- Finish Allowance = 0





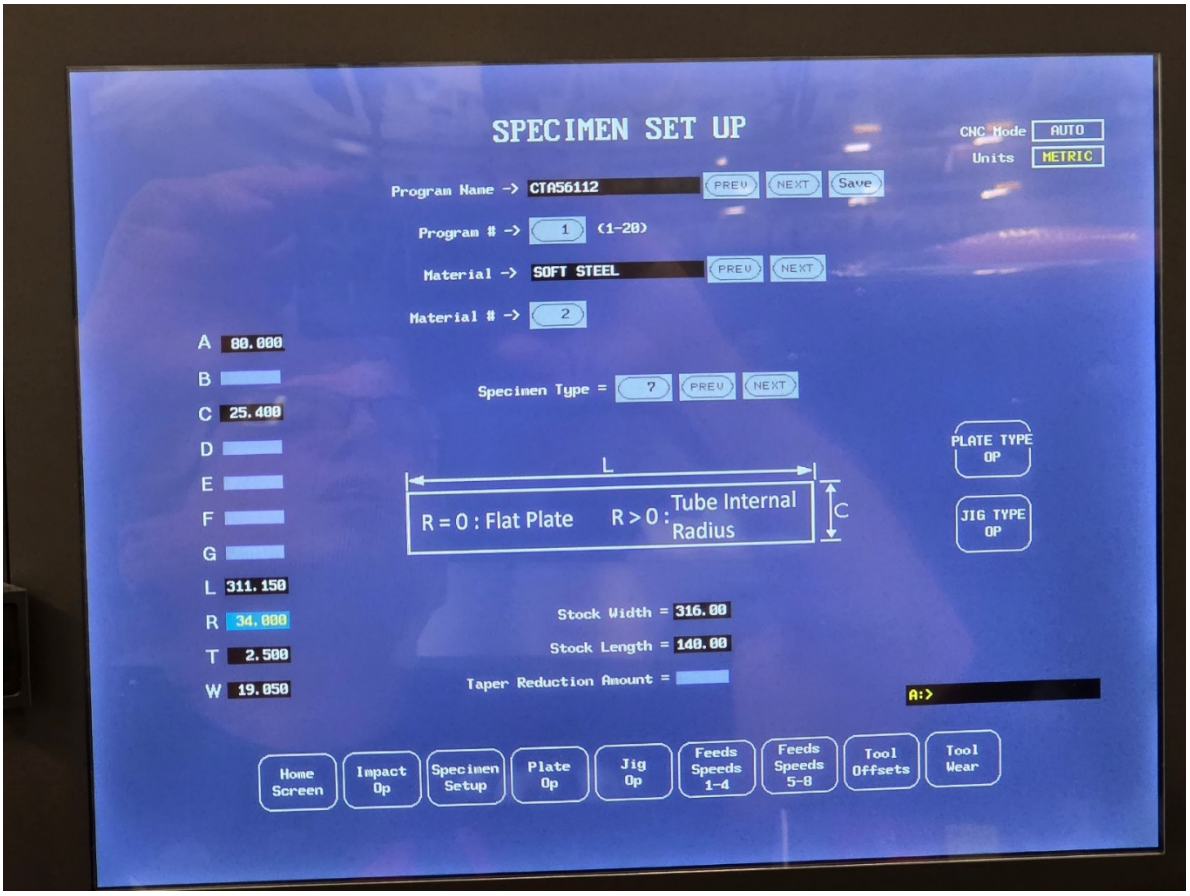
Setup Jig:

Position the tool at the center of the part and touch the height sensor in the Z-axis. Then click on:

- Measure X
- Measure Y
- Measure Z

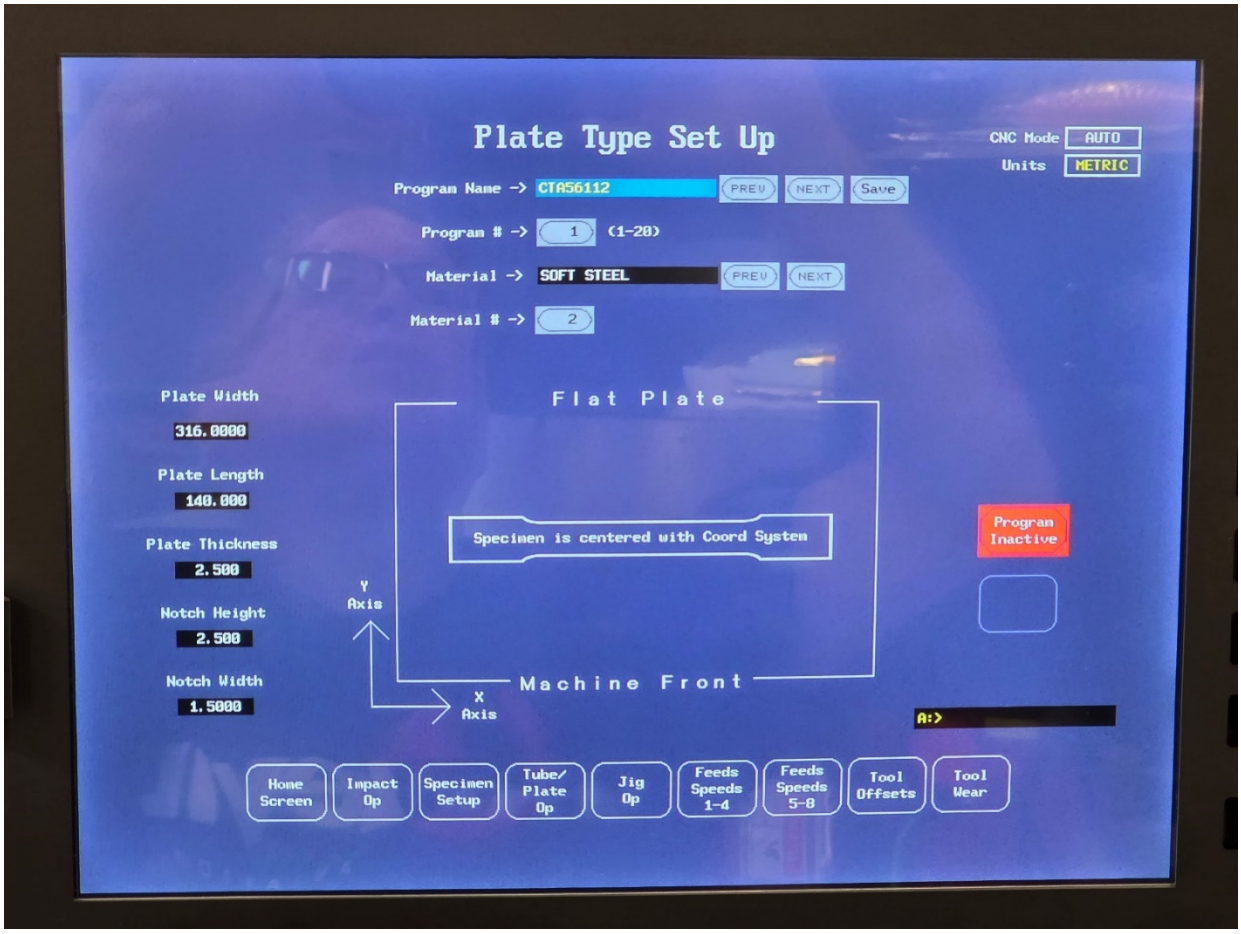
Program Specimen (Specimen Setup Screen):

- C = 25.4
- L = 311.15
- T = 2.5



Set up Plate:

- Plate Width = 316.0 mm
- Plate Length = 140 mm
- Plate Thickness = 2.5 mm
- Click on Program Inactive



Operation Steps:

- Set Mode to AUTO
- Press Program Inactive (or Program Active)
- Press Simulate Cutting
- Press SIMULATE
- Press REWIND
- Press START
- After the simulation finishes, press CYCLE START to begin machining the specimen