

Customer:

Machine Used: TensileMill CNC – Classic Upgrade Model

Date:

Prepared By:

Supplied Material:

- 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.

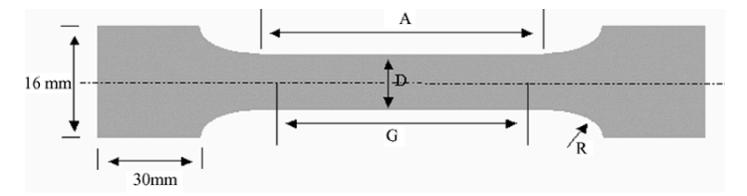






Machining Parameters:

- 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



2220 Meridian Blvd., Suite #AF937, Minden, NV, 89423, USA
11407 SW Amu St., Tualatin, OR, 97062, USA
4071 L.B. Mcleod Rd. Ste D PMB 34, Orlando, FL, 32811, USA
847 Sumpter Road, Belleville, MI, 48111, USA
918 16 Ave NW, Calgary, AB, T2M 0K3, Canada

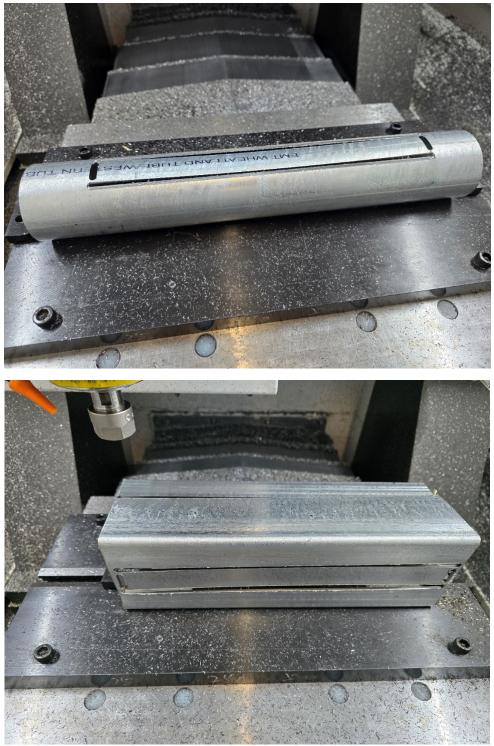


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Photographic Documentation:

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





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Machining Instructions: Set up Cutting Conditions:

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

2 1	Feeds and Sp	eeds Tools 1-	-4 CNC Hode AUTO Units NETRIC		
	Tool 1 Tool 2 NO TOOL	Tool 3 Too No No Tool To	0		
Feed Rate	0. 0700 MM/REV 0. 0000 M	M/REV 0.0000 MM/REV 0.0	0000 MM/REV		
Surface Speed	200 M/MIN 0	17MIN 0 H7MIN	0 M/MIN		
Width of Cut	0.2500 MM 0.0000	нн 0.0000 мм 0.0	3000 MM		
Finish Amount	0.0000 MM 0.0000	MM 0.0000 MM 0.0	000 MM		
Material -> SOFT STEEL (PREV) (NEXT) Gave) Material # -> 2					
			A:>		
Hone Screen Inpact Op	Specimen Setup Op	Jig Op Peeds 1-4 Speeds 5-8	Tool Offsets Wear		





TensileMill



Setup Jig:

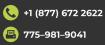
Position the tool at the center of the part and touch the height sensor in the Z-axis. Then click on:

- Measure X
- Measure Y
- Measure Z

Program Specimen (Specimen Setup Screen):

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







SPECIMEN SET UP Program Name -> CTA56112 PREV NEW Save Program # -> 1 (1-20) Meterial -> SOFT STEEL PREV NEWT
Haterial # → 2 A 88.600
C 25.400
E ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■
G 111.159
R 34,000 Stock Width = 316.00
T 2.500 Stock Length = 149.00
W 19.050 Taper Reduction Amount = All
Home Screen Impact Op Setup Plate Op Op Feeds I-4 Feeds Speeds S-8 Offsets Tool Wear

Set up Plate:

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







TensileMill

	Plate Type Set Up 🛛 🛁	CNC Mode AUTO Units METRI
	Program Name -> CTA56112 PREV (NEXT) (Save)	
	Progran # -> 1 (1-28)	
	Material -> SOFT STEEL	
	Material # -> 2	
Plate Width	Flat Plate	
316.0000		
Plate Length		
140.000		Program
Plate Thickness 2.500	Specimen is centered with Coord System	
Y Notch Height Axi	s	
2.500		
Notch Width	Machine Front	
1, 5000		
	Tuber	
Home Imp Screen 0	act Specimen Plate Jig Speeds Speeds Offerste	Tool Wear

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



