LCSGW? Tube – Manufacturing Procedure

Boring cut is an inside turning cut

WATCH THE VIDEO!
(Lathe Operations)
https://youtu.be/T-IBWwnVPLM

1) **Cut a piece of ø1.0" ID X ø1.5" OD 6061-T6 aluminum alloy hollow round bar to a length of 6" on the bandsaw.** *(7:11)*
Tools used: Combination square

Feed rate → IPR
roughing 0.008" - 0.01"
finishing 0.003" - 0.005"

Turning Cut ← Z axis
Facing Cut ↑ X-axis

Lathe Operations:

Mount stock in a 3-jaw chuck on the lathe with 4.5" stick-out.

2) **Face one side to clean.** *(9:13)* steps 2-6 → 533 RPM
Tools used: 6" rule, HSS turning tool, WD-40 lubricant, digital readout

3) **Turn ø1.5" stock OD MINIMUM to 100% clean surface. Cut at least 4" length.** *(9:49)*
Tools used: HSS turning tool, digital readout 1.484"

Flip part around and remount with 3" stick-out. *From this point on, use copper shims between part and chuck jaws to protect machined surfaces.*

4) **Face opposite side to clean.** *(11:52)*
Tools used: 6" rule, HSS turning tool, WD-40 lubricant, digital readout

Remove part, measure length with dial caliper, remount with 3" stick-out.

5) **Face to 5.8" overall length.** *(12:32)*
Tools used: 6" rule, HSS turning tool, WD-40 lubricant, digital readout, dial caliper

6) **Turn ø1.38" to 2.0" from end.** *(14:18)*
Tools used: HSS turning tool, WD-40 lubricant, digital readout, 1-2" micrometer

Inside feed straight on

7) **Use .002" shim to touch off chamfering tool on ø1.38" surface. Blend 45° chamfer at transition between ø1.38" and ø1.5" surfaces.** *(19:20)*
Tools used: .002" shim, HSS chamfering tool, WD-40 lubricant

8) **Drill ø1.06" through center of part at least 4.5" deep.** *(20:07)*
Tools used: 1-1/16" HSS twist drill, morse taper adapter (if required), WD-40 lubricant

too big

453 RPM Min

9) **Bore ø1.125" X 1.00" deep.** *(21:04)*
Tools used: 5/8" boring bar with CCGX-3(2.5)1 (or -2) carbide insert, WD-40 lubricant, digital readout, 1-2" micrometer, telescoping gage (size B)

of ø1.107 +0.006 1.125

10) **Break inside edge .015" max.** *(24:33)*
Tools used: HSS chamfering tool, WD-40 lubricant, digital readout

11) **Cut .03" X 45° external chamfer.** *(25:12)*
Tools used: HSS chamfering tool, WD-40 lubricant, digital readout

Flip part around again and remount with 2" stick-out.

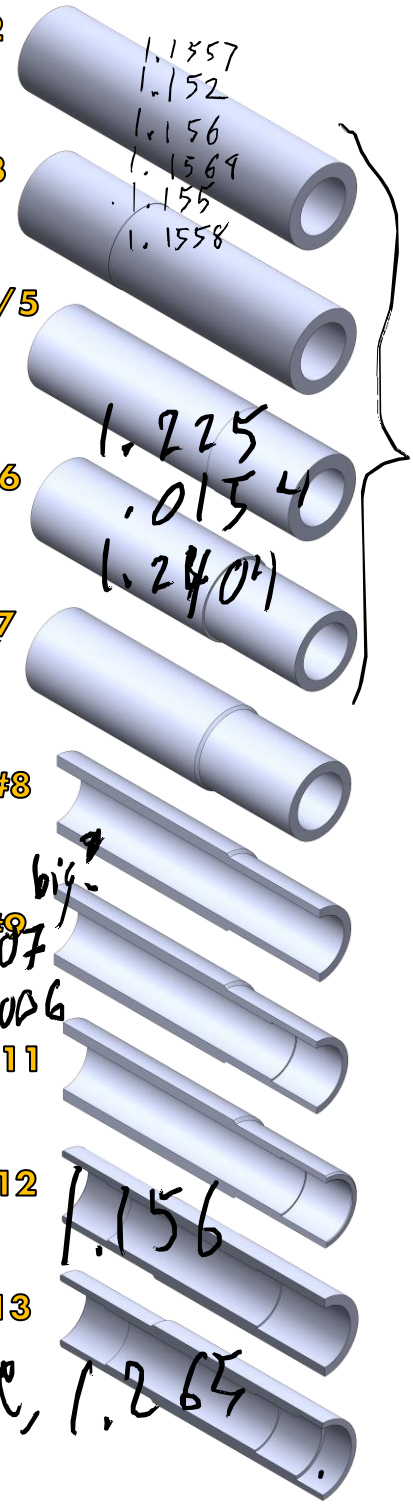
12) **Bore ø1.13" X 1.5" deep.** *(25:38)*
Tools used: 5/8" boring bar with CCGX-3(2.5)1 (or -2) carbide insert, WD-40 lubricant, digital readout, 1-2" micrometer, telescoping gage (size B)

This is too large, but ok

13) **Bore ø1.265" X .588" deep.** *(27:35)*
Tools used: 5/8" boring bar with CCGX-3(2.5)1 (or -2) carbide insert, WD-40 lubricant, digital readout, 1-2" micrometer, telescoping gage (size B)

[ ] → 267 RPM

✓ → 2832 RPM



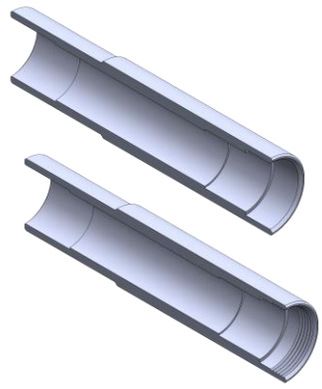
14) **Cut .05” X 45° internal chamfer.** *(28:40)*
Tools used: HSS chamfering tool, WD-40 lubricant, digital readout

15) **Cut .03” X 45° external chamfer.** *(28:59)*
Tools used: HSS chamfering tool, WD-40 lubricant, digital readout

16) **Tap 1-5/16-16 UNS 2B threads .3” deep.** *(29:10)*
Tools used: 1-5/16-16 UNS HSS plug tap, tap handle, spring-loaded tap guide, drill chuck, WD-40 lubricant

#14/15

#16

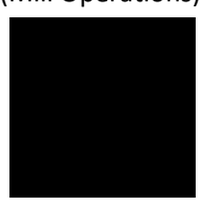


Milling Machine Operations:

4 x C 5

Install indexing head on table and ensure it is properly aligned to the table travel. Mount part in chuck with smaller OD in jaws and with 4” stick-out. (Use copper shims!) Lightly support end of part with screw jack on table.

WATCH THE VIDEO!
(Mill Operations)



COMING SOON!

17) **Using edgefinder, touch both sides of part OD to find center and then touch end of part to find edge. Position spindle 3.22” from end of part.** ***Do NOT forget to add radius of edgefinder when locating an edge.***
Tools used: Edgefinder, drill chuck, digital readout

≤1000 RPM?

18) **Spot hole for ¼-20 UNC 2B threads.** → 600-1000 RPM
Tools used: #3 HSS center drill, drill chuck, WD-40 lubricant, digital readout

19) **Drill hole for ¼-20 UNC 2B threads.** → 2388 RPM
Tools used: #7 HSS drill, drill chuck, WD-40 lubricant, digital readout

20) **Countersink hole for ¼-20 UNC 2B threads.** → 480 RPM ?
Tools used: 1/2” X 90° HSS countersink, drill chuck, WD-40 lubricant, digital readout

#18-20, 26

21) **Position spindle .775” from end of part.**
Tools used: Digital readout

22) **Spot drill first hole for #6-32 UNC 2B thread.** → 600-1000 RPM
Tools used: #3 HSS center drill, drill chuck, WD-40 lubricant, digital readout

23) **Pre-drill first hole for #6-32 UNC 2B thread.** → 4486 RPM (3000 Tap RPM)
Tools used: #36 HSS drill, drill chuck, WD-40 lubricant, digital readout

Loosen screw jack, index part 120 degrees, reapply screw jack and repeat steps 22 & 23. Then index part another 120 degrees and repeat steps 22 & 23 again.

24) **Countersink first hole for #6-32 UNC 2B thread.** → 480 RPM
Tools used: 1/2” X 90° HSS countersink, drill chuck, WD-40 lubricant, digital readout

#22-25

Loosen screw jack, index part 120 degrees, reapply screw jack and repeat step 24. Then index part another 120 degrees and repeat step 24 again.

25) **Tap first hole for #6-32 UNC 2B thread.**
Tools used: #6-32 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout

Loosen screw jack, index part 120 degrees, reapply screw jack and repeat step 25. Then index part another 120 degrees and repeat step 25 again.

26) **Tap hole for ¼-20 UNC 2B thread.**
Tools used: ¼-20 HSS plug tap, tap wrench, spring-loaded tap guide, drill chuck, WD-40 lubricant, digital readout

For spotting, same speed and tool
for drilling, single → #7 HSS drill, Ø0.201”
triple holes → #36 HSS Ø0.107”