

10/2020
Steven Hull

Machine: ST-20 CNC lathe

Work Instruction: Butterfly, Machined

Machine time: 40 minutes **CONFIRMED**

Operation #1

Material: INCONEL 718 butterfly rough castings

Tooling Box: 106

Chucking pressure: 350 PSI

(Use setting graph 76 chuck pedal lock-out)

Tailstock pressure: 220 PSI

Tooling as follows:

Tool 1 - Rough turn #1	CNMG 432 AH120
Tool 2 - Rough turn #2	VNMG 332 AH120
Tool 3 - Finish turn	VNMG 332 AH120
Tool 4 - Rough groove	HTN MW120319 01 323F
Tool 5 - OD groove	KCTP-3R TC-60
Tool 6 - Finish groove	HTN MW120319 01 323F
Tool 7 -	
Tool 8 -	
Tool 9 -	
Tool 10 -	
Tool 11 -	
Tool 12 -	

N1 - The tailstock rapids to 18.". Orient the casting with the slot in the live center. Press cycle start, and the tailstock then feeds to 18.5" (until it is against the center). Make sure to keep the center aligned with the fixture until the part is fully restrained.

N2 (T101) - Rough turn o/s to 1.900 dia.

N3 (T202) - Rough turn the 1.858 \pm .002 spherical dia to 1.868

N4 (T303) - Finish turn the 1.858 \pm .002 spherical dia to size.

N5 (T404) - Rough groove the .035 \pm .0015 X 1.565 \pm .005 to 1.570.

N6 (T505) - Break the edges of the groove to .007/.008 x 45°.

N7 (T606) - Finish groove the .035 \pm .0015 X 1.565 \pm .005 to size.

M00 - Deburr the OD & groove with 240 grit to remove any residual burrs.

N8 - Retract tailstock & remove part.

NOTES:

1. The part locates on the 2 tooling bosses on the castings.
2. The groove inserts are custom ground from Horizon Tool. Lead time is 12 weeks, so make sure to always keep 10 in tooling inventory.
3. Change the rough groove insert every 18-24 parts and the finish groove every 60 parts.
4. Macros programming is implemented in this program to facilitate tracking insert usage. The way this works is that the two rough turn inserts are tracked in GLOBAL VARIABLE 500, and the finish turn insert is tracked in GLOBAL VARIABLE 501. BE SURE TO ZERO BOTH OF THESE VARIABLES AT THE START OF THE JOB.

For the rough inserts, the macros will set an alarm every two parts for the rough turn insert corner with an alarm message `'1015 CHANGE ROUGH INSERTS'`. When this alarm sets, CHANGE THE INSERTS TO A NEW CORNER, then RESET the machine and continue running.

For the finish insert, the macros will set an alarm every six parts with an alarm message `'1016 CHANGE FINISH INSERT'`. When this alarm sets, follow this procedure:

1. RESET the machine.
2. Change the insert to a new cutting corner.
3. Press cycle start. The machine will automatically reset T303 offsets with the ATP.
4. Load a casting and press cycle start.