STANDARD PROCESS INSTRUCTIONS

No.	REVISION	DATE	APPROVED	SINTERED SPECIALTIES DIVISION		
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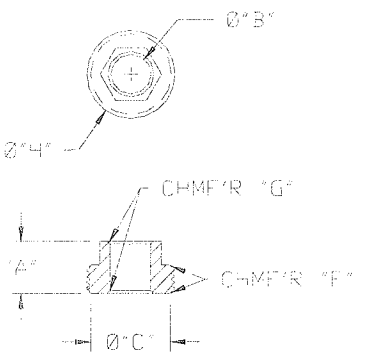
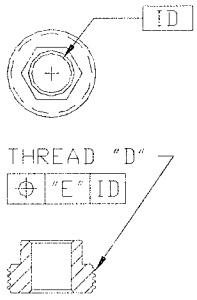
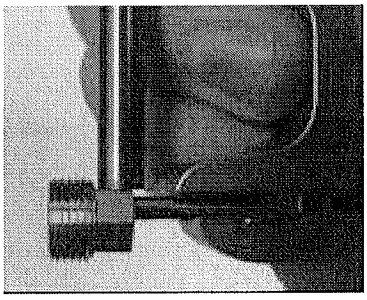
CNC LATHE MONITOR:

Dimensions	Gauging	Frequency	Comments
Dim. "B": I.D. **Ø .263" / .266"**	Split Ball Gauge & Plug Gauges	1 pc./ 24 pcs. **4336turn-spc** **Run Chart**	Use split ball gauge to get a SPC data. Check the part with the Go/No-Go gauges to verify the gauge. **Check both the top and bottom of the part with plug gages to verify the hole size.**
Dim. "A": OAL **0.342" / 0.350"**	DHI or 0-1" Mic.		Use a Ø1/2" flat bottom tip. Check in one spot. Sand top & bottom surfaces if there are burrs.
Dim "H": OD **Ø.582" / .588"**	0-1" Mic		Measure the thread OD. Operators may need to compare turned OD sizes to threaded OD sizes.
Thread Pitch Ø: **-0.04 / -.095 mm**	Fowler Thread Trend Gauge		Zero out gage with Full Form master roll. Engage part and turn for ¼ turn CCW or CW. Record value.
Dim. "C": Chamfer Ø **Ø .522" / .530"**	Optical Comp. w/ 20X lens	1 pc./ 24 pcs. **4336turn-spc** Data Sheet	Check a minimum of eight datum points to calculate the chamfer diameter. Or measure across X- & Y-axes.
Dim. "D": Thread **M15 x 1 – 6g**	Go / No-Go Thread Gauges		Parts **must** thread down for 2 full turns beyond the last thread in Go side. Only 2 full turns permitted on No Go side.
Dim. "E": True Position **.0030" Max.**	Multi-Anvil Mic.	1 pc./ 4 Hrs. **4336turn-spc** Data Sheet	Measure in (4) spots, each approximately 90° apart. Check wall thickness from ID to thread OD. True Position = Max. Value – Min. Value
Dim. "F": Thread Chamfer **40° / 50° (2 Places)**	Optical Comp. w/ 20X lens		Place part on a pin in a V-block & place on the comparator. Don't check the threads. Use them to line up the part to check the chamfer angle.
Hex Size: **0.346" / 0.354"**	0-1" Mic.		Check all (3) sides of the part. Record all (3) sizes in the SPC sheet.
Dim. 'G": I.D. Chamfers **.015"/.025" x 40°/50°**	Optical Comp. w/ 20X lens		The back chamfer should have a smooth transition to the ID. – No burrs allowed! (*See pictures on the following pages*)
Chamfers blend smoothly to threads	Magnification (10X Min.)	1 pc./ 24 pcs. **4336turn-spc**	Reference: Customer standard **SVS-00047**
Hex-end I.D. burr			No string burrs on the ID chamfer at the hex end.
True Position: ID to hex: **.0060" Max.**	Multi-Anvil Mic or Pin, V-Block, & DHI	Once at Setup & at start of shift.	Measure in (6) spots, once on each hex flat. Measure the hex wall thickness. True Position of Hex = Max. Value – Min. Value.
Clean Fowler Gauge	Visual	Every 4 Hours	Clean Fowler gage rolls. General Instructions **HERE**







NEXT OPERATION: LATHE OPERATOR

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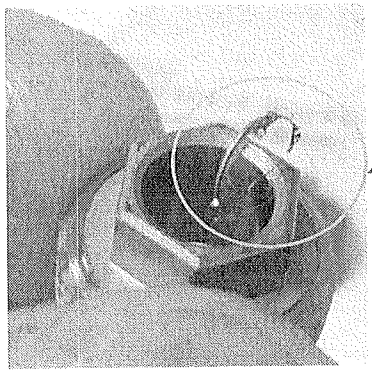
Part Name: [redacted]

Customer: [redacted] **P/N:** [redacted]

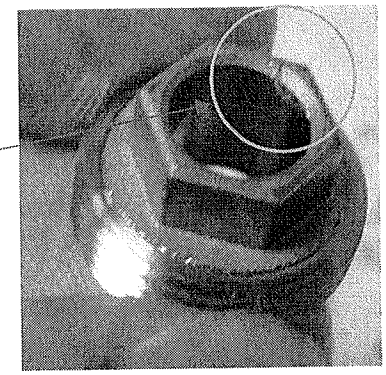
Machine: Wasino CNC Lathe **Rate**: 116 /Hr.
Machine: Other CNC Lathes **Rate**: 60 - 175
Material/ Mix: MS-9056

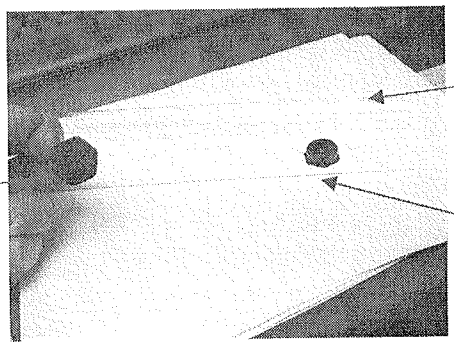
CNC LATHE OPERATOR/MONITOR:

1. Use the totes in order. Tote numbers are listed on the lot cards taped to the totes.
2. Any parts still stuck together from sintering may be broken apart for use.
3. Place around ½ to 1 tote of parts in the bowl feeder.
4. Inspect (10) parts for all features prior to starting the production run.
5. Record all data in 4336turn-spc.
6. Inspect the last part per stocker pin for the 1 in 24 checks to confirm that the rest of the posts parts are acceptable. If one feature is out of specification, 100% all parts on that post and any later parts already produced for that feature.
7. When changing inserts, inspect the last part made by the old insert and the first part from the new insert for the features being controlled by that insert.
8. Manually blow off the stack of parts to remove as much machine coolant as possible prior to packaging.
9. Slide the transfer tube and packing tube over the completed stack of parts when they are done. Flip the stack with the tubes and remove them. Then place a wooden dowel in the center before removing the packing tube.
10. Follow packaging instruction on the last page.



When visually inspecting Dimension "G", operators should look carefully to make sure that there is no evidence of raised or hanging burrs on the hex end of the part at the I.D. Use magnification if you are unsure that a burr exists!!!





Ø3/4 x 8.5" Lg. Clear Plastic Tube Open on Both Ends

¾" Hex Cap – (2) Req'd Per Tube. At assembly, caps **must** be fully seated.

Ø1/8 Wooden Dowel – (1) Req'd Per Tube.

NEXT OPERATION: LATHE TOOL ADJUSTMENTS

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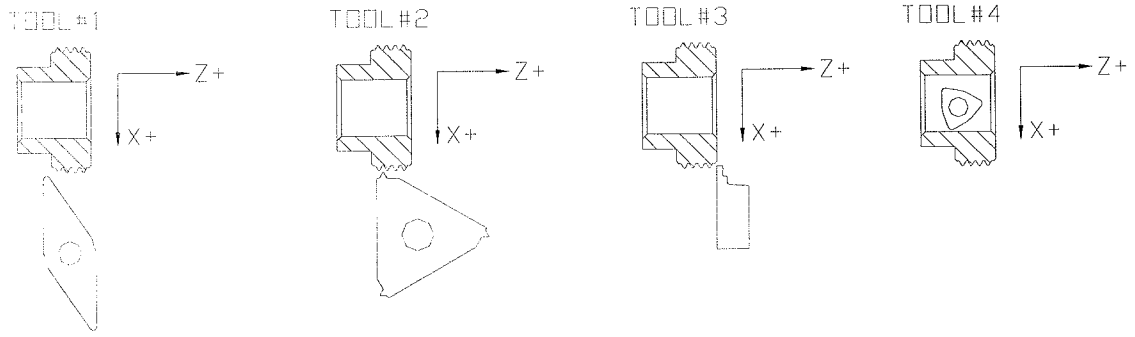
CNC LATHE TOOL ADJUSTMENTS (Wasino):



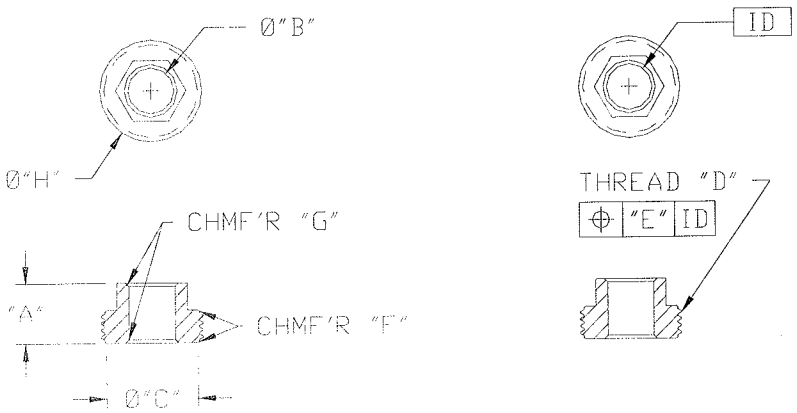
Tool #1: Face & OD:
Offset T1 → X+ will make the Thread O.D. bigger, & Z+ will increase Overall Length "A".

Tool #2: Threader:
Offset T2 → X+ will make the Threads "D" larger in size (e.g. larger Pitch Ø). When the parts start getting tight on the gage or towards the control limits measured by the Fowler Thread Trend gage, make your offset (X- to decrease Pitch Ø, X+ to increase Pitch Ø). Do not wait for them to go out of tolerance.

Tool #3: Thread Chamfers (Deburring Tool):
Offset T3 → Z+ will make the Hex side Chamfer "F" bigger
Offset T4 → Z- will make the Face side Chamfer "F" bigger and "ØC" smaller.

Tool #4: ID & Front ID Chamfer:
Offset T5 → X+ will make the Bore "B" larger & Z- will make the face I.D. Chamfer "G" bigger.

- True Position "E" is controlled by the chuck runout and by the loader jaws (e.g. loading parts out of alignment will negatively affect the true position.).
- The 45° Thread Chamfer angle is controlled in the CNC program.



NEXT OPERATION: QUALITY AUDIT & PACKAGE