

SkillsUSA

2015 Contest Projects

CNC Technician

Click the “Print this Section” button above to automatically print the specifications for this contest. Make sure your printer is turned on before pressing the button.

Scored By: _____

Contestant #

--

Specification	Value (points)	✓
N1 rough Face (.020 on Z axis)	10	
N2 rough outside Profile and large Pocket (no points , codes are provided)		
N3 finish Slot/Groove	25	
N4 rough small Pocket (no points , codes are provided)		
N5 drill for reamed Holes	10	
N6 drill for tapped Holes	10	
N7 chamfer for tapped Holes; chamfer edges of Profile and Pocket	25	
N8 ream Holes	10	
N9 finish Full Radius Pockets (ball milling)	40	
N10 finish floor of large Pocket (no points , codes are provided)		
N11 finish outside Profile	25	
N12 finish large and small Pocket	25	
N13 tap Holes	10	
N14 finish Face	10	

Total Points Earned: _____

Total Possible Points: 200

Scored By: _____

Contestant #

--

Specification	Value (points)	✓
N1 rough Face (.010 on Z axis)	10	
N2 drill Hole	10	
N3 rough ID Bore (-.020 on X axis and .003 on Z axis)	30	
N4 finish ID Groove (thread relief)	30	
N5 finish ID Thread (check program for feed rate of .08333)	10	
N6 finish ID Profile (no points , codes are provided)		
N7 finish OD Profile	20	
Part is Flipped		
N8 rough OD Profile back -2.050 on Z depth (.020 on X axis and .003 on Z axis)	30	
N9 finish OD Groove and Thread Relief	50	
N10 finish OD Thread (check program for feed rate of .08333)	10	
N11 finish OD Profile (no points , codes are provided and references toolpath from N8)		

Total Points Earned: _____

Total Possible Points: 200

Milling Technician Skills 2015 MTC2015



VF-2 Machine Highlights

- 40 Taper Medium Duty Machining of Aluminum
- Rigid Tapping
- Programmable Coolant Nozzle

Set up information

Work Holding:

- Use 6.0" vise or equivalent for work holding
- Aluminum Jaws

Tools:

- See Tool List

Material:

- Material Type 6061-T6 Aluminum
- Material Size 1.0" x 3.0" x 4.0"

Machine Time:

- Cycle time in minutes 13 minutes

Programs:

- Vise jaw program O00997.NC
- Template program O02135.NC

Demo Descriptions :

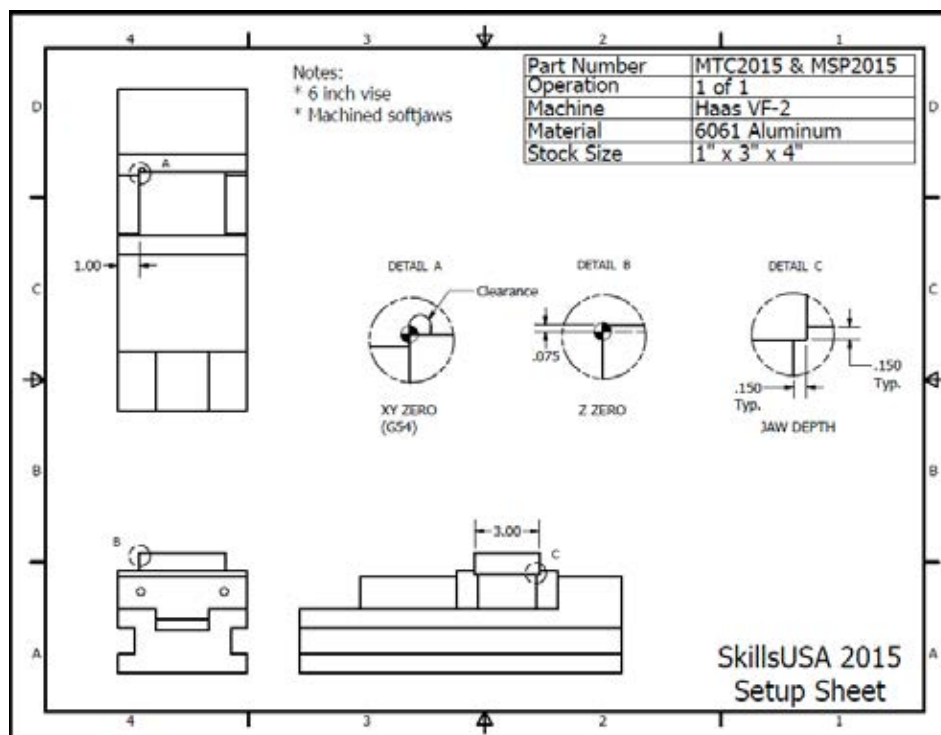
- This part is completed in one operation
- Use 6.0" vise or equivalent for work holding
- Mill step in jaws 0.150" deep program O00997.nc
- Recommended to program using cutter compensation
- All tool diameter offsets are set to full diameter when using cutter compensation

Work Holding Vise Jaw Setup:

- Use a .500" Dia. End Mill to machine the vise jaws (O00997.nc).
The program mills a stop on back left 0.150" deep x 0.150" wide.
- Clamp a 2.00" spacer in vise when machining.
- Set all tool length offsets from top of vise jaws.
- G59 X axis zero is the center of vise
- G59 Y axis zero is -1.00" from stationary jaw.
- G59 Z axis zero is top of jaws.

Work Offsets Information

- G54 X zero, Y zero left back corner as shown in Setup sheet.
- Set all tool length offsets from top of raw stock and adjust the G54 Z work offset -0.075" per Setup Sheet below.



Competition Information

Save a copy of the template program by following the instructions below

Press the LIST PROG button, select the Memory tab, highlight program O01235.NC then type letter "O" followed by your contestant number then Press the F2 button to create a copy of the original program saved as your contestant number.

Edit this new program by following the operation instructions to complete the part per drawing MTC2015.


- N1 Use (tool #1) 2.0" diameter shell mill face part to leave +.020".
- N2 Do not edit operation N2. This operation is roughing the profile and pocket of the part.
- N3 Use (tool#15) .1575" wide x 3.986" diameter slotting mill to machine groove around profile of part.
- N4 Do not edit operation N4. This operation is roughing the slot inside the pocket of the part.
- N5 Use (tool# 4) .266" diameter drill in the correct location of the two .275 diameter holes (section E-E).
- N6 Use (tool# 5) .205" diameter drill in the correct location of the two 1/4-20 tapped holes.
- N7 Use (tool#7) .500"x 45 degree chamfer tool to chamfer holes and edge of part per drawing.
- N8 Use (tool# 8) .275" diameter reamer to ream two holes in the correct location (section E-E).
- N9 Use (tool# 11) .375" diameter ball end mill to machine two slots in (section E-E).
- N10 Do not edit operation N10. This operation finished the floor of the pocket.
- N11 Use (tool# 12) .625" diameter end mill to finish the profile of the part.
- N12 Use (tool# 3) .375" diameter end mill to finish the slot and inside of the pocket staying +.003 off the finished floor.
- N13 Use (tool# 9) 1/4-20 tap for the two tapped holes.
- N14 Use (tool #1) 2.0" diameter shell mills to finish facing the part.


Save a copy of the finished program to the provided USB device by following the instructions below


Plug the USB device into the simulator, Press the LIST PROG button, select the Memory tab, highlight the program with your contestant number and Press the F2 button , select USB Device in the Copy To window and press WRITE/ENTER twice.


Tool Information:


Tool Number: 1 Cutter Type: 2.0" Shell Mill Holder Type:	
Cutter Supplier: Sandvik Order Code: RA245-051 R19-12H	
Insert Supplier: R245-12 T3E-AL Order code: H10	
Holder Supplier: Sandvik Order Code: AA3B05-40 19 38	
Collet Supplier: N/A Order Code: N/A	
Tool Number: 2 Cutter Type: 0.625" End Mill Holder Type:	
Cutter Supplier: Sandvik Order Code: AE16-A16-SS-030	
Insert Supplier: Sandvik Order code: A316-16SM350-06208P 1030	
Holder Supplier: Sandvik Order Code: 930-V40-S-20-090	
Collet Supplier: Sandvik Order Code: A393.CGS-20 10 52	
Tool Number: 3 Cutter Type: .375" End Mill Holder Type:	
Cutter Supplier: SGS Order Code:	
Insert Supplier: Order code:	
Holder Supplier: Sandvik Order Code: 930-V40-S-20-090	
Collet Supplier: Sandvik Order Code: A393.CGS-20 06 52	


Tool Number:	4		
Cutter Type:	.266" Dia. Drill		
Holder Type:			
Cutter Supplier:	Sandvik		
Order Code:	460.1-0675-020A0-XM GC34		
Insert Supplier:			
Order code:			
Holder Supplier:	Sandvik		
Order Code:	AA3B14-40 32 079		
Collet Supplier:	Sandvik		
Order Code:	393.14-32 080		


Tool Number:	5		
Cutter Type:	0.205 Dia. Drill		
Holder Type:			
Cutter Supplier:	Sandvik		
Order Code:	460.1-0520-016A0-XM GC34		
Holder Description			
Holder Supplier:	Sandvik		
Order Code:	AA3B14-40 32 079		
Collet Supplier:	Sandvik		
Order Code:	393.14-32 060		


Tool Number:	6		
Cutter Type:	0.625" End Mill		
Holder Type:			
Cutter Supplier:	Sandvik		
Order Code:	AE16-A16-SS-030		
Insert Supplier:	Sandvik		
Order code	A316-16SM350-06208P 1030		
Holder Supplier:	Sandvik		
Order Code:	930-V40-S-20-090		
Collet Supplier:	Sandvik		
Order Code:	A393.CGS-20 10 52		


Tool Number:	7	
Cutter Type:	.500" Chamfer Mill	
Holder Type:		
Cutter Supplier:	Sandvik	
Order Code:	AE12-A12-SS-030	
Insert Supplier:	Sandvik	
Order code:	A316-12CM600-05045G 1030	
Holder Supplier:	Sandvik	
Order Code:	AA3B14-40 32 079	
Collet Supplier:	Sandvik	
Order Code:	393.14-32 130	

Tool Number:	8	
Cutter Type:	.275 Dia. Reamer	
Holder Type:		
Cutter Supplier:	Sandvik	
Order Code:	435.T-0700-A1-XF	
Insert Supplier:		
Order code:		
Holder Supplier:	Sandvik	
Order Code:	AA3B14-40 32 079	
Collet Supplier:	Sandvik	
Order Code:	393.14-32 080	

Tool Number:	9	
Cutter Type:	1/4-20 Tap	
Holder Type:		
Cutter Supplier:	Sandvik	
Order Code:	E8861/4	
Holder Description:		
Holder Supplier:	Sandvik	
Order Code:	970-V40-25-122	
Collet Supplier:	Sandvik	
Order Code:	A393.14-25-1/4	

Tool Number:	10	
Cutter Type:	.375" End Mill	
Holder Type:		
Cutter Supplier:	SGS	
Order Code:		
Insert Supplier:		
Order code:		
Holder Supplier:	Sandvik	
Order Code:	930-V40-S-20-090	
Collet Supplier:	Sandvik	
Order Code:	A393.CGS-20 06 52	

Tool Number:	11	
Cutter Type:	.375" Ball End Mill	
Holder Type:		
Cutter Supplier:	Sandvik	
Order Code:	1B232-0953-XA 1620	
Insert Supplier:		
Order code:		
Holder Supplier:	Sandvik	
Order Code:	930-V40-S-20-090	
Collet Supplier:	Sandvik	
Order Code:	A393.CGS-20 06 52	

Tool Number:	12	
Cutter Type:	0.625" End Mill	
Holder Type:		
Cutter Supplier:	SGS	
Order Code:		
Insert Supplier:		
Order code:		
Holder Supplier:	Sandvik	
Order Code:	930-V40-S-20-090	
Collet Supplier:	Sandvik	
Order Code:	A393.CGS-20 10 52	

Tool Number:	15
Cutter Type:	3.986" Slotting
Holder Type:	Mill
Cutter Supplier:	A329-102R19-H
Order Code:	
Insert Supplier:	Sandvik
Order code	N123H2-0400-0002- CM 1125
Holder Supplier:	Sandvik
Order Code:	AA3B05-40 19 38
Collet Supplier:	Sandvik
Order Code:	A393.CGS-20 10 52



Lathe Technician Skills 2015 TTC2015



ST-10 Lathe Highlights

- 6000 RPM Spindle
- 12 Station BOT Turret
- Automatic Tool Probe

Set up information

Work Holding:

- 1.80" length Chuck Jaws

Tools:

- See Tool List

Material:

- Material Type 6061-T6 Aluminum
- Material Size 2.0" Dia. x 4.0" Long

Machine Time:

- Cycle time in minutes 6 minutes

Programs:

- Chuck jaw program O00998.NC
- Template program O02015.NC

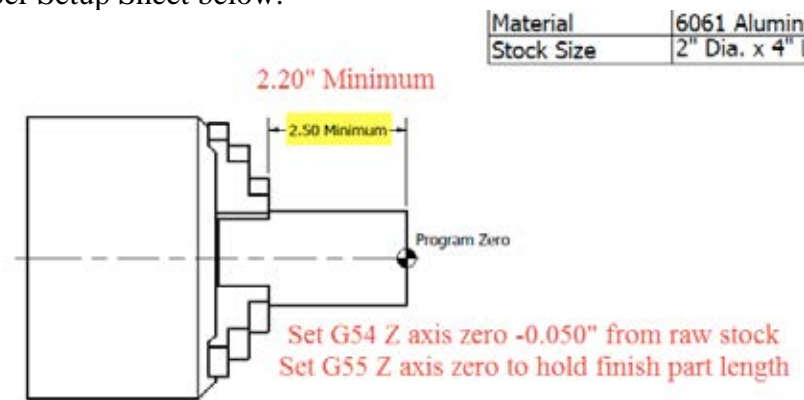
Description :

- This part is completed in two operations
- Use 1.8" tall chuck jaws
- Machine jaw ID 1.95" Dia. and profile using program O00998.nc

Work Holding (Chuck Jaw) Setup:

Work Offsets Information

- Set all tool offsets with the automatic tool probe. Set work offset G54 Z axis zero -0.05 from the face of the raw stock. Set work offset G55 per Setup Sheet below.



Competition Information

Save a copy of the template program by following the instructions below

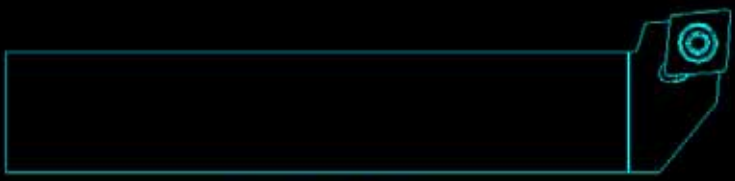
- Press the LIST PROG button, select the Memory tab, highlight program O02015.NC then type letter "O" followed by your contestant number then Press the F2 button to create a copy of the original program saved as your contestant number.
- Edit this new program by following the operation instructions to complete the part per drawing TTC2015.
- The "Nxx" numbers below are the order of tool paths used in the template program.
- The tool number used for each tool path may not match the "Nxx" number.
- This part is completed in two operations. The first operation uses work offset G54 to complete half of the part. All tool paths are programed from Z axis zero. There is an "M00" with a message to flip the part for the second operation.
- The second operation uses work offset G55 to complete the part.

- N1 Use (tool #1) OD turning tool face part to leave +.010".
- N2 Use (tool #10) 0.750" diameter drill to drill the correct depth Z depth.
- N3 Use (tool#2) ID boring bar to rough ID profile leaving material for finish (X-.020" and Z 0.002").
- N4 Use (tool# 4) .157" wide ID Groove to finish 1.650" diameter ID groove per drawing.
- N5 Use (tool#5) ID Threading bar to finish 1.50" ID thread.
- N6 Use (tool#3) ID boring bar to finish ID profile. Do not edit this operation..
- N7 Use (tool#12) OD turning to finish OD profile of part 2.05" maximum Z depth.
- M00 Do not edit this M-code.
- N8 Use (tool #1) OD turning tool face part to leave +.010"and rough OD profile leaving material for finish (X0.020" and Z 0.003") 2.05" maximum Z depth..
- N9 Use (tool# 6) .1574" wide groove tool to finish the two OD grooves per drawing.
- N10 Use (tool# 7) OD threading tool. Add the correct feed to the G76 block 1¾ diameter thread.
- N11 Use (tool# 12) OD turning to finish OD profile. Do not edit this operation.

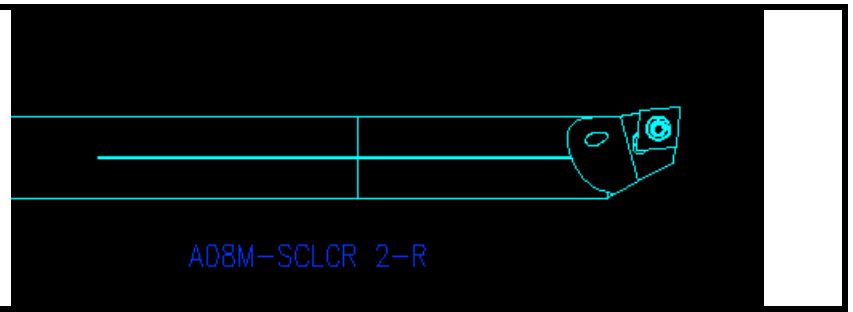
Save a copy of the finished program to the provided USB device by following the instructions below

Plug the USB device into the simulator, Press the LIST PROG button, select the Memory tab, highlight the program with your contestant number and Press the F2 button , select USB Device in the Copy To window and press WRITE/ENTER twice.

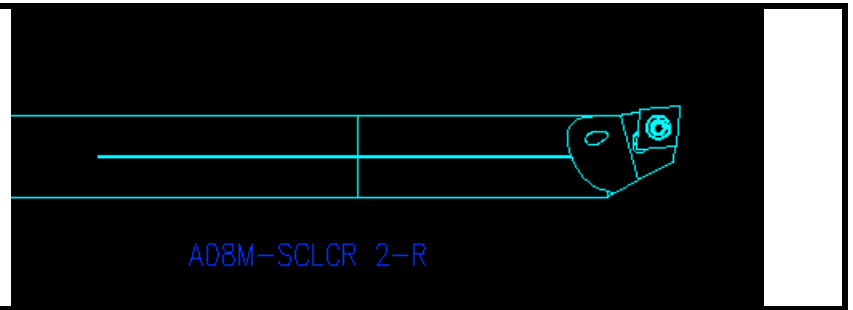
Tool Information:

Tool Number:	1	
Station Number:	1	
Tool Type:	Rough OD	
Holder Supplier	Sandvik	
Order Code:	SCLCR123B	
Insert Supplier:	Sandvik	
Order Code:	CCGX 3 (2.5)2-AL	
Insert Nose Radius:	0.0312"	
Grade Selection:	H10	

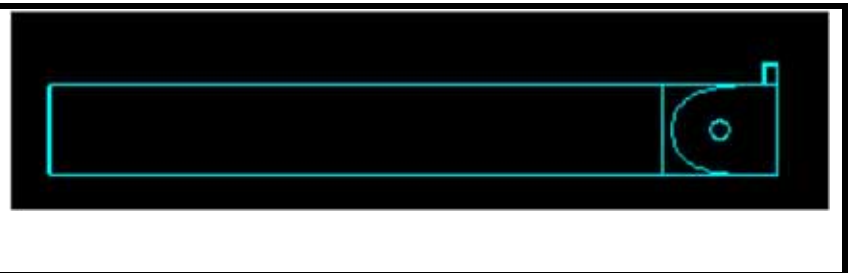
Tool Number:	2
Station Number:	2
Tool Type:	Rough Bore ID
Holder Supplier	Sandvik
Order Code:	A08M-SCLCR 2-R
Insert Supplier:	Sandvik
Order Code:	CCGX 2 (1.5)I-AL H10
Insert Nose Radius:	0.015"
Grade Selection:	4325



Tool Number:	3
Station Number:	3
Tool Type:	Finish Bore ID
Holder Supplier	Sandvik
Order Code:	A08M-SCLCR 2-R
Insert Supplier:	Sandvik
Order Code:	CCGX 2 (1.5)I-AL H10
Insert Nose Radius:	0.015"
Grade Selection:	4325



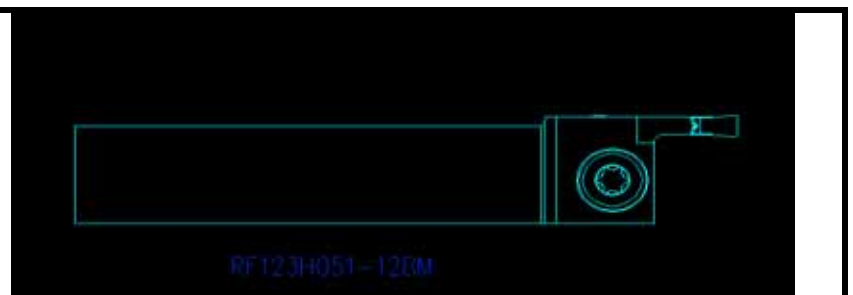
Tool Number:	4
Station Number:	4
Tool Type:	ID Groove
Holder Supplier	Sandvik
Order Code:	RAG151.32-D16-30
Insert Supplier:	Sandvik
Order Code:	N151.3 400-30-7C
Insert Nose Radius:	0.008"
Grade Selection:	1125



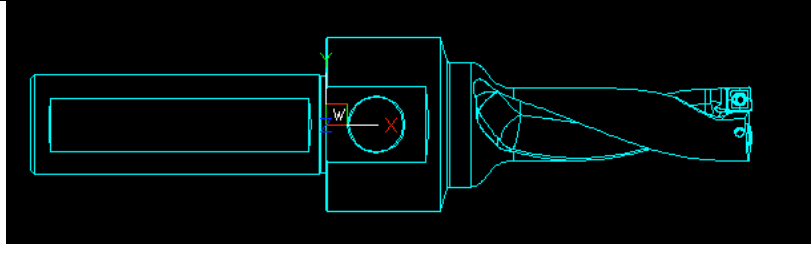
Tool Number:	5
Station Number:	5
Tool Type:	ID Thread
Holder Supplier	Sandvik
Order Code:	266RKF-D16-3
Insert Supplier:	Sandvik
Order Code:	266RL-16UN01A120M
Insert Nose Radius:	
Grade Selection:	1125



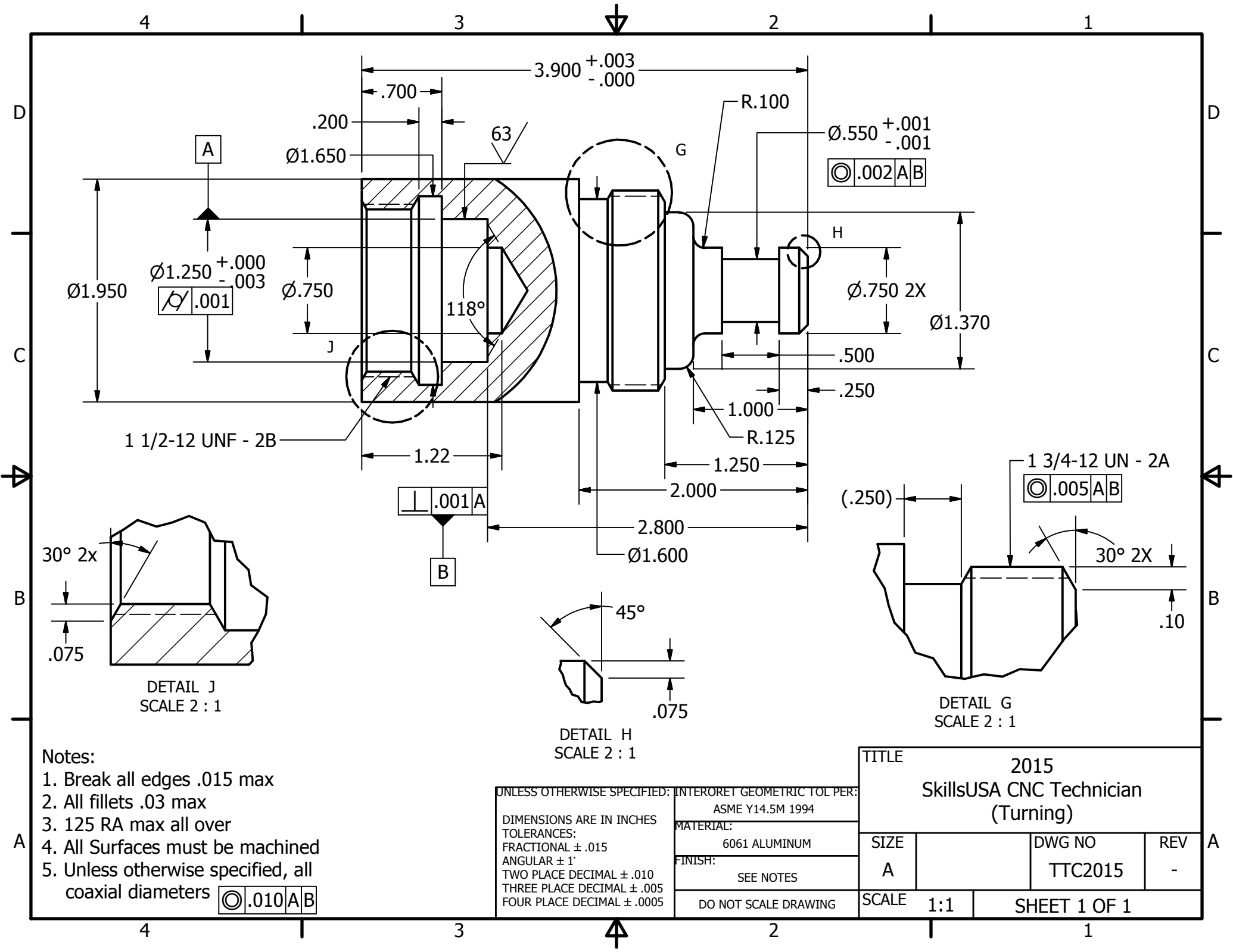
Tool Number:	6
Station Number:	6
Tool Type:	OD Groove
Holder Supplier	Sandvik
Order Code:	RF123H051-12BM
Insert Supplier:	Sandvik
Order Code:	N123H2-0400-0002-GF
Insert Nose Radius:	0.008"
Grade Selection:	H13A



Tool Number:	7	
Station Number:	7	
Tool Type:	OD Thread	
Holder Supplier:	Sandvik	
Order Code:	266RFG-123B	
Insert Supplier:	Sandvik	
Order Code:	266RG-16UN01A120M	
Insert Nose Radius:		
Grade Selection:	1125	

Tool Number:	10	
Station Number:	10	
Tool Type:	0.75 Dia. Drill	
Holder Supplier:	Sandvik	
Order Code:	A880-D0750P25-03	
Insert Supplier:	Sandvik	
Order Code OD:	880-03 03 W06H-P-LM	
Order Code Center:	880-03 03 05H-C-LM	
Grade Selection:	H13A	

Tool Number:	12	
Station Number:	12	
Tool Type:	Finish OD	
Holder Supplier:	Sandvik	
Order Code:	SCLCR123B	
Insert Supplier:	Sandvik	
Order Code:	CCGX 3 (2.5)1-AL	
Insert Nose Radius:	0.015"	
Grade Selection:	H10	



UNLESS OTHERWISE SPECIFIED: INTERPRET GEOMETRIC TOL PER:	
ASME Y14.5M 1994	
DIMENSIONS ARE IN INCHES	MATERIAL:
TOLERANCES:	6061 ALUMINUM
FRACTIONAL $\pm .015$	FINISH:
ANGULAR $\pm 1^\circ$	SEE NOTES
TWO PLACE DECIMAL $\pm .010$	DO NOT SCALE DRAWING
THREE PLACE DECIMAL $\pm .005$	
FOUR PLACE DECIMAL $\pm .0005$	

TITLE			
2015 SkillsUSA CNC Technician (Turning)			
SIZE	A	DWG NO	REV
		TTC2015	-
SCALE	1:1	SHEET 1 OF 1	