National Institute for Metalworking Skills, Inc.

Credentialing Achievement Record

Screw Machining
Level II
Operate with Multiple Spindles

National Institute for Metalworking Skills
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http://nims-skills.org

SCREW MACHINING CREDENTIALING PROGRAM

LEVEL II CREDENTIALING ACHIEVEMENT RECORD (CAR)

and

Official Performance *CHECKLISTs* **(Skill Checks)**

✎ Please print

NAME:	**Reg. No.**	**Job Title**:

Site Name:	**Site No.**

STATUS:	***Non-Completer*** ❑	***Candidate has Successfully Completed all NIMS Performance Requirements in the Following Credentialing Area:***
	Reason:	Duty Cluster Name: **OPERATE MULTIPLE SPINDLE SCREW MACHINE** Date Completed:_____

Directions

This *Credentialing Achievement Record* (*CAR*) is the official training and performance document for the above named NIMS credentialing candidate. The CAR is used by the trainer/supervisor and candidate as a record (or logbook) of individual on-the-job performance. The CAR is the *vehicle* that will allow eligible candidates to take the NIMS written credentialing examination(s). Supervisors, trainers, and candidates should take care of this record and be sure that it is accurate, kept up to date, filled out correctly, and properly stored. All information recorded in the *CAR* should be considered **CONFIDENTIAL**.

Candidates may select as many credentialing Duty Clusters as applicable to the facility or appropriate to the job. There are separate CAR booklets for each credentialing Duty Cluster. The CAR opens with a list of Critical Work Activities (or experience statements) that must be acknowledged and documented. However, actual performance is assessed two ways: **1**) by fulfilling these general experience and historical statements and **2**) by an examiner administering *Skill Checks* (or performance assessments). Two successful Skill Check attempts are required. Skill Checks are clearly marked with the title - **CAR SKILL CHECK**. Candidate performance is documented by a ☑ on the Examiner's *CHECKLIST*. All Skill Checks must be co-signed and dated by the trainer/supervisor and candidate. Work Activity sign-offs must be co-initialed by the trainer/supervisor or manager and candidate, and then dated. If a particular Skill Check step or standard does not apply at your facility, check-off the applicable ***NA*** box and continue. Skill Checks may require the candidate to perform work a bit differently than his normal procedure or learn how to do something that may not be part of his typical day-to-day responsibilities. However, you may only check-off ***NA*** if the process-standard does not apply because the equipment or tooling is not available or the machining process itself does not require this activity or competency.

For additional information about administering *CAR* Skill Checks, see the CAR Administration Guide or consult with your facility Credentialing Coordinator.

SCREW MACHINING CREDENTIALING PROGRAM

*LEVEL **II** **C**REDENTIALING **A**CHIEVEMENT **R**ECORD* **(CAR)**

Operate a Multiple Spindle Screw Machine

Level II Automatic Bar and Chucking Machine

Critical Work Activities & Experience	Date Completed	Supervisor Initials	Trainer Initials	Trainee Initials
All of the following statements must be completed prior to submission of the CAR		and /or		
Multiple Spindle Screw Machining				
Candidate has successfully completed all required safety training/courses as specified by the work facility or required by OHSA. Candidate has working knowledge of applicable OHSA, ISO, and ANSI regulations and guidelines.				
Candidate has successfully completed the probationary period for this position (job title) as specified by the work facility.				
Candidate has met the attendance policy of the facility over the last 12 consecutive months.				
Candidate has had no company documented safety violations within the last 12 consecutive months.				
Candidate has no reported incidents of non-conforming parts contaminating quality parts over the last three (3) consecutive months.				
Candidate has demonstrated the ability to maintain a clean and orderly work area in compliance with facility housekeeping policies and has no reported violations for a period of three (3) consecutive months.				
Candidate demonstrated the ability to recognize and explain the type of screw machine and its function (including controls, mechanical devices, tooling, and auxiliaries if applicable).				
Candidate has demonstrated working knowledge of material/part conformance standards and basic SPC recording techniques.				

Critical Work Activities & Experience	Date Completed	Supervisor Initials	Trainer Initials	Trainee Initials
Given specific duties to perform, instructions, and necessary written documentation, candidate has demonstrated the ability to locate, read and use information to plan, execute, and control a machining process to defined quality standards.				
Candidate has demonstrated basic abilities in decision making and problem solving.				
Candidate has demonstrated ability to link *cause and effect* to solve simple to moderately complex problems.				
Candidate has demonstrated appropriate social and communicative skills in resolving conflicts with supervisors, teams leaders, and/or co-workers or when verbally presenting new ideas.				
Candidate has worked cooperatively with others and has contributed to company efforts with ideas, suggestions, and/or feedback to improve a process, resolve a problem, or improvise a new method.				
Candidate can recognize appropriate codes of conduct and values in the workplace and has exhibited honesty, integrity, and responsibility when doing work and communicating with others.				
Candidate has demonstrated competency interpreting blueprints and/or technical drawings (Standard and GDT orthographics, geometric dimensioning and tolerancing, etc.)				
Candidate has applied knowledge of precision measuring instruments and has used those devices to determine work piece compliance along selected dimensions (as per blueprints, technical drawings and/or reference part).				
Candidate can explain basic concepts of heat, shock, friction, zone of distortion, cutting interface, metallurgy, cutter presentation/geometry, and chip-breaking capabilities as they relate to specific screw machining operations.				

NOTE: Further details and specifics regarding worker competencies, see Duties & Standards for Screw Machining Skills - Level II & III, National Institute for Metalworking Skills/Precision Machined Products Association

Skill Checks begin on next page

CAR SKILL CHECK

NIMS SCREW MACHINING SKILL CHECK
Level II

Candidate:	**Date:** 199
Examiner:	(For examiner use only) **Results:** **Pass** ❑ *Yes* **Date:**

Work Activity — Operate a Multiple Spindle Automatic Screw Machine

Performance Conditions

Setting: Shop, bench, and QC area(s). Candidate will plan a screw machining job, perform pre-production assignments, startup/shutdown equipment, make parts, and inspect parts for quality. A non-CNC, automatic multiple-spindle screw machine has already been set-up and verified for function and safety. The first bars are in (stocked/loaded) the machine. The screw machine is shut-off or at rest (idle mode). The job to be demonstrated has already been approved as a "new run." Two (2) successful Skill Check attempts required for on-the-job performance recognition.

To take these Skill Checks, the metal piece-parts to be made must have (at minimum) the following attributes and characteristics:

- a Cut-Off
- a Formed OD
- a Shaved OD
- a Reamed or Drilled Hole, and
- an ID or OD Thread.

Safety Equipment:

- *P*ersonal *P*rotection *E*quipment/*C*lothing (*PPE/PPC*)

Tools, Equipment and Materials:

- Bar Stock/Raw Material
- Cutting Oil/Lube Oil
- Tote Pans and Chip/Part Containers
- Shop Wipes and Lint Free Wipes
- OP Charts/Overlays
- Prints, Charts, Drawings
- Common Hand Tools
- Flashlight/Mirror
- Watch/Stop Watch
- Housekeeping Supplies
- Production and QC Documentation

Measuring Instruments:

- Scales
- Micrometer
- Dial Calipers
- Dial Indicators
- Thread Gages
- Plug Gages
- Functional Gages
- Profilometer
- SPC Input
- Optical Comparator or CMM/Vision System

Attainment Standards

1. 100% of all applicable procedural steps and process standards, without assistance and within company-specific time limit, following all safety, ISO, equipment manufacturer, and plant-specific practices and procedures.
2. 100% conformance with all SPC final product standards and NIMS performance product criteria.

Trainee Directions

The previously referenced tools, equipment, materials and supplies may be used to Operate a Non-CNC Multiple Spindle Automatic Screw Machine. All safety and plant-specific procedures must be followed. The examiner will evaluate both the process used and final result of the process. Process steps should be performed in the sequence and all process elements must meet the standards for successful completion.

The skill check you are about to take is a hands-on performance assessment administered as part of the credentialing process. This assessment will enable you to verify your experience and demonstrate your competency by completing practical job tasks. The Skill Check will cover areas that you should know and problems you should be able to solve. If you need any additional materials or experience any problems with equipment during the assessment, notify the examiner immediately.

Examiner Instructions

For successful completion of this Skill Check, the candidate must demonstrate the ability to successfully complete the work activity under controlled assessment conditions. All work must be completed to standard.

Before administering the Skill Check:

- Read/review the CAR *Administration Guide* developed for the program.
- Ensure that you have a copy of this Skill Check for the candidate to review prior to demonstrating the job. Be sure all applicable equipment and supplies are available.

Stop the Skill Check immediately if the candidate violates a safety/environmental regulation or procedure or if there is any possibility of personal injury or damage to equipment.

Do not provide assistance during the Skill Check. Monitor work in-progress and evaluate for ***process standard***. Assess the completed work for conformance with **final product** criteria. Mark ***NA*** if a process-product is not appropriate.

Examiner Instructions

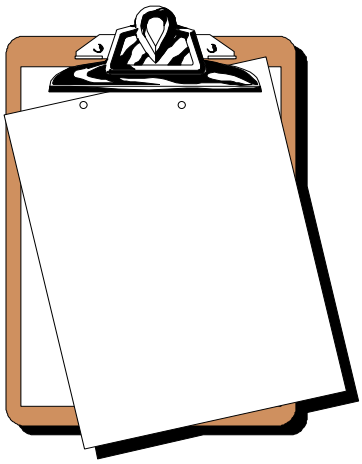
Before assessment, the examiner may discuss appropriate safety requirements and loss potential issues (*i.e., Lock and Tag/Zero Energy, HAZMAT, personal protection equipment, pinch points, compressed air/fluid, high or residual voltage, E-Stops, OHSA-1910 Loss Potential, etc.)*.

EXAMINER: Read aloud the *Skill Check Script* from the *Administration Guide* (*verbatim*).

When the candidate indicates that he/she has completed the Skill Check or when your maximum time allowed has run out, assess Final Product Standards and follow the closing procedures outlined in the *Administration Guide.*

Checklist

Scoring Procedures: Observe the candidate's performance for each Process Step and mark the *CHECKLIST* whether or not the *Process*-Product Standards were attained (*Do not rely on your memory).* *Process*-Product Standards are to be marked as each element is competed.



Examiner's CHECKLIST SKILL CHECK #1

Operate a Non-CNC Multiple Spindle Automatic Screw Machine

Process Steps	*Process*-Product Standards			
START DATE:		Yes	No	*NA*
A - JOB PLANNING				
1. Verify Availability of Tools, Equipment and Supplies.	• Machine selected was appropriate for, or assigned to the job.	❑	❑	❑
	• Gage calibration tags are current.	❑	❑	❑
	• Gage checklist obtained and reviewed.	❑	❑	❑
	• Part pans and production tags/tickets prepared.	❑	❑	❑
	• Tool box at job site.	❑	❑	❑
	• Bench cleared and tools staged.	❑	❑	❑
	• Chip and part containers positioned.	❑	❑	❑
	• No loose objects lying on/in machine.	❑	❑	❑
	• Chips removed from/exited machine.	❑	❑	❑
2. Examine Prints, Drawings and Quality Specifications	• Correct and current prints/drawing obtained.	❑	❑	❑
	• Work or job order/number matched print number and/or equipment number.	❑	❑	❑
	• Print revisions acknowledged.	❑	❑	❑
3. Review Production Sheet and Lot Size Requirements	• Layout sheet checked for tooling, tool position, sequence of operations, and hardware (gears, accessories, etc.)	❑	❑	❑
	• Coolant/lubricant supply verified for job (type, application, viscosity, etc.)	❑	❑	❑
	• Demonstrated good coolant/lubricant handling and application techniques.	❑	❑	❑
B- PRE-PRODUCTION & QUALITY CONTROL				
1. Check Fluid and Air Levels and Pressures	• Fluid reservoirs full or @ indicated levels for maximum machine performance.	❑	❑	❑
	• *psi* set and holding steady @ or within required specifications.	❑	❑	❑
	• Fittings and bushings lubricated as per manufacturer specifications.	❑	❑	❑
2. Check Splash Guards and Safety Devices	• All splashguards verified for function and position.	❑	❑	❑
	• Floor will remain dry during operations.	❑	❑	❑
	• Plexiglas is not cracked or damaged.	❑	❑	❑
	• All physical barriers/guards are in-place and secure/closed.	❑	❑	❑
	• Hand cranks/wheels have been removed and safety set aside or stored.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
3. Clear Machine and Work Area	• No previous, broken or non-comforming parts present in or around machine.	❑	❑	❑
	• Previous parts not contaminated with new parts.	❑	❑	❑
	• Chips removed and disposed (Splashguard visibly clean).	❑	❑	❑
	• Floor clean and dry (No standing oil, coolant, water, etc.)	❑	❑	❑
4. Check Tooling/Cutting Tools	• Tooling verified and appropriate for job.	❑	❑	❑
	• Tooling and tool sequence conforms to layout and process plan requirements.	❑	❑	❑
	• Tooling clean, sharp, and showing no damage or excessive wear.	❑	❑	❑
	• Steel grade/hardness and design of tooling appropriate for the job.	❑	❑	❑
	• Tool clearance and position is correct (tool will cut rather than rub).	❑	❑	❑
5. Start/Re-Start Multiple Spindle Screw Machine	• Feed successfully disengaged.	❑	❑	❑
	• Spindles are running and safety guarding secure.	❑	❑	❑
	• Lubrication system functioning (flow and pressure adequate for application).	❑	❑	❑
	• Collet closed completely on bar(s).	❑	❑	❑
	• No unusual sounds, odors, smoke, or excessive vibration present.	❑	❑	❑
	• No alarms activated or leakage present.	❑	❑	❑
6. Inspect and Adjust Lines and Flow	• Pressurized lines are not leaking oil, coolant, or air.	❑	❑	❑
	• No air present in coolant (not foaming).	❑	❑	❑
	• Coolant lines/nozzles pointed at the work area and will provide adequate flow.	❑	❑	❑
	• Screens are clean (sufficient flow and no smoke).	❑	❑	❑
7. Cycle Machine and Make Trial Part	• Selected proper mode of operation (machine energized).	❑	❑	❑
	• Cams and tooling mechanisms operational.	❑	❑	❑
	• Bar in position and collet tension correct.	❑	❑	❑
	• No smoke, unusual odors, belt squeal, or excessive vibration or noise present.	❑	❑	❑
	• Feed engaged and trial piece-part made.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
8. Verify Machine for Function	• Trial piece-part safely removed from work area for visual inspections.	❑	❑	❑
	• No burn marks, burring or damage present on part.	❑	❑	❑
	• No chatter or glazing present.	❑	❑	❑
	• Part features look like print/drawing (visual inspection).	❑	❑	❑
	• Machine function verified.	❑	❑	❑
9. Make First Piece-Parts	• One sample part made *per* spindle.	❑	❑	❑
	• Sample piece-parts kept in order or sequence.	❑	❑	❑
10. Inspect Sample Parts Using Hand-Held Measuring Devices	• IDs/ODs conform to diameter specifications.	❑	❑	❑
	• OAL in conformance with part specifications.	❑	❑	❑
	• Threads within specifications (major/minor/pitch).	❑	❑	❑
	• IO/OD depths conform to print specifications.	❑	❑	❑
	• Surface (and/or micro) finish matched print, customer, or quality specifications.	❑	❑	❑
	• Demonstrated proficiency using hand-held precision measuring instruments.	❑	❑	❑
11. Inspect Sample Parts for Dimensional Characteristics Using an Optical Comparator.	• Hands clean before use.	❑	❑	❑
	• Part(s) cleaned prior to viewing.	❑	❑	❑
	• Turned on instrument and verified operation for function (lamp on, controls work, screen active).	❑	❑	❑
	• View screen and lens clean (no scratches or film present on screen or lens).	❑	❑	❑
CMM or Vision System may be used in addition to, or in lieu of an optical comparator	• Magnification adjusted to viewing requirements.	❑	❑	❑
	• Part properly staged and positioned in/on optical comparator/instrument.	❑	❑	❑
	• Instrument focused @ 20/20 and image clear.	❑	❑	❑
	• Part manipulated and all angles and radius/radii are within +/- tolerances and specifications.	❑	❑	❑
	• Accurately checked profiles/control limits as specified as Quality Plan or SPC.	❑	❑	❑
	• Achieved part dimensional conformance or notified proper authority of any non-conformance profiles.	❑	❑	❑
	• Turned off instrument (screen, lens, surface area, work holder(s), and inspection site left clean and undamaged).	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
12. Inspect Sample Parts for Quality Attributes	• No glazing or withdrawal marks present.	❑	❑	❑
	• No flaking, tearing, or pitting present.	❑	❑	❑
	• No burrs, nicks, chipping, or chatter present.	❑	❑	❑
	• All appropriate finish areas smooth.	❑	❑	❑
	• Features conform to print requirements.	❑	❑	❑
	• Completed all quality control/SPC documentation accurately and legibly (including sign-offs).	❑	❑	❑
	• Sample parts inspected met full production standards.	❑	❑	❑
	• Machine production and process ready.	❑	❑	❑
	C - PRODUCTION OPERATIONS & PROCESS CONTROL			
1. Re-Start/Start Production Cycle	• Selected proper mode of operation (machine will cycle/index).	❑	❑	❑
	• Coolant lines bathing work area with sufficient flow.	❑	❑	❑
	• Piece parts machined on an on-going basis.	❑	❑	❑
2. Monitor Running Processes *(Machine Parts)*	• Slides operating smoothly (no chatter or jerking).	❑	❑	❑
	• Cycle time (%) is correct.	❑	❑	❑
	• Chips pulled and/or evacuating unit (sump is not plugging up).	❑	❑	❑
	• Machine properly indexing (no slamming, jamming, banging, etc.) and running efficiently.	❑	❑	❑
	• Quality parts sequentially machined on a continuous basis to % productivity standards (e.g.,"*parts-per-minute*").	❑	❑	❑
3. Load Next/Another Bar Stock	• Parts from previous bar removed (no cross contamination).	❑	❑	❑
	• Bar ends removed one at a time.	❑	❑	❑
	• Bars stocked/loaded one at a time.	❑	❑	❑
	• Collet tension verified.	❑	❑	❑
	• First piece-part per spindle passed visual inspections (machine verified for function).	❑	❑	❑
	• Machine cycling, indexing, and parts made.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	NA
	C - PRODUCTION OPERATIONS & PROCESS CONTROL *Continued*			
4. Inspect Parts Using Hand-Held Precision Measurement Devices (Applicable to next bar sampling or in-process intermediate inspections)	• ID/OD conforms to diameter specifications.	❑	❑	❑
	• OAL in conformance with part specifications.	❑	❑	❑
	• Threads within specifications (major/minor/pitch).	❑	❑	❑
	• IO/OD depths conform to print specifications.	❑	❑	❑
	• Surface (and/or micro) finish met print or quality specifications.	❑	❑	❑
	• Demonstrated proficiency using and reading hand-held precision measuring instruments.	❑	❑	❑
	• Parts pulled immediately after sample (no cross contamination).	❑	❑	❑
5. Inspect Sample Parts for Dimensional Characteristics Using an Optical Comparator.	• Hands clean before use.	❑	❑	❑
	• Part(s) cleaned prior to viewing.	❑	❑	❑
	• Turned on instrument and functioning (lamp on, controls work, screen active, etc.).	❑	❑	❑
	• View screen and lens clean (no scratches or film present on screen or lens).	❑	❑	❑
CMM or Vision System may be used in addition to, or in lieu of an optical comparator	• Magnification adjusted to clear viewing requirements.	❑	❑	❑
	• Part properly staged and positioned in/on optical comparator.	❑	❑	❑
	• Instrument optics focused and image sharp.	❑	❑	❑
	• Part manipulated and all angles and radius/radii are within +/- tolerances and specifications.	❑	❑	❑
	• Accurately checked profiles/control limits as specified in Quality/Sample Plan or by SPC.	❑	❑	❑
	• Achieved part conformance or notified proper authority of any non-conformance profiles.	❑	❑	❑
	• Turned off instrument (screen, lens, surface area, work holder(s), and inspection site left clean and undamaged).	❑	❑	❑
6. Maintain Process and Service Machine	• Coolant/lubricant @ indicated levels and flowing (screens clear).	❑	❑	❑
	• No smoke, excessive vibration, or unusual odors/sound present.	❑	❑	❑
	• Chip containers maintained and not over flowing.	❑	❑	❑
	• Part/chip containers replaced when full.	❑	❑	❑
	• Adhered to tool change frequency requirements.	❑	❑	❑
	• Floor clean, dry and free of debris.	❑	❑	❑

Continued

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	C - PRODUCTION OPERATIONS & PROCESS CONTROL *Continued*			
7. Shutdown Screw Machine	• Cycle stopped at correct position (not in mid-cut).	❑	❑	❑
	• Spindles not turning.	❑	❑	❑
	• No chips in machine or on floor.	❑	❑	❑
	• Sump screens clean.	❑	❑	❑
	• Part containers removed and tagged/identified.	❑	❑	❑
	• Work station clean and tooling examined.	❑	❑	❑
	• Maintenance (equipment servicing) items noted/requested or provided.	❑	❑	❑
END DATE:	• Machine locked (*@ zero energy*) for total shutdown or in safety rest (idle) for handoff.	❑	❑	❑

FINAL PRODUCT STANDARDS

"Work is Done As Expected When:"

a. ❑ All written/verbal instructions, checklists, and guidelines were followed and candidate demonstrated safe workplace practices in materials handling, tool sequencing, machine operations, guarding, and coolant application.

b. ❑ Condition of each tool was verified prior to operations and acceptable tolerances established (minimum accuracy levels @ ≤ +/- 1/16th on most factions and/or ≤ + .006 - .000 on drilled diameters required).

c. ❑ All quality control inspections were performed to Quality Plan criteria (procedures), result within SPC requirements, and recorded compliance within the part's required profile(s), tolerances, and dimensions.

d. ❑ Following the process plan, machine was verified for function as necessary for a smooth and continuous run.

e. ❑ Parts were machined and inspected on an on-going basis without contaminating good/bad parts.

f. ❑ Current prints and tangible part features, characteristics and processes met specified, or implied needs as per usability, reliability, maintainability, and economics.

g. ❑ All shop safety and housekeeping practices and procedures have been followed.

COMMENTS

Operate Multiple Spindle Screw Machine

Candidate: _____

_____

_____

_____

_____

Examiner: _____

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_____

_____

Equipment Model/Machine Type Used:

Signatures: _____ **Date:** _____

(Manager) Title: _____

_____ **Date:** _____

(Examiner/Trainer or Supervisor) Tile: _____

_____ **Date:** _____

(Candidate)

Examiner's CHECKLIST SKILL CHECK #2

Operate a Non-CNC Multiple Spindle Automatic Screw Machine

Process Steps	*Process*-Product Standards			
START DATE:		Yes	No	*NA*
A - JOB PLANNING				
1. Verify Availability of Tools, Equipment and Supplies.	• Machine selected was appropriate for, or assigned to the job.	❑	❑	❑
	• Gage calibration tags are current.	❑	❑	❑
	• Gage checklist obtained and reviewed.	❑	❑	❑
	• Part pans and production tags/tickets prepared.	❑	❑	❑
	• Bench cleared and tools staged.	❑	❑	❑
	• Chip and part containers positioned.	❑	❑	❑
	• No loose objects lying on/in machine.	❑	❑	❑
	• Chips removed from/exited machine.	❑	❑	❑
2. Examine Prints, Drawings and Quality Specifications	• Correct and current prints/drawing obtained.	❑	❑	❑
	• Work or job order/number matched print number and/or equipment number.	❑	❑	❑
	• Print revisions acknowledged.	❑	❑	❑
3. Review Production Sheet and Lot Size Requirements	• Layout sheet checked for tooling, tool position, sequence of operations, and hardware (gears, accessories, etc.)	❑	❑	❑
	• Coolant/lubricant supply verified for job (type, application, viscosity, etc.)	❑	❑	❑
	• Demonstrated good coolant/lubricant handling and application techniques.	❑	❑	❑
B- PRE-PRODUCTION & QUALITY CONTROL				
1. Check Fluid and Air Levels and Pressures	• Fluid reservoirs full or @ indicated levels for maximum machine performance.	❑	❑	❑
	• *psi* set and holding steady @ or within required specifications.	❑	❑	❑
	• Fittings and bushings lubricated as per manufacturer specifications.	❑	❑	❑
2. Check Splash Guards and Safety Devices	• All splashguards verified for function and position.	❑	❑	❑
	• Floor will remain dry during operations.	❑	❑	❑
	• Plexiglas is not cracked or damaged.	❑	❑	❑
	• All physical barriers/guards are in-place and secure/closed.	❑	❑	❑
	• Hand cranks/wheels have been removed and safety set aside or stored.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
3. Clear Machine and Work Area	• No previous, broken or non-comforming parts present in or around machine.	❑	❑	❑
	• Previous parts not contaminated with new parts.	❑	❑	❑
	• Chips removed and disposed (Splashguard visibly clean).	❑	❑	❑
	• Floor clean and dry (No standing oil, coolant, water, etc.)	❑	❑	❑
4. Check Tooling/Cutting Tools	• Tooling verified and appropriate for job.	❑	❑	❑
	• Tooling and tool sequence conforms to layout and process plan requirements.	❑	❑	❑
	• Tooling clean, sharp, and showing no damage or excessive wear.	❑	❑	❑
	• Steel grade/hardness and design of tooling appropriate for the job.	❑	❑	❑
	• Tool clearance and position is correct (tool will cut rather than rub).	❑	❑	❑
5. Start/Re-Start Multiple Spindle Screw Machine	• Feed successfully disengaged.	❑	❑	❑
	• Spindles are running and safety guarding secure.	❑	❑	❑
	• Lubrication system functioning (flow and pressure adequate for application).	❑	❑	❑
	• Collet closed completely on bar(s).	❑	❑	❑
	• No unusual sounds, odors, smoke, or excessive vibration present.	❑	❑	❑
	• No alarms activated or leakage present.	❑	❑	❑
6. Inspect and Adjust Lines and Flow	• Pressurized lines are not leaking oil, coolant, or air.	❑	❑	❑
	• No air present in coolant (not foaming).	❑	❑	❑
	• Coolant lines/nozzles pointed at the work area and will provide adequate flow.	❑	❑	❑
	• Screens are clean (sufficient flow and no smoke).	❑	❑	❑
7. Cycle Machine and Make Trial Part	• Selected proper mode of operation (machine energized).	❑	❑	❑
	• Cams and tooling mechanisms operational.	❑	❑	❑
	• Bar in position and collet tension correct.	❑	❑	❑
	• No smoke, unusual odors, belt squeal, or excessive vibration or noise present.	❑	❑	❑
	• Feed engaged and trial piece-part made.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
8. Verify Machine for Function	• Trial piece-part safely removed from work area for visual inspections.	❑	❑	❑
	• No burn marks, burring or damage present on part.	❑	❑	❑
	• No chatter or glazing present.	❑	❑	❑
	• Part features look like print/drawing (visual inspection).	❑	❑	❑
	• Machine function verified.	❑	❑	❑
9. Make First Piece-Parts	• One sample part made *per* spindle.	❑	❑	❑
	• Sample piece-parts kept in order or sequence.	❑	❑	❑
10. Inspect Sample Parts Using Hand-Held Measuring Devices	• IDs/ODs conform to diameter specifications.	❑	❑	❑
	• OAL in conformance with part specifications.	❑	❑	❑
	• Threads within specifications (major/minor/pitch).	❑	❑	❑
	• IO/OD depths conform to print specifications.	❑	❑	❑
	• Surface (and/or micro) finish matched print, customer, or quality specifications.	❑	❑	❑
	• Demonstrated proficiency using hand-held precision measuring instruments.	❑	❑	❑
11. Inspect Sample Parts for Dimensional Characteristics Using an Optical Comparator.	• Hands clean before use.	❑	❑	❑
	• Part(s) cleaned prior to viewing.	❑	❑	❑
	• Turned on instrument and verified operation for function (lamp on, controls work, screen active).	❑	❑	❑
	• View screen and lens clean (no scratches or film present on screen or lens).	❑	❑	❑
CMM or Vision System may be used in addition to, or in lieu of an optical comparator	• Magnification adjusted to viewing requirements.	❑	❑	❑
	• Part properly staged and positioned in/on optical comparator/instrument.	❑	❑	❑
	• Instrument focused @ 20/20 and image clear.	❑	❑	❑
	• Part manipulated and all angles and radius/radii are within +/- tolerances and specifications.	❑	❑	❑
	• Accurately checked profiles/control limits as specified as Quality Plan or SPC.	❑	❑	❑
	• Achieved part dimensional conformance or notified proper authority of any non-conformance profiles.	❑	❑	❑
	• Turned off instrument (screen, lens, surface area, work holder(s), and inspection site left clean and undamaged).	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	B - PRE-PRODUCTION & QUALITY CONTROL *Continued*			
12. Inspect Sample Parts for Quality Attributes	• No glazing or withdrawal marks present.	❑	❑	❑
	• No flaking, tearing, or pitting present.	❑	❑	❑
	• No burrs, nicks, chipping, or chatter present.	❑	❑	❑
	• All appropriate finish areas smooth.	❑	❑	❑
	• Features conform to print requirements.	❑	❑	❑
	• Completed all quality control/SPC documentation accurately and legibly (including sign-offs).	❑	❑	❑
	• Sample parts inspected met full production standards.	❑	❑	❑
	• Machine production and process ready.	❑	❑	❑
	C - PRODUCTION OPERATIONS & PROCESS CONTROL			
1. Re-Start/Start Production Cycle	• Selected proper mode of operation (machine will cycle/index).	❑	❑	❑
	• Coolant lines bathing work area with sufficient flow.	❑	❑	❑
	• Piece parts machined on an on-going basis.	❑	❑	❑
2. Monitor Running Processes *(Machine Parts)*	• Slides operating smoothly (no chatter or jerking).	❑	❑	❑
	• Cycle time (%) is correct.	❑	❑	❑
	• Chips pulled and/or evacuating unit (sump is not plugging up).	❑	❑	❑
	• Machine properly indexing (no slamming, jamming, banging, etc.) and running efficiently.	❑	❑	❑
	• Quality parts sequentially machined on a continuous basis to % productivity standards (e.g.,"*parts-per-minute*").	❑	❑	❑
3. Load Next/Another Bar Stock	• Parts from previous bar removed (no cross contamination).	❑	❑	❑
	• Bar ends removed one at a time.	❑	❑	❑
	• Bars stocked/loaded one at a time.	❑	❑	❑
	• Collet tension verified.	❑	❑	❑
	• First piece-part per spindle passed visual inspections (machine verified for function).	❑	❑	❑
	• Machine cycling, indexing, and parts made.	❑	❑	❑

Process Steps	*Process-Product* Standards	Yes	No	NA
	C - PRODUCTION OPERATIONS & PROCESS CONTROL *Continued*			
4. Inspect Parts Using Hand-Held Precision Measurement Devices (Applicable to next bar sampling or in-process intermediate inspections)	• ID/OD conforms to diameter specifications.	❑	❑	❑
	• OAL in conformance with part specifications.	❑	❑	❑
	• Threads within specifications (major/minor/pitch).	❑	❑	❑
	• IO/OD depths conform to print specifications.	❑	❑	❑
	• Surface (and/or micro) finish met print or quality specifications.	❑	❑	❑
	• Demonstrated proficiency using and reading hand-held precision measuring instruments.	❑	❑	❑
	• Parts pulled immediately after sample (no cross contamination).	❑	❑	❑
5. Inspect Sample Parts for Dimensional Characteristics Using an Optical Comparator.	• Hands clean before use.	❑	❑	❑
	• Part(s) cleaned prior to viewing.	❑	❑	❑
	• Turned on instrument and functioning (lamp on, controls work, screen active, etc.).	❑	❑	❑
	• View screen and lens clean (no scratches or film present on screen or lens).	❑	❑	❑
CMM or Vision System may be used in addition to, or in lieu of an optical comparator	• Magnification adjusted to clear viewing requirements.	❑	❑	❑
	• Part properly staged and positioned in/on optical comparator.	❑	❑	❑
	• Instrument optics focused and image sharp.	❑	❑	❑
	• Part manipulated and all angles and radius/radii are within +/- tolerances and specifications.	❑	❑	❑
	• Accurately checked profiles/control limits as specified in Quality/Sample Plan or by SPC.	❑	❑	❑
	• Achieved part conformance or notified proper authority of any non-conformance profiles.	❑	❑	❑
	• Turned off instrument (screen, lens, surface area, work holder(s), and inspection site left clean and undamaged).	❑	❑	❑
6. Maintain Process and Service Machine	• Coolant/lubricant @ indicated levels and flowing (screens clear).	❑	❑	❑
	• No smoke, excessive vibration, or unusual odors/sound present.	❑	❑	❑
	• Chip containers maintained and not over flowing.	❑	❑	❑
	• Part/chip containers replaced when full.	❑	❑	❑
	• Adhered to tool change frequency requirements.	❑	❑	❑
	• Floor clean, dry and free of debris.	❑	❑	❑

Continued

Process Steps	*Process-Product* Standards	Yes	No	*NA*
	C - PRODUCTION OPERATIONS & PROCESS CONTROL *Continued*			
7. Shutdown Screw Machine	• Cycle stopped at correct position (not in mid-cut).	❑	❑	❑
	• Spindles not turning.	❑	❑	❑
	• No chips in machine or on floor.	❑	❑	❑
	• Sump screens clean.	❑	❑	❑
	• Part containers removed and tagged/identified.	❑	❑	❑
	• Work station clean and tooling examined.	❑	❑	❑
	• Maintenance (equipment servicing) items noted/requested or provided.	❑	❑	❑
END DATE:	• Machine locked (*@ zero energy*) for total shutdown or in safety rest (idle) for handoff.	❑	❑	❑

FINAL PRODUCT STANDARDS

"Work is Done As Expected When:"

a. ❑ All written/verbal instructions, checklists, and guidelines were followed and candidate demonstrated safe workplace practices in materials handling, tool sequencing, machine operations, guarding, and coolant application.

b. ❑ Condition of each tool was verified prior to operations and acceptable tolerances established (minimum accuracy levels @ ≤ +/- 1/16th on most factions and/or ≤ + .006 - .000 on drilled diameters required).

c. ❑ All quality control inspections were performed to Quality Plan criteria (procedures), result within SPC requirements, and recorded compliance within the part's required profile(s), tolerances, and dimensions.

d. ❑ Following the process plan, machine was verified for function as necessary for a smooth and continuous run.

e. ❑ Parts were machined and inspected on an on-going basis without contaminating good/bad parts. Demonstrated repeatability.

f. ❑ Current prints and tangible part features, characteristics and processes met specified, or implied needs as per usability, reliability, maintainability, and economics.

g. ❑ All shop safety and housekeeping practices and procedures have been followed.

COMMENTS

Operate Multiple Spindle Screw Machine

Candidate: _____

_____

_____

_____

_____

Examiner: _____

_____

_____

_____

_____

Equipment Model/Machine Type Used:

Signatures: _____ **Date:** _____

(Manager) Title: _____

_____ **Date:** _____

(Examiner/Trainer or Supervisor) Tile: _____

_____ **Date:** _____

(Candidate)

Affidavit of Successful Completion

NIMS Level II Screw Machining Credentialing Program

Credentialing Achievement Record

Please print

Candidate Name	Reg. No.	Date Completed:

The credentialing candidate named above has completed all necessary CAR requirements for NIMS Level II OJT recognition.

Site Name and Address:	Site No.

Indicate in the number of Skill Checks completed and dates of successful performance for each Skill Check

Duty Cluster Name *OPERATE MULTIPLE SPINDLE SCREW MACHINE*	Required Skill Checks	*Number of Skill Checks Completed*
	2	
Successful Skill Check Attempt #1	Date:	
Successful Skill Check Attempt #2	Date:	
Work activity experience-eligibility statements have been completed, dated, and co-initialed.	Yes ❑	No ❑

Site Coordinator/Manager ***Signature*** **Date** **Year**

Supervisor/Trainer ***Signature*** **Date** **Year**

Candidate ***Signature*** **Date** **Year**

Make a copy of the completed *Affidavit of Successful Completion* for your records and send original CAR to:

National Institute for Metalworking Skills Inc.
3251 Old Lee Highway, Suite 205
Fairfax, VA 22030
http//www.nims-skills.org

COMMENTS, SPECIAL AWARDS, OR OTHER PROFESSIONAL ACKNOWLEDGMENTS

See attachments if provided