

## **Appendix A.3**

### **Core Competency Requirements NIMS Certified Mold Maker**

**I. MOLD MAKER SKILL LEVEL: BASIC COMPETENCIES**

Duty Area	Task	Date Completed	Supervisor Signature
<i>A</i>	<i>Inspect Molds, Details &amp; Materials</i>		
A1	Measure Material & Detail Thickness and Verify to Engineering Specifications		
A2	Measure Material & Detail Length and Width		
A3	Determine Material Hardness		
A7	Measure Diameters		
A11	Measure Leader Pins & Bushings		
A13	Measure Runners		
A14	Measure Sprue		
A15	Measure Water Lines		
A17	Measure Point-to-Point Distances		
<i>C</i>	<i>Machine Details</i>		
C8	Grind Flats		
C12	Set-up Drill Press		
C15	Drill Holes (Mill or Turn)		
C19	Countersink/Counterbore Holes (Mill or Turn)		
<i>D</i>	<i>Perform Benchwork</i>		
D5	Demagnetize Details		
D8	Verify Steel Size		
<i>E</i>	<i>Assemble Mold</i>		
E1	Install O-Rings, Gaskets & Baffles		
E15	Prepare Mold for Pick-up		

**II. MOLD MAKER SKILL LEVEL: INTERMEDIATE COMPETENCIES**

II. Core Competency Assessment: Mold Maker Intermediate Competencies

Duty Area	Task	Date Completed	Supervisor Signature
<i>A</i>	<i>Inspect Molds, Details &amp; Materials</i>		
A4	Check/Verify Surface Finish Requirements		
A5	Check Detail Cosmetics		
A6	Verify Shut-Off Edges		
A8	Measure Angles		
A9	Measure Radius/Radii		
A10	Measure Depth & Width of Vents		
A12	Measure Gates		
A16	Measure Critical Dimensions of Tryout Parts		
A18	Check Details for Damage & Flaws		
A19	Measure Electrode & Check Over burn/Soverburnpark Gap		
A20	Check/Verify Engraving for Quality & Compliance		
A21	Calculate for an Unknown Dimension		
<i>B</i>	<i>Plan &amp; Design Job</i>		
B1	Review Work Order		
B2	Verify Prints/Drawings		
B3	Confirm Tolerances & Work piece Specifications		
B6	Order/Receive Material, Die Components and Hardware		
B7	Inventory & Stage Material, Mold Details and Hardware		
B8	Determine Appropriateness & Availability of Equipment		
B10	Determine & Verify Vent Sizes & Locations (where applicable)		
B11	Establish & Verify Waterline Size & Locations		

II. Core Competency Assessment: Mold Maker Intermediate Competencies (cont.)

Duty Area	Task	Date Completed	Supervisor Signature
C	<i>Machine Details</i>		
C1	Set-up Grinders & Wheels		
C2	Grind ID/OD		
C3	Grind Diameters		
C4	Grind Contours		
C5	Grind Angles & Radius		
C7	Grind Edges for Clearance		
C10	Sharpen Cutting Tools		
C11	Set-up Lathe (CNC/Non-CNC)		
C13	Set-up Mill (CNC/Non-CNC, Vertical or Horizontal)		
C14	Square Block		
C16	Lap and/or Hone Holes		
C17	Tap Holes (Mill or Turn)		
C18	Bore Holes (Mill or Turn)		
C20	Ream/Drill Holes (Mill or Turn)		
C21	Cut Keyways, Frames, Pockets & Profiles (Mill or Turn)		
C22	Machine Electrodes		
C23	Cut Hardened Material (Mill or Turn)		
C24	Mill/Grind Grease Grooves		
C26	Turn Between Centers		
C27	Turn Chucked Work piece		
C28	Chase Threads		
C29	(Gun) Drill Holes & Waterlines		
C30	Cut Side Pockets		
C31	Set-up Conventional Electronic Discharge Machine(EDM)		
C32	Burn Threads		
C33	Alter Surface Finish (EDM)		
C34	Burn Holes		
C35	Burn Profiles		
C36	Set-up Wire EDM		
C37	Wire Cuts Features Through Material		
C39	Inspect Machined Parts for Quality & Compliance		
C40	Verify Timing and Shutoff		

II. Core Competency Assessment: Mold Maker Intermediate Competencies (cont.)

Duty Area	Task	Date Completed	Supervisor Signature
<i>D</i>	<i>Perform Benchwork</i>		
D2	Assemble Mold on Bench		
D4	Deburr Details & Surfaces		
D6	Engrave Mold Information & Detail Identifications		
D7	Layout/Scribe Part Details		
<i>E</i>	<i>Assemble Mold</i>		
E2	Install Manifolds/Drops		
E3	Install Cavity & Core Blocks		
E4	Install Ejector & Return Pins		
E5	Install & Fit Interlocks & Side Locks		
E6	Test for Water Leaks & Check Pressure		
E7	Test for Hydraulic/Pneumatic Leaks & Pressure		
E8	Install CAM/Rocker Sub-Assembly		
E9	Lubricate Moving Parts, Components & Details		
E11	Test Limit/Proxy Switches		
E12	Install Water/Hydraulic Fittings		
E14	Mount & Install Insulator Board/Sheet		
<i>F</i>	<i>Conduct Tryouts &amp; Validate Mold</i>		
F1	Setup Mold in Press (if applicable)		
F2	Determine & Communicate Tryout Process (if applicable)		
F3	Run Parts to Part Count or Time Specs (if applicable)		
F5	Prepare Tryout Parts for Sampling (if applicable)		
F7	Adjust Z-Pin/Puller (if applicable)		
F9	Repair Water Leaks (if applicable)		
F10	Adjust Vents (if applicable)		
F11	Add Air Manifolds (if applicable)		
F13	Clear/Unblock Water Passages (if applicable)		
F15	Clean-Out/Unblock Manifold Nozzles (if applicable)		
F16	Pull Mold or Tools for Rework (if applicable)		
<i>G</i>	<i>Troubleshoot Mold &amp; Process Problems (Selected Examples)</i>		
G5	Respond to Part that was not Ejected and Trapped in Mold		
<i>H</i>	<i>Coordinate/Manage Project</i>		
H4	Participate in Pre/Post Mold Building Meetings		
H5	Document & Track Engineering Changes & Closeout Project (with approval)		

**III. MOLD MAKER SKILL LEVEL: ADVANCED COMPETENCIES**

III. Core Competency Assessment: Mold Maker Advanced Competencies

Duty Area	Task	Date Completed	Supervisor Signature
<i>B</i>	<i>Plan &amp; Design Job</i>		
B4	Determine & Establish Job Flow, Milestones and Timelines (with approval)		
B5	Develop/Outline Manufacturing Plan		
B9	Design Tools From Part Print (non-designed tools/prototypes)		
B12	Verify Heat Treating Requirements		
B13	Verify Coating Requirements		
B14	Calculate Shrink for Non-Designed Tools		
B15	Estimate Mold Construction & Assembly Hours (Compare to Quoted Hours)		
B16	Draw/Sketch Details, Components and/or Parts		
<i>C</i>	<i>Machine Details</i>		
C9	Grind Electrodes		
C38	Wire Profiles & Angles Through Material		
<i>D</i>	<i>Perform Benchwork</i>		
D1	Polish Parts/Details		
D3	Fit & Mount Details		
<i>E</i>	<i>Assemble Mold</i>		
E10	Test Manifold Zones		
E13	Set Timing & Shutoff		
<i>F</i>	<i>Conduct Tryouts &amp; Validate Mold</i>		
F4	Inspect Tryout Parts for Quality & Compliance		
F6	Repair/Adjust Slides		
F8	Adjust/Set Timing		
F12	Adjust/Repair Gates		

III. Core Competency Assessment: Mold Maker Advanced Competencies (cont.)

Duty Area	Task	Date Completed	Supervisor Signature
<i>F</i>	<i>Conduct Tryouts &amp; Validate Mold</i>		
F14	Adjust Stack Height		
<i>G</i>	<i>Troubleshoot Mold &amp; Process Problems (Selected Examples)</i>		
G1	Isolate the Cause of Water, Air or Hydraulic Leaks		
G2	Find Out Why Flash has Occurred		
G3	Respond to a "Short Shot" Situation		
G4	Determine Why Parts are Sticking		
G6	Respond to Plastic Deformation on a Part		
<i>H</i>	<i>Coordinate/Manage Project</i>		
H1	Delegate & Monitor Work Assignments		
H2	Maintain Timelines and Monitor Building Schedule		
H3	Oversee Mold Making Assignments		
H6	Evaluate In-Process Inspection Results & Data		
H7	Develop Contingency or Corrective Action Plans		
H8	Communicate With Contractors, Vendors & Suppliers (optional)		
H9	Communicate Tolerances, Fits, Specifications and Customer Requirements		
H10	Identify & Communicate Hours Over Quoted Hours		
H11	Acknowledge Validation of Mold		
H12	Closeout Project (Deleted) (with approval)		

Required NIMS Credentials

In order to demonstrate proficiency in all of the competencies listed in this appendix, the apprentice will have completed all of the following NIMS Credentials.

Name of Credential	Date Completed	Supervisor Signature
Measurement, Materials and Safety		
Job Planning, Benchwork and Layout		
Drill Press Skills		
<b>One of the Following Two</b>		
Manual Milling Skills I CNC Milling: Programming Set-up and Operations I		
<b>One of the Following Three</b>		
Turning Operations: Turning Between Centers I Turning Operations: Turning Chucking Skills CNC Turning: Programming Set-up and Operations		
<b>One of the Following Two</b>		
Manual Milling Skills II CNC Milling Skills II		
<b>One of the Following Three</b>		
Turning II—Chucking Turning II—Between Centers CNC Turning Skills II		
<b>All of the Following Three</b>		
Grinding Skills I		
Surface Grinding Skills		
Cylindrical Grinding Skills		
<b>Both of the Following</b>		
Mold making and Die Cast Die making Level II		
Mold making and Die Cast Die making Level III		
<b>The Following Two are Optional</b>		
EDM—Plunge (Optional)		
EDM—2-Axis Wire (Optional)		