



## APPENDIX A

### MACHINE BUILDER

D.O.T. CODE 600.281-022

O\*NET CODE 51-2031.00

This training outline is the current standard for Work Processes and Related Instruction. Changes in technology, regulations, and safety/health issues may result in the need for additional on-the-job or classroom learning.

### WORK PROCESSES

	<u>Approximate Hours</u>
A. <u>Boring Mill, Horizontal</u>	350
1.    Following all safety procedures and policies	
2.    Setting up work, using jigs, fixtures, vee blocks, bolts, straps, jacks, etc.	
3.    Rough boring, relief boring, deep boring, internal recessing, end bar boring, boring to shoulders, drilling, tapping, reaming, spotfacing, counterboring, chamfering, grooving, grinding tools	
4.    Adjusting feeds and speeds	
5.    Using numerically controlled hobs (if applicable)	
6.    Lubricating	
7.    NC programming (if applicable)	
8.    CNC programming (if applicable)	
B. <u>Lathe</u>	350
1.    Following all safety procedures and policies	
2.    Using faceplate, different types of chucks, mandrels, steady rests, follow rests, taper attachments, compound and offset tailstock	

3. Centering, straight turning, taper turning, facing, drilling, boring, reaming, necking, recessing, filing, lapping, tapping, polishing, thread cutting, knurling, form turning, eccentric turning, setting and grinding of tools
  4. Adjusting feeds and speeds
  5. Lubricating
  6. NC programming (if applicable)
  7. CNC programming (if applicable)
- C. Radial and Sensitive Drills 170
1. Following all safety procedures and policies
  2. Laying out holes, setting up work using straps, clamps, jigs and fixtures. Using leveling gauges
  3. Drilling, reaming, tapping, boring, spotfacing,
  4. Using templates, grinding tools, setting tools
  5. Lubricating
  6. NC programming (if applicable)
  7. CNC programming (if applicable)
- D. Milling Machine 210
1. Following all safety procedures and policies
  2. Keyway milling, spline milling, horizontal milling, vertical milling, planing
  3. Using fixtures, jigs, knees, and dividing head
  4. Using turntable; boring, reaming and drilling
  5. Milling splines, racks, squares, hexagons, spur gears, graduations, tee slots
  6. Adjusting feeds and speeds
  7. Lubricating
  8. NC programming (if applicable)
  9. CNC programming (if applicable)
- E. Grinders 210
1. Following all safety procedures and policies
  2. Operating internal, external, rotary and surface grinders
  3. Using magnetic chuck
  4. Loading and blocking work on the table
  5. Plain grinding, plunge, face and shoulder grinding, grinding bars, taper grinding, using taper bushings,

	end plugs and arbors	
	6. Dressing grinding wheels	
F.	<u>Production Control Department</u>	290
	1. Learning general routine of the department	
	2. Following up on electrical, piping, or other work being done in the shop	
G.	<u>Production Engineering Department</u>	590
	1. Learning general routine of the department	
	2. Estimating time, materials, costs of jobs	
H.	<u>Sales Department</u>	430
	1. Learning the divisions and general routine of the department	
	2. Relating to customers in a professional, clear and helpful way	
	3. Discussing their requirements with customers; learning the specifications and components of machines they need	
	4. Developing accurate quotations for in-house cost consideration	
I.	<u>Blueprints, Technical Instructions, Layout</u>	760
	1. Reading and understanding specifications	
	2. Reading and interpreting detail and assembly drawings and schematic drawings	
	3. Using list sheets and engineering orders pertaining to different orders or machines	
	4. Using assembly sequence write-ups and inspection sheets to insure proper techniques	
	5. Tracing and lettering	
	6. Making accurate drawings; showing detailing, tolerances, fit, finish dimensions	
	7. Making two-view and three-view drawings, sectional views	
	8. Changing existing drawings	
J.	<u>Scraper and Hand Tools</u>	330
	1. Using hand and power scrapers to fit sliding surfaces	



M.	<u>Welding</u>	210
	<ol style="list-style-type: none"> <li>1. Performing basic welding techniques on various steels</li> <li>2. Knowing the different uses for various metals, such as: iron, steel, brass, bronze, aluminum, copper, etc.</li> </ol>	
N.	<u>Assembly Measurements</u>	210
	<ol style="list-style-type: none"> <li>1. Accurately using measuring devices, such as: electronic level, electric wire micrometer, spirit level, indicators, optical equipment, laser interferometer</li> </ol>	
O.	<u>Final Assembly and Testing</u>	2100
	<ol style="list-style-type: none"> <li>1. Performing final mechanical assembly operation on each category of machine manufactured by sponsor</li> <li>2. Performing final electrical assembly operation on each category of machine manufactured by sponsor</li> <li>3. Assisting in test running of machines; troubleshooting</li> <li>4. Installing machines in customers' places of operation (if applicable)</li> </ol>	
	TOTAL HOURS	<hr style="width: 100px; margin-left: auto; margin-right: 0;"/> 8,000

*Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to <http://www.labor.state.ny.us/workerprotection/publicwork/PDFs/Article8FAQS.pdf>.*

APPENDIX B

MACHINE BUILDER

RELATED INSTRUCTION

Safety and Health

OSHA 10-hour Safety Course for General Industry, or General Shop Safety  
Proper Use of Personal Protective Equipment (PPE)  
Machine Safety  
Right-to-Know/Material Safety Data Sheets (MSDS)  
Proper Lifting Techniques  
First Aid – minimum 6.5 hours every 3 years

Blueprint Reading and Drawing

Reading and Interpreting Blueprints, Schematics, Drawings  
Trade Drafting, including: scales, dimensioning, types of lines, types of drawings, tolerances, common abbreviations and symbols, blueprint format, electrical schematics

Mathematics

Metrics  
Use of Calculator  
Use of Machinist's Handbook and Machinery Handbook  
Arithmetic  
Plane Geometry for the Trade  
Trigonometry for the Trade  
Precision Measurement

Trade Theory and Science

Tools and Equipment: Proper Care and Use  
Materials of the Trade and Their Characteristics  
Fundamentals of Metallurgy  
Strength of Materials  
Trade Terminology  
Machine Tools and Other Machines: Proper Care and Operation  
Fundamentals of Mechanics  
Fundamentals of Hydraulics  
Basic Electrical Circuits  
Production Control, including: materials, personnel, records, flow charts, shipping schedules

Engineering, including: design, operation, materials, manufacturing methods,  
industrial standards, fabrication, transportation  
Heat Treating (if applicable)  
Testing: Destructive and Non-Destructive  
Rigging, Signaling, Hoisting  
Welding for the Trade  
Layout: Rough, Semi-Precision, Precision  
Millwright Principles, including: foundations, heavy equipment moving,  
anchoring, setting, electrical hookup, machinery installation codes  
(if applicable)

#### Other Workplace Skills

Oral Communication Skills  
Customer Relations  
Team Building Skills  
Engineering and Manufacturing Economics  
Time Management (optional)

Sexual Harassment Prevention Training – minimum 3 hours

A minimum of 144 hours of Related Instruction is required for each apprentice for each year.