



STATE OF NEW YORK  
DEPARTMENT OF LABOR

APPENDIX A

DESIGN DRAFTER  
(ELECTRICAL-MECHANICAL-HYDRAULIC)

D.O.T. CODE 017.261.014

WORK PROCESSES

	<u>Approximate Hours</u>
A. <u>Basic Drafting Concepts and Sketching</u>	1,500
1. Lettering and format, drawing methods, bill of materials, wire lists, free-hand sketching, dimensioning – decimal, metric	
2. Drawings – release systems; production engineering and experimental drawings; types – assembly, schematics, proposal, detail, specification and source control, installation, layout production	
3. Layouts – (Hydraulics) manifold, weight contouring, systems and linkages, seals; (Electronics) circuit boards, cabinet design, shielding, service, connectors, schematic diagrams, (logic, discrete components), interconnections (external of units)	
B. <u>Basic Detailing</u>	1,500
1. Materials selection, engineering notes; springs-materials, rate and modulus, loads, calculations; (Electronics) art copy-lettering, typesetting, creating art copy, panel and chassis	
C. <u>Printed Circuit Boards (Electronics) Layout</u>	2,000
1. Single-sided, double-sided and multi-layer; layout restrictions, master drawings; drawing layouts for symmetry, spacing circuit flow, placement of identification, assemblies	
2. Wire routing drawings, cable assemblies, wiring harness, wire lists	
3. Machining of circuit boards – drilling instructions, including hole spacing, sizing, material and dimensioning	
D. <u>Hydraulic Layouts – Design Standards</u>	2,000
1. Body design and components – spools, bushings, surface finish and materials; design function – null edges and nulling	

D.	<u>Hydraulic Layouts – Design Standards</u> – continued	
	conditions, dimensional control; materials, surface finish and clearances	
	2. Hydraulic schematics – systems, closed loop, open loop	
	3. Strength of materials – bolt tension (torque); hoop strength; bending vs. shear; stress risers	
E.	<u>Machining and Machining Concepts</u>	2,000
	1. Machining processes – lathe milling machine, grinders, electrical discharge machines, drilling, NC machining, point-to-point and continuous path systems; hones and lapping	
F.	<u>Fits and Tolerances</u>	1,000
	1. Tolerance stackups; geometrical positional and tolerancing; fits and fit systems; interchangeable null fits	
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	Total hours	10,000

*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

### DESIGN DRAFTER (ELECTRICAL-MECHANICAL-HYDRAULIC)

#### RELATED INSTRUCTION

##### Mathematics

Geometry and Geometrical Construction; Trade Electronic Mathematics, Estimating and Specifications; Advanced Mathematics, Algebra, Trigonometry, Ratio and Proportion, Area; Mensuration, Advanced Calculations for Physical Properties and Conditions

##### Blueprint Reading

Basic and Advanced; Production, Assembly, Schematics for Hydraulics, Electronics, NC Machining Concepts

##### Trade Theory

(Drafting) Tools, Machines, and Equipment; Operations, Care and Maintenance; Terminology; NEMA Standards; Industrial Standards  
Metallurgy; Strength of Materials; Hydraulics-Fluid Power and Fluid Mechanics; Electricity and Electronics AC and DC, Circuitry and Design of Systems

##### Trade Sciences

Machine Design, Analytical Mechanics, Physics (basic and second year)  
Thermodynamics, Heat, Light, Sound, and Molecular Modulus Change;  
Principle of Machines, Tools, and Equipment

##### Safety

Fundamentals of Personal, Machine, and Environmental - Trade Safety;  
First Aid, OSHA Standards

##### Industrial and Labor Relations

History and Background  
Current Laws and Practices

First Aid – 10 hours per year

Sexual Harassment Prevention Training – minimum 3 hours

Other Related Courses as Necessary

144 Hours of Related Instruction are Required for Each Apprentice for Each Year.