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 Drivers

## ABSTRACT

These cluster matrices provide duties and tasks that form the basis of instructional content for secondary, postsecondary, and adult training programs industrial health occupations. The 14 clusters (and the job titles included in each cluster) are as follows: (1) construction (bricklayer, carpenter, building maintenance worker, electrician, maintenance painter, plumber/pipefitter); (2) electronic (computer repair technician, electrical and electronic technician); (3) graphic communications (commercial artists, compositors and/or typesetters, offset lithographic press operators, printing photographers, camera operators); (4) transportation (automotive mechanic, diesel mechanic, gasoline engine/mower repair); (5) manufacturing (machine tool operator, machinist, tool and die maker, punch press operator, sheet metal worker, combination welder, maintenance repairer, automated manufacturing systems technician, thermoplastic machine set-up specialist); (6) technical preparation (computer repair technician, electrical and electronic technician, automated manufacturing systems technician); (7) auto body repairer; (8) bus driver; (9) drafter/computer-aided drafter; (10) truck driver; (11) correction officers and jailers; (12) electric home appliance and power tool repairer; (13) office machine/cash register repairer; and (14) telephone and cable television line installers/repairers. (YLB)

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For  
Employment  
Task Lists

Illinois  
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Adult  
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Technical Education

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CLUSTER MATRICES  
FOR  
INDUSTRIAL OCCUPATIONS

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**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

## **CONSTRUCTION CLUSTER**

Bricklayer  
Carpenter  
Building Maintenance Worker  
Electrician  
Maintenance Painter  
Plumber/Pipefitter  
\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

These materials were prepared under contract with the Illinois State Board of Education, Department of Adult, Vocational and Technical Education ("Illinois Competency Based Vocational Education Project," contract number PS-10-130).

# CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

B = Bricklayer  
 C = Carpenter  
 M = Building Maintenance Worker  
 E = Electrician  
 MP = Maintenance Painter  
 PP = Plumber/Pipefitter

## APPLYING SAFETY PRACTICES

	B	C	M	E	MP	PP
705A001 Comply with shop and equipment safety rules	X	X	X	X	X	X
705A002 Apply basic emergency first aid techniques	X	X	X	X	X	X
705A003 Complete accident reports	X	X	Y	X	X	X
705A004 Inspect workplaces for safe working environment	X	X	X	X	X	X
705A005 Report shop, environmental and equipment safety violations	X	X	X	X	X	X
705A006 Demonstrate use of fire extinguishers	X	X	X	X	X	X
705A007 Participate in disaster control exercises	X	X	X	X	X	X
705A008 Participate in shop safety committees	X	X	X	X	X	X
705A009 Correct safety hazards	X	X	X	X	X	X
705A010 Demonstrate cardiopulmonary resuscitation techniques	X	X	X	X	X	X
705A011 Participate in safety training programs	X	X	X	X	X	X
705A012 Evaluate personnel safety violations	X	X	X	X	X	X

## PERFORMING SUPERVISORY FUNCTIONS

	B	C	M	E	MP	PP
705B001 Determine availability of machines, supplies and materials	X	X	X	X	X	X
705B002 Requisition, schedule and distribute supplies and materials	X	X	X	X	X	X
705B003 Coordinate workers with work to be done	X	X	X	X	X	X
705B004 Schedule and control shop flow of jobs	X	X	X	X	X	X
705B005 Maintain files	X	X	X	X	X	X
705B006 Maintain service records	X	X	X	X	X	X
705B007 Maintain labor records	X	X	X	X	X	X
705B008 Maintain warranty records	X	X	X	X	X	X
705B009 Explain work requirements	X	X	X	X	X	X
705B010 Inventory supplies and equipment	X	X	X	X	X	X
705B011 Maintain charts, tables, graphs or status boards on work scheduled	X	X	X	X	X	X
705B012 Check job/time cards	X	X	X	X	X	X
705B013 Inspect shop equipment and arrange for maintenance and repair work	X	X	X	X	X	X
705B014 Follow up employee reports of problems or equipment failures	X	X	X	X	X	X
705B015 Draft correspondence	X	X	X	X	X	X
705B016 Inspect quality of brickwork	X					
705B017 Order masonry supplies and equipment	X					
705B018 Orient new employees	X	X	X	X	X	X
705B019 Prepare bids for contract masonry work	X					
705B020 Prepare masonry budgets	X					
705B021 Prepare estimate of brickwork	X					
705B022 Compute average cost rates for work performed	X	X	X	X	X	X
705B023 Determine actual costs of work completed	X	X	X	X	X	X
705B024 Write work schedules	X	X	X	X	X	X
705B025 Write technical reports	X	X	X	X	X	X
705B026 Plan and implement technical training for employees	X	X	X	X	X	X

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
705B027	Evaluate employee progress and performance	X	X	X	X	X	X
705B028	Interview job applicants	X	X	X	X	X	X
705B029	Hire workers	X	X	X	X	X	X
705B030	Fire workers	X	X	X	X	X	X
705B031	Conduct meetings	X	X	X	X	X	X

PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES

		B	C	M	E	MP	PP
705C001	Clean and maintain work area and leave in safe condition	X	X	X	X	X	X
705C002	Follow tool crib procedures	X	X	X	X	X	X
705C003	Report problems to supervisor	X	X	X	X	X	X
705C004	Complete time cards	X	X	X	X	X	X
705C005	Complete job status reports	X	X	X	X	X	X
705C006	Make equipment failure reports	X	X	X	X	X	X
705C007	Determine basic maintenance procedures using manuals	X	X	X	X	X	X
705C008	Plan sequence of work operations	X	X	X	X	X	X
705C009	Use technical references	X	X	X	X	X	X
705C010	Participate in a participative management program (Quality Circles)	X	X	X	X	X	X

CONDUCTING SHOP OPERATIONS

		B	C	M	E	MP	PP
705D001	Answer customer questions	X	X	X	X	X	X
705D002	Troubleshoot customer problems	X	X	X	X	X	X
705D003	Perform public relations activities	X	X	X	X	X	X
705D004	Maintain records of service tools and equipment	X	X	X	X	X	X
705D005	Unpack and inspect new equipment	X	X	X	X	X	X
705D006	Receive and store parts and supplies	X	X	X	X	X	X
705D007	Update parts catalogs	X	X	X	X	X	X
705D008	Modify wiring diagrams to reflect repair changes		X	X	X		
705D009	Make out material lists used on each job	X	X	X	X	X	X
705D010	Complete work orders	X	X	X	X	X	X

ESTIMATING MATERIALS

		B	C	M	E	MP	PP
705E001	Estimate forming materials	X	X	X			
705E002	Estimate concrete	X	X	X			
705E003	Estimate concrete blocks	X	X	X			
705E004	Estimate rough framing materials	X	X	X			
705E005	Estimate roofing materials		X	X			
705E006	Estimate windows		X	X			
705E007	Estimate doors and jambs		X	X			
705E008	Estimate interior underlayment		X				
705E009	Estimate interior panels		X	X			
705E010	Estimate stairway materials		X	X			
705E011	Estimate closet accessories		X	X			
705E012	Estimate acoustical ceiling materials		X	X			
705E013	Estimate prefabricated cabinets		X	X			
705E014	Estimate materials for built-ins		X	X			
705E015	Estimate finish hardware		X	X			
705E016	Estimate siding		X	X			
705E017	Estimate cost of jobs	X	X	X	X	X	X

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

PREPARING BUILDING SITE

		B	C	M	E	MP	PP
705F001	Establish elevation reference points from bench mark	X	X				
705F002	Establish footing grades	X	X				
705F003	Locate and square corners	X	X				
705F004	Install batter boards	X	X				
705F005	Set grade stakes	X	X				
705F006	Lay out buildings using transit	X	X				

PREPARING FOUNDATIONS AND FOOTINGS

		B	C	M	E	MP	PP
705G001	Build footings	X	X				
705G002	Build forms for concrete	X	X				
705G003	Construct piers	X					
705G004	Construct walls containing pilasters	X					
705G005	Raise foundations	X					
705G006	Waterproof foundations	X	X				
705G007	Construct stud and sheathing wall forms	X	X				
705G008	Erect plywood panel wall forms	X	X				
705G009	Erect manufactured wall forms	X	X				
705G010	Construct stair forms	X	X				
705G011	Strip forms	X	X				
705G012	Install beams	X	X				
705G013	Install anchor bolts in concrete	X					
705G014	Install anchor bolts in concrete blocks	X					
705G015	Install bulkheads	X	X				
705G016	Install keyway for footings and foundations	X	X				

LAYING, JOINTING AND POINTING BRICK

		B	C	M	E	MP	PP
705H001	Bond walls	X					
705H002	Build Gothic archs	X					
705H003	Build jack archs	X					
705H004	Build Roman archs	X					
705H005	Build segmental archs	X					
705H006	Build soldier archs	X					
705H007	Build Tudor archs	X					
705H008	Build corner brick columns	X					
705H009	Build rectangular brick columns	X					
705H010	Build round brick columns	X					
705H011	Build square brick columns	X					
705H012	Clean brick walls	X			X		
705H013	Construct brick veneer walls	X			X		
705H014	Construct cavity walls	X					
705H015	Cut bat closures	X					
705H016	Cut queen closures	X					
705H017	Form corbels	X					
705H018	Gage masonry walls with mortar scale	X					
705H019	Gage masonry walls with story pole	X					
705H020	Lay basket weave patterns	X					
705H021	Lay common bond patterns	X					
705H022	Lay diamond patterns	X					
705H023	Lay Dutch bond patterns	X					
705H024	Lay Flemish bond patterns	X					
705H025	Lay header courses	X					
705H026	Lay herringbone bond patterns	X					



CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
705H027	Lay rowlock courses	X					
705H028	Lay sailor courses	X					
705H029	Lay shiner courses	X					
705H030	Lay soldier courses	X					
705H031	Lay stack bond patterns	X					
705H032	Lay stretcher courses	X					
705H033	Lay American bond patterns	X					
705H034	Lay English bond patterns	X					
705H035	Lay fine bricks with clay	X					
705H036	Tool concave joints	X					
705H037	Tool convex joints	X					
705H038	Lay corners	X					
705H039	Tool rake joints	X			X		
705H040	Tool squeeze joints	X			X		
705H041	Tool V joints	X			X		
705H042	Mix cement mortar	X			X		
705H043	Mix mortar by hand	X			X		
705H044	Mix mortar with power mixer	X			X		
705H045	Point walls	X			X		
705H046	Reinforce brick masonry	X			X		
705H047	Tie doors to walls using anchors	X			X		
705H048	Tie walls together using anchors	X			X		
705H049	Cut bricks using masonry saw	X			X		
705H050	Cut bricks using partner saw	X			X		
705H051	Cut brick blocks using brick hammer	X			X		
705H052	Cut brick blocks using brick set	X			X		
705H053	Figure pitch using framing square	X			X		
705H054	Figure runs of rakes using framing square	X			X		
705H055	Mix slack lime mortar	X			X		

CONSTRUCTING RESIDENTIAL CHIMNEYS AND FIREPLACES

		B	C	M	E	MP	PP
705I001	Build double face chimneys	X					
705I002	Build single face chimneys	X					
705I003	Cut flue linings	X					
705I004	Install ash dumps	X					
705I005	Install clean-out doors	X					
705I006	Insert dampers	X					
705I007	Install heatilators	X					
705I008	Lay hearths	X					
705I009	Lay mantels	X					
705I010	Lay throats	X					
705I011	Lay backs of fireplaces	X					
705I012	Lay bottoms of fireplaces	X					
705I013	Lay sides of fireplaces	X					
705I014	Set flues	X					
705I015	Install log lighters	X					

CONSTRUCTING MASONRY BUILDINGS

		B	C	M	E	MP	PP
705J001	Build partitions	X		X			
705J002	Construct jambs	X		X			
705J003	Construct sills	X		X			
705J004	Damp proof walls	X		X			
705J005	Install wall ties	X		X			

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705J006 Lay flight of steps	X					
705J007 Make reinforced lintels	X					
705J008 Place beams	X					
705J009 Set door frames	X		X			
705J010 Set lintels	X		X			
705J011 Set windows	X		X			

CONSTRUCTING CONCRETE MASONRY

	B	C	M	E	MP	PP
705K001 Lay concrete blocks	X		X			
705K002 Lay running bond patterns in concrete masonry	X					
705K003 Lay vertical bond patterns in concrete masonry	X					
705K004 Pour concrete	X		X			
705K005 Screed concrete	X		X			
705K006 Finish concrete	X		X			

PERFORMING MISCELLANEOUS MASONRY WORK

	B	C	M	E	MP	PP
705L001 Construct manholes	X					
705L002 Construct planters	X		X			
705L003 Construct water fountains	X		X			
705L004 Fireproof beams	X		X			
705L005 Fireproof walls	X		X			
705L006 Install flashing	X		X			
705L007 Lay glass blocks	X		X			
705L008 Lay masonry driveways	X					
705L009 Lay masonry floors	X		X			
705L010 Lay masonry walks	X		X			
705L011 Lay ornamental lattice pattern walls	X					
705L012 Lay structural clay tiles	X					
705L013 Repair masonry work	X		X			
705L014 Set stones	X		X			
705L015 Set precast panels	X					
705L016 Anchor precast panels by welding, bolting or clamping	X					

SHARPENING TOOLS

	B	C	M	E	MP	PP
705M001 Sharpen wood chisels		X	X			
705M002 Hone plane irons		X	X			
705M003 Sharpen circular saw blades		X	X			
705M004 Sharpen twist drills		X	X			
705M005 Sharpen auger bits		X	X			

INSTALLING ROUGH FRAMING

	B	C	M	E	MP	PP
705N001 Stack lumber		X				
705N002 Install sill plates		X	X			
705N003 Frame walls		X				
705N004 Align and brace walls		X				
705N005 Construct plywood box beams		X				
705N006 Install diagonal wind bracing		X				
705N007 Frame floor openings		X				
705N008 Frame door openings		X				
705N009 Frame window openings		X				

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
705N010	Frame roof openings		X				
705N011	Frame built-up stringers		X				
705N012	Frame cleated stair stringers		X				
705N013	Install floor joists		X				
705N014	Install cross-bridging		X				
705N015	Install ceiling joists		X				
705N016	Construct post and beam frames		X				
705N017	Install steel beams		X				
705N018	Install lally posts		X				
705N019	Install backing for hanging fixtures and cabinets		X	X			
705N020	Install exterior wall sheathings		X				
705N021	Install battens		X				
705N022	Install plyscore sub-floors		X	X			
705N023	Install diagonal sub-floors		X	X			
705N024	Install underlayment over sub-floors		X	X			
705N025	Install metal studs		X				
705N026	Set metal door frames for masonry construction		X	X			
705N027	Set metal window frames for masonry construction		X	X			
705N028	Construct roof trusses		X				
705N029	Install collar beams		X				
705N030	Install overhang purlins		X				
705N031	Install rafter support purlins		X				
705N032	Install ridgeboards		X				
705N033	Install common rafters		X				
705N034	Install tail rafters		X				
705N035	Install cripple jack rafters		X				
705N036	Install hip rafters		X				
705N037	Install hip jack rafters		X				
705N038	Install valley rafters		X				
705N039	Install valley jack rafters		X				
705N040	Install gambrel roof rafters		X				
705N041	Frame dormers without sidewalls		X				
705N042	Frame dormers with sidewalls		X				
705N043	Frame roof saddles		X				
705N044	Frame snub gables		X				
705N045	Install gable studs		X				
705N046	Construct intersecting gable roofs		X				
705N047	Install roof sheathings		X	X			

INSTALLING ROOF COMPONENTS

		B	C	M	E	MP	PP
7050001	Install roofing felts		X	X			
7050002	Install chimney flashes		X	X			
7050003	Install valley flashes		X	X			
7050004	Install composite strip shingles		X	X			
7050005	Install composite shingles on ridge cap		X	X			
7050006	Install composite shingles in valley		X	X			
7050007	Install composite shingles around roof opening		X	X			
7050008	Install shingles over dormers or roof appendages		X	X			
7050009	Install roof vents		X	X			
7050010	Install ridge vents		X	X			
7050011	Install skylights		X	X			
7050012	Install wood shingles/shakes		X	X			
7050013	Install wood shingles/shakes on ridge cap		X	X			
7050014	Install wood shingles/shakes in valley		X	X			

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
7050015	Install wood shingles/shakes around roof opening		X	X			
7050016	Install gutters		X	X			
7050017	Install downspouts		X	X			

INSTALLING EXTERIOR FINISHES

		B	C	M	E	MP	PP
705P001	Construct box cornice		X				
705P002	Construct rake cornice		X				
705P003	Case exterior opening		X				
705P004	Install wood jamb window units		X	X			
705P005	Hang exterior doors		X	X			
705P006	Install exterior door jambs		X	X			
705P007	Install metal corners for aluminum or vinyl siding		X	X			
705P008	Install corner boards for wood siding		X	X			
705P009	Install wood fascia		X	X			
705P010	Install wood soffit		X	X			
705P011	Install aluminum fascia		X	X			
705P012	Install aluminum soffit		X	X			
705P013	Install prefabricated columns		X	X			
705P014	Install garage doors		X	X			
705P015	Install metal siding		X	X			
705P016	Install vinyl siding		X	X			
705P017	Install composition siding		X	X			
705P018	Install prefabricated storm doors		X	X			
705P019	Install prefabricated storm windows		X	X			
705P020	Install drip caps		X	X			
705P021	Install bevel siding		X	X			
705P022	Install lap siding		X	X			
705P023	Install wood shingle siding		X	X			
705P024	Install outside corners of wood shingle siding		X	X			
705P025	Install panel siding		X	X			
705P026	Construct and install wood louvers		X	X			
705P027	Install exterior shutters		X	X			

INSTALLING INTERIOR FINISHES

		B	C	M	E	MP	PP
705Q001	Install batt insulations		X	X			
705Q002	Install vapor barriers		X	X			
705Q003	Install wall panels		X	X			
705Q004	Assemble prefabricated cabinets		X	X			
705Q005	Install closet accessories		X	X			
705Q006	Install interior door jambs		X	X			
705Q007	Construct built-in cabinets		X	X			
705Q008	Install shelves		X	X			
705Q009	Install baseboards		X	X			
705Q010	Install ceiling molds		X	X			
705Q011	Hang drywalls		X	X			
705Q012	Case interior openings		X	X			
705Q013	Hang interior doors		X	X			
705Q014	Install prehung split jamb door units		X	X			
705Q015	Install double-acting doors		X	X			
705Q016	Install folding (accordian) doors		X	X			
705Q017	Install sliding doors		X	X			
705Q018	Install bi-fold doors		X	X			
705Q019	Install pocket doors		X	X			

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

B C M E MP PP

705Q020	Install cylinder locksets	X	X			
705Q021	Install mortise locksets	X	X			
705Q022	Install door closers	X	X			
705Q023	Install door holders	X	X			
705Q024	Install panic bars	X	X			
705Q025	Install flush bolts	X	X			
705Q026	Install door plates	X	X			
705Q027	Install weatherstripping	X	X			
705Q028	Install wall cabinets	X	X			
705Q029	Install base cabinets	X	X			
705Q030	Install recessed medicine cabinets	X	X			
705Q031	Install thresholds	X	X			
705Q032	Install gypsum lathes	X	X			
705Q033	Install corner beading for lathes	X	X			
705Q034	Install plaster grounds	X	X			
705Q035	Install parquet flooring	X	X			
705Q036	Install plank flooring	X	X			
705Q037	Install tongue and groove flooring	X	X			
705Q038	Install suspended T-grid ceiling	X	X			
705Q039	Install suspended concealed grid ceiling	X	X			
705Q040	Install tongue and groove ceiling tiles	X	X			

ASSEMBLING AND CONSTRUCTING STAIRS

B C M E MP PP

705R001	Install prefabricated stairs	X	X			
705R002	Install disappearing stair unit	X	X			
705R003	Construct open riser stairs	X	X			
705R004	Construct box stairs	X	X			
705R005	Install wood newel post, balusters and railings	X	X			
705R006	Install metal newel post and railings	X	X			

SELECTING ELECTRICAL MATERIALS AND DETERMINING WORK TO BE DONE

B C M E MP PP

705S001	Locate and lay out devices for job from a blueprint or schematic diagram			X	X	
705S002	Figure materials list from blueprint or schematic diagram			X	X	
705S003	Determine governing codes			X	X	
705S004	Determine type and size for splice and device boxes and covers			X	X	
705S005	Select location of inside panels and boxes				X	
705S006	Select type and size of wires			X	X	
705S007	Select mounting devices			X	X	
705S008	Select equipment disconnects				X	
705S009	Determine panelboards				X	
705S010	Select ground fault protections				X	
705S011	Select service entrance				X	
705S012	Select receptacles			X	X	
705S013	Select connectors			X	X	
705S014	Determine electrical insulations				X	
705S015	Determine physical protection of conductors			X	X	

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

COMPUTING SERVICE LOADS

		B	C	M	E	MP	PP
705T001	Balance the total load per phase			X	X		
705T002	Calculate individual circuit loads			X	X		
705T003	Calculate load in watts and load current in amps for entire job			X	X		
705T004	Compute size of service entrance conductors				X		
705T005	Design electrical systems				X		
705T006	Determine number of outlets per circuit			X	X		
705T007	Determine ground fault circuits			X	X		
705T008	Determine cost and practicality of underground or overhead service				X		
705T009	Determine location of inside panels and boxes			X	X		

INSTALLING ELECTRICAL ENVIRONMENTAL CONTROL COMPONENTS

		B	C	M	E	MP	PP
705U001	Install baseboard heat units			X	X		
705U002	Connect ceiling heating cables to thermostat			X	X		
705U003	Connect central electric heaters			X	X		
705U004	Connect furnace motors			X	X		
705U005	Connect line voltage thermostats			X	X		
705U006	Connect low voltage thermostats			X	X		
705U007	Install wall heaters			X	X		
705U008	Connect wiring for boiler control system				X		
705U009	Install ceiling heating cables			X	X		
705U010	Install central electric heaters				X		
705U011	Install furnace motors			X	X		
705U012	Install individual space heaters			X	X		
705U013	Install vent fans			X	X		
705U014	Install air conditioning units			X	X		
705U015	Install electrical environmental control systems				X		

INSTALLING LIGHTING FIXTURES

		B	C	M	E	MP	PP
705V001	Install flood lights			X	X		
705V002	Install incandescent lighting fixture dimmers			X	X		
705V003	Install fluorescent lighting fixture dimmers			X	X		
705V004	Install heat-a-vent lights				X		
705V005	Install light fixtures			X	X		
705V006	Install photo-electric controls on light			X	X		
705V007	Install post lights			X	X		
705V008	Install power failure lighting			X	X		
705V009	Install delayed lighting switches				X		
705V010	Install low-voltage lighting controls				X		
705V011	Install moisture resistant fixtures			X	X		
705V012	Install appliance pilot lights			X	X		
705V013	Install fan controlled by switch			X	X		
705V014	Install 110 volt light fixtures			X	X		
705V015	Select and install lighting control devices			X	X		
705V016	Connect incandescent lighting fixtures			X	X		
705V017	Connect fluorescent lighting fixtures			X	X		
705V018	Install single pole light circuits with 3-way switches			X	X		
705V019	Install single pole light circuits with 4-way switches			X	X		
705V020	Install remote control light circuits				X		

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

INSTALLING SERVICE ENTRANCE

	B	C	M	E	MP	PP
705W001				X		
705W002				X		
705W003				X		
705W004				X		
705W005				X		
705W006				X		
705W007				X		
705W008				X		
705W009				X		

INSTALLING SWITCH BOXES AND OUTLET BOXES

	B	C	M	E	MP	PP
705X001				X		
705X002				X		
705X003				X	X	
705X004				X	X	
705X005				X	X	
705X006				X	X	
705X007				X	X	
705X008				X	X	
705X009				X	X	
705X010				X	X	
705X011				X	X	
705X012				X		

MAINTAINING EXISTING WIRING

	B	C	M	E	MP	PP
705Y001				X		
705Y002				X		
705Y003				X	X	
705Y004				X		
705Y005				X	X	
705Y006				X	X	
705Y007				X	X	
705Y008				X	X	
705Y009				X	X	
705Y010				X	X	
705Y011				X	X	
705Y012				X		
705Y013				X	X	
705Y014				X	X	
705Y015				X	X	
705Y016				X	X	
705Y017				X	X	
705Y018				X	X	
705Y019				X		
705Y020				X	X	
705Y021				X		
705Y022				X		
705Y023				X	X	

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
705Y024	Troubleshoot branch circuits			X	X		
705Y025	Determine electrical problems using available troubleshooting techniques			X	X		
705Y026	Interpret control diagrams for electrical systems			X	X		
705Y027	Diagnose malfunctions of electrical systems using available test and measurement equipment			X	X		
705Y028	Measure and bend conduits			X	X		
705Y029	Pull conductors through existing structures			X	X		
705Y030	Test apparatus for operation			X	X		
705Y031	Adjust apparatus and devices to specifications			X	X		
705Y032	Test installations for mechanical integrities			X	X		
705Y033	Replace circuit breakers			X	X		
705Y034	Check for overloaded circuits			X	X		
705Y035	Wire parallel circuits			X	X		
705Y036	Wire series circuits			X	X		
705Y037	Wire series-parallel circuits			X	X		

ROUGHING IN FEEDERS, BRANCH CIRCUIT CABLES AND CIRCUITS

		B	C	M	E	MP	PP
705Z001	Rough in 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
705Z002	Rough in 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
705Z003	Rough in armored cables to outlet boxes				X		
705Z004	Rough in cables between existing boxes and new boxes				X		
705Z005	Rough in cables for branch circuits			X	X		
705Z006	Rough in conduits for branch circuits			X	X		
705Z007	Install devices controlled by two three-way switches with feed to switch box				X		
705Z008	Install devices controlled by two three-way switches with feed to light box				X		
705Z009	Install devices controlled by two three-way switches and one four-way switch with feed to three-way switch				X		
705Z010	Install device controlled by two three-way switches and one four-way switch with feed to light				X		
705Z011	Install device controlled by two three-way switches and two four-way switches with feed to three-way switch				X		
705Z012	Rough in circuit for door chime system			X	X		
705Z013	Rough in circuit for an intercom system			X	X		
705Z014	Rough in line-voltage thermostat wiring			X	X		
705Z015	Rough in low-voltage thermostat wiring			X	X		
705Z016	Rough in non-metallic cable in outlet boxes			X	X		
705Z017	Install pressure switches in existing well				X		
705Z018	Install receptacles with two three-way switches controlling one half of two receptacles			X	X		
705Z019	Install single pole switches controlling one or more devices with feed to switch box				X		
705Z020	Install single pole switches controlling one or more devices with feed to light/device box				X		
705Z021	Install single pole switches controlling three lights or devices with feed to end light box				X		
705Z022	Install split circuit duplex receptacles				X		



CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

		B	C	M	E	MP	PP
705Z023	Install two three-way switches controlling one device using conduit and 4" square boxes with plaster rings-circuitry and boxes				X		
705Z024	Install underground circuits				X		
705Z025	Install underground direct burial cables				X		
705Z026	Make up branch circuit wires to panels				X		
705Z027	Rough in single pole switch circuits				X		
705Z028	Run feeder cable from main service panel to auxiliary panel				X		
705Z029	Make joints using crimp type connectors			X	X		
705Z030	Make pigtail splices			X	X		
705Z031	Make splices using mechanical-type connectors			X	X		
705Z032	Make fixture splices			X	X		

TRIMMING OUT ELECTRICAL DEVICES AND APPLIANCES

		B	C	M	E	MP	PP
705AA001	Install automatic garage door openers			X	X		
705AA002	Connect door chime systems			X	X		
705AA003	Connect duplex receptacles			X	X		
705AA004	Install electric fence chargers				X		
705AA005	Install emergency warning systems (burglar or fire - state license only)			X	X		
705AA006	Install three-wire 220 volt receptacles				X		
705AA007	Install four-wire 220 volt receptacles				X		
705AA008	Install ground fault interrupting devices				X		
705AA009	Install hot water heaters			X	X		
705AA010	Install humidity control devices				X		
705AA011	Connect intercom systems			X	X		
705AA012	Connect low-voltage lighting controls			X	X		
705AA013	Install photo-electric cell controls			X	X		
705AA014	Connect recessed fixture boxes in ceiling			X	X		
705AA015	Connect single pole switches			X	X		
705AA016	Install single pole switches with pilot light			X	X		
705AA017	Connect split circuit duplex receptacles			X	X		
705AA018	Install timer or delayed action switches			X	X		
705AA019	Connect water pump motors				X		
705AA020	Connect wires from junction boxes to appliances			X	X		
705AA021	Install three-way switches			X	X		
705AA022	Install four-way switches			X	X		
705AA023	Install surface raceways			X	X		
705AA024	Install water pump motors				X		
705AA025	Connect 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
705AA026	Connect 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		

INSTALLING AND MAINTAINING MOTORS

		B	C	M	E	MP	PP
705AB001	Install split-phase motors			X	X		
705AB002	Maintain split-phase motors			X	X		
705AB003	Install capacitor start motors			X	X		
705AB004	Maintain capacitor start motors			X	X		
705AB005	Reverse the rotation of motors			X	X		
705AB006	Install motor controls			X	X		
705AB007	Maintain motor controls			X	X		

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705AB008 Change motors for running voltage			X	X		
705AB009 Replace blower motors			X	X		
705AB010 Replace furnace motors				X		
705AB011 Replace pump motors for well				X		
705AB012 Service electric motors				X		

USING CLIMBING EQUIPMENT

	B	C	M	E	MP	PP
705AC001 Inspect climbing equipment for safety	X	X	X	X	X	X
705AC002 Set up ladders	X	X	X	X	X	X
705AC003 Set up ladder jacks and planks	X	X	X		X	
705AC004 Construct outrigger scaffolds	X	X	X		X	
705AC005 Erect metal scaffolds	X	X	X		X	
705AC006 Construct hanging and swinging scaffolds	X	X	X		X	
705AC007 Erect suspended work platforms	X	X	X		X	
705AC008 Set up Bosun's chairs					X	
705AC009 Set up mobile and powered scaffolds	X	X	X		X	
705AC010 Construct single-pole scaffolds	X	X	X		X	
705AC011 Construct double-pole scaffolds	X	X	X		X	

PREPARING SURFACE FOR FINISHING

	B	C	M	E	MP	PP
705AD001 Prepare surfaces for painting			X		X	
705AD002 Prepare surfaces for papering			X		X	
705AD003 Prepare wood surfaces for finishing			X		X	
705AD004 Prepare concrete surfaces for finishing			X		X	
705AD005 Prepare metal surfaces for finishing			X		X	
705AD006 Prepare gypsum surfaces for finishing			X		X	
705AD007 Prepare plaster surfaces for finishing			X		X	

USING COMPRESSOR AND SPRAY EQUIPMENT

	B	C	M	E	MP	PP
705AE001 Lubricate compressors			X		X	
705AE002 Adjust air regulators			X		X	
705AE003 Select and use air and fluid hoses			X		X	
705AE004 Apply paint with conventional spray gun			X		X	
705AE005 Apply paint with airless spray gun			X		X	
705AE006 Select and use respirators			X		X	
705AE007 Clean spray equipment			X		X	

FINISHING SURFACES

	B	C	M	E	MP	PP
705AF001 Mix primer			X		X	
705AF002 Mix paint to desired color			X		X	
705AF003 Clean surfaces using paint removal tools and sandpaper			X		X	
705AF004 Fill holes and cracks			X		X	
705AF005 Apply primer to surface to be painted			X		X	
705AF006 Paint plaster or wall surfaces			X		X	
705AF007 Paint concrete surfaces			X		X	
705AF008 Paint metal surfaces			X		X	
705AF009 Seal uncoated wood surfaces			X		X	
705AF010 Paint uncoated wood surfaces			X		X	
705AF011 Stain uncoated wood surfaces			X		X	
705AF012 Apply varnish to wood surfaces			X		X	

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705AF013 Apply shellac to wood surfaces			X		X	
705AF014 Apply lacquer to wood surfaces			X		X	
705AF015 Clean area and equipment of finishing materials			X		X	

COVERING WALLS

	B	C	M	E	MP	PP
705AG001 Estimate amount of wallpaper needed			X		X	
705AG002 Cut wallpaper			X		X	
705AG003 Prepare wall surfaces for wallpaper			X		X	
705AG004 Apply wallpaper to walls			X		X	

MAINTAINING STRUCTURES

	B	C	M	E	MP	PP
705AH001 Inspect structures for soundness			X		X	
705AH002 Repair cracks			X		X	
705AH003 Repair alligatoring			X		X	
705AH004 Repair checking			X		X	
705AH005 Repair blistering			X		X	
705AH006 Repair peeling			X		X	
705AH007 Repair flaking			X		X	
705AH008 Remove mildew			X		X	
705AH009 Repair nail head stains			X		X	
705AH010 Repair peeling and flaking on metal gutters			X		X	
705AH011 Repair flaking and chaulking masonry			X		X	
705AH012 Apply protective wall coverings below grade			X		X	
705AH013 Repaint walls and ceilings			X		X	
705AH014 Remove and hang new wall coverings			X		X	
705AH015 Refinish woodwork			X		X	
705AH016 Refinish concrete			X		X	
705AH017 Refinish metal			X		X	

JOINING PIPE

	B	C	M	E	MP	PP
705AI001 Bend copper tubing with spring bender			X			X
705AI002 Braze pipes with gas torch and filler metal			X			X
705AI003 Join cast-iron pipes using lead and oakum						X
705AI004 Cut cast-iron soil pipes with snap-type chain cutter						X
705AI005 Cut concrete pipes						X
705AI006 Cut copper tubing and pipes with hacksaw			X			X
705AI007 Cut copper tubing and pipes with tubing cutter			X			X
705AI008 Cut steel pipes with 4-wheel pipe cutter			X			X
705AI009 Cut steel pipes with one-wheel cutter			X			X
705AI010 Join cast-iron pipes to clay pipe						X
705AI011 Join clay pipes with couplings						X
705AI012 Join copper tubing to brass pipes			X			X
705AI013 Join copper tubing/pipes to copper pipe/tubing			X			X
705AI014 Join copper tubing/pipes to plastic pipes, using sweat method			X			X
705AI015 Join copper tubing to steel pipes			X			X
705AI016 Join copper tubing with compressed connectors			X			X
705AI017 Join pipe with no-hub or band clamp couplings			X			X
705AI018 Join plastic pipes to cast-iron pipes with no-hub couplings			X			X
705AI019 Join plastic pipes using solvent cement method			X			X

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705AI020 Join plastic pipes to steel pipe			X			X
705AI021 Join steel pipes to cast-iron pipes with no-hub couplings						X
705AI022 Thread steel pipes with adjustable dies			X			X
705AI023 Thread steel pipes with non-adjustable dies			X			X
705AI024 Thread steel pipes with power-driven vise stands			X			X
705AI025 Join pipes with electric arc welders and filler metals			X			X
705AI026 Weld pipes with oxyacetylene torches and filler materials			X			X
<b>INSTALLING HANGERS AND SUPPORTS</b>						
	B	C	M	E	MP	PP
705AJ001 Install pipe sleeves or thimbles through walls, floors or ceilings			X			X
705AJ002 Secure horizontal and vertical lines of pipe to masonry surfaces with hangers			X			X
705AJ003 Secure horizontal and vertical lines of pipe to metal surfaces with hangers			X			X
705AJ004 Secure horizontal and vertical lines of pipe to wood surfaces with hangers			X			X
<b>BUILDING WATER DISTRIBUTION LINES</b>						
	B	C	M	E	MP	PP
705AK001 Install booster pumps in water supply lines						X
705AK002 Install cut-off valves			X			X
705AK003 Install cut-off valves in stop-and-waste box			X			X
705AK004 Install expansion joints			X			X
705AK005 Install hot or cold water storage tanks			X			X
705AK006 Repair make-up water components on water cooling towers						X
705AK007 Install pressure relief valves			X			X
705AK008 Install water circulating pumps			X			X
705AK009 Insulate water lines			X			X
705AK010 Make water pressure tests on water supply systems			X			X
705AK011 Rough-in water supply lines for bathtubs			X			X
705AK012 Rough-in water supply lines for wall-mounted urinals			X			X
705AK013 Rough-in water supply lines for water closets			X			X
705AK014 Rough-in water supply lines for water heaters			X			X
705AK015 Lay out trench lines						X
<b>BUILDING DRAINS</b>						
	B	C	M	E	MP	PP
705AL001 Backfill trenches						X
705AL002 Calculate slope required for building sewer lines						X
705AL003 Install drain pipes in trenches						X
705AL004 Establish grade lines for installing plumbing						X
705AL005 Install cleanouts on drains			X			X
705AL006 Install float valves on water cooling towers						X
705AL007 Install overflow pipes on water cooling towers						X
705AL008 Install storm drains						X
705AL009 Lay out house drains						X
705AL010 Make water tests on building drains			X			X
705AL011 Rough-in waste lines and vents for bathtubs			X			X

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705AL012 Rough-in waste lines and vents for built-in lavatories			X			X
705AL013 Rough-in waste lines and vents for dishwashers			X			X
705AL014 Rough-in waste lines and vents for floor-mounted water closets			X			X
705AL015 Rough-in waste lines for shower baths			X			X
705AL016 Rough-in waste lines for wall-mounted urinals			X			X
<b>INSTALLING TRAPS AND CLEANOUTS</b>						
	B	C	M	E	MP	PP
705AM001 Install acid-proof traps			X			X
705AM002 Install garbage disposal units			X			X
705AM003 Install grease interceptors in waste lines			X			X
705AM004 Install waste sinks for food-handling equipment			X			X
<b>INSTALLING VENTS</b>						
	B	C	M	E	MP	PP
705AN001 Install soil or waste back vents			X			X
705AN002 Install vent terminals (roof-flashing)			X			X
<b>INSTALLING FIXTURES</b>						
	B	C	M	E	MP	PP
705AO001 Install built-in lavatories			X			X
705AO002 Install dishwashers			X			X
705AO003 Install drinking fountains			X			X
705AO004 Install electric water heaters			X			X
705AO005 Install flush valve-type water closets			X			X
705AO006 Install gas water heaters			X			X
705AO007 Install washing machines			X			X
705AO008 Install shower bath accessories in ceramic tile baths			X			X
705AO009 Install tank-type water closets			X			X
705AO010 Install bathtubs			X			X
705AO011 Install wall-mounted lavatories			X			X
705AO012 Install wall-mounted urinals			X			X
<b>INSTALLING/MAINTAINING HYDRONIC HEATING SYSTEMS</b>						
	B	C	M	E	MP	PP
705AP001 Install cast iron sectional boilers						X
705AP002 Install horizontal steel tube boilers						X
705AP003 Install expansion tanks			X			X
705AP004 Install fin tube radiation			X			X
705AP005 Install cast iron baseboard radiation			X			X
705AP006 Install circulating pumps			X			X
705AP007 Install header and "hartford loops"						X
705AP008 Select and install valves for heating system			X			X
705AP009 Install steam traps						X
705AP010 Replace relief valves			X			X
705AP011 Repair circulating pumps			X			X
705AP012 Troubleshoot control system for hot water boilers			X			X
705AP013 Troubleshoot control system for steam boilers			X			X
705AP014 Check for improper combustions			X			X
705AP015 Repair leak in radiant floor coil systems			X			X
705AP016 Clean and adjust gas burners			X			X

CONSTRUCTION OCCUPATIONS CLUSTER MATRIX

	B	C	M	E	MP	PP
705AP017 Check steam pressures for boiler malfunctions			X			X
705AP018 Clean deposits from boilers			X			X

MAINTAINING PLUMBING SYSTEMS

	B	C	M	E	MP	PP
705AQ001 Clear obstructions from lavatory drains			X			X
705AQ002 Remove obstructions from main drain lines			X			X
705AQ003 Remove obstructions from water closet drains			X			X
705AQ004 Replace lavatory trap drains			X			X
705AQ005 Repair leaking shower valves			X			X
705AQ006 Repair leaking water faucets or valves			X			X
705AQ007 Repair water flush valves on water closets			X			X
705AQ008 Clean steam pressure regulator valves			X			X
705AQ009 Install prefabricated air chambers						X
705AQ010 Replace pressure control switches on water pumps			X			X
705AQ011 Replace section of galvanized water supply lines			X			X
705AQ012 Inspect fuel tank liners			X			X
705AQ013 Replace fuel tank liners			X			X

MAINTAINING THE OUTSIDE ENVIRONMENT

	B	C	M	E	MP	PP
705AR001 Mow lawns			X			
705AR002 Prune trees and shrubs			X			
705AR003 Clean drives and walks of snow			X			
705AR004 Water lawns			X			
705AR005 Water inside plants			X			
705AR006 Seed lawns			X			
705AR007 Lay sod			X			
705AR008 Control tree and shrub diseases			X			
705AR009 Control tree and shrub insects			X			
705AR010 Control lawn diseases			X			
705AR011 Control lawn insects			X			
705AR012 Control lawn weeds			X			
705AR013 Plant trees and shrubs			X			
705AR014 Fertilize lawns			X			
705AR015 Rake and sweep lawns			X			
705AR016 Aerate lawns			X			



**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

## **ELECTRONIC CLUSTER**

Computer Repair Technician  
Electrical and Electronic Technician  
\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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ELECTRONIC OCCUPATIONS CLUSTER MATRIX

CRT = Computer Repair Technician  
 EET = Electrical and Electronic Technician

APPLYING SAFETY PRACTICES

	CRT	EET
720A001 Apply basic emergency first aid techniques	X	X
720A002 Complete accident report	X	X
720A003 Inspect work area and equipment for safe working environment	X	X
720A004 Report shop, environmental and equipment safety violations	X	X
720A005 Demonstrate use of fire extinguishers	X	X
720A006 Plan shutdown procedure for given area	X	X
720A007 Participate in disaster control exercises	X	X
720A008 Prepare plan for disaster control exercises	X	X
720A009 Participate in shop safety committee	X	X
720A010 Organize shop safety committee	X	X
720A011 Correct safety hazards	X	X
720A012 Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X

ANALYZING DC CIRCUITS

	CRT	EET
720B001 Read and interpret color codes	X	X
720B002 Analyze, construct and troubleshoot series circuits	X	X
720B003 Analyze, construct and troubleshoot parallel circuits	X	X
720B004 Analyze, construct and troubleshoot series-parallel circuits	X	X
720B005 Analyze, construct and troubleshoot voltage dividers	X	X
720B006 Analyze, construct and verify maximum power theory	X	X
720B007 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits	X	X

ANALYZING AC CIRCUITS

	CRT	EET
720C001 Set up and operate frequency counters and signal generators for AC circuits	X	X
720C002 Analyze, construct and troubleshoot AC capacitive circuits using a schematic	X	X
720C003 Analyze, construct and troubleshoot AC inductive circuits using a schematic	X	X
720C004 Analyze and apply principles of transformers to AC circuits using a schematic	X	X
720C005 Analyze, construct and troubleshoot resistor, capacitor and inductor (RCL) circuits using a schematic	X	X
720C006 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic	X	X
720C007 Analyze, construct and troubleshoot filter circuits using a schematic	X	X

ANALYZING SOLID STATE DEVICES

	CRT	EET
720D001 Analyze, construct and troubleshoot simple common base amplifiers using a schematic	X	X
720D002 Analyze, construct and troubleshoot simple common emitters using a schematic	X	X
720D003 Analyze, construct and troubleshoot simple common collectors using a schematic	X	X
720D004 Examine field effect transistor (FET) characteristics	X	X

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

		CRT	EET
720D005	Analyze, construct and troubleshoot simple common sources using a schematic	X	X
720D006	Analyze, construct and troubleshoot simple common drains using a schematic	X	X
720D007	Analyze, construct and troubleshoot simple common gains using a schematic	X	X
720D008	Analyze, construct and troubleshoot thyristors using a schematic	X	X
720D009	Analyze, construct and troubleshoot integrated circuit operational amplifiers using a schematic	X	X
720D010	Analyze, construct and troubleshoot optoelectronic devices using a schematic	X	X

ANALYZING ANALOG CIRCUITS

		CRT	EET
720E001	Analyze, construct and troubleshoot single-stage amplifiers using a schematic	X	X
720E002	Analyze, construct and troubleshoot multistage amplifiers using a schematic	X	X
720E003	Analyze, construct and troubleshoot basic power supplies, filters and regulators using a schematic	X	X
720E004	Analyze, construct and troubleshoot differential and operational amplifiers using a schematic	X	X
720E005	Analyze, construct and troubleshoot active filters using a schematic	X	X
720E006	Analyze, construct and troubleshoot oscillators using a schematic	X	X
720E007	Analyze, construct and troubleshoot basic pulse circuits using a schematic	X	X
720E008	Analyze, construct and troubleshoot basic modulation circuits using a schematic	X	X

ANALYZING DIGITAL ELECTRONIC CIRCUITS

		CRT	EET
720F001	Analyze and troubleshoot basic digital logic gate integrated circuits using a schematic	X	X
720F002	Verify basic Boolean expressions using basic logic gates	X	X
720F003	Analyze, construct and troubleshoot basic encoding and decoding circuits using a schematic	X	X
720F004	Analyze, construct and troubleshoot flip flops (memory) using a schematic	X	X
720F005	Analyze, construct and troubleshoot shift registers using a schematic	X	X
720F006	Analyze, construct and troubleshoot counters using a schematic	X	X
720F007	Analyze, construct and troubleshoot arithmetic circuits using a schematic	X	X
720F008	Analyze, construct and troubleshoot basic digital logic systems using a schematic	X	X

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

PERFORMING MICROPROCESSING OPERATIONS

	CRT	EET
720G001 Write, enter, verify and run simple machine language programs	X	X
720G002 Write, enter, verify and run machine language arithmetic programs	X	X
720G003 Write, enter, verify and run machine language branching programs	X	X
720G004 Perform basic programming using algorithms	X	X
720G005 Write, enter, verify and run machine language program using additional addressing modes	X	X
720G006 Perform basic programming using branching, algorithms and flow charting	X	X
720G007 Perform basic programming to demonstrate computer arithmetic	X	X
720G008 Prepare simple program to demonstrate operation of micro-processor unit (MPU) stack, subroutines, input/output (I/O) and interrupts	X	X
720G009 Prepare simple program to perform interface operations with random access memory (RAM) and display	X	X
720G010 Prepare simple program to perform interface operations with switches and light emitted diodes (LEO's)	X	X
720G011 Interface analog to digital converters to microprocessor	X	X
720G012 Interface digital to analog converters to microprocessor	X	X

PERFORMING LAB PRACTICES

	CRT	EET
720H001 Assemble printed circuit (PC) board	X	X
720H002 Solder wires to turret terminals and printed circuit (PC) boards	X	X
720H003 Assemble and solder printed circuit (PC) board	X	X
720H004 Repair printed circuit (PC) board	X	X
720H005 Set up and operate scales	X	X
720H006 Set up and operate mechanical and optical measuring devices	X	X
720H007 Set up and operate height gauges	X	X
720H008 Set up and operate depth gauges	X	X
720H009 Set up and operate oscilloscopes	X	X
720H010 Set up and operate multimeter and power supplies	X	X
720H011 Set up and operate capacitor inductor analyzers	X	X
720H012 Set up and operate semiconductor testers and curve tracers	X	X
720H013 Set up and operate chart recorder	X	X
720H014 Set up and use digital test equipment	X	X

RECORDING AND REPORTING TECHNICAL MATERIAL

	CRT	EET
720I001 Record data and design curves and graphs	X	X
720I002 Write reports	X	X
720I003 Make equipment failure reports	X	X
720I004 Specify and requisition simple electronic components	X	X
720I005 Write formal reports of laboratory experiences	X	X

USING TECHNICAL REFERENCES

	CRT	EET
720J001 Identify manufacturers of various electronic devices using numerical integrated circuit (IC) reference manuals	X	X
720J002 Identify specific characteristics of various electronic devices using manufacturers' reference manuals	X	X

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

	CRT	EET
720J003 Identify distributors of various electronic devices using reference manuals	X	X
720J004 Cross-reference various electronic devices between manufacturers using reference manuals	X	X
720J005 Determine maintenance procedures using manuals	X	X

MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS

	CRT	EET
720K001 Replace faulty electrical cords and plugs	X	X
720K002 Determine electrical problems using available troubleshooting techniques	X	X
720K003 Interpret control diagrams for electrical systems	X	X
720K004 Diagnose malfunctions of electrical systems using available test and measurement equipment	X	X

MAINTAINING AND REPAIRING ELECTRONIC SYSTEMS

	CRT	EET
720L001 Determine electronic problems using available troubleshooting techniques	X	X
720L002 Interpret control diagrams for electronic systems	X	X
720L003 Diagnose malfunctions of electronic systems using available test and measurement equipment	X	X

CONDUCTING SHOP OPERATIONS

	CRT	EET
720M001 Answer customer questions	X	X
720M002 Troubleshoot customer problems	X	X
720M003 Determine repair method	X	X
720M004 Perform public relations activities	X	X
720M005 Demonstrate computer equipment functions at store	X	X
720M006 Demonstrate software functions	X	X
720M007 Prepare service bill	X	X
720M008 Maintain accounts receivable/paid records	X	X
720M009 Maintain receiving records	X	X
720M010 Maintain shipping records	X	X
720M011 Maintain records of service tools and equipment	X	X
720M012 Maintain computer equipment inventory	X	X
720M013 Maintain call record report	X	X
720M014 Update on-site maintenance log	X	X
720M015 Unpack and inspect new equipment	X	X
720M016 Receive and store parts and supplies	X	X
720M017 Discuss delivery schedule with approved supplier	X	X
720M018 Order parts and supplies	X	X
720M019 Establish customer and equipment history file	X	X
720M020 Establish customer files	X	X
720M021 Prepare items for shipping	X	X
720M022 Update service manuals	X	X
720M023 Update parts catalogs	X	X
720M024 Modify wiring diagrams to reflect repair changes	X	X

PERFORMING HOUSEKEEPING AND RECORDKEEPING

	CRT	EET
720N001 Clean and maintain work area and leave in safe condition	X	X
720N002 Follow tool crib procedures	X	X
720N003 Report problems to supervisor	X	X

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

	CRT	EET
720N004 Complete time cards	X	X
720N005 Complete job status reports	X	X
720N006 Make equipment failure reports	X	X
720N007 Use manuals to determine basic maintenance procedures	X	X
720N008 Participate in participation management program (Quality Circles)	X	X

PERFORMING SUPERVISORY FUNCTIONS

	CRT	EET
7200001 Determine availability of machines, supplies and materials	X	X
7200002 Requisition, schedule and distribute supplies and materials	X	X
7200003 Coordinate workers with work to be done	X	X
7200004 Schedule and control shop flow of jobs	X	X
7200005 Maintain files	X	X
7200006 Maintain service records	X	X
7200007 Maintain labor records	X	X
7200008 Explain work requirements	X	X
7200009 Write technical reports	X	X
7200010 Inventory supplies and equipment	X	X
7200011 Maintain charts, tables, graphs or status boards on work scheduled	X	X
7200012 Check job/time cards	X	X
7200013 Inspect shop equipment and arrange for maintenance and work	X	X
7200014 Coordinate maintenance and repair of shop equipment	X	X
7200015 Develop preventative maintenance program	X	X
7200016 Plan and implement technical training for employees	X	X
7200017 Train new service technicians	X	X
7200018 Evaluate employee progress and performance	X	X
7200019 Follow up employee reports of problems or equipment failures	X	X
7200020 Interview job applicants	X	X
7200021 Estimate cost of equipment installation	X	X
7200022 Estimate cost of system installation	X	X
7200023 Estimate cost of maintenance repairs and downtime	X	X
7200024 Conduct representative meetings	X	X

INSTALLING COMPUTER EQUIPMENT

	CRT	EET
720P001 Determine customer computing requirements	X	
720P002 Design computer system layout	X	
720P003 Transport computer equipment	X	
720P004 Set up computer equipment	X	
720P005 Perform computer installation tests	X	
720P006 Demonstrate usage of computer system on-site	X	
720P007 Complete warranty cards for computer equipment	X	
720P008 Construct cables for computer equipment	X	

EVALUATING COMPUTER DIAGNOSTICS

	CRT	EET
720Q001 Conduct motherboard random access memory (RAM) test	X	
720Q002 Conduct motherboard read only memory random access (ROM) test	X	
720Q003 Conduct programmers' aid test	X	
720Q004 Conduct computer keyboard test	X	
720Q005 Conduct computer paddle/button test	X	

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

	CRT	EET
720Q006 Conduct computer tape read/write/verify test	X	
720Q007 Conduct computer color bar test	X	
720Q008 Conduct computer graphic tablet test	X	
720Q009 Conduct basic/integer read only memory (ROM) card test	X	
720Q010 Conduct computer language card test	X	
720Q011 Conduct computer disk interface card test	X	
720Q012 Conduct computer printer card test	X	
720Q013 Conduct computer serial communication card test	X	
720Q014 Conduct computer monitor test	X	
720Q015 Conduct computer oscilloscope test	X	
720Q016 Conduct computer data communication line test	X	
720Q017 Interpret computer diagnostic flow charts	X	

MAINTAINING COMPUTER EQUIPMENT

	CRT	EET
720R001 Clean metallic computer parts	X	
720R002 Clean nonmetallic computer parts	X	
720R003 Clean electrical connections in computer	X	
720R004 Clean computer cable connections	X	
720R005 Clean printer head	X	
720R006 Clean computer disk drive head	X	
720R007 Clean and demagnetize computer tape head	X	
720R008 Lubricate metallic mechanical computer parts	X	
720R009 Lubricate nonmetallic mechanical computer parts	X	
720R010 Adjust mechanical computer assemblies	X	
720R011 Adjust and align computer disk drive head	X	
720R012 Adjust and align computer tape head	X	
720R013 Set computer disk read/write/verify speed	X	
720R014 Set computer tape read/write/verify speed	X	
720R015 Clean or replace computer filters	X	
720R016 Clean outside case/cover of computer	X	

SERVICING COMPUTER EQUIPMENT

	CRT	EET
720S001 Interpret computer troubleshooting charts	X	
720S002 Interpret chip-swapping charts	X	
720S003 Interpret computer schematics	X	
720S004 Interpret manufacturing upgrade	X	
720S005 Remove and install computer cover	X	
720S006 Install computer keyboard	X	
720S007 Install motherboard in computer	X	
720S008 Install power supply in computer	X	
720S009 Install analog board in computer	X	
720S010 Install disk drive assembly in computer	X	
720S011 Install main logic assembly in computer	X	
720S012 Install integrated circuit chips in computer	X	
720S013 Install power light in computer	X	
720S014 Install on-off switch in computer	X	
720S015 Install main printed circuit board in computer	X	
720S016 Install power supply printed circuit board in computer	X	
720S017 Install drive motor	X	
720S018 Install print hammer	X	
720S019 Install print mechanism	X	
720S020 Install carriage assembly	X	
720S021 Install paper feed assembly	X	

## ELECTRONIC OCCUPATIONS CLUSTER MATRIX

	CRT	EET
720S022 Install drive indicator light	X	
720S023 Install peripheral connection cables	X	
720S024 Install peripheral connections	X	
720S025 Install circuit/language cards	X	
720S026 Install modem coupler	X	
720S027 Install tape transport assembly	X	
720S028 Install read/write/verify head	X	
720S029 Install modem set switch	X	
720S030 Install ribbon assembly	X	
720S031 Install drive belts	X	
720S032 Install AC input connections	X	
720S033 Install fuse holders and fuses	X	
720S034 Install ejector mechanisms	X	
720S035 Install cathode ray tube	X	
720S036 Install configuration switches	X	
720S037 Install peripheral controls	X	
720S038 Install data communications adaptor	X	
720S039 Install expansion memory	X	
720S040 Install main memory	X	
720S041 Install field type product line	X	
720S042 Install remote terminals	X	
720S043 Install electrical wiring	X	
720S044 Install keys on keyboard	X	
720S045 Repair keyboard	X	
720S046 Repair motherboard	X	
720S047 Repair analog board	X	
720S048 Repair disk drive assembly	X	
720S049 Repair logic assembly	X	
720S050 Repair on-off switch	X	
720S051 Repair mechanical assembly	X	
720S052 Repair printed circuit board	X	
720S053 Repair drive motor	X	
720S054 Repair carriage assembly	X	
720S055 Repair paper feed assembly	X	
720S056 Repair circuit/language card	X	
720S057 Repair tape transport assembly	X	
720S058 Repair print mechanism	X	
720S059 Repair read/write/verify head	X	
720S060 Repair ribbon assembly	X	
720S061 Repair ejector mechanism	X	
720S062 Repair peripheral controls	X	
720S063 Repair data communications adaptor	X	
720S064 Repair expansion memory	X	
720S065 Repair memory	X	
720S066 Repair field type product line	X	
720S067 Repair remote terminals	X	
720S068 Identify integrated circuit chips	X	
720S069 Identify machine components and test points	X	
720S070 Set configuration switches	X	
720S071 Set user switches	X	
720S072 Install mechanical assembly	X	
720S073 Perform operator duties	X	

ELECTRONIC OCCUPATIONS CLUSTER MATRIX

720S074 Realign read/write/verify head  
720S075 Adjust motor speed  
720S076 Check AC power source  
720S077 Repair power supply

CRT EET  
X  
X  
X  
X





**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

## **GRAPHIC COMMUNICATIONS CLUSTER**

Commercial Artists  
Compositors and/or Typesetters  
Offset Lithographic Press Operators  
Printing Photographers  
Camera Operators  
\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

These materials were prepared under contract with the Illinois State Board of Education, Department of Adult, Vocational and Technical Education ("Illinois Competency Based Vocational Education Project," contract number PS-10-130).

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

ART = Commercial Artists  
 CTS = Compositors and/or Typesetters  
 OLP = Offset Lithographic Press Operators  
 PHO = Photographers  
 CO = Printing Camera Operators

APPLYING SAFETY PRACTICES

	ART	CTS	OLP	PHO	CO
735A001 Comply with shop and equipment safety rules	X	X	X	X	X
735A002 Apply basic emergency first aid techniques	X	X	X	X	X
735A003 Complete accident report	X	X	X	X	X
735A004 Inspect work area and equipment for safe working environment	X	X	X	X	X
735A005 Report shop, environmental and equipment safety violations	X	X	X	X	X
735A006 Demonstrate use of fire extinguishers	X	X	X	X	X
735A007 Correct safety hazards	X	X	X	X	X
735A008 Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X	X	X	X
735A009 Participate in safety training program	X	X	X	X	X
735A010 Participate in disaster control exercises		X	X		X
735A011 Participate in shop safety committee		X	X	X	X
735A012 Comply with safety rules for working with photographic chemicals				X	X

PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES

	ART	CTS	OLP	PHO	CO
735B001 Clean and maintain work area and leave in safe condition	X	X	X	X	X
735B002 Report problems to supervisor	X	X	X	X	X
735B003 Maintain records	X	X		X	X
735B004 Coordinate work with other departments	X	X		X	X
735B005 Complete time cards	X	X	X	X	X
735B006 Complete job status reports	X	X	X	X	X
735B007 Calculate time and materials	X	X		X	X
735B008 Participate in participative management program (Quality Circles)	X	X	X	X	X
735B009 Make equipment failure reports		X	X	X	X
735B010 Determine basic maintenance procedures using manuals		X	X	X	X
735B011 Maintain log on film and chemical expiration dates		X			
735B012 Order ink, supplies and chemicals			X		
735B013 Store ink			X		
735B014 Store printing supplies			X		
735B015 Store printing chemicals			X		
735B016 Read and interpret specifications on job ticket				X	X
735B017 Requisition photographic supplies and materials				X	X
735B018 Order photographic supplies and materials				X	X
735B019 Store photographic supplies				X	X
735B020 Store photographic chemicals				X	X

CONDUCTING SHOP OPERATIONS

	ART	CTS	OLP	PHO	CO
735C001 Answer customer questions	X			X	
735C002 Troubleshoot customer problems	X			X	
735C003 Requisition art supplies and materials	X				
735C004 Order art supplies and materials	X				

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735C005	Store art supplies	X				
735C006	Inventory supplies	X				
735C007	Guide and direct the work of graphic design team	X				
735C008	Prepare estimates and bids on graphic arts jobs	X				
735C009	Negotiate art and production work with prospective clients	X				
735C010	Complete graphic art assignment contract	X				
735C011	Complete expense record	X				X
735C012	Establish and maintain appointment/assignment book	X				X
735C013	Complete customer billing for commercial assignment	X				X
735C014	Maintain art reference files	X				
735C015	File completed customer orders and negatives	X				X
735C016	Interpret and apply copyright laws	X				X
735C017	Complete business license application	X				X
735C018	Set up a studio	X				
735C019	Evaluate design team work	X				
735C020	Control design efforts to meet job requirements and limits	X				
735C021	Withhold release of inadequate design	X				
735C022	Present client with alternative designs	X				
735C023	Prepare portfolio of artwork	X				
735C024	Maintain presentational portfolio	X				
735C025	Display artwork	X				
735C026	Order prints from lab	X				X
735C027	Determine production volume and select production processes	X				
735C028	Plan and schedule work assignments	X				
735C029	Give directions to printers	X				
735C030	Give directions to photographer	X				
735C031	Communicate with free lancers	X				
735C032	Communicate with department heads	X				
735C033	Communicate with media personnel	X				
735C034	Advertise services	X				X
735C035	Plan work areas	X				
735C036	Maintain work areas	X				
735C037	Maintain equipment inventory					X
735C038	Guide and direct the work of photography team					X
735C039	Prepare estimates and bids on photographic jobs					X
735C040	Complete photography assignment contract					X
735C041	Complete photograph release form					X
735C042	Arrange photography session					X
735C043	Set up a photography studio					X
735C044	Set up a darkroom					X
735C045	Purchase photographic equipment					X
735C046	Purchase photographic supplies					X
735C047	Evaluate photographic work					X
735C048	Prepare portfolio of photographic work					X
735C049	Assemble and exhibit proofbook					X
735C050	Display photographic work					X
735C051	Store and transport cameras and accessories					X

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

PRODUCING COMPREHENSIVE LAYOUTS

	ART	CTS	OLP	PHO	CO
735D001 Establish visual directions and specifications for layout	X				
735D002 Make thumbnails of layout	X				
735D003 Design rough layouts	X				
735D004 Select mediums for comprehensive layouts	X				
735D005 Select type styles and illustration styles for layouts	X				
735D006 Design artwork and placement of elements in layouts	X				
735D007 Mark color or colors to be used for layouts	X				
735D008 Mark percentage of enlargements or reductions required on photographs	X				
735D009 Letter layouts and designs	X				
735D010 Make dummy layout of multipage printed product for signature specifications	X				
735D011 Produce rough layouts	X				
735D012 Mark copy for typesetting	X				
735D013 Prepare layout for presentation	X				
735D014 Prepare comprehensive layouts	X				
735D015 Revise layout to customer specifications	X				

ANALYZING AND DEFINING DESIGN PROBLEMS

	ART	CTS	OLP	PHO	CO
735E001 Interpret and define basic design function	X				
735E002 Specify physical requirements and limits of design	X				
735E003 Interpret design requirements of client	X				
735E004 Analyze focal point of specific public group	X				
735E005 Explore and collect ideas and definitions of design problem from design team	X				
735E006 Determine nature of distractions from design	X				

APPLYING AND ANALYZING COLOR

	ART	CTS	OLP	PHO	CO
735F001 Select and prepare color media	X				
735F002 Select and apply color to emphasize central theme	X				
735F003 Select and apply color to create visual focal image	X				
735F004 Select and apply color to distort or create illusion	X				
735F005 Select and apply color to make minor points	X				
735F006 Select and apply color to create image of character	X				
735F007 Select and apply color to create image to further purpose of client	X				
735F008 Select and apply color to create depth	X				
735F009 Select and apply color to create physical impression	X				
735F010 Select and apply color to take advantage of tradition and convention	X				
735F011 Select and apply color to arouse basic emotion	X				
735F012 Select and apply color to arrest attention	X				

COMPOSING ARTWORK

	ART	CTS	OLP	PHO	CO
735G001 Compose artwork in terms of normal eye movement	X				
735G002 Compose artwork to direct attention to key message	X				
735G003 Compose artwork to use the unusual as eye-catching visual focus	X				
735G004 Compose artwork to maintain clarity of theme	X				
735G005 Compose artwork to perceive and isolate a theme	X				

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735G006	Compose artwork to develop a central theme	X				
735G007	Compose artwork to create visual impact	X				
735G008	Compose artwork to create an illusion	X				

APPLYING DRAWING SKILLS

		ART	CTS	OLP	PHO	CO
735H001	Produce scratchboard illustrations	X				
735H002	Sketch and rough out ideas and design	X				
735H003	Illustrate scenes with line techniques	X				
735H004	Illustrate scenes with pen and ink	X				
735H005	Illustrate scenes with brush and wash	X				
735H006	Illustrate scenes with one-point perspective	X				
735H007	Illustrate scenes with two-point perspective	X				
735H008	Illustrate scenes with three-point perspective	X				
735H009	Illustrate scenes with three-dimensional shapes	X				
735H010	Illustrate scenes depicting light and its effects	X				
735H011	Illustrate scenes with shading techniques	X				
735H012	Illustrate scenes with still life objects	X				
735H013	Illustrate scenes with buildings	X				
735H014	Draw architectural illustrations	X				
735H015	Produce house exterior illustrations	X				
735H016	Produce house interior illustrations	X				
735H017	Illustrate scenes with furniture	X				
735H018	Produce schematic diagrams of equipment	X				
735H019	Illustrate scenes with fashion figures	X				
735H020	Illustrate scenes with heads and faces	X				
735H021	Illustrate scenes with caricatures	X				
735H022	Illustrate scenes with animals	X				
735H023	Illustrate scenes with wildlife	X				
735H024	Illustrate scenes with landscapes	X				
735H025	Prepare color separation drawings	X				
735H026	Prepare and maintain drawing tools and equipment	X				
735H027	Establish accurate size and proportions in artwork	X				
735H028	Adapt drawings to desired ideas, mood or effect	X				
735H029	Stylize drawings through distortion and use of effects	X				
735H030	Draw final artwork	X				
735H031	Select and purchase final artwork	X				
735H032	Determine final art style	X				

APPLYING LETTERING SKILLS

		ART	CTS	OLP	PHO	CO
735I001	Select lettering style and type for job	X				
735I002	Letter layouts and designs using transfer lettering	X				
735I003	Letter layouts and designs with speedball pen	X				
735I004	Letter layouts and designs with a brush	X				
735I005	Letter layouts and designs mechanically	X				
735I006	Letter layouts and designs with pen and ink	X				
735I007	Letter artwork using drop shading techniques	X				
735I008	Letter artwork using striping techniques	X				
735I009	Letter artwork freehand	X				
735I010	Layout lettering for illustrations	X				
735I011	Produce lettering for illustrations	X				
735I012	Hand letter, balance and proportion basic letter forms	X				
735I013	Analyze letter traditions and trends and select best design for desired effect	X				

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

	ART	CTS	OLP	PHO	CO
735I014 Design new letter forms	X				
735I015 Draw final hand lettering for artwork	X				
735I016 Select and purchase final hand lettering for artwork	X				
<b>PRODUCING AIRBRUSHED ARTWORK</b>					
	ART	CTS	OLP	PHO	CO
735J001 Select and mix airbrush paints	X				
735J002 Prepare and maintain airbrush equipment	X				
735J003 Render artwork with airbrush	X				
735J004 Render drawings using airbrush techniques	X				
<b>PRODUCING CARTOONS</b>					
	ART	CTS	OLP	PHO	CO
735K001 Sketch rough storyboard	X				
735K002 Draw cartoon characters	X				
735K003 Animate drawings	X				
<b>CREATING FUNCTIONAL DESIGNS</b>					
	ART	CTS	OLP	PHO	CO
735L001 Render designs and define sizes, materials and limitations	X				
735L002 Analyze and base design on standardized materials	X				
735L003 Analyze and base design on natural materials	X				
735L004 Construct three-dimensional models	X				
735L005 Determine cost, size, function and other product criteria limits	X				
735L006 Design displays	X				
735L007 Design functional packaging	X				
735L008 Produce design to meet psychological needs	X				
735L009 Produce design to meet needs for comfort and convenience	X				
735L010 Produce designs that maintain realistic balance between functional and creative design	X				
735L011 Experiment with materials to determine qualities and design limitations	X				
735L012 Design brochures	X				
735L013 Design pamphlets	X				
735L014 Design a logo	X				
735L015 Design magazine ads	X				
735L016 Research specifications for ads in various media	X				
735L017 Produce prints using commercial materials	X				
735L018 Prepare artwork for transparencies or slides	X				
735L019 Produce graphics for letterpress process	X				
735L020 Produce graphics for offset process	X				
735L021 Produce graphics for silk-screen process	X				
735L022 Produce signs on posterboard	X				
735L023 Prepare charts	X				
735L024 Prepare graphs	X				
735L025 Prepare graphic illustrations for television	X				
735L026 Prepare fashion illustrations	X				
735L027 Prepare arts for newspapers	X				
735L028 Prepare arts for posters	X				
735L029 Prepare arts for collaterals	X				
735L030 Prepare arts for specialty advertising	X				
735L031 Prepare arts for signages	X				

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735L032	Prepare arts for audiovisuals	X				
735L033	Prepare arts for points of purchase	X				
735L034	Prepare arts for outdoor advertisements	X				
735L035	Prepare other functional designs	X				
<b>APPLYING GRAPHIC ARTS PHOTOGRAPHY</b>						
		ART	CTS	OLP	PHO	CO
735M001	Use photo mechanical transfer paper negative	X				
735M002	Produce photomechanical transfer paper positive	X				
735M003	Produce photomechanical transfer film positive	X				
735M004	Produce photomechanical transfer and film negatives	X				
735M005	Produce photomechanical transfer halftone	X				
735M006	Retouch photographs	X				
735M007	Select locations for photography session	X				
735M008	Select models for photography session	X				
735M009	Select props for photography session	X				
735M010	Give directions to models	X				
735M011	Evaluate the use of photography in graphic design	X				
735M012	Combine photographs and artwork	X				
735M013	Crop photographs	X				
735M014	Consult with photographer	X				
735M015	Incorporate photographs in artwork	X				
735M016	Expose photographs using contact halftone screens	X				
735M017	Make line enlargements/reductions using graphic arts camera and processor	X				
735M018	Retouch existing black and white photographs	X				
735M019	Proof camera-ready copy for photo reproduction quality	X				
<b>PREPARING MECHANICALS</b>						
		ART	CTS	OLP	PHO	CO
735N001	Add registration and trim marks	X				
735N002	Apply border tapes	X				
735N003	Apply dry-transfer letters	X				
735N004	Apply dry-transfer screen tints and shading film	X				
735N005	Attach artwork to mechanical	X				
735N006	Crop and size photographs	X				
735N007	Cut outlines of artwork in masking film	X				
735N008	Cut panels for halftones and reverses	X				
735N009	Draw reference and centering lines on masking sheets	X				
735N010	Draw up base sheet for final paste up	X				
735N011	Locate and paste up clip art	Y				
735N012	Prepare tissue overlays	X				
735N013	Opaque photostat imperfections	X				
735N014	Paste up type matter in position on base sheet (flat)	X				
735N015	Position and secure protective tissue	X				
735N016	Position and secure overlays	X				
735N017	Proof all proportions and sizes with job specifications	X				
735N018	Proof mechanical flat against copy and dummy layout	X				
735N019	Select typeface for design effect desired	X				
735N020	Crop up board for reproduction	X				
735N021	Add bleed to a keyline	X				
735N022	Read guide photos and bleed panels	X				
735N023	Put register marks on board and overlay	X				
735N024	Crop, size and key photos	X				
735N025	Flap and tissue keyline art	X				



GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735N026	Lay out and paste up for four-color separation	X				
735N027	Prepare mechanical for stationary items	X				
735N028	Prepare mechanical for one-color calendar	X				
735N029	Prepare mechanical for one-color grocery paste-up	X				
735N030	Prepare mechanical for one-color ruled forms	X				
735N031	Prepare mechanical for newsletter with stripping corrections	X				
735N032	Prepare mechanical for postal mailer using overlays	X				
735N033	Prepare mechanical for catalog pages	X				
735N034	Prepare mechanical using keyline techniques	X				
735N035	Prepare mechanical using transfer letters and tint overlays	X				
735N036	Prepare mechanical to achieve multiple color effects	X				
735N037	Perform photocropping and scaling techniques	X				
735N038	Prepare mechanical for a process color brochure	X				
735N039	Prepare other mechanicals	X				
735N040	Mark up copy for typesetting	X				

REPRODUCING ARTWORK

		ART	CTS	OLP	PHO	CO
7350001	Reproduce photographs	X				
7350002	Reproduce artwork using copy machines	X				
7350003	Reproduce artwork using thermofax machines	X				
7350004	Reproduce artwork using diazo machines	X				
7350005	Reproduce artwork using other processes	X				

MARKING COPY

		ART	CTS	OLP	PHO	CO
735P001	Read job order to determine composition information		X			
735P002	Mark up copy		X			
735P003	Measure type size		X			
735P004	Measure leading		X			
735P005	Measure line length		X			
735P006	Measure tabular column length and indents		X			
735P007	Measure horizontal and vertical rules		X			
735P008	Determine location of graphics		X			
735P009	Select type font, size and leading for job		X			

PROGRAMMING AND SETTING UP COMPOSING MACHINES

		ART	CTS	OLP	PHO	CO
735Q001	Set composing machine margins, leadings and tabs		X			
735Q002	Set composing machine impression		X			
735Q003	Set composing machine justification		X			
735Q004	Select and change ribbon in composing machine		X			
735Q005	Adjust parameters throughout job on composing machine		X			
735Q006	Set newspaper and newsletter copy on composing machine		X			
735Q007	Set invoice, application, billing and other forms on composing machine		X			
735Q008	Set display advertising copy on composing machine		X			
735Q009	Set letterhead, envelope, business card copy, books, manuals, reports, brochures, circulars or flyers on composing machine		X			
735Q010	Set lists, indexes and tables on composing machine		X			
735Q011	Adjust composing machine copy		X			
735Q012	Insert paper in composing machine		X			

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735Q013	Verify set up of composing machine		X			
735Q014	Adjust composing machine		X			
735Q015	Proofread composing machine copy		X			
735Q016	Produce phototypeset hard copy reader proof		X			
735Q017	Submit phototypeset output for proofreading		X			
735Q018	Read proofreader's marks and make indicated corrections in composing machine copy		X			
735Q019	Read editor's marks and make indicated corrections in composing machine copy		X			
735Q020	Correct grammar and spelling in composing machine copy		X			
735Q021	Correct typographical errors in composing machine copy		X			
735Q022	Fit text and graphics to layout in composing machine		X			
735Q023	Inspect and adjust composing machine copy for density		X			
735Q024	Inspect and adjust composing machine copy for alignment		X			
735Q025	Inspect and adjust composing machine copy for leading and margins		X			
735Q026	Inspect and adjust composing machine copy for type styles, family and size		X			
735Q027	Produce final composing machine typeset		X			

PROGRAMMING AND SETTING UP PHOTOTYPESETTING, DIGITAL AND DESKTOP PUBLISHING EQUIPMENT

		ART	CTS	OLP	PHO	CO
735R001	Enter layout specifications on typesetting or desktop publishing equipment		X			
735R002	Write formats for typesetting or desktop publishing equipment		X			
735R003	Receive off line data		X			
735R004	Receive telecommunication data		X			
735R005	Check system error report/documentation		X			
735R006	Determine if hardware/software problem		X			
735R007	Correct coding		X			
735R008	Determine and set margins, leadings and tabs		X			
735R009	Determine and set light density on phototypesetting equipment		X			
735R010	Set justification on phototypesetting equipment		X			
735R011	Adjust parameters throughout job on typesetting or desktop publishing equipment		X			
735R012	Keyboard newspaper and newsletter copy on typesetting or desktop publishing equipment		X			
735R013	Keyboard invoice, application, billing and other forms on typesetting or desktop publishing equipment		X			
735R014	Keyboard display advertising copy on typesetting or desktop publishing equipment		X			
735R015	Keyboard letterhead, envelope, business card copy, books, manuals, reports, brochures, circulars or flyers on typesetting or desktop publishing equipment		X			
735R016	Keyboard lists, indexes and tables on typesetting or desktop publishing equipment		X			
735R017	Enter keyboarded copy into memory		X			
735R018	Enter keyboarded copy into photo unit		X			
735R019	Enter formats for page pagination on typesetting or desktop publishing equipment		X			
735R020	Load fonts into output devices		X			
735R021	Load typesetter with film or paper		X			

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735R022	Proofread typeset copy on screen		X			
735R023	Produce phototypeset soft copy reader proof		X			
735R024	Produce typeset hard copy reader proof		X			
735R025	Submit typeset output for proofreading		X			
735R026	Read proofreader's marks and make indicated corrections in typeset copy		X			
735R027	Read editor's marks and make indicated corrections in typeset copy		X			
735R028	Correct grammar and spelling in typeset copy		X			
735R029	Correct typeset typographical errors		X			
735R030	Fit text and graphics to layout in phototypeset copy		X			
735R031	Inspect and adjust phototypeset copy for density		X			
735R032	Inspect and adjust phototypeset copy for alignment		X			
735R033	Inspect and adjust typeset copy for leading and margins		X			
735R034	Inspect and adjust typeset copy for type styles, family and size		X			
735R035	Update job file		X			
735R036	Produce final typeset copy		X			
735R037	Archive job file		X			
735R038	Merge text and graphics using software applications packages		X			
735R039	Complete a global search and edit or replace words and/or text		X			
735R040	Create structured graphics, flowcharts, diagrams, graphs, technical drawings or charts		X			
735R041	Input text and graphics using optical scanners		X			
735R042	Open, move, resize and close a window		X			
735R043	Back up the system		X			

DEVELOPING PHOTOTYPESETTING FILM

		ART	CTS	OLP	PHO	CO
735S001	Select and mix developing chemicals		X			
735S002	Fill processor with chemicals		X			
735S003	Transfer film to processor		X			
735S004	Develop film using processor		X			
735S005	Dry film		X			
735S006	Match dried film to original copy		X			
735S007	Identify and adjust film density problems		X			

MAINTAINING ELECTRONIC JOB FILES

		ART	CTS	OLP	PHO	CO
735T001	Save files on disk		X			
735T002	Retrieve files from disk		X			
735T003	Delete unneeded files from disk storage		X			
735T004	Transfer files from damaged disk to new disk		X			
735T005	Store disks		X			
735T006	Update disk log		X			
735T007	Update font information		X			
735T008	Update front end programs (software programs)		X			

PERFORMING BASIC MAINTENANCE ON TYPESETTING EQUIPMENT

		ART	CTS	OLP	PHO	CO
735U001	Adjust screen intensity and brightness		X			
735U002	Clean photo unit type fonts		X			
735U003	Clean keyboard		X			

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

	ART	CTS	OLP	PHO	CO
735U004 Clean photo unit dust filters		X			
735U005 Clean photo unit lens filters, lenses and mirrors		X			
735U006 Empty chemicals in processor		X			
735U007 Clean processor		X			
735U008 Clean exterior of keyboard, photo and processor unit		X			
735U009 Replace lamp bulbs in photo unit		X			
735U010 Perform basic maintenance on processor		X			
735U011 Perform basic maintenance on photo unit		X			
735U012 Perform basic maintenance on terminal and keyboard		X			
735U013 Arrange for repairperson to make call or schedule repairs		X			
735U014 Perform basic maintenance on composing machines		X			

PERFORMING PRESSWORK

	ART	CTS	OLP	PHO	CO
735V001 Read job orders to determine printing information			X		
735V002 Lubricate presses			X		
735V003 Inspect and pack impression cylinder			X		
735V004 Adjust vacuum, air blow and impression pressure on press			X		
735V005 Inspect and adjust buckle				X	
735V006 Inspect and pack plate cylinder				X	
735V007 Inspect and set dampening rollers				X	
735V008 Inspect and set ink rollers				X	
735V009 Estimate quantity of stock for job				X	
735V010 Select stock for job				X	
735V011 Determine press size for job				X	
735V012 Determine color of ink for job				X	
735V013 Estimate quantity of ink for job				X	
735V014 Mix ink				X	
735V015 Add ink to press ink fountain				X	
735V016 Meter ink to press rollers				X	
735V017 Mix fountain solutions				X	
735V018 Add fountain solution to water fountain tray				X	
735V019 Add fountain solution to bottle				X	
735V020 Add bottle to fountain				X	
735V021 Meter fountain solution to rollers or dampers				X	
735V022 Adjust one-color facilities on presses				X	
735V023 Adjust two-color facilities on presses				X	
735V024 Adjust perfecting qualities on presses				X	
735V025 Install plates on presses				X	
735V026 Set feed system				X	
735V027 Load stock in feed system				X	
735V028 Set delivery systems				X	
735V029 Ink press				X	
735V030 Set dampening systems				X	
735V031 Print test sheets				X	
735V032 Check position of image on stock				X	
735V033 Adjust presses				X	
735V034 Run trial sheets				X	
735V035 Check the register of the image on stock				X	
735V036 Check and adjust balance of ink/water				X	
735V037 Run trial stock to obtain desired ink density				X	
735V038 Set counter				X	
735V039 Clean and wipe off blanket				X	

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

		ART	CTS	OLP	PHO	CO
735V040	Wipe plate with fountain solution				X	
735V041	Run trial stock to obtain desired density and fidelity				X	
735V042	Adjust press to desired density and fidelity				X	
735V043	Adjust speed of sheet fed presses				X	
735V044	Adjust paper and size limitations of presses				X	
735V045	Adjust printing size limitations of presses				X	
735V046	Adjust printing quality of presses				X	
735V047	Remove test stock and reset counter				X	
735V048	Load paper				X	
735V049	Run one-color job				X	
735V050	Run two-color job				X	
735V051	Run multi-color job				X	
735V052	Run job on specialty stock				X	
735V053	Inspect quality of copy while running job				X	
735V054	Add ink as needed				X	
735V055	Add fountain solution as needed				X	
735V056	Inspect and adjust press during run				X	
735V057	Troubleshoot press during run				X	
735V058	Turn off stock feed and raise rollers off plate				X	
735V059	Remove stock				X	
735V060	Remove copy				X	

CLEANING PRESSES

		ART	CTS	OLP	PHO	CO
735W001	Clean blanket on press				X	
735W002	Wash plate				X	
735W003	Apply gum to plate and dry plate				X	
735W004	Return plate to plate file				X	
735W005	Wash blanket on press				X	
735W006	Remove ink from ink fountain				X	
735W007	Remove fountain solution from fountain				X	
735W008	Remove ink fountain from press				X	
735W009	Remove water fountain from press				X	
735W010	Clean ink fountain				X	
735W011	Clean out water fountain				X	
735W012	Take pressure off rollers				X	
735W013	Clean ink off rollers				X	
735W014	Wipe down rollers and edges				X	
735W015	Install clean ink fountain on press				X	
735W016	Install clean water fountain on press				X	
735W017	Wipe down press to remove ink and water				X	
735W018	Change blanket on press				X	
735W019	Clean impression cylinder				X	
735W020	Remove and clean rollers				X	
735W021	Remove glaze from rollers				X	
735W022	Desensitize rollers and blanket				X	
735W023	Replace rollers				X	
735W024	Adjust rollers				X	
735W025	Fill solvent containers				X	
735W026	Clean press air filters				X	
735W027	Perform basic press maintenance				X	

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

PERFORMING CAMERA WORK

	ART	CTS	OLP	PHO	CO
735X001				X	X
735X002				X	X
735X003				X	
735X004				X	
735X005				X	
735X006				X	
735X007				X	
735X008				X	
735X009				X	X
735X010				X	
735X011				X	
735X012				X	
735X013				X	
735X014				X	
735X015				X	
735X016				X	
735X017				X	
735X018					X
735X019					X
735X020					X
735X021					X
735X022					X
735X023					X
735X024					X
735X025					X
735X026					X
735X027					X
735X028					X
735X029					X
735X030					X
735X031					X
735X032					X
735X033					X
735X034					X
735X035					X
735X036					X
735X037					X
735X038					X
735X039					X
735X040					X
735X041					X
735X042					X
735X043					X
735X044					X

DETERMINING AND SETTING UP LIGHTING

	ART	CTS	OLP	PHO	CO
735Y001				X	
735Y002				X	
735Y003				X	
735Y004				X	
735Y005				X	

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

ART CTS OLP PHO CO

735Y006	Calculate the need for additional lights				X
735Y007	Set up supplementary lights				X
735Y008	Select, set up and use reflectors				X
735Y009	Set up lighting for outdoor available light				X
735Y010	Set up lighting for outdoor artificial light				X
735Y011	Set up combination available and artificial light				X
735Y012	Set up lighting for studio portrait				X
735Y013	Set up high key portrait lighting in studio				X
735Y014	Set up lighting for tabletop objects				X
735Y015	Set up lighting for large objects in studio				X
735Y016	Set up lighting for large objects on location				X
735Y017	Set up lighting for copy stand				X
735Y018	Set up lighting for rear/front view projection				X
735Y019	Calculate main and flash exposure				X
735Y020	Calculate filtration exposure				X
735Y021	Make basic exposure test				X

PHOTOGRAPHING SUBJECTS

ART CTS OLP PHO CO

735Z001	Select locations for photography session				X
735Z002	Select models for photography session				X
735Z003	Select props for photography session				X
735Z004	Give directions to models				X
735Z005	Pose and relax people				X
735Z006	Photograph individual in studio				X
735Z007	Photograph individual on location				X
735Z008	Photograph group in studio				X
735Z009	Photograph group on location				X
735Z010	Photograph individual for passport/alien resident picture				X
735Z011	Photograph weddings				X
735Z012	Photograph tabletop objects				X
735Z013	Photograph large objects in studio				X
735Z014	Photograph large objects on location				X
735Z015	Photograph interiors				X
735Z016	Photograph exteriors				X
735Z017	Photograph food				X
735Z018	Photograph fashion items in studio				X
735Z019	Photograph fashion items on location				X
735Z020	Photograph objects using macro lens				X
735Z021	Take photograph for environmental impact documentation				X
735Z022	Take photograph for equipment/hardware documentation				X
735Z023	Take aerial photographs				X
735Z024	Photograph commercial products				X
735Z025	Photograph merchandise				X
735Z026	Photograph press conference				X
735Z027	Photograph news events				X
735Z028	Photograph feature stories				X
735Z029	Photograph sports events				X
735Z030	Take photographs using multiple exposure techniques				X
735Z031	Solve photographic problems				X

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

PERFORMING DARKROOM WORK

	ART	CTS	OLP	PHO	CO
735AA001 Prepare darkroom and arrange equipment				X	X
735AA002 Mix photographic chemicals				X	X
735AA003 Process black and white film using daylight tank				X	
735AA004 Process black and white film using automatic processor				X	
735AA005 Process black and white film using trays				X	
735AA006 Process color negative film using daylight tank				X	
735AA007 Process color negative film using automatic processor				X	
735AA008 Process color negative film using trays				X	
735AA009 Process color transparency film using daylight tank				X	
735AA010 Process color transparency film using automatic processor				X	
735AA011 Duplicate slides				X	
735AA012 Produce special effects title slides				X	
735AA013 Produce multi-image graphic slides				X	
735AA014 Retouch black and white negative				X	
735AA015 Process control strip in automatic processor				X	
735AA016 Monitor silver recovery unit				X	
735AA017 Recover photographic silver				X	
735AA018 Load film canisters				X	X
735AA019 Solve darkroom problems				X	
735AA020 Measure optical density of copy					X
735AA021 Process film					X
735AA022 Develop film by grey scale method					X
735AA023 Develop film by time and temperature method					X
735AA024 Develop film by visual method					X
735AA025 Dry film with film dryer					X
735AA026 Dry and handle film					X
735AA027 Develop contact silverplates					X
735AA028 Expose combination negatives with pin register by contact printing					X
735AA029 Expose for reverses, shrinks and spreads by contact printing					X
735AA030 Inspect half tones for density, quality and size					X
735AA031 Inspect negatives					X
735AA032 Correct negative defects					X
735AA033 Make contact prints					X
735AA034 Make duplicate negatives					X
735AA035 Opaque and scribe line negatives					X

PRINTING PHOTOGRAPHIC IMAGES

	ART	CTS	OLP	PHO	CO
735AB001 Expose black and white paper for enlargements				X	
735AB002 Expose contact sheet				X	
735AB003 Expose contact print				X	
735AB004 Expose color paper for enlargement				X	
735AB005 Dodge/burn in image during printing				X	
735AB006 Vignette image during printing				X	
735AB007 Diffuse image during printing				X	
735AB008 Print tone-line conversion				X	
735AB009 Posterize photograph				X	
735AB010 Print sabatier effect enlargement				X	
735AB011 Sandwich negatives during printing				X	



GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

	ART	CTS	OLP	PHO	CO
735AB012 Copy black and white slide				X	
735AB013 Copy color slide				X	
735AB014 Copy print using view camera				X	
735AB015 Clean negatives				X	
735AB016 Establish exposure for black and white print using analyzer				X	
735AB017 Establish exposure for black and white print using test strip				X	
735AB018 Establish color filtration and exposure for color paper using analyzer				X	
735AB019 Establish filtration and exposure for color paper using test strip				X	
<b>PROCESSING PHOTOGRAPHIC PAPER</b>					
	ART	CTS	OLP	PHO	CO
735AC001 Mix stock solution for paper				X	
735AC002 Process black and white paper using trays				X	
735AC003 Process black and white paper using automatic processor				X	
735AC004 Process black and white paper using stabilization processor				X	
735AC005 Process color paper using trays				X	
735AC006 Process color paper using automatic processor				X	
735AC007 Process color paper using drum/tube processing				X	
735AC008 Process print archivally				X	
<b>FINISHING PRINTS</b>					
	ART	CTS	OLP	PHO	CO
735AD001 Tone print				X	
735AD002 Bleach print				X	
735AD003 Spot print				X	
735AD004 Airbrush print				X	
735AD005 Retouch print				X	
735AD006 Etch print				X	
735AD007 Trim print				X	
735AD008 Spray-finish print				X	
735AD009 Dry mount print				X	
735AD010 Position print on matte				X	
735AD011 Mount slides				X	
<b>CLEANING AND MAINTAINING DARKROOM</b>					
	ART	CTS	OLP	PHO	CO
735AE001 Clean darkroom sinks				X	X
735AE002 Clean darkroom trays and mixing utensils				X	X
735AE003 Inspect mechanical components of cameras				X	X
735AE004 Clean photographic cameras				X	X
735AE005 Clean photographic lenses				X	X
735AE006 Perform minor maintenance on photographic cameras				X	X
735AE007 Clean automatic film processor				X	X
735AE008 Perform minor maintenance on automatic film processor				X	X
735AE009 Clean daylight tank processing unit				X	
735AE010 Clean drum/tube processing unit				X	
735AE011 Clean stabilization processing unit				X	
735AE012 Clean automatic film dryer				X	X
735AE013 Perform minor maintenance on automatic film dryer				X	X

GRAPHIC COMMUNICATIONS OCCUPATIONS CLUSTER MATRIX

	ART	CTS	OLP	PHO	CO
735AE014 Clean silver recovery unit				X	
735AE015 Perform minor maintenance on silver recovery unit				X	
735AE016 Maintain dustfree darkroom environment				X	X
735AE017 Maintain darkroom equipment				X	X
735AE018 Clean illumination system				X	X
735AE019 Perform minor maintenance on illumination system				X	X
735AE020 Solve darkroom problems				X	
735AE021 Inspect automatic film processor					X
735AE022 Inspect automatic film dryer					X
735AE023 Clean vacuum back					X
735AE024 Perform minor maintenance on vacuum back					X
735AE025 Clean PMT processor					X
735AE026 Perform minor maintenance on PMT processor					X
735AE027 Clean lithographic film processor					X
735AE028 Perform minor maintenance on lithographic film processor					X

PERFORMING STRIPPING OPERATIONS

	ART	CTS	OLP	PHO	CO
735AF001 Check flat against copy and dummy layout					X
735AF002 Check negatives against dummy layout					X
735AF003 Mark flats for proportions					X
735AF004 Cut rubylith for color separations					X
735AF005 Prepare masking sheets					X
735AF006 Inspect finished flat for accuracy					X
735AF007 Position and tape negatives on flat					X
735AF008 Opaque negative imperfections					X
735AF009 Open, inspect and correct image areas					X
735AF010 Insert halftones, screens or reverses					X
735AF011 Strip changes and corrections in flat					X
735AF012 Strip for double burns and pin register					X
735AF013 Strip line negatives					X
735AF014 Outline and strip halftones					X
735AF015 Strip multi-color flats					X
735AF016 Strip flats with screen tint					X
735AF017 Strip flats with reverse overprint					X
735AF018 Strip step-off flats					X
735AF019 Strip one-up flats					X
735AF020 Strip multi-unit flats					X
735AF021 Strip step and repeat flats					X
735AF022 Strip surprint flats					X
735AF023 Tape halftones and screen tints					X
735AF024 Adjust for light tables					X
735AF025 Finish flats					X
735AF026 Write instructions for succeeding operations					X



**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

## **TRANSPORTATION CLUSTER**

Automotive Mechanic

Diesel Mechanic

Gasoline Engine/Mower Repairer

\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

AM = Automotive Mechanic  
 DM = Diesel Mechanic  
 GMR = Gasoline Engine/Mower Repairer

PREPARING NEW VEHICLES

		AM	DM	GMR
750A001	Adjust and lubricate door hinges and striker plates	X	X	
750A002	Locate water leaks	X	X	
750A003	Seal water leaks	X	X	
750A004	Locate duct leaks	X	X	
750A005	Seal duct leaks	X	X	
750A006	Locate rattles and noises	X		
750A007	Install door moldings	X		
750A008	Remove and replace window regulators	X	X	
750A009	Adjust window regulators	X	X	
750A010	Install air shocks	X	X	
750A011	Install C.B. and radios	X	X	

SERVICING SUSPENSION SYSTEMS

		AM	DM	GMR
750B001	Inspect suspension systems for worn parts	X	X	
750B002	Remove and replace suspension bushings and king pins	X	X	
750B003	Inspect tires and wheels for damage and irregular wear	X	X	
750B004	Remove and replace front wheel bearings (drum brakes)	X	X	
750B005	Remove and replace front wheel bearings (disc brakes)	X	X	
750B006	Repack wheel bearings	X	X	
750B007	Remove and replace shock absorbers	X	X	
750B008	Remove and replace control arms	X	X	
750B009	Remove and replace ball joints	X	X	
750B010	Remove and replace torsion bars	X	X	
750B011	Remove and replace coil springs	X	X	
750B012	Remove and replace spindle	X	X	
750B013	Remove and replace McPherson strut assembly	X		
750B014	Rebuild McPherson strut assembly	X		
750B015	Remove and replace trunnion pin assembly	X	X	
750B016	Remove and replace leaf spring assembly	X	X	
750B017	Remove and replace spring hangers	X	X	
750B018	Remove and replace "I" beam	X	X	
750B019	Remove and replace stabilizer and bushings	X	X	
750B020	Replace idler arm	X	X	
750B021	Replace pitman arm	X	X	
750B022	Inspect walking beams		X	
750B023	Replace walking beams		X	
750B024	Inspect torque arms	X	X	
750B025	Replace torque arms	X	X	
750B026	Inspect and adjust torsion bar	X	X	
750B027	Inspect ball joints	X	X	

SERVICING HEATING AND COOLING SYSTEMS

		AM	DM	GMR
750C001	Determine cause of overheating	X	X	
750C002	Test thermal sensing switch	X	X	
750C003	Remove and replace thermal sensing switch	X	X	
750C004	Remove and replace drive belts	X	X	
750C005	Test coolant freezing point	X	X	
750C006	Install antifreeze	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750C007	Inspect and replace water hoses	X	X	
750C008	Check variable speed fan clutch	X	X	
750C009	Remove and replace variable speed fan clutch	X	X	
750C010	Remove and replace electric cooling fan motor	X	X	
750C011	Chemically clean cooling system	X	X	
750C012	Remove and replace thermostat	X	X	
750C013	Test thermostat	X	X	
750C014	Test coolant pressure caps	X	X	
750C015	Pressure test cooling system	X	X	
750C016	Remove and replace heater hoses	X	X	
750C017	Remove and replace radiator hoses	X	X	
750C018	Remove and replace radiator	X	X	
750C019	Rebuild blower assembly on air-cooled engines	X	X	
750C020	Remove and replace heater cores	X	X	
750C021	Remove and replace water pump	X	X	
750C022	Inspect shutter stat		X	

PERFORMING STEERING AND WHEEL SERVICES

		AM	DM	GMR
750D001	Inspect steering gear and linkage for worn parts	X	X	
750D002	Check and service fluid level	X	X	
750D003	Lubricate steering gear and linkage	X	X	
750D004	Test tire pressure	X	X	
750D005	Rotate tires	X		
750D006	Balance wheel and tire assembly	X	X	
750D007	Adjust steering sector	X	X	
750D008	Remove and replace steering linkage components	X	X	
750D009	Remove and replace manual steering sector	X	X	
750D010	Remove and replace steering damper	X	X	
750D011	Remove and replace power steering hoses	X	X	
750D012	Remove and replace belt(s) and set tension	X	X	
750D013	Remove and replace power steering cylinder	X	X	
750D014	Remove and replace power steering control valve assembly	X	X	
750D015	Rebuild power steering control valve assembly	X	X	
750D016	Remove and replace power steering pump	X	X	
750D017	Rebuild rack and pinion power steering assembly	X	X	
750D018	Rebuild rack and pinion manual steering assembly	X	X	
750D019	Adjust toe-in	X	X	
750D020	Align front end	X	X	
750D021	Align rear wheels	X	X	
750D022	Remove and replace turn signal switch	X	X	
750D023	Remove and replace ignition switch rack	X	X	
750D024	Remove and replace steering wheel	X	X	
750D025	Remove and replace mast jacket	X	X	
750D026	Set center line steering	X	X	
750D027	Check steering axis inclination	X	X	
750D028	Remove and replace tilt wheel and telescope	X	X	
750D029	Remove and replace power steering seals	X	X	
750D030	Remove and replace four-way switch	X	X	
750D031	Rebuild steering column	X	X	
750D032	Remove and replace steering column bearings, shift tube and socket	X	X	
750D033	Remove and replace steering column	X	X	
750D034	Replace shift detent in column	X	X	
750D035	Remove and replace rack and pinion power steering assembly	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

SERVICING BRAKE SYSTEMS

		AM	DM	GMR
750E001	Check brake operation	X	X	
750E002	Inspect brake hoses and lines	X	X	
750E003	Flush brake system	X	X	
750E004	Adjust brake shoes	X	X	
750E005	Free up parking brake cable and linkage	X		
750E006	Adjust parking brake linkage	X		
750E007	Remove and replace parking brake cable and linkage	X		
750E008	Remove and replace parking brake external band	X		
750E009	Remove and replace brake shoes	X	X	
750E010	Remove and replace self-adjusters	X		
750E011	Remove and replace wheel cylinder	X	X	
750E012	Rebuild wheel cylinder	X	X	
750E013	Cam grind brake shoe	X	X	
750E014	Grind (turn) brake drum	X	X	
750E015	Recondition backing plate	X	X	
750E016	Remove and replace disc brake rotor	X	X	
750E017	Reface disc brake rotor	X	X	
750E018	Remove and replace caliper assembly	X	X	
750E019	Rebuild caliper assembly	X	X	
750E020	Remove and replace master cylinder	X	X	
750E021	Rebuild master cylinder	X	X	
750E022	Remove and replace hydraulic power brake unit	X	X	
750E023	Remove and replace hydrobrake booster unit	X	X	
750E024	Bleed brake system	X	X	
750E025	Remove and replace proportioning meter (combination valve)	X	X	
750E026	Test brake antilock system	X	X	
750E027	Replace defective components in brake antilock system	X	X	
750E028	Test rotor parallelism	X	X	
750E029	Test rotor runout	X	X	
750E030	Torque wheel lug nuts	X	X	
750E031	Check and service fluid level	X	X	
750E032	Replace wheels	X	X	
750E033	Repack wheel bearings	X	X	
750E034	Replace hydraulic lines and hoses	X	X	
750E035	Adjust air brakes	X	X	
750E036	Inspect air valves		X	
750E037	Replace air valves		X	
750E038	Inspect compressor		X	
750E039	Replace air compressor		X	
750E040	Test air compressor governor		X	
750E041	Replace air compressor governor		X	
750E042	Inspect antiskid system		X	
750E043	Inspect air chambers		X	
750E044	Replace air chambers		X	
750E045	Inspect parking brake chamber		X	
750E046	Replace parking brake chamber		X	
750E047	Test air system for leaks		X	
750E048	Reline air brake		X	
750E049	Replace air valves		X	

SERVICING EMISSION CONTROL SYSTEMS

		AM	DM	GMR
750F001	Test emission control system using propane enrichment apparatus	X		
750F002	Remove and replace vacuum hoses	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750F003	Test positive crankcase ventilation system	X		
750F004	Remove and replace positive crankcase ventilation valve	X		
750F005	Remove and replace positive crankcase ventilation valve hose(s)	X		
750F006	Test vacuum advance/retard device	X		
750F007	Remove and replace vacuum advance/retard device	X		
750F008	Test electrical advance/retard device	X		
750F009	Check idle solenoid	X		
750F010	Remove and replace idle solenoid	X		
750F011	Remove and replace deceleration valve	X		
750F012	Test thermostatic air cleaner	X	X	
750F013	Adjust thermostatic air cleaner	X	X	
750F014	Remove and replace thermostatic air cleaner	X	X	
750F015	Check exhaust gas recirculation valve operation	X		
750F016	Remove and replace exhaust gas recirculation valve	X		
750F017	Check air injection system	X		
750F018	Remove and replace air pump	X		
750F019	Remove and repair diverter and anti-backfire valve	X		
750F020	Test fuel evaporation system	X		
750F021	Remove and replace closed system charcoal canister filter	X		
750F022	Test back pressure of exhaust system	X		
750F023	Remove and replace catalytic converter	X		
750F024	Remove and replace beads in catalytic converter	X		
750F025	Test exhaust oxygen sensor	X		
750F026	Remove and replace exhaust oxygen sensor	X		
750F027	Test electronic fuel mixture control system	X		

SERVICING EXHAUST SYSTEMS

		AM	DM	GMR
750G001	Check exhaust system for leaks and restrictions	X	X	
750G002	Remove and replace exhaust system supports	X	X	
750G003	Remove and replace muffler	X	X	
750G004	Remove and replace exhaust pipe	X	X	
750G005	Remove and replace tail pipe	X	X	
750G006	Remove and replace exhaust manifold	X	X	
750G007	Inspect exhaust system	X	X	
750G008	Inspect exhaust manifold	X	X	
750G009	Inspect turbocharger	X	X	
750G010	Replace turbocharger	X	X	
750G011	Rebuild turbocharger	X	X	

SERVICING HEATING AND AIR-CONDITIONING SYSTEMS

		AM	DM	GMR
750H001	Inspect control cables	X	X	
750H002	Test electrical control circuits	X	X	
750H003	Remove and replace compressor belts	X	X	
750H004	Test vacuum components	X	X	
750H005	Remove and replace vacuum components	X	X	
750H006	Test air-conditioning thermal switch	X	X	
750H007	Test blower motor	X	X	
750H008	Remove and replace blower motor	X	X	
750H009	Test thermostatic clutch switch	X	X	
750H010	Remove and replace thermostatic clutch switch	X	X	
750H011	Inspect air-conditioning magnetic clutch switch	X	X	
750H012	Remove and replace air-conditioning magnetic clutch switch (piston type)	X	X	



TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750H013	Inspect clutch and pulley assembly	X	X	
750H014	Remove and replace clutch and hub assembly (rotary type)	X	X	
750H015	Test air conditioner charge	X	X	
750H016	Charge system using pound cans	X	X	
750H017	Charge system using bulk source	X	X	
750H018	Perform leak test with halide torch	X	X	
750H019	Perform leak test with electronic tester	X	X	
750H020	Remove and replace refrigerant lines	X	X	
750H021	Fabricate refrigerant lines	X	X	
750H022	Remove and replace compressor seals	X	X	
750H023	Check compressor oil level	X	X	
750H024	Inspect dryer	X	X	
750H025	Remove and replace dryer in air-conditioning unit	X	X	
750H026	Remove and replace condenser in air-conditioning unit	X	X	
750H027	Remove and replace evaporator	X	X	
750H028	Remove and replace metering orifice valve (expansion valve)	X	X	
750H029	Test throttle-suctioning valve	X	X	
750H030	Remove and replace throttle-suctioning valve	X	X	
750H031	Test compressor reed plates	X	X	
750H032	Remove and replace compressor reed plates	X	X	
750H033	Remove and replace compressor	X	X	
750H034	Rebuild rotary compressor (swash-plate)	X	X	
750H035	Remove and replace heater core	X	X	
750H036	Install air-conditioning system	X	X	
750H037	Remove and replace low pressure cutout switch	X	X	
750H038	Remove and replace high pressure cutout switch	X	X	
750H039	Evacuate and charge refrigeration system	X	X	
750H040	Check system for leaks	X	X	
750H041	Replace refrigeration clutch	X	X	
750H042	Inspect refrigeration controls	X	X	
750H043	Repair refrigeration controls	X	X	

SERVICING FUEL SYSTEMS

		AM	DM	GMR
750I001	Test carburetor adjustment using combustion analyzer	X		
750I002	Test carburetor adjustment using infrared tester	X		
750I003	Test carburetor adjustment using propane enrichment apparatus	X		
750I004	Adjust carburetor idle mixture	X		
750I005	Adjust antistall device	X		
750I006	Inspect carburetor linkage for binding and worn parts	X		
750I007	Check carburetor for vacuum leaks	X		
750I008	Remove and replace carburetor air cleaner	X		
750I009	Clean automatic choke	X		
750I010	Adjust automatic choke	X		
750I011	Free up manifold heat riser valve	X		
750I012	Remove and replace manifold heat riser valve	X		
750I013	Clean heat riser passages	X		
750I014	Adjust float	X		
750I015	Adjust carburetor metering rods	X		
750I016	Remove and replace carburetor metering jets	X		
750I017	Remove and replace carburetor	X		
750I018	Rebuild carburetor	X		
750I019	Remove and replace fuel filter unit	X	X	
750I020	Test and adjust fuel pump	X	X	
750I021	Remove and replace fuel pump	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750I022	Test and adjust fuel injection system	X	X	
750I023	Remove and replace electrical fuel injector computer	X		
750I024	Test wiring harness of electronic fuel injection system	X		
750I025	Remove and replace fuel injection nozzle	X	X	
750I026	Rebuild fuel injection nozzle	X	X	
750I027	Remove and replace fuel injection pump	X	X	
750I028	Rebuild fuel injection pump	X	X	
750I029	Check waste gate adjustment	X	X	
750I030	Adjust waste gate adjustment	X	X	
750I031	Remove and replace turbocharger	X	X	
750I032	Rebuild turbocharger	X	X	
750I033	Remove and replace fuel lines	X	X	
750I034	Remove and replace fuel tank	X	X	
750I035	Remove and replace fuel level sending unit	X	X	
750I036	Test electronic fuel mixture control system	X	X	
750I037	Time diesel engine injector pump	X	X	
750I038	Remove and replace injector (diesel)	X	X	
750I039	Remove and replace injector line (diesel)	X	X	
750I040	Test injector spray pattern (diesel)	X	X	
750I041	Test calibration of injector lines (diesel)	X	X	
750I042	Bleed fuel system	X	X	
750I043	Clean fuel filter	X	X	
750I044	Check air cleaner element	X	X	
750I045	Clean air cleaner element	X	X	
750I046	Remove and replace wiring harness of electronic fuel system	X		

SERVICING IGNITION SYSTEMS

		AM	DM	GMR
750J001	Test engine using engine analyzer	X		
750J002	Test point dwell	X		
750J003	Remove and replace distributor cap	X		
750J004	Remove and replace distributor rotor	X		
750J005	Inspect distributor for worn parts	X		
750J006	Remove and replace points	X		
750J007	Remove and replace condenser	X		
750J008	Test condenser	X		
750J009	Remove and replace distributor	X		
750J010	Rebuild distributor	X		
750J011	Test control unit (electronic)	X		
750J012	Remove and replace control unit (electronic)	X		
750J013	Test pickup coil (electronic)	X		
750J014	Remove and replace pickup coil (electronic)	X		
750J015	Test automatic spark advance mechanism	X		
750J016	Remove and replace spark advance mechanism	X		
750J017	Adjust point dwell	X		
750J018	Test ignition timing	X		
750J019	Adjust ignition timing	X		
750J020	Test ignition coil	X		
750J021	Test primary circuit resistance	X		
750J022	Test secondary circuit continuity	X		
750J023	Test spark plug wire resistance	X		
750J024	Remove and replace spark plug wires	X		
750J025	Remove and replace spark plugs	X		
750J026	Clean spark plugs	X		
750J027	Gap spark plugs	X		

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750J028	Test glow plug electrical system	X	X	
750J029	Test glow plug	X	X	
750J030	Remove and replace glow plug	X	X	
750J031	Test solenoid	X	X	
750J032	Replace solenoid	X	X	
750J033	Test distributor	X		
750J034	Time distributor to engine	X		
750J035	Test generator/alternator	X	X	
750J036	Replace generator/alternator	X	X	
750J037	Test regulator	X	X	
750J038	Replace regulator	X	X	

SERVICING AUTOMATIC TRANSMISSIONS

		AM	DM	GMR
750K001	Pressure test transmission in vehicle	X	X	
750K002	Stall test automatic transmission in vehicle	X	X	
750K003	Clean transmission oil strainer	X	X	
750K004	Remove and replace transmission oil filter	X	X	
750K005	Adjust automatic transmission shift linkage	X	X	
750K006	Test vacuum shift modulator	X	X	
750K007	Remove and replace vacuum shift modulator	X	X	
750K008	Adjust bands	X	X	
750K009	Remove and replace transmission governor	X	X	
750K010	Clean transmission governor	X	X	
750K011	Clean transmission valve body	X	X	
750K012	Remove and replace automatic transmission with converter assembly	X	X	
750K013	Remove and replace automatic transmission without converter assembly	X	X	
750K014	Rebuild automatic transmission assembly	X	X	
750K015	Measure converter turbine end play	X	X	
750K016	Air pressure test transmission on bench	X	X	
750K017	Pressure flush converter assembly	X	X	
750K018	Pressure flush automatic transmission cooler assembly	X	X	
750K019	Remove and replace torque converter	X	X	
750K020	Remove and replace extension housing seal and bushing	X	X	
750K021	Splice cooler lines	X	X	
750K022	Replenish transmission oil	X	X	
750K023	Test electrical controls of automatic clutch converter	X	X	
750K024	Inspect and replace automatic transmission	X	X	
750K025	Inspect and service drive shaft and U-joints	X	X	
750K026	Replace U-joints	X	X	
750K027	Replace single speed differential	X	X	
750K028	Rebuild single speed differential	X	X	
750K029	Replace two-speed differential		X	
750K030	Rebuild shift unit		X	
750K031	Replace power divider		X	
750K032	Rebuild power divider		X	
750K033	Replace axles and seals	X	X	
750K034	Replace power takeoff		X	

PERFORMING ENGINE MECHANICAL DIAGNOSIS

		AM	DM	GMR
750L001	Test cylinder balance using engine analyzer	X		
750L002	Test cylinder leakage	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750L003	Inspect engine for vacuum leaks	X	X	
750L004	Inspect engine for oil leaks	X	X	
750L005	Inspect to determine cause of overheating	X	X	
750L006	Inspect cooling system for source of coolant loss	X	X	
750L007	Inspect valve train and guides for cause of malfunctions	X	X	
750L008	Inspect engine for source of mechanical engine noise	X	X	

SERVICING ENGINE BLOCKS

		AM	DM	GMR
750M001	Steam clean engine	X	X	
750M002	Test oil pump pressure	X	X	
750M003	Test oil pressure relief valve	X	X	
750M004	Remove and replace motor mounts	X	X	
750M005	Remove and replace engine assembly	X	X	
750M006	Remove and replace oil pan	X	X	
750M007	Remove and replace rod bearing(s)	X	X	
750M008	Remove and replace crankshaft	X	X	
750M009	Inspect block for warp	X	X	
750M010	Bore cylinders	X	X	
750M011	Hone cylinders	X	X	
750M012	Install cam bearings	X	X	
750M013	Assemble short block	X	X	
750M014	Check engine compression	X	X	
750M015	Replace intake manifold	X	X	
750M016	Inspect and replace exhaust manifold	X	X	
750M017	Replace water manifold		X	
750M018	Replace clutch assembly	X	X	
750M019	Replace turboblower	X	X	
750M020	Replace water pump	X	X	
750M021	Replace cylinder heads	X	X	
750M022	Rebuild water pump		X	
750M023	Replace connecting rods and pistons	X	X	
750M024	Replace sleeves		X	
750M025	Replace vibration damper	X	X	
750M026	Replace timing flow cover		X	
750M027	Replace crankshaft assembly	X	X	
750M028	Replace camshaft assembly	X	X	
750M029	Replace oil seals	X	X	
750M030	Replace freeze plugs	X	X	

SERVICING CYLINDER HEADS AND VALVE TRAINS

		AM	DM	GMR
750N001	Inspect for rocker arm lubrication	X	X	
750N002	Remove and replace intake manifold	X	X	
750N003	Test valve lifters	X	X	
750N004	Remove and replace cylinder head	X	X	
750N005	Inspect cylinder head for warp or cracks	X	X	
750N006	Rebuild cylinder head	X	X	
750N007	Remove and replace harmonic balancer	X	X	
750N008	Remove and replace timing chain or belt	X	X	
750N009	Remove and replace timing gear	X	X	
750N010	Remove and replace camshaft	X	X	
750N011	Remove and replace camshaft bearings	X	X	
750N012	Adjust hydraulic valve lifters	X	X	
750N013	Adjust mechanical valve lifters	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

SERVICING ELECTRICAL SYSTEMS

		AM	DM	GMR
7500001	Inspect battery electrolyte level	X	X	
7500002	Test battery with hydrometer	X	X	
7500003	Test battery for surface leakage	X	X	
7500004	Test battery voltage	X	X	
7500005	Test battery for capacity (load)	X	X	
7500006	Clean battery, posts and cable connections	X	X	
7500007	Measure ground system resistance	X	X	
7500008	Remove and replace battery cables	X	X	
7500009	Charge battery	X	X	
7500010	Test charging system output	X	X	
7500011	Test alternator output	X	X	
7500012	Remove and replace generator or alternator	X	X	
7500013	Rebuild generator	X	X	
7500014	Rebuild alternator	X	X	
7500015	Remove and replace charging system regulator	X	X	
7500016	Test starter control circuit	X	X	
7500017	Test starter current draw	X	X	
7500018	Remove and replace starter solenoid	X	X	
7500019	Test electrical motors	X	X	
7500020	Remove and replace starter	X	X	
7500021	Rebuild starter	X	X	
7500022	Test switches	X	X	
7500023	Remove and replace switches	X	X	
7500024	Test fuses	X	X	
7500025	Remove and replace fuses	X	X	
7500026	Test circuit breakers	X	X	
7500027	Remove and replace circuit breakers	X	X	
7500028	Remove and replace fuse block assembly	X	X	
7500029	Inspect lighting system for faulty bulbs	X	X	
7500030	Remove and replace light bulbs	X	X	
7500031	Remove and replace sockets	X	X	
7500032	Adjust headlights	X	X	
7500033	Test parking light circuit	X	X	
7500034	Remove and replace dimmer switch	X	X	
7500035	Test turn signal circuit	X	X	
7500036	Remove and replace turn signal switch	X	X	
7500037	Adjust backup light switch	X	X	
7500038	Remove and replace backup light switch	X	X	
7500039	Adjust stop light switch	X	X	
7500040	Remove and replace stop light switch	X	X	
7500041	Check horn circuit	X	X	
7500042	Test horn relay	X	X	
7500043	Remove and replace horn relay	X	X	
7500044	Remove and replace horn	X	X	
7500045	Test windshield wiper circuit	X	X	
7500046	Remove and replace windshield wiper motor	X	X	
7500047	Test constant voltage regulator	X	X	
7500048	Remove and replace constant voltage regulator	X	X	
7500049	Adjust voltage regulator output	X	X	
7500050	Test generator output	X	X	
7500051	Test instrument gauges	X	X	
7500052	Remove and replace instrument gauges	X	X	
7500053	Test sending units	X	X	
7500054	Remove and replace sending units	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
7500055	Test warning lamps	X	X	
7500056	Remove and replace warning lamps	X	X	

SERVICING ELECTRICAL ACCESSORIES

		AM	DM	GMR
750P001	Test cruise control unit	X		
750P002	Remove and replace cruise control components	X		
750P003	Test automatic alarm system	X		
750P004	Remove and replace automatic alarm system components	X		
750P005	Test radio power circuit	X	X	
750P006	Inspect radio speaker	X	X	
750P007	Remove and replace radio speaker	X	X	
750P008	Test radio antenna	X	X	
750P009	Remove and replace radio antenna	X	X	
750P010	Trim radio antenna	X	X	
750P011	Remove and replace power antenna motor	X		
750P012	Remove and replace power window motors	X	X	
750P013	Remove and replace power seat motors	X		
750P014	Test cigarette lighter circuit	X	X	
750P015	Remove and replace cigarette lighter receptacle	X	X	
750P016	Replace radio components	X	X	
750P017	Repair windshield wipers	X	X	
750P018	Test lighting systems	X	X	
750P019	Test electrical shift mechanisms	X	X	
750P020	Repair electrical shift mechanisms	X	X	
750P021	Repair lighting system	X	X	

SERVICING MANUAL TRANSMISSIONS

		AM	DM	GMR
750Q001	Inspect and adjust shift linkage	X	X	
750Q002	Adjust manual clutch	X	X	
750Q003	Adjust hydraulic clutch free travel	X	X	
750Q004	Remove and replace extension housing seal and bushing	X	X	
750Q005	Remove and replace manual transmission	X	X	
750Q006	Rebuild manual transmission	X	X	
750Q007	Remove and replace pressure plate assembly	X	X	
750Q008	Remove and replace clutch release bearing	X	X	
750Q009	Remove and replace release fork	X	X	
750Q010	Remove and replace pilot bearing	X	X	
750Q011	Remove and replace hydraulic clutch slave cylinder	X	X	
750Q012	Rebuild hydraulic clutch slave cylinder	X	X	
750Q013	Remove and replace hydraulic clutch master cylinder	X	X	
750Q014	Rebuild hydraulic clutch master cylinder	X	X	
750Q015	Measure flywheel runout	X	X	
750Q016	Replace flywheel	X	X	
750Q017	Repair flywheel		X	
750Q018	Measure bellhousing runout	X	X	
750Q019	Remove and replace four-wheel-drive transfer case	X		
750Q020	Rebuild four-wheel-drive transfer case	X		
750Q021	Check fluid levels	X	X	

SERVICING DRIVE LINES

		AM	DM	GMR
750R001	Inspect drive line for worn parts	X	X	
750R002	Lubricate universal joint	X	X	

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750R003	Remove and replace universal joint	X	X	
750R004	Remove and replace trunnion joint	X	X	
750R005	Lubricate speedometer cable	X	X	
750R006	Remove and replace speedometer cable	X	X	
750R007	Remove and replace speedometer drive gear	X	X	
750R008	Remove and replace axle seal	X	X	
750R009	Remove and replace axle bearing	X	X	
750R010	Balance drive shaft (in car)	X		
750R011	Remove and replace transmission mount	X	X	
750R012	Check drive line angles	X	X	
750R013	Remove and replace differential assembly (integral)	X		
750R014	Remove and replace differential assembly (removable)	X	X	
750R015	Rebuild differential assembly (integral)	X		
750R016	Rebuild differential assembly (removable)	X		
750R017	Remove and replace transaxle assembly	X		
750R018	Rebuild transaxle assembly	X		
750R019	Remove and replace front-wheel-drive axle assemblies	X		
750R020	Rebuild four wheel drive locking hubs	X		
750R021	Remove and replace pinion seal	X	X	
750R022	Rebuild power takeoff	X	X	
750R023	Remove and replace drive shaft center support bearings	X	X	
750R024	Rebuild constant velocity universal joints	X		
750R025	Remove and replace constant velocity joints	X		
750R026	Repack constant velocity joints	X		
750R027	Remove and replace constant velocity boots	X		

PERFORMING WELDING AND OXY-FUEL CUTTING

		AM	DM	GMR
750S001	Set up oxy-fuel welding and cutting equipment	X	X	X
750S002	Braze mild steel	X	X	X
750S003	Solder copper tubing	X	X	
750S004	Cut mild steel with oxy-fuel equipment	X	X	X
750S005	Set up shielded metal arc welding equipment	X	X	X
750S006	Weld 3/16" mild steel in flat position	X	X	X
750S007	Weld 3/16" mild steel in horizontal position	X	X	X
750S008	Solder electrical components and wire	X	X	X
750S009	Heat metal parts to assist in removal	X	X	X
750S010	Weld cast iron	X	X	
750S011	Braze cast iron	X	X	

PERFORMING DIESEL ENGINE TUNE-UPS

		AM	DM	GMR
750T001	Test and adjust air inductor system	X	X	
750T002	Test fuel system	X	X	
750T003	Adjust injector timing	X	X	
750T004	Adjust valve clearance	X	X	
750T005	Adjust fuel pressure	X	X	
750T006	Adjust control rack	X	X	
750T007	Check and adjust linkage for full throttle operation	X	X	

PERFORMING SAFETY PRACTICES

		AM	DM	GMR
750U001	Apply shop and equipment safety rules	X	X	
750U002	Apply first aid procedures	X	X	X
750U003	Complete an accident report	X	X	X

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

		AM	DM	GMR
750U004	Evaluate personnel safety violations	X	X	
750U005	Inspect the workplace for safe working environment	X	X	X
750U006	Report shop safety violations	X	X	X
750U007	Correct safety violations	X	X	X
750U008	Participate in shop safety committee	X	X	X
750U009	Comply with shop and equipment safety rules			X
750U010	Conduct safety briefings on OSHA regulations			X

PERFORMING PREVENTATIVE MAINTENANCE

		AM	DM	GMR
750V001	Perform underside inspections	X	X	
750V002	Service crankcase lube	X	X	
750V003	Service fuel filter	X	X	
750V004	Perform underhood inspections	X	X	
750V005	Complete lubrication operations	X	X	
750V006	Service tires	X	X	

PERFORMING MAINTENANCE CONTROL FUNCTIONS

		AM	DM	GMR
750W001	Complete labor time cards	X	X	X
750W002	Complete requests for procurement of parts	X	X	X
750W003	Complete unsatisfactory reports	X	X	X
750W004	Enter work performed on work orders	X	X	X
750W005	Follow up on requisitions	X	X	X
750W006	Initiate and complete work order	X	X	X
750W007	Initiate request for parts	X	X	X
750W008	Maintain daily work control logs or status boards	X	X	
750W009	Plan, schedule and control maintenance of vehicles	X	X	
750W010	Prepare reports of vehicle defects	X	X	X
750W011	Spot check service orders	X	X	
750W012	Identify interchangeable parts			X
750W013	Obtain parts from stockroom			X

PERFORMING PRECISION MEASUREMENTS

		AM	DM	GMR
750X001	Measure parts using standard and metric measurement systems	X	X	X
750X002	Measure parts with steel rule	X	X	X
750X003	Measure parts using dial indicators	X	X	X
750X004	Measure parts using outside micrometers	X	X	X
750X005	Measure parts using inside micrometers	X	X	X
750X006	Measure parts using depth micrometers	X	X	X
750X007	Measure parts using special micrometers	X	X	X
750X008	Measure parts using inside and outside calipers	X	X	X
750X009	Measure threads	X	X	X
750X010	Calibrate precision measuring tools	X	X	X
750X011	Clean and store precision measuring tools	X	X	X
750X012	Inspect parts with comparison measuring tools			X
750X013	Measure parts using telescoping gages			X
750X014	Measure parts using small hole gages			X
750X015	Measure parts using bore gages			X
750X016	Measure parts using radius gages			X



TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

PERFORMING CHASSIS AND CAB MAINTENANCE

	AM	DM	GMR
750Y001 Inspect fifth wheel and king pin		X	
750Y002 Inspect and service landing gears		X	
750Y003 Inspect and service slider tandem		X	
750Y004 Replace torque arms	X	X	
750Y005 Repair doors	X	X	
750Y006 Install windshield, back and side glass	X	X	
750Y007 Inspect and service hood	X	X	
750Y008 Inspect and repair mirrors	X	X	
750Y009 Inspect and service ventilation system	X	X	
750Y010 Inspect and service seat	X	X	

PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES

	AM	DM	GMR
750Z001 Clean and maintain work area and leave in safe condition			X
750Z002 Follow tool crib procedures			X
750Z003 Report problems to supervisor			X
750Z004 Determine basic maintenance procedures using manuals			X
750Z005 Participate in participative management program (Quality Circles)			X

PERFORMING BENCHWORK OPERATIONS

	AM	DM	GMR
750AA001 Cut threads with taps and dies			X
750AA002 Remove threaded fasteners and repair threads			X
750AA003 Polish parts using coated abrasives			X
750AA004 Disassemble, assemble and straighten parts using arbor press			X
750AA005 Disassemble, fit and reassemble parts			X
750AA006 Lift and position workpiece using hoists			X
750AA007 Repair handtools			X
750AA008 Work materials with hand tools			X
750AA009 Work materials with portable power tools			X

SERVICING SMALL ENGINE FUEL SYSTEMS

	AM	DM	GMR
750AB001 Diagnose fuel system problems			X
750AB002 Clean fuel systems			X
750AB003 Remove and replace fuel systems			X
750AB004 Diagnose and repair fuel pumps			X
750AB005 Diagnose and repair fuel gage system			X
750AB006 Service air cleaners			X
750AB007 Diagnose carburetor problems			X
750AB008 Disassemble, clean and reassemble a pulsation-type carburetor			X
750AB009 Disassemble, clean and reassemble a vacuum-type carburetor			X
750AB010 Disassemble, clean and reassemble a float-type carburetor			X
750AB011 Rebuild carburetors			X
750AB012 Adjust carburetors			X
750AB013 Adjust engine idle speed			X
750AB014 Synchronize carburetors			X
750AB015 Repair governor assembly			X

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

AM DM GMR

750AB016	Inspect and service intake manifold			X
750AB017	Remove and replace intake manifolds			X
750AB018	Service crankcase breather			X
750AB019	Inspect and adjust throttle linkage			X
750AB020	Repair and adjust manual choke system			X
750AB021	Troubleshoot fuel system			X

SERVICING SMALL ENGINE CHARGING/STARTING CIRCUITS

AM DM GMR

750AC001	Remove and replace pullies			X
750AC002	Remove and replace belts			X
750AC003	Remove and replace alternator			X
750AC004	Rebuild alternator			X
750AC005	Remove and replace generator			X
750AC006	Rebuild generator			X
750AC007	Remove and replace voltage regulator			X
750AC008	Remove and replace rectifiers			X
750AC008	Remove and replace diode assembly			X
750AC010	Clean commutator			X
750AC011	Remove and replace starter			X
750AC012	Repair starter			X
750AC013	Diagnose and repair solenoid and relay problems			X
750AC014	Remove and replace ignition switch			X
750AC015	Remove and replace charging system gages or indicator lights			X
750AC016	Diagnose and repair charging circuit wiring system problems			X
750AC017	Service battery			X
750AC018	Prepare new battery for service			X
750AC019	Troubleshoot charging circuits			X
750AC020	Troubleshoot starting circuit			X

SERVICING SMALL ENGINE MANUAL STARTING SYSTEMS

AM DM GMR

750AD001	Diagnose manual starting system problems			X
750AD002	Remove and replace manual starting assembly			X
750AD003	Disassemble and clean manual starter			X
750AD004	Rebuild manual starter			X
750AD005	Troubleshoot manual starting system			X

SERVICING SMALL ENGINE IGNITION SYSTEMS

AM DM GMR

750AE001	Diagnose ignition system problems			X
750AE002	Remove, test, clean, adjust and reinstall spark plugs			X
750AE003	Remove and replace ignition wiring			X
750AE004	Remove and replace distributor cap and rotor			X
750AE005	Test, remove and replace distributor			X
750AE006	Adjust breaker points			X
750AE007	Remove and replace points and condenser			X
750AE008	Remove and replace plunger and guide			X
750AE009	Adjust armature air gap			X
750AE010	Remove, test and replace ignition coil			X
750AE011	Remove, test and replace magneto			X
750AE012	Test electronic ignition components			X
750AE013	Remove and replace electronic ignition components			X

## TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

AM DM GMR

750AE014	Test, remove and replace safety kill switch				X
750AE015	Time an electronic ignition system				X
750AE016	Time a magneto ignition system				X
750AE017	Time a battery coil ignition system				X
750AE018	Troubleshoot an electronic ignition system				X
750AE019	Troubleshoot a magneto ignition system				X
750AE020	Troubleshoot a battery coil ignition system				X

### REPAIRING AND OVERHAULING SMALL ENGINES

AM DM GMR

750AF001	Check compression				X
750AF002	Check oil pressure and levels				X
750AF003	Diagnose engine mechanical condition				X
750AF004	Remove and replace oil pump				X
750AF005	Rebuild oil pump				X
750AF006	Inspect pistons, rods and cylinder head				X
750AF007	Remove, assemble and install piston, rings and connecting rod assembly				X
750AF008	Remove and replace connecting rods				X
750AF009	Remove and replace crankshaft				X
750AF010	Remove and replace cylinder head				X
750AF011	Bore engine cylinder				X
750AF012	Remove, replace and retune a camshaft				X
750AF013	Remove and replace valve train				X
750AF014	Remove and replace rocker arm assemblies				X
750AF015	Remove and replace reed valves				X
750AFC16	Replace valves and valve seats				X
750AF017	Grind valves				X
750AF018	Lap valves				X
750AF019	Grind or cut valve seats				X
750AF020	Adjust valve clearance				X
750AF021	Inspect compression release mechanism				X
750AF022	Remove and replace compression release mechanism				X
750AF023	Assemble and adjust ignition timing mechanisms				X
750AF024	Remove and replace gaskets				X
750AF025	Remove and replace oil seals				X
750AF026	Remove transferable components from original engine				X
750AF027	Remove and replace engine block				X
750AF028	Clean and inspect engine block				X
750AF029	Install components on new block				X
750AF030	Install engine block				X
750AF031	Rebuild two-cycle engine				X
750AF032	Rebuild four-cycle engine				X

### SERVICING SMALL ENGINE COOLING SYSTEMS

AM DM GMR

750AG001	Inspect air cooling system components				X
750AG002	Clean debris from cooling system				X
750AG003	Inspect water cooling system components				X
750AG004	Remove and replace radiators				X
750AG005	Remove and replace water pump				X
750AG006	Remove and replace hoses				X



TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

AM DM GMR

750AK006	Remove and replace steering gear			X
750AK007	Inspect power steering system			X
750AK008	Remove and replace power steering system			X
750AK009	Remove and replace tie rod ends			X
750AK010	Remove and replace power steering hoses, lines and belts			X
750AK011	Remove and replace power steering pump			X
750AK012	Diagnose power steering system problems			X
750AK013	Rebuild power steering cylinder and control valve			X
750AK014	Inspect tires and wheels			X
750AK015	Remove and replace wheel bearings			X
750AK016	Pack and adjust wheel bearings			X
750AK017	Diagnose wheel bearing problems			X
750AK018	Repair flat tires			X
750AK019	Remove and replace lawn tractor brakes			X
750AK020	Adjust lawn tractor brakes			X
750AK021	Diagnose lawn tractor brake system problems			X
750AK022	Inspect lawn tractor frame and body			X
750AK023	Repair lawn tractor body			X
750AK024	Repair lawn tractor frame			X

SERVICING LAWN AND GARDEN EQUIPMENT HYDRAULIC SYSTEMS

AM DM GMR

750AL001	Inspect and test lawn tractor hydraulic system			X
750AL002	Remove and replace hydraulic system pump			X
750AL003	Remove and replace hydraulic fluid and filter			X
750AL004	Rebuild and adjust hydraulic pump			X
750AL005	Remove and replace hydraulic lines and hoses			X
750AL006	Remove and replace hydraulic system control valves			X
750AL007	Rebuild hydraulic system control valves			X
750AL008	Remove and replace hydraulic cylinder			X
750AL009	Rebuild hydraulic cylinder			X
750AL010	Diagnose lawn tractor hydraulic system problems			X

SETTING UP AND STORING LAWN AND GARDEN EQUIPMENT

AM DM GMR

750AM001	Uncrate and assemble lawn and garden equipment			X
750AM002	Test and inspect new lawn and garden equipment			X
750AM003	Set up new lawn mowers			X
750AM004	Set up new lawn tractors			X
750AM005	Set up new lawn and garden equipment			X
750AM006	Prepare lawn and garden equipment for off-season storage			X
750AM007	Return lawn and garden equipment from storage			X

SERVICING LAWN MOWER ASSEMBLIES

AM DM GMR

750AN001	Adjust height of cut			X
750AN002	Sharpen and balance lawn mower blades			X
750AN003	Remove and replace drive on self-propelled equipment			X
750AN004	Repair drive on self-propelled equipment			X
750AN005	Replace lawn mower throttle cables			X
750AN006	Adjust lawn mower clutch control rod			X
750AN007	Repair lawn mower safety devices			X

TRANSPORTATION OCCUPATIONS CLUSTER MATRIX

	AM	DM	GMR
750AN008 Adjust reel type mowers			X
750AN009 Grind bed knife and reel			X
750AN010 Inspect mower			X
750AN011 Repair cutter deck			X
750AN012 Remove and replace mower handles			X
750AN013 Remove and replace bagging system			X

CONDUCTING SHOP OPERATIONS

	AM	DM	GMR
750A0001 Answer customer questions			X
750A0002 Troubleshoot customer problems			X
750A0003 Determine repair method			X
750A0004 Perform public relations activities			X
750A0005 Prepare service bill			X
750A0006 Maintain accounts receivable/paid records			X
750A0007 Maintain receiving records			X
750A0008 Maintain records of service tools and equipment			X
750A0009 Receive and store parts and supplies			X
750A0010 Discuss delivery schedule with approved supplier			X
750A0011 Order parts and supplies			X
750A0012 Establish customer and equipment history files			X
750A0013 Establish customer files			X
750A0014 Update service manuals			X
750A0015 Update parts catalogs			X
750A0016 Determine economic feasibility of repair			X
750A0017 Calculate labor cost using a flat rate manual			X
750A0018 Estimate total cost of repair			X
750A0019 Prepare and submit warranty claims			X
750A0020 Plan the layout of a small engine repair facility			X



# **INDUSTRIAL OCCUPATIONS 1988**

## **MANUFACTURING CLUSTER**

Machine Tool Operator

Machinist

Tool and Die Maker

Punch Press Operator

Sheet Metal Worker

Combination Welder

Maintenance Repairer

Automated Manufacturing Systems Technician

Thermoplastic Machine Set-up Specialist

\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT = Machine Tool Operator  
M = Machinist  
TD = Tool and Die Maker  
PP = Punch Press Operator  
SM = Sheet Metal Worker  
CW = Combination Welder  
MR = Maintenance Repairer  
AM = Automated Manufacturing Systems Technician  
TP = Thermoplastic Machine Set-up Specialist

APPLYING SAFETY PRACTICES

	MT	M	TD	PP	SM	CW	MR	AM	TP
760A001 Comply with shop and equipment safety rules	X	X	X	X	X	X	X	X	
760A002 Apply basic emergency first aid techniques	X	X	X	X	X	X	X	X	
760A003 Complete accident report	X	X	X	X	X	X	X	X	
760A004 Inspect work area and equipment for safe working environment	X	X	X	X	X	X	X	X	
760A005 Report shop, environmental and equipment safety violations	X	X	X	X	X	X	X	X	
760A006 Demonstrate use of fire extinguishers	X	X	X	X	X	X	X	X	
760A007 Participate in disaster control exercises	X	X	X	X		X	X	X	
760A008 Participate in shop safety committee	X	X	X	X		X	X	X	
760A009 Correct safety hazards	X	X	X	X	X	X	X	X	
760A010 Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X	X	X	X		X	X	
760A011 Comply with safety requirements for working around automated systems	X	X	X	X		X	X	X	
760A012 Participate in safety training program	X	X	X	X	X	X	X	X	
760A013 Conduct safety training program		X	X					X	

PERFORMING BENCHWORK OPERATIONS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760B001 Cut threads with taps and dies	X	X	X				X	X	
760B002 Remove threaded fasteners and repair threads	X	X	X				X	X	
760B003 Deburr parts	X	X	X		X		X	X	
760B004 Polish parts using coated abrasives	X	X	X				X	X	
760B005 Sharpen and polish tools using abrasive stones	X	X	X				X	X	
760B006 Rough finish parts with hand filing machines						X		X	
760B007 Rough grind parts with hand grinders						X	X	X	
760B008 Finish parts with hand grinders		X	X			X	X	X	
760B009 Determine high spots using pigment		X	X				X	X	
760B010 Remove high spots		X	X				X	X	
760B011 Polish and buff parts with portable hand tools		X	X				X	X	
760B012 Lap and fit parts		X	X				X	X	
760B013 Scrape friction surfaces			X				X	X	
760B014 Disassemble, assemble and straighten parts using arbor press	X	X	X			X	X	X	
760B015 Cut keyway with broach	X	X	X				X	X	
760B016 Set up and use hone to apply specified surface in hole	X	X	X						
760B017 Disassemble, fit and reassemble parts	X	X	X	X	X	X	X	X	
760B018 Lift and position workpiece using hoists	X	X	X	X		X	X	X	
760B019 Assemble jigs and fixtures		X	X						
760B020 Repair jigs and fixtures		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760B021	Fit and assemble metalworking dies			X						
760B022	Repair metalworking dies			X						
760B023	Assemble cutting tools			X						
760B024	Repair cutting tools			X						
760B025	Assemble gages			X						
760B026	Repair gages			X						
760B027	Repair handtools			X						
760B028	Plan assembly operations		X	X		X	X	X		
760B029	Supervise assembly operations		X	X						
760B030	Work materials with hand tools	X	X	X	X	X	X	X	X	
760B031	Work materials with portable power tools	X	X	X		X	X	X	X	
760B032	Bend metal with box and pan brake					X	X			
760B033	Bend sheet metal with cornice brake					X				
760B034	Bend metal with power brake					X	X			
760B035	Cut metal with power shear					X	X			
760B036	Notch materials					X	X			
760B037	Roll cylindrical metal shapes					X	X			
760B038	Chip slag						X			
760B039	Work materials with hydraulic iron worker					X	X			
760B040	Bevel pipe						X			
760B041	Position materials to be welded with positioners						X			
760B042	Position weldments						X			

PERFORMING PRECISION MEASUREMENT

		MT	M	TD	PP	SM	CW	MR	AM	TP
760C001	Measure parts with semi-precision measuring tools	X	X	X	X	X	X	X	X	
760C002	Inspect parts with precision measuring tools	X	X	X	X	X	X	X	X	
760C003	Inspect parts with comparison measuring tools	X	X	X	X	X	X	X	X	
760C004	Inspect parts using go/no go gages	X	X	X	X					
760C005	Measure parts using dial calipers	X	X	X	X					
760C006	Measure parts using vernier measuring tools	X	X	X	X					
760C007	Measure parts using outside micrometers	X	X	X	X					
760C008	Measure parts using inside micrometers	X	X	X	X					
760C009	Measure parts using depth micrometers	X	X	X	X					
760C010	Measure parts using special micrometers		X	X	X					
760C011	Measure parts using telescoping gages	X	X	X						
760C012	Measure parts using small hole gages	X	X	X						
760C013	Measure parts using bore gages	X	X	X						
760C014	Inspect parts using radius gages	X	X	X						
760C015	Set up and inspect parts using dial indicators	X	X	X	X			X	X	
760C016	Measure parts using optical comparators	X	X	X	X					
760C017	Measure parts with height gage	X	X	X	X					
760C018	Measure angles using sine bar		X	X						
760C019	Measure angles, arcs and locations from reference point		X	X						
760C020	Measure threads	X	X	X				X	X	
760C021	Measure tapers	X	X	X				X	X	
760C022	Inspect keyways	X	X	X				X	X	
760C023	Measure gears	X	X	X				X	X	
760C024	Inspect surface finish of parts	X	X	X				X	X	
760C025	Calibrate and use indicating micrometers		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760C026	Calibrate precision measuring tools	X	X	X				X	X	
760C027	Measure parts using mechanical measuring tools		X	X	X					
760C028	Measure parts using electronic measuring tools		X	X	X					
760C029	Measure parts using special measuring tools		X	X	X					
760C030	Clean and store precision measuring tools	X	X	X	X		X	X	X	
760C031	Perform first piece inspection		X	X	X					
760C032	Inspect parts according to quality control inspection standards and procedures	X	X	X	X		X			
760C033	Monitor reports of discrepancy or rejects during production process		X	X	X		X			
760C034	Conduct quality tests under differing environmental conditions	X	X	X	X		X			
760C035	Verify dimensions		X	X				X	X	
760C036	Verify alignments		X	X				X	X	
760C037	Verify clearances		X	X				X	X	
760C038	Inspect machined parts	X	X	X				X	X	
760C039	Inspect assemblies		X	X		X	X	X	X	
760C040	Inspect parts with metric measuring instruments	X	X	X	X	X	X	X	X	

PERFORMING LAYOUTS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760D001	Analyze specifications	X	X	X		X	X	X	X	
760D002	Compute layout dimensions	X	X	X		X	X	X	X	
760D003	Plan layout operations	X	X	X		X	X	X	X	
760D004	Calculate reference points		X	X		X	X	X	X	
760D005	Calculate angles from reference point		X	X		X	X	X	X	
760D006	Calculate arcs from reference point		X	X		X	X	X	X	
760D007	Calculate locations from reference point		X	X		X	X	X	X	
760D008	Verify workpiece specifications		X	X		X	X	X	X	
760D009	Lay out reference points		X	X		X	X	X	X	
760D010	Lay out angles, arcs and locations from reference point		X	X		X	X	X	X	
760D011	Label workpiece	X	X	X		X	X	X	X	
760D012	Perform semi-precision layouts	X	X	X		X	X	X	X	
760D013	Perform precision layouts from blueprints	X	X	X			X	X	X	
760D014	Perform sheet metal layouts from blueprints					X				
760D015	Perform layouts from templates					X	X			
760D016	Transfer layouts from models		X			X				
760D017	Perform pipe layouts						X			
760D018	Verify layouts		X	X		X	X	X	X	
760D019	Supervise layout operations		X	X			X			

OPERATING SAWS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760E001	Remove and replace saw blades	X	X	X			X			
760E002	Cut and weld band saw blades	X	X	X			X			
760E003	Calculate and set cutting speed and feed rate for sawing	X	X	X			X			
760E004	Saw straight, curved and irregular lines on vertical band saws	X	X	X			X			
760E005	Saw material to layout with vertical band saw	X	X	X			X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760E006	Set up and use vertical band saw for interior contour sawing	X	X	X						
760E007	Set up and use vertical band saw to file parts	X	X	X						
760E008	Cut straight lines on vertical band saw using automatic feed	X	X	X						
760E009	Cut angles on vertical band saw by tilting table	X	X	X						
760E010	Set up and use jigs and fixtures for special sawing operations	X	X	X						
760E011	Slot, groove, miter and trim parts on saw	X	X	X			X			
760E012	Set up and use stops and guides to control dimension of cuts	X	X	X			X			
760E013	Set up and use automatic bar feed mechanism for production work	X	X							
760E014	Set up and use horizontal band saw for production work	X	X				X			
760E015	Set up and use power hack saw for production work	X	X				X			
760E016	Set up and use circular saw for production work	X	X				X			
760E017	Set up and use friction saw for production work	X	X				X			
760E018	Set up and use rubber disk saw for production work	X	X				X			
760E019	Use and maintain coolant system for sawing	X	X	X			X			
760E020	Perform basic saw maintenance	X	X	X			X			
760E021	Plan sequence of sawing operations		X	X			X			

OPERATING DRILLING MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760F001	Select drills using drill chart	X	X	X		X	X			
760F002	Use and maintain coolant system for drilling	X	X	X		X	X			
760F003	Change drills and tool holders	X	X	X		X	X			
760F004	Calculate and set drilling speeds, feeds and depth of cut		X	X		X	X			
760F005	Align workpiece, jigs and fixtures with drill spindle		X	X						
760F006	Align tools with drill guide bushings	X	X	X						
760F007	Center drill and drill holes to size	X	X	X		X	X			
760F008	Countersink, counterbore and spot face parts to specifications	X	X	X						
760F009	Drill blind holes to specifications	X	X	X						
760F010	Drill deep holes to specifications	X	X	X						
760F011	Drill holes to specifications using special drills	X	X	X						
760F012	Thread parts using tapping attachment	X	X	X						
760F013	Ream holes to size	X	X	X						
760F014	Burnish parts to specifications	X	X	X						
760F015	Drill holes at angle by tilting head or table	X	X	X						
760F016	Position spindle over hole location by swinging radial arm		X	X						
760F017	Sharpen drills		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760F018	Perform basic drilling machine maintenance	X	X	X		X	X			
760F019	Plan sequence of drilling operations		X	X		X	X			
760F020	Set up drill press		X	X		X	X			
760F021	Set up radial drill to drill large workpieces		X	X						
760F022	Set up precision drills		X	X						
760F023	Set up special drilling machines		X	X						

OPERATING BENCH GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760G001	Change and dress bench grinding wheels	X	X	X		X	X			
760G002	Sharpen and recondition hand tools	X	X	X		X	X			
760G003	Grind lathe turning tools		X	X						
760G004	Grind lathe form tools		X	X						
760G005	Grind lathe threading tools		X	X						
760G006	Grind lathe cut-off tools		X	X						
760G007	Grind lathe boring tools		X	X						
760G008	Sharpen carbide tools		X	X						
760G009	Rough grind materials					X	X			
760G010	Perform basic bench grinder maintenance	X	X	X		X	X			

OPERATING LATHES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760H001	Calculate and set lathe speeds, feeds and depth of cut		X	X						
760H002	Use and maintain coolant system on lathe	X	X	X						
760H003	Face and turn parts in 3-jaw chuck	X	X	X						
760H004	Machine parts between centers	X	X	X						
760H005	Indicate and machine parts in 4-jaw chuck	X	X	X						
760H006	Machine parts using collet chucks	X	X	X						
760H007	Machine parts using faceplate	X	X	X						
760H008	Perform forming operations	X	X	X						
760H009	Perform knurling operations	X	X	X						
760H010	Center drill and drill parts	X	X	X						
760H011	Bore, face and recess internal diameters	X	X	X						
760H012	Ream holes to specifications	X	X	X						
760H013	Undercut diameters and shoulders	X	X	X						
760H014	Machine eccentric diameters	X	X	X						
760H015	Manufacture springs	X	X	X						
760H016	Cut off parts	X	X	X						
760H017	Align lathe centers		X	X						
760H018	Calculate tapers		X	X						
760H019	Turn tapers	X	X	X						
760H020	Machine internal tapers	X	X	X						
760H021	Thread external diameters	X	X	X						
760H022	Thread internal diameters	X	X	X						
760H023	Repair threads	X	X	X						
760H024	Cut special thread forms		X	X						
760H025	Hold dimensions using feed, precision and indicator stops on lathe	X	X	X						
760H026	Hold dimensions using digital readout on lathe	X	X	X						
760H027	Machine parts using carbide tooling	X	X	X						
760H028	Machine parts using ceramic tooling	X	X	X						
760H029	Machine parts using steady rest	X	X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760H030	Machine long parts using follower rest	X	X	X						
760H031	Machine parts using jigs and fixtures	X	X	X						
760H032	Machine radii	X	X	X						
760H033	Duplicate parts using tracing attachment	X	X	X						
760H034	Grind parts using tool post grinder	X	X	X						
760H035	Machine parts using quick change tooling system	X	X	X						
760H036	Identify machining problems, determine causes and correct problems		X	X						
760H037	Perform basic lathe maintenance	X	X	X						
760H038	Plan sequence of lathe operations		X	X						
760H039	Set up engine lathe		X	X						
760H040	Set up high speed lathe for secondary operations		X	X						
760H041	Set up bar turret lathe for production work		X							
760H042	Set up chucking lathe for production work		X							

OPERATING VERTICAL MILLING MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760I001	Calculate and set speeds, feeds and depth of cut for vertical mill		X	X						
760I002	Align the vertical milling machine head		X	X						
760I003	Align workpiece, work holding devices, jigs and fixtures on vertical mill		X	X						
760I004	Use and maintain coolant system on milling machine	X	X	X						
760I005	Change tool holders and cutters on vertical mill		X	X						
760I006	Establish zero reference point on workpiece to be machined		X	X						
760I007	Hold dimensions using table and precision stops on vertical mill	X	X	X						
760I008	Hold dimensions using digital readout on vertical mill	X	X	X						
760I009	Machine parts using end milling cutters on vertical mill	X	X	X						
760I010	Machine parts using carbide milling cutters on vertical mill	X	X	X						
760I011	Machine parts using ceramic milling cutters on vertical mill	X	X	X						
760I012	Machine parts using conventional and climb milling on vertical mill	X	X	X						
760I013	Machine parts square on vertical mill	X	X	X						
760I014	Machine closed pockets on vertical mill	X	X	X						
760I015	Machine angles on vertical mill	X	X	X						
760I016	Machine radii using form milling cutter on vertical mill	X	X	X						
760I017	Machine keyways on vertical mill	X	X	X						
760I018	Machine "T" slots on vertical mill	X	X	X						
760I019	Machine dovetails on vertical mill	X	X	X						
760I020	Center drill, drill and ream holes on vertical mill	X	X	X						
760I021	Tap holes on vertical mill	X	X	X						
760I022	Bore, face and recess diameters using boring head	X	X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760I023	Set up and use jigs and fixtures on vertical mill	X	X	X						
760I024	Solve indexing problems		X	X						
760I025	Mill multiple surfaces using indexing fixture on vertical mill	X	X	X						
760I026	Mill multiple surfaces using dividing head on vertical mill	X	X	X						
760I027	Mill radii using rotary table	X	X	X						
760I028	Drill hole patterns using rotary table	X	X	X						
760I029	Mill angles using rotary table	X	X	X						
760I030	Duplicate contours using tracing attachment	X	X	X						
760I031	Identify milling problems, determine causes and correct problems		X	X						
760I032	Perform basic vertical milling machine maintenance	X	X	X						
760I033	Plan sequence of vertical milling operations		X	X						
760I034	Set up vertical milling machine for manual operations		X	X						
760I035	Set up vertical milling machine for automatic operations		X	X						

OPERATING HORIZONTAL MILLING MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760J001	Calculate and set milling speeds, feeds and depth of cut for horizontal mill		X	X						
760J002	Align workpiece, work holding devices, jigs and fixtures on horizontal mill		X	X						
760J003	Change arbors and cutters on horizontal mill		X	X						
760J004	Hold dimensions using table and precision stops on horizontal mill	X	X	X						
760J005	Hold dimensions using digital readouts on horizontal mill	X	X	X						
760J006	Machine parts using conventional and climb milling on horizontal mill	X	X	X						
760J007	Machine parts using carbide insert cutters on horizontal mill	X	X	X						
760J008	Machine parts using ceramic cutting tools on horizontal mill	X	X	X						
760J009	Perform slab milling	X	X	X						
760J010	Perform gang milling	X	X	X						
760J011	Perform straddle milling	X	X	X						
760J012	Mill parts square using horizontal mill	X	X	X						
760J013	Mill angles on horizontal mill	X	X	X						
760J014	Machine keyways on horizontal mill	X	X	X						
760J015	Machine deep slots on horizontal mill	X	X	X						
760J016	Cut off parts using horizontal mill	X	X	X						
760J017	Perform gear calculations		X	X						
760J018	Machine gears on horizontal mill using dividing head	X	X	X						
760J019	Machine splines on horizontal mill using dividing head	X	X	X						
760J020	Machine rack on horizontal mill	X	X	X						
760J021	Machine multiple surfaces using indexing fixture on horizontal mill	X	X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760J022	Perform basic horizontal milling machine maintenance	X	X	X						
760J023	Plan sequence of horizontal milling operations		X	X						
760J024	Set up horizontal milling machine for manual operations		X	X						
760J025	Set up horizontal milling machine for automatic operations		X	X						

OPERATING BORING MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760K001	Calculate and set speeds, feeds and depth of cut on boring machine		X	X						
760K002	Align workpiece, work holding devices, jigs and fixtures on boring machine		X	X						
760K003	Use and maintain coolant system on boring machine	X	X	X						
760K004	Change cutters and tool holders on boring machine		X	X						
760K005	Hold dimensions using table and precision stops on boring machine	X	X	X						
760K006	Hold dimensions using digital readout on boring machine	X	X	X						
760K007	Establish zero reference point on workpiece		X	X						
760K008	Center drill, drill and ream holes on boring machine	X	X	X						
760K009	Countersink, counterbore and spot face holes on boring machine	X	X	X						
760K010	Tap holes on boring machine	X	X	X						
760K011	Bore, face and recess internal surfaces on boring machine	X	X	X						
760K012	Machine external surfaces on boring machine	X	X	X						
760K013	Identify boring machine problems, determine causes and solve problems		X	X						
760K014	Perform basic boring machine maintenance	X	X	X						
760K015	Plan sequence of boring machine operations		X	X						
760K016	Set up boring machine for manual operations		X	X						
760K017	Set up boring machine for automatic operations		X	X						

OPERATING SURFACE GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760L001	Select grinding wheel using manufacturers' wheel data charts		X	X						
760L002	Inspect, mount and dress surface grinding wheels		X	X						
760L003	Calculate and set surface grinding feeds and depth of cut		X	X						
760L004	Maintain grinding coolant system	X	X	X						
760L005	Grind parallel surfaces on surface grinder	X	X	X						
760L006	Grind parts square on surface grinder	X	X	X						
760L007	Grind vertical surface on surface grinder	X	X	X						
760L008	Grind angles on surface grinder	X	X	X						
760L009	Grind radii on surface grinder	X	X	X						



MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760L010	Grind profiles on surface grinder	X	X	X						
760L011	Remove warp using surface grinder	X	X	X						
760L012	Cut off parts on surface grinder	X	X	X						
760L013	Inspect ground parts	X	X	X						
760L014	Perform basic surface grinder maintenance	X	X	X						
760L015	Plan sequence of surface grinder operations		X	X						
760L016	Set up surface grinder for manual operations		X	X						
760L017	Set up surface grinder for automatic operations		X	X						

OPERATING INSIDE DIAMETER (I.D.) GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760M001	Inspect, mount and dress I.D. grinding wheels		X	X						
760M002	Calculate and set I.D. grinding speeds, feeds and depth of cut		X	X						
760M003	Parallel grind inside diameters	X	X	X						
760M004	Grind to internal shoulder	X	X	X						
760M005	Grind internal taper	X	X	X						
760M006	Grind internal radius	X	X	X						
760M007	Grind internal recess	X	X	X						
760M008	Grind internal angle	X	X	X						
760M009	Face grind internal shoulder	X	X	X						
760M010	Grind blind hole	X	X	X						
760M011	Grind through parts	X	X	X						
760M012	Inspect inside diameters of ground parts	X	X	X						
760M013	Perform basic I.D. grinder maintenance	X	X	X						
760M014	Plan sequence of I.D. grinder operations		X	X						
760M015	Set up I.D. grinder for manual operations		X	X						
760M016	Set up I.D. grinder for automatic operations		X	X						

OPERATING OUTSIDE DIAMETER (O.D.) GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760N001	Inspect, mount and dress O.D. grinding wheels		X	X						
760N002	Calculate and set O.D. grinding speeds, feeds and depth of cut		X	X						
760N003	Align O.D. grinder head, table and fixtures		X	X						
760N004	Parallel grind outside diameters on O.D. grinder	X	X	X						
760N005	Grind to external shoulder on O.D. grinder	X	X	X						
760N006	Grind external taper on O.D. grinder	X	X	X						
760N007	Grind external radius on O.D. grinder	X	X	X						
760N008	Grind external angle on O.D. grinder	X	X	X						
760N009	Plunge grind external diameter on O.D. grinder	X	X	X						
760N010	Grind parts between centers	X	X	X						
760N011	Grind parts using collet chucks	X	X	X						
760N012	Grind parts using other work holding devices	X	X	X						
760N013	Grind parts using steady rest	X	X	X						
760N014	Grind parts using follower rest	X	X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760N015	Grind complex profile on O.D. grinder	X	X	X						
760N016	Inspect outside diameters of parts ground on O.D. grinder	X	X	X						
760N017	Perform basic O.D. grinder maintenance	X	X	X						
760N018	Plan sequence of O.D. grinder operations		X	X						
760N019	Set up O.D. grinder for manual operations		X	X						
760N020	Set up O.D. grinder for automatic operations		X	X						

OPERATING CENTERLESS GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
7600001	Inspect, mount and balance centerless grinding wheels		X	X						
7600002	Dress centerless grinding wheels and regulating wheels		X	X						
7600003	Calculate and set centerless grinding speeds, feeds and depth of cut		X	X						
7600004	Parallel grind outside diameters on centerless grinder	X	X	X						
7600005	Grind to external shoulder on centerless grinder	X	X	X						
7600006	Grind external taper on centerless grinder	X	X	X						
7600007	Grind external radius on centerless grinder	X	X	X						
7600008	Grind external angle on centerless grinder	X	X	X						
7600009	Plunge grind external diameter on centerless grinder	X	X	X						
7600010	Plunge grind complex profile on centerless grinder		X	X						
7600011	Inspect outside diameters of parts ground on centerless grinder	X	X	X						
7600012	Perform basic centerless grinder maintenance	X	X	X						
7600013	Plan sequence of centerless grinder operations		X	X						
7600014	Set up centerless grinder		X	X						

OPERATING TOOL AND CUTTER GRINDERS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760P001	Select, inspect, mount and dress wheels on tool and cutter grinder		X	X						
760P002	Align workhead and work holding devices on tool and cutter grinder		X	X						
760P003	Calculate and set speeds, feeds and depth of cut on tool and cutter grinder		X	X						
760P004	Grind plain milling cutters		X	X						
760P005	Grind staggered tooth milling cutters		X	X						
760P006	Grind form relieved milling cutters		X	X						
760P007	Grind end mills		X	X						
760P008	Grind helical milling cutters		X	X						
760P009	Grind angular milling cutters		X	X						
760P010	Sharpen drills		X	X						
760P011	Grind step drills		X	X						
760P012	Grind straight reamers		X	X						
760P013	Grind tapered reamers		X	X						
760P014	Grind taps		X	X						
760P015	Grind set of thread chasers		X	X						
760P016	Grind boring bars		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760P017	Grind lathe turning tools	X	X						
760P018	Grind lathe form tools	X	X						
760P019	Grind complex profiles	X	X						
760P020	Grind carbide tools and cutters	X	X						
760P021	Inspect cutter clearance angles	X	X						
760P022	Identify grinding problems, determine causes and solve problems	X	X						
760P023	Perform basic tool and cutter grinder maintenance	X	X						
760P024	Plan sequence of tool and cutter grinder operations	X	X						
760P025	Set up tool and cutter grinder for manual operations	X	X						
760P026	Set up tool and cutter grinder for automatic operations	X	X						

OPERATING JIG GRINDERS

MT M TD PP SM CW MR AM TP

760Q001	Select, inspect, mount and dress wheels on jig grinder			X					
760Q002	Calculate and set speeds, feeds and depth of cut on jig grinder			X					
760Q003	Set diameter of planetary action			X					
760Q004	Set limits of automatic reciprocating wheel feed			X					
760Q005	Establish zero reference point on workpiece			X					
760Q006	Indicate work under spindle center on jig grinder			X					
760Q007	Grind holes on jig grinder			X					
760Q008	Grind contours on jig grinder			X					
760Q009	Set spindle angle for taper grinding			X					
760Q010	Grind tapers on jig grinder			X					
760Q011	Perform basic jig grinder maintenance			X					
760Q012	Plan sequence of jig grinder operations			X					
760Q013	Set up jig grinder			X					

OPERATING ELECTRICAL DISCHARGE MACHINES (EDM)

MT M TD PP SM CW MR AM TP

760R001	Machine EDM electrodes to job specifications	X	X						
760R002	Mount EDM electrodes in holder	X	X						
760R003	Position workpiece on table or fixture	X	X						
760R004	Align work and check for clearance	X	X						
760R005	Calculate and set feed rate and depth of cut	X	X						
760R006	Select electrical discharge circuit	X	X						
760R007	Select method for using dielectric fluid	X	X						
760R008	Perform internal rough and finish cuts	X	X	X					
760R009	Perform external rough and finish cuts	X	X	X					
760R010	Perform profile rough and finish cuts	X	X	X					
760R011	Perform repair work	X	X	X					
760R012	Inspect parts machined with EDM	X	X	X					
760R013	Identify EDM problems, determine the causes and solve the problem	X	X						
760R014	Perform basic EDM maintenance	X	X	X					
760R015	Plan sequence of EDM operations	X	X						

**MANUFACTURING OCCUPATIONS CLUSTER MATRIX**

		MT	M	TD	PP	SM	CW	MR	AM	TP
760R016	Set up wire EDM machine		X	X						
760R017	Set up electrical discharge machine		X	X						
760R018	Set up and operate portable EDM machine		X	X						

**SELECTING MATERIALS**

		MT	M	TD	PP	SM	CW	MR	AM	TP
760S001	Interpret color codes, numbering systems and classification systems of materials (ie. AISI, SAE)		X	X		X	X	X	X	
760S002	Select material for job		X	X	X	X	X	X	X	
760S003	Identify metals using spark test		X	X			X		X	
760S004	Identify metals using variety of tests		X	X					X	
760S005	Identify materials		X	X	X	X	X	X	X	

**PERFORMING HEAT TREATMENT OF METALS**

		MT	M	TD	PP	SM	CW	MR	AM	TP
760T001	Test hardness of metals		X	X						
760T002	Perform non-destructive testing		X	X						
760T003	Perform destructive testing		X	X						
760T004	Harden metals to job specifications		X	X			X			
760T005	Temper metals to job specifications		X	X			X			
760T006	Anneal metals to job specifications		X	X			X			
760T007	Normalize metals to job specifications		X	X			X			
760T008	Case harden metals to job specifications		X	X			X			
760T009	Preheat and post-heat metals to control distortion/warpage during welding						X			

**PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES**

		MT	M	TD	PP	SM	CW	MR	AM	TP
760U001	Dispose of scrap metal chips, shavings, trash and waste	X	X	X	X	X	X	X		
760U002	Clean and maintain work area and leave in safe condition	X	X	X	X	X	X	X	X	
760U003	Clean and store hand tools, cutters, fixtures, jigs and attachments	X	X	X	X	X	X	X	X	
760U004	Store grinding wheels	X	X	X				X		
760U005	Follow tool crib procedures	X	X	X	X	X	X	X	X	
760U006	Inspect and remove, replace or adjust machine guards	X	X	X	X		X	X		
760U007	Scrape and paint machines	X	X		X			X		
760U008	Report problems to supervisor	X	X	X	X	X	X	X	X	
760U009	Complete time cards	X	X	X	X	X	X	X	X	
760U010	Complete job status reports	X	X	X	X	X	X	X	X	
760U011	Make equipment failure reports	X	X	X	X	X	X	X	X	
760U012	Record preventive maintenance activities			X				X	X	
760U013	Record repair activities			X				X	X	
760U014	Read job orders and process sheets to determine tooling and set up information		X	X	X		X	X	X	
760U015	Determine basic maintenance procedures using manuals	X	X	X	X	X	X	X	X	
760U016	Participate in participative management program (Quality Circles)	X	X	X	X	X	X	X	X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

PERFORMING SUPERVISORY FUNCTIONS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760V001	Determine availability of machines, supplies and materials		X	X	X	X		X	X	
760V002	Requisition, schedule and distribute supplies and materials		X	X		X		X	X	
760V003	Select most productive machine tool and tooling for job		X	X	X	X		X	X	
760V004	Coordinate workers with work to be done		X	X	X	X		X	X	
760V005	Write work schedules		X	X	X	X		X	X	
760V006	Schedule and control shop flow of jobs		X	X	X	X		X	X	
760V007	Maintain files		X	X	X	X		X	X	
760V008	Maintain production records		X	X	X	X		X	X	
760V009	Maintain labor records		X	X	X	X		X	X	
760V010	Maintain warranty records			X				X	X	
760V011	Review job orders, process sheets and blueprint specifications		X	X	X	X		X	X	
760V012	Issue blueprints, job orders, process sheets and tooling		X	X	X	X		X	X	
760V013	Explain work requirements		X	X	X	X		X	X	
760V014	Write production and progress reports		X	X	X	X		X	X	
760V015	Write technical reports		X	X	X	X		X	X	
760V016	Inventory supplies and equipment		X	X	X	X		X	X	
760V017	Maintain charts, tables, graphs or status boards on work scheduled		X	X	X	X		X	X	
760V018	Submit parts for first piece inspection		X	X	X				X	
760V019	Conduct in-process inspections		X	X	X				X	
760V020	Monitor reports of discrepancy or rejects during production process		X	X	X				X	
760V021	Follow up on end product quality control standards		X	X	X				X	
760V022	Initiate engineering change notices and rejection reports		X	X	X			X	X	
760V023	Write requests for deviation to specifications		X	X	X			X	X	
760V024	Check job/time cards		X	X	X	X		X	X	
760V025	Supervise machine use		X	X	X			X	X	
760V026	Inspect shop equipment and arrange for maintenance and repair work		X	X	X	X		X	X	
760V027	Prepare preventive maintenance schedule							X	X	
760V028	Evaluate preventive maintenance program							X	X	
760V029	Coordinate maintenance and repair of shop equipment		X	X	X	X		X	X	
760V030	Prepare repair schedule							X	X	
760V031	Observe maintenance and repair activities							X	X	
760V032	Evaluate repair activities							X	X	
760V033	Plan and implement technical training for employees		X	X	X	X		X	X	
760V034	Train employees to operate mechanical devices		X	X	X	X		X	X	
760V035	Evaluate employee progress and performance		X	X	X	X		X	X	
760V036	Follow up employee reports of problems or equipment failures		X	X	X	X		X	X	
760V037	Interview job applicants		X	X				X	X	
760V038	Hire workers		X	X						
760V039	Dismiss employees		X	X	X					
760V040	Determine work to be done by outside firm		X	X						
760V041	Write contract for work with outside firm		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760V042	Conduct meetings		X	X						X
760V043	Estimate cost of equipment installation							X	X	
760V044	Estimate cost of system installation							X	X	
760V045	Estimate cost of repairs and downtime							X	X	
760V046	Supervise assembly operations									X

SETTING UP NUMERICAL CONTROL/COMPUTER NUMERICAL CONTROL (NC/CNC) MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760W001	Read job orders and process sheets to determine tooling and setup information		X	X						
760W002	Mount work holding device		X	X						
760W003	Install cutting tools in holders		X	X						
760W004	Mount holder and tool on spindle		X	X						
760W005	Insert tools and holder in machine magazine		X	X						
760W006	Load tools in tool drum		X	X						
760W007	Load automatic tool changer		X	X						
760W008	Load tools in turret		X	X						
760W009	Operate drawbar		X	X						
760W010	Dial cutter compensation		X	X						
760W011	Mount workpiece		X	X						
760W012	Position and secure stock in work holding device		X	X						
760W013	Place control tape in reader of control console		X	X						
760W014	Load program in computer		X	X						
760W015	Index cutting tool to zero point		X	X						
760W016	Set controls to operating position and start machine		X	X						
760W017	Dry run machine with machine locked		X	X						
760W018	Run machine in manual/jog mode to verify cutter path		X	X						
760W019	Machine first piece to verify accuracy of setup		X	X						
760W020	Machine first piece to verify accuracy of program		X	X						
760W021	Change cutting tools		X	X						
760W022	Change location of clamps or fixtures		X	X						
760W023	Reposition stock on fixture		X	X						
760W024	Observe machine operation		X	X						
760W025	Verify accuracy of machined workpiece		X	X						
760W026	Adjust speeds and feeds for maximum output		X	X						
760W027	Identify programming errors		X	X						
760W028	Update programs stored in bubble memory		X	X						
760W029	Notify supervisor of program errors		X	X						
760W030	Identify machine malfunctions		X	X						
760W031	Correct minor machine malfunctions		X	X						
760W032	Notify supervisor of machine malfunctions		X	X						
760W033	Verify workpiece detail identification number		X	X						
760W034	Verify type of material of workpiece		X	X						
760W035	Notify supervisor of discrepancies in parts		X	X						
760W036	Complete machine tool safety setup		X	X						
760W037	Establish tolerance requirement		X	X						
760W038	Inspect first piece to verify setup		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

OPERATING NUMERICAL CONTROL/COMPUTER NUMERICAL CONTROL (NC/CNC) MACHINES

		MT	M	TD	PP	SM	CW	MR	AM	TP
760X001	Turn on/off power		X	X						
760X002	Call up program in distributed numerical control		X	X						
760X003	Place tape in reader		X	X						
760X004	Key in program on machine		X	X						
760X005	Align holding device with machine axis		X	X						
760X006	Clamp dial indicator to tool holder		X	X						
760X007	Change tool holder		X	X						
760X008	Change or replace cutting tool		X	X						
760X009	Adjust tool offset manually		X	X						
760X010	Interpret operator related messages on screen		X	X						
760X011	Control spindle speed override		X	X						
760X012	Control feedrate override		X	X						
760X013	Activate automatic cycle mode		X	X						
760X014	Interrupt automatic cycle mode manually		X	X						
760X015	Set manual mode control		X	X						
760X016	Select cycle modifiers		X	X						
760X017	Select manual feed/jog mode		X	X						
760X018	Adjust cutter compensation		X	X						
760X019	Edit program		X	X						
760X020	Run segment of program		X	X						
760X021	Perform sequence search		X	X						
760X022	Interpret status lights		X	X						
760X023	Change spindle speed		X	X						
760X024	Initiate program restart from zero		X	X						
760X025	Interrupt cycle		X	X						
760X026	Check cutting fluids		X	X						
760X027	Check surface finish		X	X						
760X028	Check cut dimension		X	X						
760X029	Index turret		X	X						
760X030	Differentiate between machine controls		X	X						
760X031	Set cycle dwell		X	X						
760X032	Modify manual data input program		X	X						
760X033	Adjust depth of cut		X	X						
760X034	Reset tool cycle time		X	X						
760X035	Execute emergency stop		X	X						
760X036	Perform milling operations on NC/CNC machine		X	X						
760X037	Perform drilling operations on NC/CNC machine		X	X						
760X038	Perform boring operations on NC/CNC machine		X	X						
760X039	Perform reaming operations on NC/CNC machine		X	X						
760X040	Perform broaching operations on NC/CNC machine		X	X						
760X041	Perform turning operations on NC/CNC machine		X	X						
760X042	Perform forming operations on NC/CNC machine		X	X						
760X043	Perform punching operations on NC/CNC machine		X	X						
760X044	Perform welding operations with NC/CNC machine		X	X						

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760X045	Perform painting operations with NC/CNC machine	X		X						
760X046	Perform assembly operations with NC/CNC machine	X		X						
SETTING UP MANUAL PUNCH PRESSES										
		MT	M	TD	PP	SM	CW	MR	AM	TP
760Y001	Strip press of previous tooling				X					
760Y002	Clean press				X					
760Y003	Review setup sheet and specifications				X					
760Y004	Set up die for change over				X					
760Y005	Install die in press				X					
760Y006	Align die in press				X					
760Y007	Bolt die in press				X					
760Y008	Adjust ram stroke to specifications				X					
760Y009	Mount and align fixtures to press				X					
760Y010	Set material stops				X					
760Y011	Set up air ejectors				X					
760Y012	Inspect and replace guards				X					
760Y013	Set controls to operating position and start press				X					
760Y014	Run press in manual/jog mode to verify clearances				X					
760Y015	Position workpiece in press				X					
760Y016	Adjust workpiece stops and supports				X					
760Y017	Position parts containers				X					
760Y018	Position scrap containers				X					
760Y019	Run first piece to verify setup and conformance to specifications				X					
760Y020	Make necessary adjustments to correct errors				X					
760Y021	Give operator instructions				X					
OPERATING MANUAL PUNCH PRESSES										
		MT	M	TD	PP	SM	CW	MR	AM	TP
760Z001	Place workpiece against stops				X					
760Z002	Place workpiece in fixture				X					
760Z003	Place workpiece in die				X					
760Z004	Operate press				X					
760Z005	Remove part				X					
760Z006	Remove scrap materials				X					
760Z007	Load and move parts containers				X					
760Z008	Count and label parts				X					
SETTING UP AND OPERATING AUTOMATIC PUNCH PRESSES										
		MT	M	TD	PP	SM	CW	MR	AM	TP
760AA001	Strip press of previous tooling				X					
760AA002	Clean press				X					
760AA003	Review setup sheet and specifications				X					
760AA004	Install die in press				X					
760AA005	Align die in press				X					
760AA006	Bolt die in press				X					
760AA007	Adjust ram stroke to specifications				X					
760AA008	Mount and align fixtures to press				X					
760AA009	Set material stops				X					
760AA010	Mount form slides				X					



MANUFACTURING OCCUPATIONS CLUSTER MATRIX

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AA011 Set cams					X				
760AA012 Set up air ejectors					X				
760AA013 Inspect and replace guards					X				
760AA014 Set controls to operating position and start press					X				
760AA015 Run press in manual/jog mode to verify clearances					X				
760AA016 Install parts chutes					X				
760AA017 Position parts containers					X				
760AA018 Position scrap containers					X				
760AA019 Run first piece to verify setup and conformance to specifications					X				
760AA020 Make necessary adjustments to correct errors					X				
760AA021 Start run					X				
760AA022 Input control panel data					X				
760AA023 Monitor control panel data					X				
760AA024 Interpret control panel data					X				

FASTENING AND/OR JOINING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AB001 Rivet sheet metal with tinnings rivets					X				
760AB002 Rivet sheet metal with pop rivets					X				
760AP003 Fasten materials using sheet metal screws					X				

FABRICATING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AC001 Construct single hem					X				
760AC002 Construct double hem					X				
760AC003 Construct single lap seam					X				
760AC004 Construct double lap seam					X				
760AC005 Construct standing seam (air duct connections)					X				
760AC006 Construct Pittsburgh lock seam					X				
760AC007 Construct grooved seam					X				
760AC008 Construct drive clip (air duct connection)					X				
760AC009 Construct S-cleat (air duct connection)					X				
760AC010 Fabricate rectangular straight duct					X				
760AC011 Fabricate rectangular radius throat and radius heel duct elbow					X				
760AC012 Fabricate rectangular square throat and square heel duct elbow					X				
760AC013 Fabricate rectangular duct ogee offset					X				
760AC014 Fabricate rectangular duct transition					X				
760AC015 Fabricate rectangular shoe tap					X				
760AC016 Fabricate round straight duct					X				
760AC017 Fabricate round duct elbow					X				
760AC018 Fabricate round duct offset					X				
760AC019 Fabricate round duct taper (transition)					X				
760AC020 Fabricate single wall equipment casing/housing					X				
760AC021 Fabricate double wall equipment casing/housing					X				
760AC022 Fabricate companion angle					X				
760AC023 Fabricate flanged duct section					X				

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

FABRICATING ARCHITECTURAL/ROOFING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AD001 Fabricate ogee gutter					X				
760AD002 Fabricate flashing					X				
760AD003 Fabricate roof coping					X				
760AD004 Fabricate gravel stop fascia					X				
760AD005 Fabricate metal siding panel					X				
760AD006 Fabricate column cover					X				
760AD007 Fabricate metal ceiling panel					X				

FABRICATING SPECIALTY SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AE001 Fabricate rectangular single blade damper in frame					X				
760AE002 Fabricate rectangular multi-blade damper in frame					X				
760AE003 Fabricate rectangular tube					X				
760AE004 Fabricate round tube					X				
760AE005 Fabricate belt guard					X				
760AE006 Fabricate breeching					X				
760AE007 Fabricate rectangular fiberglass duct					X				
760AE008 Fabricate lagging for insulated breeching					X				

FABRICATING FOOD AND BEVERAGE DISPENSING EQUIPMENT

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AF001 Fabricate sink					X				
760AF002 Fabricate shelf					X				
760AF003 Fabricate cabinet shell					X				
760AF004 Fabricate cabinet drawer					X				
760AF005 Fabricate cabinet sliding door					X				
760AF006 Fabricate cabinet hinge door					X				
760AF007 Assemble cabinet components					X				
760AF008 Fabricate range hood					X				

INSTALLING SHEET METAL SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AG001 Install rectangular duct system					X				
760AG002 Install round duct system					X				
760AG003 Install single wall equipment casing/housing					X				
760AG004 Install double wall equipment casing/housing					X				
760AG005 Install breeching					X				
760AG006 Install belt guards					X				
760AG007 Install ogee gutter					X				
760AG008 Install flashing					X				
760AG009 Install coping					X				
760AG010 Install gravel stop fascia					X				
760AG011 Install louver					X				

PERFORMING OXY-FUEL WELDING (OAW)

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AH001 Select oxy-fuel welding (OAW) gas and filler metal according to job					X	X			
760AH002 Charge cylinders and adjust oxy-fuel manifold					X	X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AH003	Set up portable oxy-acetylene welding equipment					X	X			
760AH004	Perform minor maintenance on oxy-acetylene welding equipment (OAW)					X	X			
760AH005	Weld 1/8" mild steel in flat position (1F,1G)						X			
760AH006	Weld 1/8" mild steel in horizontal position (2F,2G)						X			
760AH007	Weld 1/8" mild steel in vertical position (3F,3G)						X			
760AH008	Weld 1/8" mild steel in overhead position (4F,4G)						X			
760AH009	Braze ferrous metals					X	X			
760AH010	Braze non-ferrous metals					X	X			
760AH011	Silver braze ferrous metals						X			
760AH012	Silver braze non-ferrous metals						X			
760AH013	Heat and bend metal to specifications						X			
760AH014	Heat metal parts to assist in removal						X			
760AH015	Build up surfaces						X			
760AH016	Hard face surfaces						X			
760AH017	Solder copper					X				
760AH018	Solder stainless steel					X				
760AH019	Solder materials					X				

PERFORMING THERMAL CUTTING OPERATIONS

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AI001	Set up portable oxy-fuel cutting equipment						X			
760AI002	Cut steel by hand using oxy-fuel cutting equipment						X			
760AI003	Cut cast iron by hand using oxy-fuel cutting equipment						X			
760AI004	Cut steel with trackcutter using oxy-fuel cutting equipment						X			
760AI005	Cut steel with pipecutter using oxy-fuel cutting equipment						X			
760AI006	Set up pattern cutter						X			
760AI007	Cut steel with single torch pattern cutter						X			
760AI008	Cut steel with multiple torch pattern cutter						X			
760AI009	Set up automatic shape cutter with photocell						X			
760AI010	Cut steel with single torch automatic shape cutter with photocell						X			
760AI011	Cut steel with multiple torch automatic shape cutter with photocell						X			
760AI012	Set up and cut shapes with digital controlled shape cutter (with tape)						X			
760AI013	Set up and cut shapes with digital controlled shape cutter (without tape)						X			
760AI014	Cut and pierce metal with shielded metal arc welding equipment (SMAW)						X			
760AI015	Set up air carbon arc equipment						X			
760AI016	Cut carbon steel with air carbon arc equipment						X			
760AI017	Cut stainless steel with air carbon arc equipment						X			
760AI018	Cut aluminum with air carbon arc equipment						X			
760AI019	Set up plasma arc cutting equipment (PAC)						X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760AI020 Cut metals by hand using plasma arc cutting equipment (PAC)

X

760AI021 Cut metals automatically using plasma arc cutting equipment (PAC)

X

PERFORMING SHIELDED METAL ARC WELDING (SMAW)

MT M TD PP SM CW MR AM TP

760AJ001 Select shielded metal arc welding (SMAW) equipment and electrodes according to job

X X

760AJ002 Set up shielded metal arc welding equipment

X X

760AJ003 Perform minor maintenance on shielded metal arc welding equipment

X X

760AJ004 Weld 3/16" mild steel in flat position (1F,1G)

X X

760AJ005 Weld 3/16" mild steel in horizontal position (2F,2G)

X X

760AJ006 Weld 3/16" mild steel in vertical up/down positions (3F,3G)

X X

760AJ007 Weld 3/16" mild steel in overhead position (4F,4G)

X

760AJ008 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)

X

760AJ009 Weld double vee-groove butt joint on 1" steel plate (1G,4G)

X

760AJ010 Weld 8" schedule 40 steel pipe in 1G position

X

760AJ011 Weld 8" schedule 40 steel pipe in 2G position

X

760AJ012 Weld 8" schedule 40 steel pipe in 5G position

X

760AJ013 Weld 8" schedule 40 steel pipe in 6G position

X

760AJ014 Weld 8" schedule 60 steel pipe in 1G position

X

760AJ015 Weld 8" schedule 60 steel pipe in 2G position

X

760AJ016 Weld 8" schedule 60 steel pipe in 5G position

X

760AJ017 Weld 8" schedule 60 steel pipe in 6G position

X

760AJ018 Weld 8" schedule 60 steel pipe in 1F position

X

760AJ019 Weld 8" schedule 60 steel pipe in 2F position

X

760AJ020 Weld 8" schedule 60 steel pipe in 2FR position

X

760AJ021 Weld 8" schedule 60 steel pipe in 4F position

X

760AJ022 Weld 8" schedule 60 steel pipe in 5F position

X

760AJ023 Weld 8" schedule 40S stainless steel pipe in 6G position

X

760AJ024 Perform stud welding using Nelson method (electric arc/flux/ferrule)

X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AJ025 Weld stainless steel with shielded metal arc welding equipment (SMAW)					X	X			
PERFORMING GAS METAL ARC WELDING (GMAW)									
	MT	M	TD	PP	SM	CW	MR	AM	TP
760AK001 Select gas metal arc welding (GMAW) equipment, filler metal and gases according to job					X	X			
760AK002 Set up gas metal arc welding equipment					X	X			
760AK003 Perform minor maintenance on gas metal arc welding equipment					X	X			
760AK004 Weld 3/16" mild steel in flat position (1F,1G)					X	X			
760AK005 Weld 3/16" mild steel in horizontal position (2F,2G)					X	X			
760AK006 Weld 3/16" mild steel in vertical up/down positions (3F,3G)					X	X			
760AK007 Weld 3/16" mild steel in overhead position (4F,4G)						X			
760AK008 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)						X			
760AK009 Weld double vee-groove butt joint on 1" steel plate (1G,4G)						X			
760AK010 Weld 8" schedule 40 steel pipe in 1G position						X			
760AK011 Weld 8" schedule 40 steel pipe in 2G position						X			
760AK012 Weld 8" schedule 40 steel pipe in 5G position						X			
760AK013 Weld 8" schedule 40 steel pipe in 6G position						X			
760AK014 Weld 8" schedule 60 steel pipe in 1G position						X			
760AK015 Weld 8" schedule 60 steel pipe in 2G position						X			
760AK016 Weld 8" schedule 60 steel pipe in 5G position						X			
760AK017 Weld 8" schedule 60 steel pipe in 6G position						X			
760AK018 Weld 8" schedule 60 steel pipe in 1F position						X			
760AK019 Weld 8" schedule 60 steel pipe in 2F position						X			
760AK020 Weld 8" schedule 60 steel pipe in 2FR position						X			
760AK021 Weld 8" schedule 60 steel pipe in 4F position						X			
760AK022 Weld 8" schedule 60 steel pipe in 5F position						X			
760AK023 Weld 8" schedule 40S stainless steel pipe in 6G position						X			
760AK024 Weld 16 gauge stainless steel in flat position (1F,1G)					X	X			
760AK025 Weld 16 gauge stainless steel in horizontal position (2F,2G)					X	X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AK026	Weld 16 gauge stainless steel in vertical up/down positions (3F,3G)					X	X			
760AK027	Weld 16 gauge stainless steel in overhead position (4F,4G)						X			
760AK028	Weld 1/4" aluminum in flat position (1F,1G)					X	X			
760AK029	Weld 1/4" aluminum in horizontal position (2F,2G)					X	X			
760AK030	Weld 1/4" aluminum in vertical up/down positions (3F,3G)						X			
760AK031	Weld 1/4" aluminum in overhead position (4F,4G)						X			

PERFORMING GAS TUNGSTEN ARC WELDING (GTAW)

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AL001	Select gas tungsten arc welding (GTAW) equipment, electrodes, gases and filler metal according to job					X	X			
760AL002	Set up gas tungsten arc welding equipment					X	X			
760AL003	Perform minor maintenance on gas tungsten arc welding equipment					X	X			
760AL004	Weld 1/8" mild steel in flat position (1F,1G)					X	X			
760AL005	Weld 1/8" mild steel in horizontal position (2F,2G)					X	X			
760AL006	Weld 1/8" mild steel in vertical up/down positions (3F,3G)					X	X			
760AL007	Weld 1/8" mild steel in overhead position (4F,4G)						X			
760AL008	Weld 3" schedule 40 steel pipe in 1G position						X			
760AL009	Weld 4" schedule 10 steel pipe in 6G position						X			
760AL010	Weld 8" schedule 60 steel pipe in 1G position						X			
760AL011	Weld 8" schedule 60 steel pipe in 2G position						X			
760AL012	Weld 8" schedule 60 steel pipe in 5G position						X			
760AL013	Weld 8" schedule 60 steel pipe in 6G position						X			
760AL014	Weld 8" schedule 60 steel pipe in 6G position with pulsed current						X			
760AL015	Weld 8" schedule 60 steel pipe in 5G position with Grinnell insert						X			
760AL016	Weld 8" schedule 60 steel pipe in 1F position						X			
760AL017	Weld 8" schedule 60 steel pipe in 2F position						X			
760AL018	Weld 8" schedule 60 steel pipe in 2FR position						X			
760AL019	Weld 8" schedule 60 steel pipe in 4F position						X			
760AL020	Weld 8" schedule 60 steel pipe in 5F position						X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760AL021	Weld 8" schedule 40S stainless steel pipe in 6G position								X
760AL022	Weld 16 gauge stainless steel in flat position (1F,1G)				X				X
760AL023	Weld 16 gauge stainless steel in horizontal position (2F,2G)				X				X
760AL024	Weld 16 gauge stainless steel in vertical up/down positions (3F,3G)								X
760AL025	Weld 16 gauge stainless steel in overhead position (4F,4G)								X
760AL026	Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)								X
760AL027	Weld 11 gauge aluminum in flat position (1F,1G)							X	X
760AL028	Weld 11 gauge aluminum in horizontal position (2F,2G)							X	X
760AL029	Weld 11 gauge aluminum in vertical up/down positions (3F,3G)							X	X
760AL030	Weld 11 gauge aluminum in overhead position (4F,4G)								X

PERFORMING FLUX CORE ARC WELDING (FCAW)

MT M TD PP SM CW MR AM TP

760AM001	Select flux core arc welding (FCAW) equipment, gases and filler metal according to job								X
760AM002	Set up flux core arc welding equipment								X
760AM003	Perform minor maintenance on flux core arc welding equipment								X
760AM004	Weld 1" steel plate, lap joint in 1F position with external shielded wire								X
760AM005	Weld 1" steel plate, lap joint in 2F position with external shielded wire								X
760AM006	Weld 1" steel plate, lap joint in 1F position with self shielded wire								X
760AM007	Weld 1" steel plate, lap joint in 2F position with self shielded wire								X
760AM008	Weld 1" steel plate, vee-groove butt joint in 1G position with external shielded wire								X
760AM009	Weld 1" steel plate, vee-groove butt joint in 2G position with external shielded wire								X
760AM010	Weld 1/2" steel plate, T-joint in 3G position up with external shielded wire								X
760AM011	Weld 3/8" steel plate, vee-groove butt joint in 3G position up with external shielded wire								X
760AM012	Weld 1/4" steel plate, T-joint in 4F position with external shielded wire								X

PERFORMING PLASMA ARC WELDING (PAW)

MT M TD PP SM CW MR AM TP

760AN001	Select plasma arc welding (PAW) equipment, gases and filler metal according to job								X
760AN002	Set up plasma arc welding equipment								X
760AN003	Perform minor maintenance on plasma arc welding equipment								X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AN004	Weld 16 gauge mild steel in flat position (1F,1G)						X			
760AN005	Weld 16 gauge mild steel in horizontal position (2F,2G)						X			
760AN006	Weld 16 gauge aluminum in flat position (1F,1G)						X			
760AN007	Weld 16 gauge aluminum in horizontal position (2F,2G)						X			
760AN008	Weld 1/8" aluminum in flat position (1F,1G)						X			
760AN009	Weld 1/8" aluminum in horizontal position (2F,2G)						X			
760AN010	Weld 22 gauge stainless steel in flat position (1F,1G)						X			
760AN011	Weld 22 gauge stainless steel in horizontal position (2F,2G)						X			
760AN012	Weld 1/8" stainless steel in flat position (1F,1G)						X			
760AN013	Weld 1/8" stainless steel in horizontal position (2F,2G)						X			

PERFORMING SUBMERGED ARC WELDING (SAW)

		MT	M	TD	PP	SM	CW	MR	AM	TP
760A0001	Select submerged arc welding (SAW) equipment, filler metal and flux according to job						X			
760A0002	Set up submerged arc welding equipment						X			
760A0003	Perform minor maintenance on submerged arc welding equipment						X			
760A0004	Weld 1/8" mild steel in flat position (1G) with automatic equipment						X			
760A0005	Weld 1/4" mild steel in flat position (1F) with semi-automatic equipment						X			
760A0006	Weld 1" mild steel, vee-groove butt joint in flat position (1G) with automatic equipment						X			
760A0007	Weld 1/4" mild steel, T-joint in horizontal position (1F) with automatic equipment						X			
760A0008	Weld 1/4" mild steel, lap-joint in horizontal position (1F) with automatic equipment						X			

PERFORMING RESISTANCE WELDING

		MT	M	TD	PP	SM	CW	MR	AM	TP
760AP001	Select resistance welding equipment according to job						X	X		
760AP002	Set up resistance welding equipment						X	X		
760AP003	Perform minor maintenance on resistance welding equipment						X	X		
760AP004	Weld materials by spot welding						X	X		
760AP005	Weld materials by projection welding						X			
760AP006	Weld materials by flash welding						X			
760AP007	Weld materials by seam welding						X			
760AP008	Weld materials by pulsation welding						X			
760AP009	Weld materials by butt welding						X			



MANUFACTURING OCCUPATIONS CLUSTER MATRIX

PERFORMING ELECTROSLAG WELDING (ESW)

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AQ001 Select electroslog welding (ESW) equipment, filler metal and flux according to job						X			
760AQ002 Set up electroslog welding equipment						X			
760AQ003 Weld materials using electroslog welding process						X			

PERFORMING ULTRASONIC WELDING (USW)

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AR001 Set up ultrasonic welding (USW) equipment						X			
760AR002 Perform minor maintenance on ultrasonic equipment						X			
760AR003 Weld materials using ultrasonic welding process						X			

PERFORMING LASER BEAM WELDING (LBW)

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AS001 Set up laser beam welding (LBW) equipment						X			
760AS002 Weld materials using laser beam welding process						X			

PERFORMING ELECTRON BEAM WELDING (EBW)

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AT001 Set up electron beam welding (EBW) equipment						X			
760AT002 Weld materials using electron beam welding process						X			

PERFORMING INERTIA WELDING

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AU001 Set up inertia welding equipment						X			
760AU002 Weld materials using inertia welding process						X			

PERFORMING UNDERWATER WELDING

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AV001 Select equipment and electrodes for underwater welding according to job						X			
760AV002 Set up underwater welding equipment						X			
760AV003 Weld materials underwater in various position (1F,4F)						X			
760AV004 Select equipment, gases and electrodes for underwater cutting according to job						X			
760AV005 Set up underwater cutting equipment						X			
760AV006 Cut materials underwater						X			

PERFORMING PLASTIC WELDING

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AW001 Select plastic welding equipment and gases according to job						X			
760AW002 Set up plastic welding equipment						X			
760AW003 Weld plastics using the hot gas method						X			
760AW004 Weld plastics using the heated tool method						X			
760AW005 Weld plastics using the induction method						X			

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

TESTING WELDS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AX001 Select destructive or non-destructive methods for testing welds						X			
760AX002 Perform visual inspection of welded materials						X			
760AX003 Perform liquid penetrant tests on welded materials						X			
760AX004 Perform hardness tests on welded materials						X			
760AX005 Perform guided bend tests on welded materials						X			
760AX006 Perform tensile tests on welded materials						X			
760AX007 Perform impact tests on welded materials						X			
760AX008 Perform radiographic tests on welded materials						X			
760AX009 Perform ultrasonic tests on welded materials						X			
760AX010 Perform magnetic particle tests on welded materials						X			

ASSEMBLING AND DISASSEMBLING MACHINE MECHANISMS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AY001 Install belts and pulleys							X	X	
760AY002 Align and adjust tension of belt drives							X	X	
760AY003 Maintain belt drives							X	X	
760AY004 Construct belt joints							X	X	
760AY005 Inspect belt drive systems							X	X	
760AY006 Troubleshoot belt drive systems							X	X	
760AY007 Repair belt drive systems							X	X	
760AY008 Install chain and sprocket drive							X	X	
760AY009 Align and adjust tension of chain and sprocket drives							X	X	
760AY010 Maintain chain and sprocket drives							X	X	
760AY011 Inspect chain and sprocket drives							X	X	
760AY012 Troubleshoot chain and sprocket drives							X	X	
760AY013 Repair chain and sprocket drives							X	X	
760AY014 Install and align gear drives							X	X	
760AY015 Maintain gear drives							X	X	
760AY016 Clean and lubricate gear drives							X	X	
760AY017 Inspect variable speed drives							X	X	
760AY018 Troubleshoot variable speed drives							X	X	
760AY019 Repair variable speed drives							X	X	
760AY020 Inspect rack and pinion drives							X	X	
760AY021 Troubleshoot rack and pinion drives							X	X	
760AY022 Repair rack and pinion drives							X	X	
760AY023 Inspect ring and pinion drives							X	X	
760AY024 Troubleshoot ring and pinion drives							X	X	
760AY025 Repair ring and pinion drives							X	X	
760AY026 Inspect gear box drives							X	X	
760AY027 Troubleshoot gear box drives							X	X	
760AY028 Repair gear box drives							X	X	
760AY029 Install couplings							X	X	
760AY030 Align couplings							X	X	
760AY031 Inspect couplings							X	X	
760AY032 Troubleshoot couplings							X	X	
760AY033 Disassemble and reassemble couplings							X	X	
760AY034 Replace packing and seals							X	X	
760AY035 Remove and install mechanical seals							X	X	
760AY036 Align pillow blocks and bearings							X	X	
760AY037 Install pillow blocks and bearings							X	X	
760AY038 Remove and install bearings in bores							X	X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AY039 Remove and install sleeve bearings in bores							X	X	
760AY040 Remove and install bearings on shafts							X	X	
760AY041 Lubricate equipment							X	X	
760AY042 Inspect bearings and mechanisms							X	X	
760AY043 Troubleshoot bearings							X	X	
760AY044 Replace shaft							X	X	
760AY045 Install shaft assembly							X	X	
760AY046 Align shaft							X	X	
760AY047 Replace universal joint							X	X	
760AY048 Install universal joint							X	X	
760AY049 Repair universal joint							X	X	
760AY050 Adjust gibs for free operation							X	X	
760AY051 Inspect linkages and lever mechanisms							X	X	
760AY052 Troubleshoot linkages and lever mechanisms							X	X	
760AY053 Repair linkages and lever mechanisms							X	X	
760AY054 Install centrifugal clutch							X	X	
760AY055 Inspect centrifugal clutch							X	X	
760AY056 Repair centrifugal clutch							X	X	
760AY057 Install safety guards for conveyor system							X	X	
760AY058 Fabricate safety guards for conveyor system							X	X	
760AY059 Align drive mechanism for conveyor system							X	X	
760AY060 Assemble conveyor system from component parts							X	X	
760AY061 Install conveyor into material handling system							X	X	
760AY062 Troubleshoot conveyor system							X	X	
760AY063 Repair conveyor system							X	X	

INSTALLING AND REMOVING MACHINERY

	MT	M	TD	PP	SM	CW	MR	AM	TP
760AZ001 Prepare area for machine installation							X	X	
760AZ002 Raise machinery using jacks, bars and blocks							X	X	
760AZ003 Move machinery using fork lift							X	X	
760AZ004 Rig chain fall to remove or install machinery							X	X	
760AZ005 Move machinery using overhead crane or chainfall							X	X	
760AZ006 Position and secure machinery on foundation							X	X	
760AZ007 Level machinery on foundation							X	X	
760AZ008 Align machinery							X	X	
760AZ009 Connect machinery to electrical source							X	X	
760AZ010 Connect machine to air or hydraulic source							X	X	
760AZ011 Balance machinery using vibration test							X	X	
760AZ012 Block and brace equipment for moving or shipping							X	X	
760AZ013 Crib equipment							X	X	
760AZ014 Lift equipment using slings							X	X	
760AZ015 Move equipment with skids							X	X	
760AZ016 Move equipment with dollies							X	X	

MAINTAINING HYDRAULIC SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BA001 Shut down hydraulic system							X	X	
760BA002 Replace and clean hydraulic strainer/filters							X	X	
760BA003 Clean and flush hydraulic motor system							X	X	
760BA004 Drain and refill hydraulic system							X	X	
760BA005 Troubleshoot hydraulic actuator							X	X	
760BA006 Replace hydraulic actuator							X	X	
760BA007 Adjust hydraulic pressure							X	X	
760BA008 Troubleshoot pressure regulators							X	X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BA009 Troubleshoot hydraulic control valve operations							X	X	
760BA010 Inspect pressure control valve							X	X	
760BA011 Replace valve in hydraulic system							X	X	
760BA012 Null hydraulic servo valve							X	X	
760BA013 Test accumulator charge							X	X	
760BA014 Recharge accumulator							X	X	
760BA015 Replace defective accumulator							X	X	
760BA016 Replace hydraulic pump							X	X	
760BA017 Align hydraulic pump							X	X	
760BA018 Seal gaskets							X	X	
760BA019 Replace hydraulic motor							X	X	
760BA020 Align hydraulic motor							X	X	
760BA021 Replace internal components in hydraulic motor							X	X	
760BA022 Replace hydraulic gasket and seals							X	X	
760BA023 Install hydraulic line							X	X	
760BA024 Connect hydraulic components to machines							X	X	
760BA025 Replace damaged hydraulic lines, fittings and components							X	X	
760BA026 Clear restriction from sealed hydraulic system							X	X	
760BA027 Troubleshoot heat exchanger							X	X	
760BA028 Measure pressure within hydraulic system							X	X	
760BA029 Measure flow within hydraulic system							X	X	
760BA030 Inspect hydraulic systems							X	X	
760BA031 Troubleshoot hydraulic systems							X	X	
760BA032 Repair hydraulic systems							X	X	
760BA033 Maintain hydraulic systems							X	X	
760BA034 Determine problem using available troubleshooting techniques							X	X	
760BA035 Interpret control diagrams for hydraulic systems							X	X	
760BA036 Diagnose malfunctions of hydraulic systems using test and measurement equipment							X	X	

MAINTAINING PNEUMATIC SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BB001 Troubleshoot air pressure regulators							X	X	
760BB002 Troubleshoot pneumatic pump							X	X	
760BB003 Verify pneumatic flow control valve operation							X	X	
760BB004 Troubleshoot pneumatic actuator							X	X	
760BB005 Replace defective pneumatic gages							X	X	
760BB006 Replace defective pneumatic lines							X	X	
760BB007 Replace air filter							X	X	
760BB008 Service pneumatic air compressor							X	X	
760BB009 Replace pneumatic air compressor							X	X	
760BB010 Verify air motor							X	X	
760BB011 Replace air motor							X	X	
760BB012 Sequence pneumatic cylinders							X	X	
760BB013 Replace pneumatic cylinders							X	X	
760BB014 Verify humidity control							X	X	
760BB015 Troubleshoot air logic system							X	X	
760BB016 Verify air logic to diagram							X	X	
760BB017 Leak test vacuum/pressure system							X	X	
760BB018 Clear restrictions from sealed pneumatic system							X	X	
760BB019 Test fittings for air leaks							X	X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760BB020 Repair air leaks X X  
 760BB021 Replace defective fittings X X  
 760BB022 Lubricate pneumatic system X X  
 760BB023 Install pneumatic systems X X  
 760BB024 Inspect pneumatic systems X X  
 760BB025 Troubleshoot pneumatic systems X X  
 760BB026 Repair pneumatic systems X X  
 760BB027 Maintain pneumatic systems X X  
 760BB028 Determine problem using available troubleshooting techniques X X  
 760BB029 Interpret control diagrams for pneumatic systems X X  
 760BB030 Diagnose malfunctions of pneumatic systems using test and measurement equipment X X

MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS

MT M TD PP SM CW MR AM TP

760BC001 Replace fuses X X  
 760BC002 Reset circuit breaker after overload X X  
 760BC003 Remove electrical overloads X X  
 760BC004 Troubleshoot electrical control components X X  
 760BC005 Change rotation of 3-phase electric motor X X  
 760BC006 Replace faulty electrical cords and plugs X X  
 760BC007 Replace electric motor brushes X X  
 760BC008 Lubricate electric motor X X  
 760BC009 Install or replace electric motor X X  
 760BC010 Clean electric motor X X  
 760BC011 Replace defective relay X X  
 760BC012 Verify electrical sensor operation X X  
 760BC013 Verify motor starter circuit X X  
 760BC014 Verify electric motor operation X X  
 760BC015 Verify thermostat operation X X  
 760BC016 Verify power supply operation X X  
 760BC017 Verify solenoid operation X X  
 760BC018 Determine electrical problems using available troubleshooting techniques X X  
 760BC019 Interpret control diagrams for electrical systems X X  
 760BC020 Diagnose malfunctions of electrical systems using test and measurement equipment X X

MAINTAINING AND REPAIRING HEATING AND COOLING DEVICES

MT M TD PP SM CW MR AM TP

760BD001 Calibrate and adjust thermostat X  
 760BD002 Lubricate air compressor X  
 760BD003 Adjust air compressor to minimize noise X  
 760BD004 Adjust air compressor to reduce overload X  
 760BD005 Disassemble and reassemble air compressor X  
 760BD006 Install air compressor X  
 760BD007 Clean condenser/evaporator X  
 760BD008 Install air cooled condenser X  
 760BD009 Install evaporative condenser X  
 760BD010 Calibrate metering devices X  
 760BD011 Clean air circulation ducts X  
 760BD012 Install fan guards, shrouds or mesh covers X  
 760BD013 Install mechanical roof ventilators X  
 760BD014 Remove foreign debris from cooling towers X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760BD015	Drain and charge air conditioning system							X	
760BD016	Clean and lubricate fans and ventilators							X	
760BD017	Calibrate and adjust airflow controls							X	
760BD018	Calibrate and adjust temperature controls							X	
760BD019	Calibrate and adjust pneumatic controls							X	
760BD020	Calibrate and adjust pressure controls							X	
760BD021	Replace air filters and air bags							X	
760BD022	Assemble and disassemble centrifugal fan							X	
760BD023	Inspect freight and personnel elevators							X	
760BD024	Adjust doors, guards and gates for elevators							X	
760BD025	Replace elevator cables							X	
760BD026	Replace hand controls for elevators							X	

INSPECTING AND REPAIRING CRANES AND ELEVATORS

MT M TD PP SM CW MR AM TP

760BE001	Replace cable on electric cable drum hoist							X	
760BE002	Replace cable on bridge crane							X	
760BE003	Replace pulleys on cranes							X	
760BE004	Replace mechanical safety devices on cranes							X	
760BE005	Replace electrical safety devices on cranes							X	
760BE006	Inspect tracks and runway areas							X	
760BE007	Replace runway tracks for cranes							X	
760BE008	Adjust mechanical brakes on cranes and elevators							X	
760BE009	Troubleshoot and repair cranes							X	
760BE010	Troubleshoot and repair elevators							X	

MAINTAINING AND REPAIRING ELECTRONIC CONTROL SYSTEMS

MT M TD PP SM CW MR AM TP

760BF001	Verify servo amplifier operation							X	X
760BF002	Insure that environmental conditions are met								X
760BF003	Verify servo motor control circuits							X	X
760BF004	Verify terminal device operation							X	X
760BF005	Troubleshoot communications links							X	X
760BF006	Troubleshoot printed circuit board							X	X
760BF007	Calibrate position feedback device							X	X
760BF008	Troubleshoot position device							X	X
760BF009	Troubleshoot robot controller								X
760BF010	Perform electrical adjustments on servo power amplifiers							X	X
760BF011	Determine problem using available troubleshooting techniques								X
760BF012	Interpret control diagrams for electronic systems								X
760BF013	Diagnose malfunctions of electronic systems using test and measurement equipment								X
760BF014	Interchange different open-loop controllers between systems								X
760BF015	Interchange different closed-loop controllers between systems								X
760BF016	Adjust control system feedback loops								X

MAINTAINING AND REPAIRING AUTOMATED SYSTEMS

MT M TD PP SM CW MR AM TP

760BG001	Run diagnostic routine								X
760BG002	Troubleshoot end effectors								X
760BG003	Troubleshoot automatic lubrication system								X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760BG004	Troubleshoot vision system							X	
760BG005	Verify pressure control system operation							X	
760BG006	Troubleshoot pressure or vacuum switch operation							X	
760BG007	Verify drive mechanism							X	
760BG008	Troubleshoot timing of automated (CAM) system							X	
760BG009	Service bearings							X	
760BG010	Adjust clutch/brake system							X	
760BG011	Adjust linkage							X	
760BG012	Troubleshoot overload protection device operation							X	
760BG013	Apply requirements of service bulletins							X	
760BG014	Aid fault isolation using manual's troubleshooting charts							X	
760BG015	Aid fault repair using manual's troubleshooting charts							X	
760BG016	Disassemble, repair, test and return to service robots which have failed							X	
760BG017	Troubleshoot and repair automated systems							X	
760BG018	Maintain automated systems							X	

INSTALLING AND TROUBLESHOOTING SENSORS

MT M TD PP SM CW MR AM TP

760BH001	Install and adjust tactile sensors							X	
760BH002	Troubleshoot and repair tactile sensors							X	
760BH003	Install and adjust video sensors							X	
760BH004	Troubleshoot and repair video sensors							X	
760BH005	Install and adjust fiber-optic components							X	
760BH006	Troubleshoot and repair fiber-optic components							X	
760BH007	Troubleshoot and repair fiber-optic systems							X	
760BH008	Set up machine vision system							X	
760BH009	Install and adjust magnetic sensors							X	
760BH010	Troubleshoot and repair magnetic sensors							X	
760BH011	Install and adjust thermal sensors							X	
760BH012	Troubleshoot and repair thermal sensors							X	
760BH013	Install and adjust sonic sensors							X	
760BH014	Troubleshoot and repair sonic sensors							X	
760BH015	Install and adjust pressure sensors							X	
760BH016	Troubleshoot and repair pressure sensors							X	
760BH017	Install and adjust microwave sensors							X	
760BH018	Troubleshoot and repair microwave sensors							X	

INSTALLING AUTOMATED SYSTEMS

MT M TD PP SM CW MR AM TP

760BI001	Install robots							X	
760BI002	Install work cell							X	
760BI003	Install automated systems							X	
760BI004	Evaluate initial start-up of robotic system							X	
760BI005	Evaluate initial start-up of work cell							X	
760BI006	Evaluate initial start-up of automated system							X	
760BI007	Start up and debug robot system							X	
760BI008	Measure robot performance for distance							X	
760BI009	Measure robot performance for positioning							X	
760BI010	Measure robot performance for accuracy							X	
760BI011	Measure robot performance for repeatability							X	
760BI012	Analyze operating difficulties of robots and adjust to specifications							X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BI013 Adjust equipment for accuracy and repeatability								X	
760BI014 Install and adjust end of arm tools (end effectors)								X	
760BI015 Install and adjust actuators (open/closed loop)								X	
760BI016 Verify system interlock operation								X	
760BI017 Install robot controller								X	
760BI018 Install programmable controller and input/output devices								X	
760BI019 Install communication links								X	
760BI020 Optimize existing system performance								X	
760BI021 Field test robot to assure conformance to specifications								X	
760BI022 Define axis control and feedback specifications								X	
760BI023 Specify robot coordinate system								X	
760BI024 Define human interface with automated system								X	
760BI025 Interconnect robots and other equipment								X	
760BI026 Analyze and select sensing requirements for manufacturing requirements								X	
760BI027 Set up robot to pick and place								X	
760BI028 Design system for counting regularly shaped objects								X	
760BI029 Design system for counting irregularly shaped objects								X	
760BI030 Coordinate operation of several pieces of automatic equipment								X	
760BI031 Adjust automated systems for accuracy and repeatability								X	
760BI032 Start up and shut down automated production system								X	
760BI033 Follow manufacturer's troubleshooting procedures for automated system								X	

PROGRAMMING AUTOMATED SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BJ001 Develop written program								X	
760BJ002 Enter executive software into control unit								X	
760BJ003 Load program into robot								X	
760BJ004 Test program								X	
760BJ005 Operate teach mode								X	
760BJ006 Interpret error messages								X	
760BJ007 Program stepper motors								X	
760BJ008 Program programmable logic controllers (PLC's) for specific sequence of events in performing application								X	
760BJ009 Draw logic diagrams (flow charts)								X	
760BJ010 Program, test and edit using teaching pendant								X	
760BJ011 Perform zeroing of encoders								X	

PROGRAMMING AND PLANNING

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BK001 Develop programmed instructions from blueprint								X	
760BK002 Develop programmed instructions from piece part								X	
760BK003 Draw sketch of desired workpiece								X	
760BK004 Select program (manual or computer-assisted)								X	
760BK005 Choose machine tools for part								X	



MANUFACTURING OCCUPATIONS CLUSTER MATRIX

MT M TD PP SM CW MR AM TP

760BK006	Select tools and holders							X	
760BK007	Select spindle speed							X	
760BK008	Select feedrate for axis travel							X	
760BK009	Position workpiece in relation to machine axis							X	
760BK010	Determine absolute or incremental mode							X	
760BK011	Compute polar/rectangular coordinates							X	
760BK012	Compute workpiece geometry							X	
760BK013	Verify cutter path							X	
760BK014	Plot program							X	
760BK015	Depict part graphically							X	
760BK016	Define cutter path							X	
760BK017	Operate post processor							X	
760BK018	Write post processor							X	
760BK019	Program tool change procedure							X	
760BK020	Prepare operator instructions for piece part							X	
760BK021	Calculate run time							X	
760BK022	Prepare tape							X	
760BK023	Select canned cycles							X	
760BK024	Program restart points							X	
760BK025	Write manual program							X	
760BK026	Program with purchased software							X	
760BK027	Design special fixtures for custom job							X	
760BK028	Design clamps and holders for custom job							X	
760BK029	Write manual complex contouring program							X	
760BK030	Enter tool offset							X	
760BK031	Enter tool length compensation							X	
760BK032	Repair broken tape							X	
760BK033	Update programs from engineering changes							X	
760BK034	Determine job priorities							X	
760BK035	Schedule programs							X	
760BK036	Schedule heat-treated materials							X	
760BK037	Schedule secondary processes							X	
760BK038	Schedule plating							X	

PERFORMING OPERATING FUNCTIONS OF AUTOMATED SYSTEM

MT M TD PP SM CW MR AM TP

760BL001	Assist supervisor in implementing plan for initial setup installation and maintenance of automated system							X	
760BL002	Determine resources needed to continue production							X	
760BL003	Arrange for acquisition of equipment and materials							X	
760BL004	Coordinate with other workers to complete task							X	

PERFORMING COMMUNICATION FUNCTIONS

MT M TD PP SM CW MR AM TP

760BM001	Prepare technical reports including charts, graphs, status reports, project summary and manuals							X	X
760BM002	Make oral presentations							X	X
760BM003	Interface with vendors							X	
760BM004	Demonstrate how equipment works							X	X
760BM005	Train others in use of automated system's equipment							X	

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

PERFORMING QUALITY CONTROL AND QUALITY ASSURANCE FUNCTIONS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BN001 Co-develop and implement quality control and inspection standards and procedures								X	
760BN002 Conduct quality tests on process and product								X	
760BN003 Calibrate test and measurement equipment								X	
760BN004 Participate in work teams								X	
760BN005 Apply statistical in-process quality control (SPC)								X	

ADAPTING AUTOMATED SYSTEMS FOR MANUFACTURING

	MT	M	TD	PP	SM	CW	MR	AM	TP
760B0001 Adapt automated system for welding applications								X	
760B0002 Adapt automated system for painting applications								X	
760B0003 Adapt automated system for bonding applications								X	
760B0004 Adapt automated system for machining applications								X	
760B0005 Adapt automated system for material handling applications								X	
760B0006 Adapt automated system for assembly applications								X	
760B0007 Adapt automated system for packing applications								X	

REVIEWING DAY'S PRIORITIES

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BP001 Review schedule with supervisor									X
760BP002 Review status with previous shift									X
760BP003 Review quality control status									X
760BP004 Develop list of priority tasks									X
760BP005 Coordinate implementation of tasks									X
760BP006 Report day's events and status									X

REVIEWING THE UPCOMING ORDER

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BQ001 Review statistical quality control (S.Q.C.) requirements									X
760BQ002 Review last run information									X
760BQ003 Review production requirements									X
760BQ004 Develop set-up procedures for new mold									X

HANDLING RAW MATERIALS

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BR001 Certify type of materials selected									X
760BR002 Mix materials if required									X
760BR003 Dry materials if required									X
760BR004 Load materials into hopper									X
760BR005 Return excess materials to storage									X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

PREPARING MOLDING MACHINE

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BS001 Clean molding machine									X
760BS002 Inspect molding machine for maintenance and safety									X
760BS003 Initiate molding machine repairs									X
760BS004 Adjust set-up parameters									X

SETTING MOLD

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BT001 Select mold from storage									X
760BT002 Mount mold in machine									X
760BT003 Inspect mold visually									X
760BT004 Prepare mold for storage									X
760BT005 Remove mold from machine									X
760BT006 Return mold to storage									X

COORDINATING AUXILIARY EQUIPMENT

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BU001 Select liquid mold temperature control equipment									X
760BU002 Inspect auxiliary equipment for maintenance and safety									X
760BU003 Initiate auxiliary equipment repairs									X
760BU004 Attach temperature control equipment to mold									X
760BU005 Prepare plastic granulator									X
760BU006 Prepare material dryer									X
760BU007 Prepare raw material handling equipment									X
760BU008 Prepare parts removal system									X
760BU009 Attach hydraulic equipment									X
760BU010 Attach pneumatic equipment									X
760BU011 Attach electrical equipment									X
760BU012 Remove auxiliary equipment upon job completion									X

COORDINATING SECONDARY OPERATIONS EQUIPMENT

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BV001 Select secondary operations equipment									X
760BV002 Inspect secondary equipment for maintenance and safety									X
760BV003 Initiate secondary equipment repairs									X
760BV004 Select secondary operations supplies									X
760BV005 Set up secondary operations equipment and supplies									X
760BV006 Remove secondary equipment upon job completion									X

ORGANIZING OPERATOR WORK AREA

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BW001 Clean machine work area									X
760LW002 Identify and resolve safety hazards									X
760BW003 Arrange work area									X
760BW004 Prepare necessary production supplies									X
760BW005 Coordinate statistical quality control/statistical process control (S.Q.C./S.P.C.) material									X
760BW006 Return statistical quality control/statistical process control (S.Q.C./S.P.C.) material to control at job completion									X

MANUFACTURING OCCUPATIONS CLUSTER MATRIX

PROCESSING PRODUCTION

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BX001 Check processing parameters									X
760BX002 Introduce material to the process									X
760BX003 Start molding cycle									X
760BX004 Perform initial quality control									X
760BX005 Adjust processing parameters									X
760BX006 Submit parts for first piece approval									X
760BX007 Document setup and job information									X
760BX008 Monitor production process									X
760BX009 Submit last piece sample									X
760BX010 Follow appropriate shutdown procedures									X

FAMILIARIZING OPERATOR WITH THE JOB

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BY001 Review statistical quality control (S.Q.C.) requirements									X
760BY002 Review job production methods									X
760BY003 Review job safety									X
760BY004 Provide training as needed									X
760BY005 Monitor operator performance									X

CONTINUING EDUCATION

	MT	M	TD	PP	SM	CW	MR	AM	TP
760BZ001 Learn raw material processing techniques									X
760BZ002 Learn equipment operation									X
760BZ003 Learn statistical quality control/statistical process control (S.Q.C./S.P.C.) techniques									X
760BZ004 Learn management techniques									X
760BZ005 Learn new technology									X
760BZ006 Review safety requirements									X



**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

## **TECHNICAL PREPARATION CLUSTER**

Computer Repair Technician

Electrical and Electronic Technician

Automated Manufacturing Systems Technician

\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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TECHNICAL PREPARATION CLUSTER MATRIX

CRT = Computer Repair Technician  
 EET = Electrical and Electronic Technician  
 AM = Automated Manufacturing Systems Technician

APPLYING SAFETY PRACTICES

		CRT	EET	AM
780A001	Apply basic emergency first aid techniques	X	X	X
780A002	Complete accident report	X	X	X
780A003	Inspect work area and equipment for safe working environment	X	X	X
780A004	Report shop, environmental and equipment safety violations	X	X	X
780A005	Demonstrate use of fire extinguishers	X	X	X
780A006	Plan shutdown procedure for given area	X	X	
780A007	Participate in disaster control exercises	X	X	X
780A008	Prepare plan for disaster control exercises	X	X	
780A009	Participate in shop safety committee	X	X	X
780A010	Organize shop safety committee	X	X	
780A011	Correct safety hazards	X	X	X
780A012	Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X	X
780A013	Comply with shop and equipment safety rules			X
780A014	Comply with safety requirements for working around automated systems			X
780A015	Participate in safety training program			X
780A016	Conduct safety training program			X

ANALYZING DC CIRCUITS

		CRT	EET	AM
780B001	Read and interpret color codes	X	X	
780B002	Analyze, construct and troubleshoot series circuits	X	X	
780B003	Analyze, construct and troubleshoot parallel circuits	X	X	
780B004	Analyze, construct and troubleshoot series-parallel circuits	X	X	
780B005	Analyze, construct and troubleshoot voltage dividers	X	X	
780B006	Analyze, construct and verify maximum power theory	X	X	
780B007	Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits	X	X	

ANALYZING AC CIRCUITS

		CRT	EET	AM
780C001	Set up and operate frequency counters and signal generators for AC circuits	X	X	
780C002	Analyze, construct and troubleshoot AC capacitive circuits using a schematic	X	X	
780C003	Analyze, construct and troubleshoot AC inductive circuits using a schematic	X	X	
780C004	Analyze and apply principles of transformers to AC circuits using a schematic	X	X	
780C005	Analyze, construct and troubleshoot resistor, capacitor and inductor (RCL) circuits using a schematic	X	X	
780C006	Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic	X	X	
780C007	Analyze, construct and troubleshoot filter circuits using a schematic	X	X	

TECHNICAL PREPARATION CLUSTER MATRIX

ANALYZING SOLID STATE DEVICES

		CRT	EET	AM
780D001	Analyze, construct and troubleshoot simple common base amplifiers using a schematic	X	X	
780D002	Analyze, construct and troubleshoot simple common emitters using a schematic	X	X	
780D003	Analyze, construct and troubleshoot simple common collectors using a schematic	X	X	
780D004	Examine field effect transistor (FET) characteristics	X	X	
780D005	Analyze, construct and troubleshoot simple common sources using a schematic	X	X	
780D006	Analyze, construct and troubleshoot simple common drains using a schematic	X	X	
780D007	Analyze, construct and troubleshoot simple common gains using a schematic	X	X	
780D008	Analyze, construct and troubleshoot thyristors using a schematic	X	X	
780D009	Analyze, construct and troubleshoot integrated circuit operational amplifiers using a schematic	X	X	
780D010	Analyze, construct and troubleshoot optoelectronic devices using a schematic	X	X	

ANALYZING ANALOG CIRCUITS

		CRT	EET	AM
780E001	Analyze, construct and troubleshoot single-stage amplifiers using a schematic	X	X	
780E002	Analyze, construct and troubleshoot multistage amplifiers using a schematic	X	X	
780E003	Analyze, construct and troubleshoot basic power supplies, filters and regulators using a schematic	X	X	
780E004	Analyze, construct and troubleshoot differential and operational amplifiers using a schematic	X	X	
780E005	Analyze, construct and troubleshoot active filters using a schematic	X	X	
780E006	Analyze, construct and troubleshoot oscillators using a schematic	X	X	
780E007	Analyze, construct and troubleshoot basic pulse circuits using a schematic	X	X	
780E008	Analyze, construct and troubleshoot basic modulation circuits using a schematic	X	X	

ANALYZING DIGITAL ELECTRONIC CIRCUITS

		CRT	EET	AM
780F001	Analyze and troubleshoot basic digital logic gate integrated circuits using a schematic	X	X	
780F002	Verify basic Boolean expressions using basic logic gates	X	X	
780F003	Analyze, construct and troubleshoot basic encoding and decoding circuits using a schematic	X	X	
780F004	Analyze, construct and troubleshoot flip flops (memory) using a schematic	X	X	
780F005	Analyze, construct and troubleshoot shift registers using a schematic	X	X	



# TECHNICAL PREPARATION CLUSTER MATRIX

		CRT	EET	AM
780F006	Analyze, construct and troubleshoot counters using a schematic	X	X	
780F007	Analyze, construct and troubleshoot arithmetic circuits using a schematic	X	X	
780F008	Analyze, construct and troubleshoot basic digital logic systems using a schematic	X	X	
 PERFORMING MICROPROCESSING OPERATIONS				
		CRT	EET	AM
780G001	Write, enter, verify and run simple machine language programs	X	X	
780G002	Write, enter, verify and run machine language arithmetic programs	X	X	
780G003	Write, enter, verify and run machine language branching programs	X	X	
780G004	Perform basic programming using algorithms	X	X	
780G005	Write, enter, verify and run machine language program using additional addressing modes	X	X	
780G006	Perform basic programming using branching, algorithms and flow charting	X	X	
780G007	Perform basic programming to demonstrate computer arithmetic	X	X	
780G008	Prepare simple program to demonstrate operation of micro-processor unit (MPU) stack, subroutines, input/output (I/O) and interrupts	X	X	
780G009	Prepare simple program to perform interface operations with random access memory (RAM) and display	X	X	
780G010	Prepare simple program to perform interface operations with switches and light emitted diodes (LEO's)	X	X	
780G011	Interface analog to digital converters to microprocessor	X	X	
780G012	Interface digital to analog converters to microprocessor	X	X	
 PERFORMING LAB PRACTICES				
		CRT	EET	AM
780H001	Assemble printed circuit (PC) board	X	X	
780H002	Solder wires to turret terminals and printed circuit (PC) boards	X	X	
780H003	Assemble and solder printed circuit (PC) board	X	X	
780H004	Repair printed circuit (PC) board	X	X	
780H005	Set up and operate scales	X	X	
780H006	Set up and operate mechanical and optical measuring devices	X	X	
780H007	Set up and operate height gauges	X	X	
780H008	Set up and operate depth gauges	X	X	
780H009	Set up and operate oscilloscopes	X	X	
780H010	Set up and operate multimeter and power supplies	X	X	
780H011	Set up and operate capacitor inductor analyzers	X	X	
780H012	Set up and operate semiconductor testers and curve tracers	X	X	
780H013	Set up and operate chart recorder	X	X	
780H014	Set up and use digital test equipment	X	X	

# TECHNICAL PREPARATION CLUSTER MATRIX

## RECORDING AND REPORTING TECHNICAL MATERIAL

		CRT	EET	AM
780I001	Record data and design curves and graphs	X	X	
780I002	Write reports	X	X	
780I003	Make equipment failure reports	X	X	
780I004	Specify and requisition simple electronic components	X	X	
780I005	Write formal reports of laboratory experiences	X	X	

## USING TECHNICAL REFERENCES

		CRT	EET	AM
780J001	Identify manufacturers of various electronic devices using numerical integrated circuit (IC) reference manuals	X	X	
780J002	Identify specific characteristics of various electronic devices using manufacturers' reference manuals	X	X	
780J003	Identify distributors of various electronic devices using reference manuals	X	X	
780J004	Cross-reference various electronic devices between manufacturers using reference manuals	X	X	
780J005	Determine maintenance procedures using manuals	X	X	

## MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS

		CRT	EET	AM
780K001	Replace faulty electrical cords and plugs	X	X	X
780K002	Determine electrical problems using available troubleshooting techniques	X	X	X
780K003	Interpret control diagrams for electrical systems	X	X	X
780K004	Diagnose malfunctions of electrical systems using test and measurement equipment	X	X	X
780K005	Replace fuses			X
780K006	Reset circuit breaker after overload			X
780K007	Remove electrical overloads			X
780K008	Troubleshoot electrical control components			X
780K009	Change rotation of 3-phase electric motor			X
780K010	Replace electric motor brushes			X
780K011	Lubricate electric motor			X
780K012	Install or replace electric motor			X
780K013	Clean electric motor			X
780K014	Replace defective relay			X
780K015	Verify electrical sensor operation			X
780K016	Verify motor starter circuit			X
780K017	Verify electric motor operation			X
780K018	Verify thermostat operation			X
780K019	Verify power supply operation			X
780K020	Verify solenoid operation			X

## MAINTAINING AND REPAIRING ELECTRONIC SYSTEMS

		CRT	EET	AM
780L001	Determine electronic problems using available troubleshooting techniques	X	X	
780L002	Interpret control diagrams for electronic systems	X	X	
780L003	Diagnose malfunctions of electronic systems using available test and measurement equipment	X	X	

TECHNICAL PREPARATION CLUSTER MATRIX

CONDUCTING SHOP OPERATIONS

	CRT	EET	AM
780M001 Answer customer questions	X	X	
780M002 Troubleshoot customer problems	X	X	
780M003 Determine repair method	X	X	
780M004 Perform public relations activities	X	X	
780M005 Demonstrate computer equipment functions at store	X	X	
780M006 Demonstrate software functions	X	X	
780M007 Prepare service bill	X	X	
780M008 Maintain accounts receivable/paid records	X	X	
780M009 Maintain receiving records	X	X	
780M010 Maintain shipping records	X	X	
780M011 Maintain records of service tools and equipment	X	X	
780M012 Maintain computer equipment inventory	X	X	
780M013 Maintain call record report	X	X	
780M014 Update on-site maintenance log	X	X	
780M015 Unpack and inspect new equipment	X	X	
780M016 Receive and store parts and supplies	X	X	
780M017 Discuss delivery schedule with approved supplier	X	X	
780M018 Order parts and supplies	X	X	
780M019 Establish customer and equipment history file	X	X	
780M020 Establish customer files	X	X	
780M021 Prepare items for shipping	X	X	
780M022 Update service manuals	X	X	
780M023 Update parts catalogs	X	X	
780M024 Modify wiring diagrams to reflect repair changes	X	X	

PERFORMING HOUSEKEEPING AND RECORDKEEPING

	CRT	EET	AM
780N001 Clean and maintain work area and leave in safe condition	X	X	X
780N002 Follow tool crib procedures	X	X	X
780N003 Report problems to supervisor	X	X	X
780N004 Complete time cards	X	X	X
780N005 Complete job status reports	X	X	X
780N006 Make equipment failure reports	X	X	X
780N007 Determine basic maintenance procedures using manuals	X	X	X
780N008 Participate in participation management program (Quality Circles)	X	X	X
780N009 Clean and store hand tools, cutters, fixtures, jigs and attachments			X
780N010 Record preventive maintenance activities			X
780N011 Record repair activities			X
780N012 Read job orders and process sheets to determine tooling and setup information			X

PERFORMING SUPERVISORY FUNCTIONS

	CRT	EET	AM
7800001 Determine availability of machines, supplies and materials	X	X	X
7800002 Requisition, schedule and distribute supplies and materials	X	X	X
7800003 Coordinate workers with work to be done	X	X	X
7800004 Schedule and control shop flow of jobs	X	X	X
7800005 Maintain files	X	X	X
7800006 Maintain service records	X	X	
7800007 Maintain labor records	X	X	X
7800008 Explain work requirements	X	X	X
7800009 Write technical reports	X	X	X

TECHNICAL PREPARATION CLUSTER MATRIX

		CRT	EET	AM
7800010	Inventory supplies and equipment	X	X	X
7800011	Maintain charts, tables, graphs or status boards on work scheduled	X	X	X
7800012	Check job/time cards	X	X	X
7800013	Inspect shop equipment and arrange for maintenance and repair work	X	X	X
7800014	Coordinate maintenance and repair of shop equipment	X	X	X
7800015	Develop preventative maintenance program	X	X	
7800016	Plan and implement technical training for employees	X	X	X
7800017	Train new service technicians	X	X	
7800018	Evaluate employee progress and performance	X	X	X
7800019	Follow up employee reports of problems or equipment failures	X	X	X
7800020	Interview job applicants	X	X	X
7800021	Estimate cost of equipment installation	X	X	X
7800022	Estimate cost of system installation	X	X	X
7800023	Estimate cost of maintenance repairs and downtime	X	X	
7800024	Conduct meetings	X	X	X
7800025	Select most productive machine tool and tooling for job			X
7800026	Write work schedules			X
7800027	Maintain production records			X
7800028	Maintain warranty records			X
7800029	Review job orders, process sheets and blueprint specifications			X
7800030	Issue blueprints, job orders, process sheets and tooling			X
7800031	Write production and progress reports			X
7800032	Submit parts for first piece inspection			X
7800033	Conduct in-process inspections			X
7800034	Monitor reports of discrepancy or rejects during production process			X
7800035	Follow up on end product quality control standards			X
7800036	Initiate engineering change notices and rejection reports			X
7800037	Write requests for deviation to specifications			X
7800038	Supervise machine use			X
7800039	Prepare preventive maintenance schedule			X
7800040	Evaluate preventive maintenance program			X
7800041	Prepare repair schedule			X
7800042	Observe maintenance and repair activities			X
7800043	Evaluate repair activities			X
7800044	Train employees to operate mechanical devices			X
7800045	Estimate cost of repairs and downtime			X
7800046	Supervise assembly operations			X

INSTALLING COMPUTER EQUIPMENT

		CRT	EET	AM
780P001	Determine customer computing requirements	X		
780P002	Design computer system layout	X		
780P003	Transport computer equipment	X		
780P004	Set up computer equipment	X		
780P005	Perform computer installation tests	X		
780P006	Demonstrate usage of computer system on-site	X		
780P007	Complete warranty cards for computer equipment	X		
780P008	Construct cables for computer equipment	X		

# TECHNICAL PREPARATION CLUSTER MATRIX

## EVALUATING COMPUTER DIAGNOSTICS

		CRT	EET	AM
780Q001	Conduct motherboard random access memory (RAM) test	X		
780Q002	Conduct motherboard read only memory random access (ROM) test	X		
780Q003	Conduct programmers' aid test	X		
780Q004	Conduct computer keyboard test	X		
780Q005	Conduct computer paddle/button test	X		
780Q006	Conduct computer tape read/write/verify test	X		
780Q007	Conduct computer color bar test	X		
780Q008	Conduct computer graphic tablet test	X		
780Q009	Conduct basic/integer read only memory (ROM) card test	X		
780Q010	Conduct computer language card test	X		
780Q011	Conduct computer disk interface card test	X		
780Q012	Conduct computer printer card test	X		
780Q013	Conduct computer serial communication card test	X		
780Q014	Conduct computer monitor test	X		
780Q015	Conduct computer oscilloscope test	X		
780Q016	Conduct computer data communication line test	X		
780Q017	Interpret computer diagnostic flow charts	X		

## MAINTAINING COMPUTER EQUIPMENT

		CRT	EET	AM
780R001	Clean metallic computer parts	X		
780R002	Clean nonmetallic computer parts	X		
780R003	Clean electrical connections in computer	X		
780R004	Clean computer cable connections	X		
780R005	Clean printer head	X		
780R006	Clean computer disk drive head	X		
780R007	Clean and demagnetize computer tape head	X		
780R008	Lubricate metallic mechanical computer parts	X		
780R009	Lubricate nonmetallic mechanical computer parts	X		
780R010	Adjust mechanical computer assemblies	X		
780R011	Adjust and align computer disk drive head	X		
780R012	Adjust and align computer tape head	X		
780R013	Set computer disk read/write/verify speed	X		
780R014	Set computer tape read/write/verify speed	X		
780R015	Clean or replace computer filters	X		
780R016	Clean outside case/cover of computer	X		

## SERVICING COMPUTER EQUIPMENT

		CRT	EET	AM
780S001	Interpret computer troubleshooting charts	X		
780S002	Interpret chip-swapping charts	X		
780S003	Interpret computer schematics	X		
780S004	Interpret manufacturing upgrade	X		
780S005	Remove and install computer cover	X		
780S006	Install computer keyboard	X		
780S007	Install motherboard in computer	X		
780S008	Install power supply in computer	X		
780S009	Install analog board in computer	X		
780S010	Install disk drive assembly in computer	X		
780S011	Install main logic assembly in computer	X		
780S012	Install integrated circuit chips in computer	X		
780S013	Install power light in computer	X		
780S014	Install on-off switch in computer	X		

TECHNICAL PREPARATION CLUSTER MATRIX

		CRT	EET	AM
780S015	Install main printed circuit board in computer	X		
780S016	Install power supply printed circuit board in computer	X		
780S017	Install drive motor	X		
780S018	Install print hammer	X		
780S019	Install print mechanism	X		
780S020	Install carriage assembly	X		
780S021	Install paper feed assembly	X		
780S022	Install drive indicator light	X		
780S023	Install peripheral connection cables	X		
780S024	Install peripheral connections	X		
780S025	Install circuit/language cards	X		
780S026	Install modem coupler	X		
780S027	Install tape transport assembly	X		
780S028	Install read/write/verify head	X		
780S029	Install modem set switch	X		
780S030	Install ribbon assembly	X		
780S031	Install drive belts	X		
780S032	Install AC input connections	X		
780S033	Install fuse holders and fuses	X		
780S034	Install ejector mechanisms	X		
780S035	Install cathode ray tube	X		
780S036	Install configuration switches	X		
780S037	Install peripheral controls	X		
780S038	Install data communications adaptor	X		
780S039	Install expansion memory	X		
780S040	Install main memory	X		
780S041	Install field type product line	X		
780S042	Install remote terminals	X		
780S043	Install electrical wiring	X		
780S044	Install keys on keyboard	X		
780S045	Repair keyboard	X		
780S046	Repair motherboard	X		
780S047	Repair analog board	X		
780S048	Repair disk drive assembly	X		
780S049	Repair logic assembly	X		
780S050	Repair on-off switch	X		
780S051	Repair mechanical assembly	X		
780S052	Repair printed circuit board	X		
780S053	Repair drive motor	X		
780S054	Repair carriage assembly	X		
780S055	Repair paper feed assembly	X		
780S056	Repair circuit/language card	X		
780S057	Repair tape transport assembly	X		
780S058	Repair print mechanism	X		
780S059	Repair read/write/verify head	X		
780S060	Repair ribbon assembly	X		
780S061	Repair ejector mechanism	X		
780S062	Repair peripheral controls	X		
780S063	Repair data communications adaptor	X		
780S064	Repair expansion memory	X		
780S065	Repair memory	X		
780S066	Repair field type product line	X		
780S067	Repair remote terminals	X		
780S068	Identify integrated circuit chips	X		
780S069	Identify machine components and test points	X		

TECHNICAL PREPARATION CLUSTER MATRIX

		CRT	EET	AM
780S070	Set configuration switches	X		
780S071	Set user switches	X		
780S072	Install mechanical assembly	X		
780S073	Perform operator duties	X		
780S074	Realign read/write/verify head	X		
780S075	Adjust motor speed	X		
780S076	Check AC power source	X		
780S077	Repair power supply	X		

PERFORMING BENCHWORK OPERATIONS

		CRT	EET	AM
780T001	Cut threads with taps and dies			X
780T002	Remove threaded fasteners and repair threads			X
780T003	Deburr parts			X
780T004	Polish parts using coated abrasives			X
780T005	Sharpen and polish tools using abrasive stones			X
780T006	Rough finish parts with hand filing machines			X
780T007	Rough grind parts with hand grinders			X
780T008	Finish parts with hand grinders			X
780T009	Determine high spots using pigment			X
780T010	Remove high spots			X
780T011	Polish and buff parts with portable hand tools			X
780T012	Lap and fit parts			X
780T013	Scrape friction surfaces			X
780T014	Disassemble, assemble and straighten parts using arbor press			X
780T015	Cut keyway with broach			X
780T016	Disassemble, fit and reassemble parts			X
780T017	Lift and position workpiece using hoists			X
780T018	Work materials with hand tools			X
780T019	Work materials with portable power tools			X

PERFORMING PRECISION MEASUREMENT

		CRT	EET	AM
780U001	Measure parts with semi-precision measuring tools			X
780U002	Inspect parts with precision measuring tools			X
780U003	Inspect parts with comparison measuring tools			X
780U004	Set up and inspect parts using dial indicators			X
780U005	Measure threads			X
780U006	Measure tapers			X
780U007	Inspect keyways			X
780U008	Measure gears			X
780U009	Inspect surface finish of parts			X
780U010	Calibrate precision measuring tools			X
780U011	Clean and store precision measuring tools			X
780U012	Verify dimensions			X
780U013	Verify alignments			X
780U014	Verify clearances			X
780U015	Inspect machined parts			X
780U016	Inspect assemblies			X
780U017	Inspect parts with metric measuring instruments			X

TECHNICAL PREPARATION CLUSTER MATRIX

PERFORMING LAYOUTS

		CRT	EET	AM
780V001	Analyze specifications			X
780V002	Compute layout dimensions			X
780V003	Plan layout operations			X
780V004	Calculate reference points			X
780V005	Calculate angles from reference point			X
780V006	Calculate arcs from reference point			X
780V007	Calculate locations from reference point			X
780V008	Verify workpiece specifications			X
780V009	Lay out reference points			X
780V010	Lay out angles, arcs and locations from reference point			X
780V011	Label workpiece			X
780V012	Perform semi-precision layouts			X
780V013	Perform precision layouts from blueprints			X
780V014	Verify layouts			X

SELECTING MATERIALS

		CRT	EET	AM
780W001	Interpret color codes, numbering systems and classification systems of materials (ie. AISI, SAE)			X
780W002	Select material for job			X
780W003	Identify metals using spark test			X
780W004	Identify metals using variety of tests			X
780W005	Identify materials			X

ASSEMBLING AND DISASSEMBLING MACHINE MECHANISMS

		CRT	EET	AM
780X001	Install belts and pulleys			X
780X002	Align and adjust tension of belt drives			X
780X003	Maintain belt drives			X
780X004	Construct belt joints			X
780X005	Inspect belt drive systems			X
780X006	Troubleshoot belt drive systems			X
780X007	Repair belt drive systems			X
780X008	Install chain and sprocket drive			X
780X009	Align and adjust tension of chain and sprocket drives			X
780X010	Maintain chain and sprocket drives			X
780X011	Inspect chain and sprocket drives			X
780X012	Troubleshoot chain and sprocket drives			X
780X013	Repair chain and sprocket drives			X
780X014	Install and align gear drives			X
780X015	Maintain gear drives			X
780X016	Clean and lubricate gear drives			X
780X017	Inspect variable speed drives			X
780X018	Troubleshoot variable speed drives			X
780X019	Repair variable speed drives			X
780X020	Inspect rack and pinion drives			X
780X021	Troubleshoot rack and pinion drives			X
780X022	Repair rack and pinion drives			X
780X023	Inspect ring and pinion drives			X
780X024	Troubleshoot ring and pinion drives			X
780X025	Repair ring and pinion drives			X
780X026	Inspect gear box drives			X
780X027	Troubleshoot gear box drives			X
780X028	Repair gear box drives			X



TECHNICAL PREPARATION CLUSTER MATRIX

		CRT EET AM
780X029	Install couplings	X
780X030	Align couplings	X
780X031	Inspect couplings	X
780X032	Troubleshoot couplings	X
780X033	Disassemble and reassemble couplings	X
780X034	Replace packing and seals	X
780X035	Remove and install mechanical seals	X
780X036	Align pillow blocks and bearings	X
780X037	Install pillow blocks and bearings	X
780X038	Remove and install bearings in bores	X
780X039	Remove and install sleeve bearings in bores	X
780X040	Remove and install bearings on shafts	X
780X041	Lubricate equipment	X
780X042	Inspect bearings and mechanisms	X
780X043	Troubleshoot bearings	X
780X044	Replace shaft	X
780X045	Install shaft assembly	X
780X046	Align shaft	X
780X047	Replace universal joint	X
780X048	Install universal joint	X
780X049	Repair universal joint	X
780X050	Adjust gibs for free operation	X
780X051	Inspect linkages and lever mechanisms	X
780X052	Troubleshoot linkages and lever mechanisms	X
780X053	Repair linkages and lever mechanisms	X
780X054	Install centrifugal clutch	X
780X055	Inspect centrifugal clutch	X
780X056	Repair centrifugal clutch	X
780X057	Install safety guards for conveyor system	X
780X058	Fabricate safety guards for conveyor system	X
780X059	Align drive mechanism for conveyor system	X
780X060	Assemble conveyor system from component parts	X
780X061	Install conveyor into material handling system	X
780X062	Troubleshoot conveyor system	X
780X063	Repair conveyor system	X

INSTALLING AND REMOVING MACHINERY

		CRT EET AM
780Y001	Prepare area for machine installation	X
780Y002	Raise machinery using jacks, bars and blocks	X
780Y003	Move machinery using fork lift	X
780Y004	Rig chain fall to remove or install machinery	X
780Y005	Move machinery using overhead crane or chainfall	X
780Y006	Position and secure machinery on foundation	X
780Y007	Level machinery on foundation	X
780Y008	Align machinery	X
780Y009	Connect machinery to electrical source	X
780Y010	Connect machine to air or hydraulic source	X
780Y011	Balance machinery using vibration test	X
780Y012	Block and brace equipment for moving or shipping	X
780Y013	Crib equipment	X
780Y014	Lift equipment using slings	X
780Y015	Move equipment with skids	X
780Y016	Move equipment with dollies	X

TECHNICAL PREPARATION CLUSTER MATRIX

MAINTAINING HYDRAULIC SYSTEMS

CRT EET AM

780Z001	Shut down hydraulic system	X
780Z002	Replace and clean hydraulic strainer/filters	X
780Z003	Clean and flush hydraulic motor system	X
780Z004	Drain and refill hydraulic system	X
780Z005	Troubleshoot hydraulic actuator	X
780Z006	Replace hydraulic actuator	X
780Z007	Adjust hydraulic pressure	X
780Z008	Troubleshoot pressure regulators	X
780Z009	Troubleshoot hydraulic control valve operations	X
780Z010	Inspect pressure control valve	X
780Z011	Replace valve in hydraulic system	X
780Z012	Null hydraulic servo valve	X
780Z013	Test accumulator charge	X
780Z014	Recharge accumulator	X
780Z015	Replace defective accumulator	X
780Z016	Replace hydraulic pump	X
780Z017	Align hydraulic pump	X
780Z018	Seal gaskets	X
780Z019	Replace hydraulic motor	X
780Z020	Align hydraulic motor	X
780Z021	Replace internal components in hydraulic motor	X
780Z022	Replace hydraulic gasket and seals	X
780Z023	Install hydraulic line	X
780Z024	Connect hydraulic components to machines	X
780Z025	Replace damaged hydraulic lines, fittings and components	X
780Z026	Clear restriction from sealed hydraulic system	X
780Z027	Troubleshoot heat exchanger	X
780Z028	Measure pressure within hydraulic system	X
780Z029	Measure flow within hydraulic system	X
780Z030	Inspect hydraulic systems	X
780Z031	Troubleshoot hydraulic systems	X
780Z032	Repair hydraulic systems	X
780Z033	Maintain hydraulic systems	X
780Z034	Determine problem using available troubleshooting techniques	X
780Z035	Interpret control diagrams for hydraulic systems	X
780Z036	Diagnose malfunctions of hydraulic systems using test and measurement equipment	X

MAINTAINING PNEUMATIC SYSTEMS

CRT EET AM

780AA001	Troubleshoot air pressure regulators	X
780AA002	Troubleshoot pneumatic pump	X
780AA003	Verify pneumatic flow control valve operation	X
780AA004	Troubleshoot pneumatic actuator	X
780AA005	Replace defective pneumatic gages	X
780AA006	Replace defective pneumatic lines	X
780AA007	Replace air filter	X
780AA008	Service pneumatic air compressor	X
780AA009	Replace pneumatic air compressor	X
780AA010	Verify air motor	X
780AA011	Replace air motor	X
780AA012	Sequence pneumatic cylinders	X
780AA013	Replace pneumatic cylinders	X

TECHNICAL PREPARATION CLUSTER MATRIX

CRT EET AM

780AA014	Verify humidity control	X
780AA015	Troubleshoot air logic system	X
780AA016	Verify air logic to diagram	X
780AA017	Leak test vacuum/pressure system	X
780AA018	Clear restrictions from sealed pneumatic system	X
780AA019	Test fittings for air leaks	X
780AA020	Repair air leaks	X
780AA021	Replace defective fittings	X
780AA022	Lubricate pneumatic system	X
780AA023	Install pneumatic systems	X
780AA024	Inspect pneumatic systems	X
780AA025	Troubleshoot pneumatic systems	X
780AA026	Repair pneumatic systems	X
780AA027	Maintain pneumatic systems	X
780AA028	Determine problem using available troubleshooting techniques	X
780AA029	Interpret control diagrams for pneumatic systems	X
780AA030	Diagnose malfunctions of pneumatic systems using test and measurement equipment	X

MAINTAINING AND REPAIRING ELECTRONIC CONTROL SYSTEMS

CRT EET AM

780AB001	Verify servo amplifier operation	X
780AB002	Insure that environmental conditions are met	X
780AB003	Verify servo motor control circuits	X
780AB004	Verify terminal device operation	X
780AB005	Troubleshoot communications links	X
780AB006	Troubleshoot printed circuit board	X
780AB007	Calibrate position feedback device	X
780AB008	Troubleshoot position device	X
780AB009	Troubleshoot robot controller	X
780AB010	Perform electrical adjustments on servo power amplifiers	X
780AB011	Determine problem using available troubleshooting techniques	X
780AB012	Interpret control diagrams for electronic systems	X
780AB013	Diagnose malfunctions of electronic systems using test and measurement equipment	X
780AB014	Interchange different open-loop controllers between systems	X
780AB015	Interchange different closed-loop controllers between systems	X
780AB016	Adjust control system feedback loops	X

MAINTAINING AND REPAIRING AUTOMATED SYSTEMS

CRT EET AM

780AC001	Run diagnostic routine	X
780AC002	Troubleshoot end effectors	X
780AC003	Troubleshoot automatic lubrication system	X
780AC004	Troubleshoot vision system	X
780AC005	Verify pressure control system operation	X
780AC006	Troubleshoot pressure or vacuum switch operation	X
780AC007	Verify drive mechanism	X
780AC008	Troubleshoot timing of automated (CAM) system	X
780AC009	Service bearings	X
780AC010	Adjust clutch/brake system	X
780AC011	Adjust linkage	X

TECHNICAL PREPARATION CLUSTER MATRIX

CRT EET AM

780AC012	Troubleshoot overload protection device operation	X
780AC013	Apply requirements of service bulletins	X
780AC014	Aid fault isolation using manual's troubleshooting charts	X
780AC015	Aid fault repair using manual's troubleshooting charts	X
780AC016	Disassemble, repair, test and return to service robots which have failed	X
780AC017	Troubleshoot and repair automated systems	X
780AC018	Maintain automated systems	X

INSTALLING AND TROUBLESHOOTING SENSORS

CRT EET AM

780AD001	Install and adjust tactile sensors	X
780AD002	Troubleshoot and repair tactile sensors	X
780AD003	Install and adjust video sensors	X
780AD004	Troubleshoot and repair video sensors	X
780AD005	Install and adjust fiber-optic components	X
780AD006	Troubleshoot and repair fiber-optic components	X
780AD007	Troubleshoot and repair fiber-optic systems	X
780AD008	Set up machine vision system	X
780AD009	Install and adjust magnetic sensors	X
780AD010	Troubleshoot and repair magnetic sensors	X
780AD011	Install and adjust thermal sensors	X
780AD012	Troubleshoot and repair thermal sensors	X
780AD013	Install and adjust sonic sensors	X
780AD014	Troubleshoot and repair sonic sensors	X
780AD015	Install and adjust pressure sensors	X
780AD016	Troubleshoot and repair pressure sensors	X
780AD017	Install and adjust microwave sensors	X
780AD018	Troubleshoot and repair microwave sensors	X

INSTALLING AUTOMATED SYSTEMS

CRT EET AM

780AE001	Install robots	X
780AE002	Install work cell	X
780AE003	Install automated systems	X
780AE004	Evaluate initial start-up of robotic system	X
780AE005	Evaluate initial start-up of work cell	X
780AE006	Evaluate initial start-up of automated system	X
780AE007	Start up and debug robot system	X
780AE008	Measure robot performance for distance	X
780AE009	Measure robot performance for positioning	X
780AE010	Measure robot performance for accuracy	X
780AE011	Measure robot performance for repeatability	X
780AE012	Analyze operating difficulties of robots and adjust to specifications	X
780AE013	Adjust equipment for accuracy and repeatability	X
780AE014	Install and adjust end of arm tools (end effectors)	X
780AE015	Install and adjust actuators (open/closed loop)	X
780AE016	Verify system interlock operation	X
780AE017	Install robot controller	X
780AE018	Install programmable controller and its input/output devices	X
780AE019	Install communication links	X
780AE020	Optimize existing system performance	X
780AE021	Field test robot to assure conformance to specifications	X

TECHNICAL PREPARATION CLUSTER MATRIX

CRT EET AM

780AE022	Define axis control and feedback specifications	X
780AE023	Specify robot coordinate system	X
780AE024	Define human interface with automated system	X
780AE025	Interconnect robots and other equipment	X
780AE026	Analyze and select sensing requirements for manufacturing requirements	X
780AE027	Set up robot to pick and place	X
780AE028	Design system for counting regularly shaped objects	X
780AE029	Design system for counting irregularly shaped objects	X
780AE030	Coordinate operation of several pieces of automatic equipment	X
780AE031	Adjust automated systems for accuracy and repeatability	X
780AE032	Start up and shut down automated production system	X
780AE033	Follow manufacturer's troubleshooting procedures for automated system	X

PROGRAMMING AUTOMATED SYSTEMS

CRT EET AM

780AF001	Develop written program	X
780AF002	Enter executive software into control unit	X
780AF003	Load program into robot	X
780AF004	Test program	X
780AF005	Operate teach mode	X
780AF006	Interpret error messages	X
780AF007	Program stepper motors	X
780AF008	Program programmable logic controllers (PLC's) for specific sequence of events in performing application	X
780AF009	Draw logic diagrams (flow charts)	X
780AF010	Program, test and edit using teaching pendant	X
780AF011	Perform zeroing of encoders	X

PROGRAMMING AND PLANNING

CRT EET AM

780AG001	Develop programmed instructions from blueprint	X
780AG002	Develop programmed instructions from piece part	X
780AG003	Draw sketch of desired workpiece	X
780AG004	Select program (manual or computer-assisted)	X
780AG005	Choose machine tools for part	X
780AG006	Select tools and holders	X
780AG007	Select spindle speed	X
780AG008	Select feedrate for axis travel	X
780AG009	Position workpiece in relation to machine axis	X
780AG010	Determine absolute or incremental mode	X
780AG011	Compute polar/rectangular coordinates	X
780AG012	Compute workpiece geometry	X
780AG013	Verify cutter path	X
780AG014	Plot program	X
780AG015	Depict part graphically	X
780AG016	Define cutter path	X
780AG017	Operate post processor	X
780AG018	Write post processor	X
780AG019	Program tool change procedure	X
780AG020	Prepare operator instructions for piece part	X
780AG021	Calculate run time	X
780AG022	Prepare tape	X

TECHNICAL PREPARATION CLUSTER MATRIX

	CRT	EET	AM
780AG023 Select canned cycles			X
780AG024 Program restart points			X
780AG025 Write manual program			X
780AG026 Program with purchased software			X
780AG027 Design special fixtures for custom job			X
780AG028 Design clamps and holders for custom job			X
780AG029 Write manual complex contouring program			X
780AG030 Enter tool offset			X
780AG031 Enter tool length compensation			X
780AG032 Repair broken tape			X
780AG033 Update programs from engineering changes			X
780AG034 Determine job priorities			X
780AG035 Schedule programs			X
780AG036 Schedule heat-treated materials			X
780AG037 Schedule secondary processes			X
780AG038 Schedule plating			X
 PERFORMING OPERATING FUNCTIONS OF AUTOMATED SYSTEM			
	CRT	EET	AM
780AH001 Assist supervisor in implementing plan for initial setup, installation and maintenance of automated system			X
780AH002 Determine resources needed to continue production			X
780AH003 Arrange for acquisition of equipment and materials			X
780AH004 Coordinate with other workers to complete task			X
 PERFORMING COMMUNICATION FUNCTIONS			
	CRT	EET	AM
780AI001 Prepare technical reports including charts, graphs, status reports, project summary and manuals			X
780AI002 Make oral presentations			X
780AI003 Interface with vendors			X
780AI004 Demonstrate how equipment works			X
780AI005 Train others in use of automated system's equipment			X
 PERFORMING QUALITY CONTROL AND QUALITY ASSURANCE FUNCTIONS			
	CRT	EET	AM
780AJ001 Co-develop and implement quality control and inspection standards and procedures			X
780AJ002 Conduct quality tests on process and product			X
780AJ003 Calibrate test and measurement equipment			X
780AJ004 Participate in work teams			X
780AJ005 Apply statistical in-process quality control (SPC)			X
 ADAPTING AUTOMATED SYSTEMS FOR MANUFACTURING			
	CRT	EET	AM
780AK001 Adapt automated system for welding applications			X
780AK002 Adapt automated system for painting applications			X
780AK003 Adapt automated system for bonding applications			X
780AK004 Adapt automated system for machining applications			X
780AK005 Adapt automated system for material handling applications			X
780AK006 Adapt automated system for assembly applications			X
780AK007 Adapt automated system for packing applications			X



**Education  
For  
Employment  
Task Lists**

Illinois  
State Board of  
Education

Adult  
Vocational and  
Technical Education

# **INDUSTRIAL OCCUPATIONS 1988**

Auto Body Repairer  
\*Employability Skills

\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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## AUTO BODY REPAIRER

### DUTY A: Applying Safety Practices

- 805A001 Apply shop and safety equipment rules
- 805A002 Apply basic emergency first aid technique
- 805A003 Demonstrate cardiopulmonary resuscitation techniques
- 805A004 Complete accident report
- 805A005 Inspect work area and equipment for safe working environment
- 805A006 Report shop, environmental and equipment safety violations
- 805A007 Correct safety hazards
- 805A008 Participate in disaster control exercises
- 805A009 Participate in shop safety committee
- 805A010 Participate in safety training program
- 805A011 Conduct safety training program
- 805A012 Apply OSHA regulations
- 805A013 Demonstrate use of fire extinguishers
- 805A014 Follow fire code regulations
- 805A015 Store flammable materials
- 805A016 Tag cars with operating deficiencies

### DUTY B: Performing Housekeeping and Recordkeeping

- 805B001 Clean and maintain work area and leave in safe condition
- 805B002 Follow tool crib procedures
- 805B003 Report problems to supervisor
- 805B004 Complete time cards
- 805B005 Complete job status reports
- 805B006 Participate in participation management program (Quality Circles)

### DUTY C: Performing Supervisory Functions

- 805C001 Determine availability of machines, supplies and materials
- 805C002 Coordinate workers with work to be done
- 805C003 Schedule and control shop flow of jobs
- 805C004 Maintain files
- 805C005 Explain work requirements
- 805C006 Inventory supplies and equipment
- 805C007 Follow up on end product quality control standards
- 805C008 Check job/time cards
- 805C009 Inspect shop equipment and arrange for maintenance and repair work
- 805C010 Coordinate maintenance and repair of shop equipment
- 805C011 Plan and implement technical training for employees
- 805C012 Train employees to operate mechanical devices
- 805C013 Evaluate employee progress and performance
- 805C014 Plan and implement participation management program (Quality Circles)
- 805C015 Follow up employee reports of problems or equipment failures
- 805C016 Interview job applicants
- 805C017 Hire workers
- 805C018 Dismiss employees
- 805C019 Determine work to be done by outside firm
- 805C020 Write contract for work with outside firm

## AUTO BODY REPAIRER

### DUTY D: Estimating Costs of Repairs

- 805D001 Estimate cost of repairs
- 805D002 Order auto body parts and supplies
- 805D003 Write service work orders for vehicle repairs
- 805D004 Write customer invoices

### DUTY E: Maintaining Tools and Equipment

- 805E001 Perform basic maintenance on painting equipment
- 805E002 Sharpen and recondition hand tools
- 805E003 Clean paint guns

### DUTY F: Repairing Body Damage

- 805F001 Inspect body and frame for damage
- 805F002 Measure body and frame alignment
- 805F003 Repair and align hood and deck panels
- 805F004 Repair and align fenders
- 805F005 Repair and align doors
- 805F006 Repair and align bumpers
- 805F007 Remove and replace fender wells
- 805F008 Repair and adjust tailgates
- 805F009 Repair and adjust liftgates
- 805F010 Repair and adjust sun roofs
- 805F011 Repair quarter panels
- 805F012 Remove and replace rocker panels
- 805F013 Repair and align roof panels
- 805F014 Repair and align rear section damage
- 805F015 Repair and align front section damage
- 805F016 Remove and replace radiators and supports
- 805F017 Remove and install weld-in panels
- 805F018 Replace fiberglass body panels
- 805F019 Straighten, repair and align body of vehicle
- 805F020 Straighten and align floor pans
- 805F021 Protect gas tanks prior to working on vehicle
- 805F022 Rough out metals
- 805F023 Align and fit sheet metal
- 805F024 Straighten deformed auto body sheet metal
- 805F025 Repair rust damage with sheet metal
- 805F026 Remove minor dents from sheet metal
- 805F027 Remove major dents from sheet metal
- 805F028 Repair tears in sheet metal
- 805F029 Hot shrink damaged metal areas
- 805F030 Arc weld vehicle body parts
- 805F031 MIG weld vehicle body parts
- 805F032 Cut and bend metal with O-A equipment
- 805F033 Repair rust damage with fiberglass
- 805F034 Repair damaged fiberglass
- 805F035 Fill and smooth areas with plastic body filler
- 805F036 Fill and smooth areas with body solder

## AUTO BODY REPAIRER

### DUTY G: Repairing Frame Damage

- 805G001 Diagnose type of frame damage
- 805G002 Straighten and align sag frame damage
- 805G003 Straighten and align twist frame damage
- 805G004 Straighten and align sway frame damage
- 805G005 Straighten and align diamond frame damage
- 805G006 Straighten and align mash frame damage
- 805G007 Repair combination frame damage
- 805G008 Diagnose damage on unitized frame
- 805G009 Repair damage on unitized frame
- 805G010 Repair frame damage on front drive vehicle
- 805G011 Repair or replace fuel tanks
- 805G012 Weld frames
- 805G013 Straighten, repair and align frame of vehicle

### DUTY H: Repairing, Replacing, Adjusting and Installing Trim and Accessories

- 805H001 Replace locks and latches
- 805H002 Remove, replace and adjust power window control units
- 805H003 Repair or replace window raising and lowering mechanisms
- 805H004 Remove and replace seats and shoulder belts
- 805H005 Remove and replace floor mats and carpets
- 805H006 Remove and replace grills
- 805H007 Remove and replace interior trim and molding
- 805H008 Remove and replace exterior trim and molding
- 805H009 Drop and install headliner
- 805H010 Remove and replace weather strips
- 805H011 Clean interior fabrics
- 805H012 Clean vehicle for delivery
- 805H013 Clean and detail vehicle engine compartment

### DUTY I: Painting and Refinishing

- 805I001 Apply corrosion materials
- 805I002 Apply primer surfacer
- 805I003 Clean and prepare repaired surfaces for painting
- 805I004 Dry sand vehicle
- 805I005 Wet sand vehicle
- 805I006 Sand surfaces for spot painting
- 805I007 Mask sections and parts
- 805I008 Finish painted surfaces
- 805I009 Heat dry painted surface
- 805I010 Verify color code match with manufacturer's information
- 805I011 Verify color match with customer
- 805I012 Featheredge paint around repaired areas
- 805I013 Sand primer surfaces
- 805I014 Apply sealers
- 805I015 Mix paints
- 805I016 Apply lacquer
- 805I017 Apply acrylic enamel
- 805I018 Apply polyurethane enamel
- 805I019 Apply alkyd enamel

## AUTO BODY REPAIRER

- 805I020 Apply undercoats
- 805I021 Apply clear coats
- 805I022 Mask vehicle for special painting effects
- 805I023 Apply special painting effects
- 805I024 Compound, polish and detail lacquer paint job
- 805I025 Compound, polish and detail enamel paint job

### DUTY J: Removing and Installing Glass

- 805J001 Remove and replace windshield
- 805J002 Remove and replace rear glass
- 805J003 Remove and replace door glass
- 805J004 Adjust or align windows in doors
- 805J005 Remove and replace vent window assembly
- 805J006 Remove and replace quarter windows
- 805J007 Remove and replace sun roof glass
- 805J008 Remove and replace rear tailgate glass
- 805J009 Remove damaged glass and install replacement
- 805J010 Test for and seal leaks

### DUTY K: Repairing Electrical Body Components

- 805K001 Align head lamps
- 805K002 Insure vehicle lights are operational
- 805K003 Service battery
- 805K004 Replace defective light bulbs
- 805K005 Repair or replace damaged electrical components
- 805K006 Replace turn signals or flasher units
- 805K007 Troubleshoot vehicle electrical system



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# **INDUSTRIAL OCCUPATIONS 1988**

**Bus Driver**  
**\*Employability Skills**

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## BUS DRIVER

### DUTY A: Performing Pre-Trip Inspection

- 810A001 Inspect exterior of unit for general appearance and condition
- 810A002 Inspect interior of unit for general appearance and condition
- 810A003 Check safety equipment
- 810A004 Secure cargo
- 810A005 Conduct performance inspection within first twenty-five miles

### DUTY B: Performing Pre-Trip Recordkeeping

- 810B001 Sign prepared condition report
- 810B002 Check for accident reports packet
- 810B003 Check route

### DUTY C: Backing and Parking

- 810C001 Back unit using mirrors
- 810C002 Park unit
- 810C003 Secure unit when parked
- 810C004 Enter traffic from parked position

### DUTY D: Slowing and Stopping

- 810D001 Slow unit using brakes
- 810D002 Slow unit by gearing down
- 810D003 Stop unit
- 810D004 Apply cool down and shut off procedures

### DUTY E: Operating in Traffic, Passing and Turning

- 810E001 Drive unit through turns
- 810E002 Drive unit through intersections
- 810E003 Drive unit across railroad grades
- 810E004 Drive unit on open highway
- 810E005 Pass other vehicles on two-lane highway
- 810E006 Pass other vehicles on four-or-more-lane highway

### DUTY F: Placing Vehicle in Motion and Using Controls

- 810F001 Start and warm up engine
- 810F002 Check instruments at regular intervals
- 810F003 Maintain proper engine revolutions per minute while driving
- 810F004 Test service brake
- 810F005 Build full pressure in air tanks before starting

## BUS DRIVER

### DUTY G: Keeping Records for Pickup and Delivery

- 810G001 Fill out logbooks as prescribed by Federal regulations
- 810G002 Notify dispatch immediately in event of an emergency
- 810G003 Report delays to company
- 810G004 Complete accident reports
- 810G005 Follow company postaccident reporting procedures
- 810G006 Complete daily vehicle condition report
- 810G007 Fill out detention report
- 810G008 Follow inspection station procedures

### DUTY H: Performing Emergency Procedures

- 810H001 Change tires
- 810H002 Make emergency repairs to electrical system
- 810H003 Make emergency repairs to damaged water lines
- 810H004 Respond to emergency involving personal injury
- 810H005 Respond to emergency involving vehicle damage
- 810H006 Perform first aid on burns
- 810H007 Perform first aid for shock
- 810H008 Perform first aid for external bleeding
- 810H009 Apply liability and Good Samaritan laws regarding emergency first aid
- 810H010 Operate citizens band (CB) radio equipment
- 810H011 Prepare vehicle and roadway for disabled vehicle

### DUTY I: Complying with Licensing Regulations

- 810I001 Read and interpret U.S. Department of Transportation regulations
- 810I002 Read and interpret State Department of Transportation regulations
- 810I003 Take and pass U.S. Department of Transportation Motor Carrier Regulations written test
- 810I004 Take and pass U.S. Department of Transportation Motor Carrier Regulations road test
- 810I005 Take and pass State Department of Transportation driver's written test
- 810I006 Take and pass State Department of Transportation driver's road test
- 810I007 Attend necessary licensing seminars
- 810I008 Obtain and maintain necessary driving permits

### DUTY J: Performing Bus Driving Skills

- 810J001 Load baggage
- 810J002 Unload baggage
- 810J003 Assist passengers with baggage
- 810J004 Record cash receipts
- 810J005 Collect tickets and fares



BUS DRIVER

- 810J006 Regulate coach environment for passenger comfort
- 810J007 Report delays to passengers
- 810J008 Transport passengers over specified route according to time schedule
- 810J009 Admonish individuals to be seated and orderly while en route



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# **INDUSTRIAL OCCUPATIONS 1988**

**Drafter/Computer–Aided Drafter**

**\*Employability Skills**

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DUTY A: Planning and Organizing Activities

- 815A001 Determine scope of a drafting job
- 815A002 Determine numbers and sizes of drawings
- 815A003 Apply appropriate drafting standards to drawings
- 815A004 Select appropriate drafting techniques for assigned drawings
- 815A005 Maintain supporting documents for drawing files

DUTY B: Researching Information

- 815B001 Locate information using manufacturers' catalogs
- 815B002 Locate information using engineering handbooks
- 815B003 Locate information using microfilm files
- 815B004 Locate information using computer data files
- 815B005 Confirm materials availability
- 815B006 Research architectural graphic standards

DUTY C: Performing General Office Procedures

- 815C001 Maintain client rapport
- 815C002 Participate in client conferences
- 815C003 Interpret plans
- 815C004 Coordinate work with engineering personnel
- 815C005 Coordinate work with welding shop personnel
- 815C006 Coordinate work with sheet metal shop personnel
- 815C007 Coordinate architectural drawings
- 815C008 Coordinate civil drawings
- 815C009 Coordinate structural drawings
- 815C010 Coordinate mechanical drawings
- 815C011 Coordinate electrical drawings
- 815C012 Coordinate other drawings
- 815C013 Check plan dimensions
- 815C014 Maintain drafting instruments and equipment
- 815C015 Clean drafting instruments and equipment
- 815C016 File original working drawings
- 815C017 Maintain and care for CAD work station
- 815C018 Start up, log/on, retrieve, save, log/off and shut down CAD system
- 815C019 Analyze and communicate equipment failure
- 815C020 Produce set drawings

DUTY D: Preparing Sketches

- 815D001 Draw freehand sketches
- 815D002 Draw isometric sketches
- 815D003 Draw orthographic sketches
- 815D004 Draw pictorial sketches
- 815D005 Read and transfer measurements
- 815D006 Prepare proportional design sketches
- 815D007 Draw oblique sketches

DUTY E: Performing Basic Layouts

- 815E001 Work from written instructions to produce drawings
- 815E002 Work from verbal instructions to produce drawings
- 815E003 Perform basic layouts to specified tolerances
- 815E004 Render designs in pencil

DUTY F: Detailing Drawings

- 815F001 Draw individual parts from assembly drawings
- 815F002 Draw individual parts from existing parts
- 815F003 Interpret assembly drawings
- 815F004 Draw orthographic projections
- 815F005 Draw sectional views
- 815F006 Draw auxiliary views
- 815F007 Draw isometric views
- 815F008 Draw intersection and development drawings
- 815F009 Dimension and tolerance drawings
- 815F010 Apply geometric tolerances to drawings
- 815F011 Apply standard fits to drawings
- 815F012 Apply x-y coordinate dimensioning standards to drawings
- 815F013 Add title block information to drawings
- 815F014 Letter presentation drawings
- 815F015 Note special instructions on drawings

DUTY G: Using Reproduction Techniques

- 815G001 Reproduce drawings on blueprint machines
- 815G002 Reproduce drawings on dry copy machines
- 815G003 Create hard copy using a plotter
- 815G004 Create hard copy using a printer
- 815G005 Copy existing drawings using digitizing techniques

DUTY H: Performing Presentation Techniques

- 815H001 Prepare plan abbreviations list
- 815H002 Produce graphs
- 815H003 Produce flow diagrams

DUTY I: Producing Architectural Drawings

- 815I001 Construct architectural symbols
- 815I002 Produce representative architectural drawings
- 815I003 Interpret local, state and federal architectural codes
- 815I004 Complete FHA specification forms
- 815I005 Check architectural drawings
- 815I006 Draw presentation floor plans
- 815I007 Draw presentation elevation views
- 815I008 Draw one point interior presentation views
- 815I009 Draw two point interior presentation views
- 815I010 Draw exterior perspective views
- 815I011 Illustrate landscape features

815I012 Sketch preliminary plan layouts  
 815I013 Sketch preliminary elevations  
 815I014 Sketch preliminary sections  
 815I015 Draw scaled floor plans  
 815I016 Draw foundation plans  
 815I017 Draw foundation sections  
 815I018 Reproduce common plan features  
 815I019 Draw exterior elevations  
 815I020 Draw framing plans  
 815I021 Draw typical wall sections  
 815I022 Draw parapet and roof sections  
 815I023 Dimension section drawings  
 815I024 Draw stair sections  
 815I025 Draw fireplace sections  
 815I026 Draw chimney sections  
 815I027 Draw door sections  
 815I028 Draw window sections  
 815I029 Draw bathroom sections  
 815I030 Draw cabinet sections and details  
 815I031 Draw millwork (trim) sections  
 815I032 Draw door and window schedules  
 815I033 Draw finish schedules  
 815I034 Draw floor sections  
 815I035 Draw attic sections  
 815I036 Draw shaft sections  
 815I037 Draw typical closet sections  
 815I038 Prepare residential house plumbing plans  
 815I039 Prepare residential house HVAC plans  
 815I040 Prepare residential house electrical plans

DUTY J: Drawing Light Commercial Building Plans

815J001 Draw commercial building floor plans  
 815J002 Draw commercial building foundation plans  
 815J003 Draw commercial building framing plans  
 815J004 Draw commercial building roof plans  
 815J005 Draw commercial building site plans  
 815J006 Draw commercial building elevations  
 815J007 Construct commercial building section drawings  
 815J008 Prepare commercial building door, window and finish schedules  
 815J009 Prepare commercial building plumbing plans  
 815J010 Prepare commercial building HVAC plans  
 815J011 Prepare commercial building electrical plans  
 815J012 Prepare commercial building landscape plans  
 815J013 Dimension commercial building plans  
 815J014 Check commercial building plans  
 815J015 Prepare commercial building quantity estimates

DUTY K: Producing Structural Working Drawings

815K001 Construct structural drafting symbols  
 815K002 Interpret local, state and federal structural codes  
 815K003 Prepare bills of materials from structural drawings

815K004 Draw structural steel plans  
 815K005 Dimension structural steel drawings  
 815K006 Draw beam connections  
 815K007 Construct column detail drawings  
 815K008 Construct detail truss drawings for timber  
 815K009 Prepare structural foundation and slab plans  
 815K010 Prepare structural floor framing plans  
 815K011 Prepare structural roof framing plans  
 815K012 Draw structural sections and details  
 815K013 Draw structural concrete foundation plans  
 815K014 Prepare column and beam schedule for structural steel  
 815K015 Prepare column and beam schedule for reinforcing steel  
 815K016 Check structural drawings

## DUTY L: Producing Mechanical Working Drawings

815L001 Construct mechanical drafting symbols  
 815L002 Construct sheet metal drafting symbols  
 815L003 Construct tool design symbols  
 815L004 Prepare bills of materials from mechanical drawings  
 815L005 Produce parts lists for mechanical assembly drawings  
 815L006 Construct mechanical orthographic assembly drawings  
 815L007 Construct mechanical orthographic subassembly drawings  
 815L008 Detail components of mechanical orthographic assembly drawings  
 8.5L009 Detail components of mechanical orthographic subassembly drawings  
 815L010 Construct mechanical isometric assembly drawings  
 815L011 Construct mechanical isometric subassembly drawings  
 815L012 Construct mechanical isometric exploded view drawings  
 815L013 Construct jig drawings  
 815L014 Construct fixture drawings  
 815L015 Construct sheet metal development drawings  
 815L016 Construct HVAC drawings  
 815L017 Construct forming die drawings  
 815L018 Check mechanical drawings  
 815L019 Design new equipment

## DUTY M: Producing Electrical and Electronic Working Drawings

815M001 Construct electrical drafting symbols  
 815M002 Construct electronic drafting symbols  
 815M003 Prepare bills of materials from electrical drawings  
 815M004 Prepare bills of materials from electronic drawings  
 815M005 Interpret local, state and federal electrical codes  
 815M006 Draw electrical block diagrams  
 815M007 Draw electrical schematic diagrams  
 815M008 Draw electrical connection diagrams  
 815M009 Draw electronic block diagrams  
 815M010 Draw electronic schematic diagrams  
 815M011 Draw electronic connection diagrams  
 815M012 Draw industrial controls ladder diagrams  
 815M013 Draw electrical power single-line diagrams

DUTY N: Producing Civil Engineering Drawings

- 815N001 Produce detailed construction drawings
- 815N002 Develop topographical profiles
- 815N003 Develop specification sheets for highway construction
- 815N004 Develop specification sheets for river and harbor improvements
- 815N005 Produce plans for flood control

DUTY O: Using CAD Command Processes

- 815O001 Build data base
- 815O002 Edit data base
- 815O003 Create plotter files
- 815O004 Create disk files
- 815O005 Copy disk files
- 815O006 Execute specialized programs
- 815O007 Develop backup files
- 815O008 Restore backup files
- 815O009 Develop configure/control changes
- 815O010 Develop execute lists using command language
- 815O011 Write simple FORTRAN program

DUTY P: Producing Drawings Using CAD

- 815P001 Generate grid on drawing
- 815P002 Select appropriate geometry to create lines, circles and arcs
- 815P003 Select appropriate geometry to create curves, tangents, fillets, chamfers and bevels
- 815P004 Develop three-dimensional drawings
- 815P005 Select appropriate line work, weights and color
- 815P006 Apply layering techniques





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# **INDUSTRIAL OCCUPATIONS 1988**

Truck Driver  
\*Employability Skills

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## TRUCK DRIVER

### DUTY A: Performing Pre-Trip Inspection

- 820A001 Inspect exterior of unit for general appearance and condition
- 820A002 Inspect interior of unit for general appearance and condition
- 820A003 Check safety equipment
- 820A004 Secure cargo
- 820A005 Check specialized cargo handling equipment
- 820A006 Conduct performance inspection before leaving terminal

### DUTY B: Performing Pre-Trip Recordkeeping

- 820B001 Check and secure tractor trailer or vehicle permit
- 820B002 Sign prepared condition report
- 820B003 Check freight bills
- 820B004 Check for accident reports packet
- 820B005 Check route
- 820B006 Check hazardous materials placards
- 820B007 Complete hazardous materials loading chart
- 820B008 Obtain gross-ton weight

### DUTY C: Coupling and Uncoupling Trailers

- 820C001 Align tractor to trailer before backing
- 820C002 Connect gladhands to trailer brakes before coupling
- 820C003 Connect gladhands and light line
- 820C004 Couple tractor to trailer
- 820C005 Raise and lower landing gear fully
- 820C006 Check visually kingpin assembly for proper coupling
- 820C007 Check coupling and try to pull away from trailer
- 820C008 Check that surface will support trailer before uncoupling

### DUTY D: Backing and Parking

- 820D001 Back unit using mirrors
- 820D002 Park unit
- 820D003 Secure unit when parked
- 820D004 Enter traffic from parked position

### DUTY E: Slowing and Stopping

- 820E001 Slow unit using brakes
- 820E002 Slow unit by gearing down
- 820E003 Stop unit
- 820E004 Apply cool down and shut off procedures

### DUTY F: Operating in Traffic, Passing and Turning

- 820F001 Drive unit through turns
- 820F002 Drive unit through intersections

## TRUCK DRIVER

- 820F003 Drive unit across railroad grades
- 820F004 Drive unit on open highway
- 820F005 Pass other vehicles on two-lane highway
- 820F006 Pass other vehicles on four-or-more-lane highway

### DUTY G: Placing Vehicle in Motion and Using Controls

- 820G001 Start and warm up engine
- 820G002 Check instruments at regular intervals
- 820G003 Maintain proper engine revolutions per minute while driving
- 820G004 Check tractor-protection valve
- 820G005 Test service brake
- 820G006 Build full pressure in air tanks before starting

### DUTY H: Keeping Records for Pickup and Delivery

- 820H001 Fill out logbooks as prescribed by Federal regulations
- 820H002 Notify dispatch immediately in event of emergency
- 820H003 Report delays to company
- 820H004 Complete accident reports
- 820H005 Follow company postaccident reporting procedures
- 820H006 Complete daily vehicle condition report
- 820H007 Fill out detention report
- 820H008 Place hazardous materials shipping papers on driver's seat when vehicle is unattended
- 820H009 Note damaged merchandise exceptions on shipping document dispatch
- 820H010 Inspect cargo condition prior to delivery
- 820H011 Handle cash on delivery (C.O.D.) shipments
- 820H012 Verify door seal number against shipping document
- 820H013 Fill out trip lease reports
- 820H014 Follow Port of Entry and Exit procedures
- 820H015 Follow inspection station procedures

### DUTY I: Performing Emergency Procedures

- 820I001 Change tires
- 820I002 Make emergency repairs to electrical system
- 820I003 Make emergency repairs to damaged water lines
- 820I004 Service refrigerator unit to insure air, fuel, oil and water
- 820I005 Respond to emergency involving personal injury
- 820I006 Respond to emergency involving vehicle damage
- 820I007 Respond to emergency involving other damage
- 820I008 Perform first aid on burns
- 820I009 Perform first aid for shock
- 820I010 Perform first aid for external bleeding
- 820I011 Apply liability and Good Samaritan laws regarding emergency first aid
- 820I012 Operate citizens band (CB) radio equipment

TRUCK DRIVER

DUTY J: Complying with Licensing Regulations

- 820J001 Read and interpret U.S. Department of Transportation regulations
- 820J002 Read and interpret State Department of Transportation regulations
- 820J003 Take and pass U.S. Department of Transportation Motor Carrier Safety Regulations written test
- 820J004 Take and pass U.S. Department of Transportation Motor Carrier Safety Regulations road test
- 820J005 Take and pass State Department of Transportation driver's written test
- 820J006 Take and pass State Department of Transportation driver's road test
- 820J007 Attend necessary licensing seminars
- 820J008 Obtain and maintain necessary driving permits

DUTY K: Transferring Cargo

- 820K001 Load cargo
- 820K002 Unload cargo



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# **INDUSTRIAL OCCUPATIONS 1988**

**Correction Officers and Jailers  
\*Employability Skills**

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DUTY A: Acquiring and Maintaining a Uniform

- 825A001 Acquire uniform
- 825A002 Maintain the uniform in serviceable condition
- 825A003 Care for and clean equipment

DUTY B: Patrolling Areas

- 825B001 Demonstrate foot patrol methods
- 825B002 Patrol area on foot
- 825B003 Inspect patrol vehicle and equipment
- 825B004 Demonstrate vehicle patrol methods
- 825B005 Patrol area in a vehicle

DUTY C: Handling Misdemeanors

- 825C001 Handle officer-witnessed misdemeanors
- 825C002 Handle misdemeanors not witnessed by an officer

DUTY D: Handling Felonies

- 825D001 Manage felony calls
- 825D002 Complete a preliminary felony investigation
- 825D003 Gather and process physical evidence of a felony

DUTY E: Making Arrests

- 825E001 Assess the arrest situation
- 825E002 Make the arrest
- 825E003 Inform suspect of their rights

DUTY F: Testifying in Court

- 825F001 Prepare for court
- 825F002 Testify in court

DUTY G: Maintaining and Using Weapons

- 825G001 Inspect handguns
- 825G002 Care for and maintain handguns
- 825G003 Qualify with handguns
- 825G004 Use handguns
- 825G005 Secure handguns
- 825G006 Inspect shotguns
- 825G007 Care for and maintain shotguns
- 825G008 Qualify with shotguns
- 825G009 Use shotguns
- 825G010 Secure shotguns
- 825G011 Inspect shoulder arms
- 825G012 Care for and maintain shoulder arms



CORRECTION OFFICERS AND JAILERS

825G013 Qualify with shoulder arms  
825G014 Use shoulder arms  
825G015 Secure shoulder arms  
825G016 Use chemical agents for control

DUTY H: Handling Fire Scenes

825H001 Assess the fire scene situation  
825H002 Expedite fire fighting efforts  
825H003 Guard fire lines and property at the fire scene

DUTY I: Handling Disaster Scenes

825I001 Assess the disaster scene situation  
825I002 Expedite disaster scene rescue efforts  
825I003 Guard disaster scene lines and property

DUTY J: Handling Unlawful Gatherings

825J001 Assess the situation at the scene of an unlawful gathering  
825J002 Detect persons inciting or agitating a gathering  
825J003 Remove persons inciting or agitating a gathering

DUTY K: Handling Public Service Calls and Inquiries

825K001 Receive inquiries  
825K002 Respond to inquiries  
825K003 Receive public service calls  
825K004 Respond to public service calls

DUTY L: Handling Mentally Ill Persons

825L001 Assess the situation and mental condition of the person  
825L002 Determine the safest and best techniques to take the  
mentally ill person into custody  
825L003 Take the mentally ill person into custody  
825L004 Transport the mentally ill person to evaluation center  
825L005 Check the mentally ill person into mental health facility

DUTY M: Handling the Service and Return of Court Documents

825M001 Receive document and determine type (civil, criminal)  
825M002 Determine a plan for servicing a service document  
825M003 Return any pertinent information and the document

CORRECTION OFFICERS AND JAILERS

DUTY N: Handling Suspicious Persons

- 825N001 Assess the situation involving a suspicious person
- 825N002 Confront and question suspicious person
- 825N003 Record and report information on suspicious person

DUTY O: Handling a Dead On Arrival (DOA)

- 825O001 Receive and record information on the DOA
- 825O002 Assess the condition of the victim
- 825O003 Perform preliminary investigation on the DOA
- 825O004 Make arrests if warranted

DUTY P: Conducting Emergency Procedures

- 825P001 Administer first aid to relieve shock
- 825P002 Administer first aid for burns
- 825P003 Administer cardiopulmonary resuscitation (CPR)
- 825P004 Administer back pressure/arm lift artificial resuscitation
- 825P005 Administer mouth-to-mouth artificial resuscitation
- 825P006 Conduct a fire drill
- 825P007 Respond to apparent epileptic seizure
- 825P008 Respond to apparent diabetic coma or insulin shock
- 825P009 Respond to suicide attempt
- 825P010 Respond to escape or escape attempt
- 825P011 Respond to hostage situation

DUTY Q: Handling Special Events

- 825Q001 Prepare for special events
- 825Q002 Handle large gatherings

DUTY R: Handling Gambling, Vice and Sex Offenses

- 825R001 Detect gambling offenses
- 825R002 Detect sex offenses

DUTY S: Filing Reports and Serving on Committees

- 825S001 Select form and format for report
- 825S002 Complete reports
- 825S003 Complete a property report
- 825S004 Complete a denial of treatment or service form
- 825S005 Complete a log
- 825S006 Prepare an observation report for confined inmates
- 825S007 Complete an incident report form
- 825S008 Complete a corrective consultation report
- 825S009 Complete a disciplinary report
- 825S010 Complete a "use of force" report
- 825S011 Conduct a disciplinary report investigation
- 825S012 Serve on a classification hearing

CORRECTION OFFICERS AND JAILERS

- 825S013 Serve on a disciplinary report hearing
- 825S014 Complete referrals for psychological evaluation
- 825S015 Review a transfer order for compliance

DUTY T: Dealing with Confidential Informants

- 825T001 Develop informant contacts
- 825T002 Use informant contacts
- 825T003 Protect confidentiality of informants

DUTY U: Booking Prisoners

- 825U001 Book prisoners
- 825U002 Complete arrest paperwork
- 825U003 Evaluate possibility for bonding
- 825U004 Oversee exit bonding procedures
- 825U005 Fingerprint arrestee
- 825U006 Photograph arrestee
- 825U007 Conduct prisoner shower/spray
- 825U008 Evaluate prisoner for medical screening

DUTY V: Conducting Searches and Seizures

- 825V001 Search an open area
- 825V002 Search an enclosed area
- 825V003 Search a vehicle
- 825V004 Search person using a frisk search
- 825V005 Search person using a strip search

DUTY W: Restraining Violators

- 825W001 Restrain person with hand hold
- 825W002 Restrain person with physical methods
- 825W003 Restrain person with handcuffs
- 825W004 Restrain person with leg irons
- 825W005 Restrain inmate with straitjacket

DUTY X: Applying Narcotic Enforcement

- 825X001 Determine if narcotic crime is being planned or committed
- 825X002 Identify narcotic law violators
- 825X003 Obtain information and evidence of narcotic law violation
- 825X004 Locate contraband or stolen property

## DUTY Y: Handling Alcohol Impaired Persons

- 825Y001 Assess the situation and condition of the alcohol impaired person
- 825Y002 Determine the safest and best techniques to take the alcohol impaired person into custody
- 825Y003 Take the alcohol impaired person into custody
- 825Y004 Collect information and evidence of liquor violation
- 825Y005 Transport the alcohol impaired person to evaluation center
- 825Y006 Check the alcohol impaired person into appropriate facility

## DUTY Z: Handling a Bomb Threat

- 825Z001 Evacuate threatened premises and surrounding area
- 825Z002 Conduct preliminary bomb search
- 825Z003 Call in bomb squad for disposition of suspicious materials

## DUTY AA: Performing Guard Duty

- 825AA001 Escort/guard designated persons
- 825AA002 Escort/guard money carriers
- 825AA003 Coordinate guard functions with other agencies
- 825AA004 Check area of employer's premises
- 825AA005 Prepare guard plans
- 825AA006 Determine physical security manpower requirements
- 825AA007 Develop physical security emergency control plans
- 825AA008 Issue guard orders
- 825AA009 Inspect posts
- 825AA010 Monitor guard operations
- 825AA011 Monitor prisoners
- 825AA012 Monitor curfews
- 825AA013 Relieve guard personnel
- 825AA014 Guard entry/exit to restricted areas
- 825AA015 Guard gate or fixed post
- 825AA016 Guard perimeters of employer's premises
- 825AA017 Secure housing areas
- 825AA018 Test intrusion detection systems
- 825AA019 Investigate intrusions detected by alarms
- 825AA020 Transport arrestees/persons in custody
- 825AA021 Transport prisoners
- 825AA022 Control personnel/vehicle movement in restricted area
- 825AA023 Conduct vehicle escorts
- 825AA024 Establish barricades/roadblocks
- 825AA025 Send and receive radio transmissions
- 825AA026 Inspect mail
- 825AA027 Prepare list of confiscated and mailed items
- 825AA028 Detect and report pilferage incidents
- 825AA029 Detect and report sabotage incidents
- 825AA030 Investigate reports of sabotage/pilferage
- 825AA031 Check and verify passes and badges
- 825AA032 Maintain ID card/badges log
- 825AA033 Maintain access list/log
- 825AA034 Maintain visitor log
- 825AA035 Provide guidance/information to visitors

CORRECTION OFFICERS AND JAILERS

825AA036 Maintain lock and key list/log  
825AA037 Control locks and keys  
825AA038 Investigate lock and key losses  
825AA039 Work with guard dogs



**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

**Electric Home Appliance and Power Tool Repairer**

**\*Employability Skills**

**\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list**

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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# ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

## DUTY A: Applying Safety Practices

- 850A001 Apply basic emergency first aid techniques
- 850A002 Complete accident report
- 850A003 Inspect work area and equipment for safe working environment
- 850A004 Report shop, environmental and equipment safety violations
- 850A005 Demonstrate use of fire extinguishers
- 850A006 Participate in shop safety committee
- 850A007 Correct safety hazards
- 850A008 Demonstrate cardiopulmonary resuscitation (CPR) techniques

## DUTY B: Analyzing DC Circuits

- 850B001 Read and interpret color codes
- 850B002 Analyze, construct and troubleshoot series circuits
- 850B003 Analyze, construct and troubleshoot parallel circuits
- 850B004 Analyze, construct and troubleshoot series-parallel circuits
- 850B005 Analyze, construct and troubleshoot voltage dividers
- 850B006 Analyze, construct and verify maximum power theory
- 850B007 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits

## DUTY C: Analyzing AC Circuits

- 850C001 Set up and operate frequency counters and signal generators for AC circuits
- 850C002 Analyze, construct and troubleshoot AC capacitive circuits using a schematic
- 850C003 Analyze, construct and troubleshoot AC inductive circuits using a schematic
- 850C004 Analyze and apply principles of transformers to AC circuits using a schematic
- 850C005 Analyze, construct and troubleshoot resistor, capacitor and inductor (RCL) circuits using a schematic
- 850C006 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic
- 850C007 Analyze, construct and troubleshoot filter circuits using a schematic

## DUTY D: Performing Precision Measurement

- 850D001 Measure parts with semiprecision measuring tools
- 850D002 Inspect parts with precision measuring tools
- 850D003 Clean and store precision measuring tools
- 850D004 Verify dimensions
- 850D005 Verify alignments
- 850D006 Verify clearances
- 850D007 Inspect assemblies
- 850D008 Inspect parts with metric measuring instruments



## ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

### DUTY E: Operating Drilling Machines

- 850E001 Select drills using drill chart
- 850E002 Change drills and tool holders
- 850E003 Center drill and drill holes to size
- 850E004 Perform basic drilling machine maintenance
- 850E005 Set up precision drills

### DUTY F: Operating Bench Grinders

- 850F001 Change and dress bench grinding wheels
- 850F002 Sharpen and recondition hand tools
- 850F003 Rough grind materials
- 850F004 Perform basic bench grinder maintenance

### DUTY G: Performing Benchwork Operations

- 850G001 Cut threads with taps and dies
- 850G002 Remove threaded fasteners and repair threads
- 850G003 Finish parts with hand grinders
- 850G004 Disassemble, assemble and straighten parts using arbor press
- 850G005 Disassemble, fit and reassemble parts
- 850G006 Repair hand tools
- 850G007 Plan assembly operations
- 850G008 Work materials with hand tools
- 850G00<sup>c</sup> Work materials with portable power tools

### DUTY H: Conducting Shop Operations

- 850H001 Answer customer questions
- 850H002 Troubleshoot customer problems
- 850H003 Maintain records of service tools and equipment
- 850H004 Maintain equipment inventory
- 850H005 Maintain call record report
- 850H006 Update service manuals
- 850H007 Update parts catalogs
- 850H008 Modify wiring diagrams to reflect repair changes
- 850H009 Order parts and supplies
- 850H010 Receive and store parts and supplies
- 850H011 Unpack and inspect new equipment
- 850H012 Demonstrate appliance functions
- 850H013 Instruct customer in operation and care of appliance
- 850H014 Complete warranty cards/records
- 850H015 Read maps to locate business
- 850H016 Call for and deliver appliances
- 850H017 Obtain and check work order to determine problem
- 850H018 Determine repair method
- 850H019 Estimate time, cost and feasibility of appliance repair
- 850H020 Estimate time, cost and feasibility of power tool repair
- 850H021 Obtain parts from inventory
- 850H022 Make out materials lists used on each job
- 850H023 Calculate repair costs

## ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

- 850H024 Prepare service bill
- 850H025 Complete work orders
- 850H026 Call office for assistance or next job
- 850H027 Make service calls

### DUTY I: Performing Housekeeping and Recordkeeping

- 850I001 Clean and maintain work area and leave in safe condition
- 850I002 Follow tool crib procedures
- 850I003 Report problems to supervisor
- 850I004 Complete time cards
- 850I005 Complete job status reports
- 850I006 Make equipment failure reports
- 850I007 Use manuals to determine basic maintenance procedures
- 850I008 Participate in participation management program (Quality Circles)
- 850I009 Complete logs

### DUTY J: Troubleshooting and Repairing Precision Mechanisms

- 850J001 Align and adjust tension of belt drives
- 850J002 Troubleshoot and repair belt drives
- 850J003 Remove and replace belt drive pulleys
- 850J004 Remove and replace drive belts
- 850J005 Clean and lubricate drive systems
- 850J006 Remove and replace gear drives
- 850J007 Troubleshoot and repair gear drives
- 850J008 Align and adjust gear drives
- 850J009 Remove and replace variable speed drives
- 850J010 Troubleshoot and repair variable speed drives
- 850J011 Align and adjust variable speed drives
- 850J012 Remove and replace clutch assemblies
- 850J013 Troubleshoot and repair clutches
- 850J014 Adjust clutches
- 850J015 Remove and replace transmissions
- 850J016 Troubleshoot and repair transmissions
- 850J017 Align and adjust transmissions
- 850J018 Troubleshoot and repair couplings
- 850J019 Align and adjust couplings
- 850J020 Remove and replace packings and seals
- 850J021 Troubleshoot and repair bearing assemblies
- 850J022 Remove and replace bearing assemblies
- 850J023 Remove and replace shaft assemblies
- 850J024 Troubleshoot and repair shaft assemblies
- 850J025 Align and adjust shaft assemblies
- 850J026 Remove and replace universal joints
- 850J027 Troubleshoot and repair universal joints
- 850J028 Remove and replace linkages and lever mechanisms
- 850J029 Troubleshoot and repair linkages and lever mechanisms
- 850J030 Align and adjust linkages and lever mechanisms
- 850J031 Remove and replace cam assemblies
- 850J032 Troubleshoot and repair cam assemblies
- 850J033 Align and adjust cam assemblies
- 850J034 Remove and replace door-latch assemblies

## ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

- 850J035 Align and adjust door-latch assemblies
- 850J036 Remove and replace door hardware
- 850J037 Align and adjust door hardware
- 850J038 Remove and replace door gaskets
- 850J039 Adjust appliance brake system
- 850J040 Remove and replace appliance brake system
- 850J041 Troubleshoot and repair appliance brake system
- 850J042 Remove and replace appliance drum rollers
- 850J043 Adjust appliance drum rollers
- 850J044 Remove and replace appliance drums
- 850J045 Troubleshoot and repair appliance drums
- 850J046 Align and adjust appliance drums
- 850J047 Remove and replace appliance fan blades and impellers
- 850J048 Clean appliances
- 850J049 Touch up appliance cabinets
- 850J050 Troubleshoot appliance mechanical problems
- 850J051 Lubricate appliances

### DUTY K: Maintaining and Repairing Appliance Plumbing Systems

- 850K001 Bend copper tubing with spring bender
- 850K002 Braze pipes with gas torch and filler metal
- 850K003 Cut copper tubing and pipes with hacksaw
- 850K004 Cut copper tubing and pipes with tubing cutter
- 850K005 Join copper tubing to steel pipes
- 850K006 Remove and replace copper tubing connectors
- 850K007 Repair copper tubing connectors
- 850K008 Remove and replace hoses, couplings and gaskets
- 850K009 Remove and replace appliance water valves
- 850K010 Troubleshoot and repair appliance water valves
- 850K011 Remove and replace appliance water pumps
- 850K012 Troubleshoot and repair appliance water pumps
- 850K013 Remove and replace appliance float sensors and switches
- 850K014 Troubleshoot and repair appliance float sensors and switches
- 850K015 Remove and replace appliance pressure sensors and switches
- 850K016 Troubleshoot and repair appliance pressure sensors and switches
- 850K017 Repair appliance watertight containers or units
- 850K018 Troubleshoot appliance plumbing systems
- 850K019 Remove and replace appliance plumbing system filters

### DUTY L: Maintaining and Repairing Appliance Heating and Cooling Systems

- 850L001 Calibrate and adjust appliance thermostat
- 850L002 Remove and replace appliance thermostat
- 850L003 Troubleshoot and repair appliance thermostat
- 850L004 Calibrate and adjust appliance thermocouple
- 850L005 Remove and replace appliance thermocouple
- 850L006 Troubleshoot and repair appliance thermocouple
- 850L007 Lubricate appliance air compressor
- 850L008 Adjust appliance air compressor
- 850L009 Remove and replace appliance air compressor
- 850L010 Troubleshoot and repair appliance air compressor
- 850L011 Clean appliance condenser/evaporator

## ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

850L012 Remove and replace appliance condenser  
850L013 Troubleshoot and repair appliance condenser  
850L014 Remove and replace appliance evaporator  
850L015 Troubleshoot and repair appliance evaporator  
850L016 Drain and charge window air-conditioning system  
850L017 Perform seasonal maintenance on window air conditioner  
850L018 Remove and replace appliance dryer/strainer  
850L019 Troubleshoot and repair appliance dryer/strainer  
850L020 Flush, dehydrate and charge appliance refrigeration system  
850L021 Remove and replace appliance refrigeration system valves  
850L022 Remove and replace appliance refrigeration system lines  
850L023 Clean appliance cooling coils  
850L024 Remove and replace appliance cooling coils  
850L025 Test appliance refrigeration system for leaks  
850L026 Repair appliance refrigeration system leaks  
850L027 Troubleshoot and repair appliance refrigeration system  
850L028 Calibrate and adjust appliance airflow controls  
850L029 Calibrate and adjust appliance temperature controls  
850L030 Remove and replace appliance air filters and air bags  
850L031 Remove and replace appliance fan  
850L032 Troubleshoot and repair appliance fan  
850L033 Remove and replace appliance burner controls  
850L034 Remove and replace appliance heating elements  
850L035 Remove and replace appliance ignition controls  
850L036 Remove and replace appliance ignitors  
850L037 Troubleshoot and repair appliance ignition systems  
850L038 Adjust appliance gas burners  
850L039 Remove and replace appliance gas burner assembly  
850L040 Clean appliance gas burners  
850L041 Remove and replace appliance gas lines  
850L042 Remove and replace appliance gas valves  
850L043 Remove and replace appliance safety valves  
850L044 Remove and replace appliance pressure regulators  
850L045 Troubleshoot and repair appliance pressure regulators  
850L046 Remove and replace appliance standing pilots  
850L047 Troubleshoot and repair appliance standing pilots  
850L048 Remove and replace appliance flame sensors  
850L049 Test appliance gas lines, connections and valves for leaks  
850L050 Repair appliance gas leaks  
850L051 Troubleshoot and repair appliance gas burner system  
850L052 Remove and replace appliance insulation  
850L053 Remove and replace appliance vents  
850L054 Install appliance vents  
850L055 Install range hood  
850L056 Remove and replace range hood

### DUTY M: Maintaining and Repairing Electrical Systems

850M001 Replace fuses  
850M002 Troubleshoot and repair fuse system  
850M003 Troubleshoot electrical control components  
850M004 Replace faulty electrical cords and plugs  
850M005 Remove and replace motor controls  
850M006 Troubleshoot and repair motor controls  
850M007 Lubricate electric motor

## ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

- 850M008 Remove and replace electric motor
- 850M009 Troubleshoot and repair electric motor
- 850M010 Remove and replace electric motor starter circuit
- 850M011 Calibrate and adjust sensors
- 850M012 Remove and replace sensors
- 850M013 Troubleshoot and repair sensors
- 850M014 Remove and replace microwave oven magnetron tube
- 850M015 Troubleshoot and repair microwave oven magnetron tube
- 850M016 Remove and replace power supply
- 850M017 Troubleshoot and repair power supply
- 850M018 Remove and replace solenoid
- 850M019 Remove and replace condenser
- 850M020 Remove and replace power transformer
- 850M021 Troubleshoot and repair power transformer
- 850M022 Remove and replace panel lights
- 850M023 Remove and replace appliance buzzers and chimes
- 850M024 Troubleshoot and repair appliance light and sound systems
- 850M025 Remove and replace relays and timers
- 850M026 Troubleshoot and repair relays and timers
- 850M027 Remove and replace circuit breakers
- 850M028 Check for overloaded circuits
- 850M029 Wire parallel circuits
- 850M030 Wire series circuits
- 850M031 Wire series-parallel circuits
- 850M032 Connect single pole switches
- 850M033 Install single pole switches with pilot light
- 850M034 Install timer or delayed action switches
- 850M035 Remove and replace switches
- 850M036 Troubleshoot and repair switches
- 850M037 Remove and replace defective wiring
- 850M038 Clean electrical connections
- 850M039 Determine adequacy of home wiring
- 850M040 Determine electrical problems using available troubleshooting techniques
- 850M041 Interpret control diagrams for electrical systems
- 850M042 Diagnose malfunctions of electrical systems using test and measurement equipment

### DUTY N: Maintaining and Repairing Electronic Systems

- 850N001 Determine electronic problems using available troubleshooting techniques
- 850N002 Interpret control diagrams for electronic systems
- 850N003 Diagnose malfunctions of electronic systems using available test and measurement equipment
- 850N004 Remove and replace printed circuit boards
- 850N005 Remove and replace chips
- 850N006 Remove and replace transistors
- 850N007 Remove and replace electronic components
- 850N008 Clean connections on electronic components
- 850N009 Set user switches
- 850N010 Troubleshoot and repair electronic components

DUTY O: Installing Major Appliances

- 8500001 Install dishwasher
- 8500002 Install electric washing machine
- 8500003 Install electric clothes dryer
- 8500004 Install gas clothes dryer
- 8500005 Install window air conditioner
- 8500006 Install electric range
- 8500007 Install gas range
- 8500008 Install refrigerator
- 8500009 Install freezer
- 8500010 Install trash compactor
- 8500011 Install garbage disposal
- 8500012 Install microwave oven
- 8500013 Install icemaker
- 8500014 Install other major appliances
- 8500015 Level major appliance
- 8500016 Adjust doors and latches
- 8500017 Adjust appliance to specifications
- 8500018 Inspect appliance to verify operation

DUTY P: Troubleshooting and Repairing Major Appliances

- 850P001 Troubleshoot and repair dishwasher
- 850P002 Troubleshoot and repair electric washing machine
- 850P003 Troubleshoot and repair electric clothes dryer
- 850P004 Troubleshoot and repair gas clothes dryer
- 850P005 Troubleshoot and repair window air conditioner
- 850P006 Troubleshoot and repair electric range
- 850P007 Troubleshoot and repair gas range
- 850P008 Troubleshoot and repair refrigerator
- 850P009 Troubleshoot and repair freezer
- 850P010 Troubleshoot and repair trash compactor
- 850P011 Troubleshoot and repair garbage disposal
- 850P012 Troubleshoot and repair microwave oven
- 850P013 Troubleshoot and repair other major appliances

DUTY Q: Troubleshooting and Repairing Small Appliances

- 850Q001 Troubleshoot and repair vacuum cleaner
- 850Q002 Troubleshoot and repair humidifier
- 850Q003 Troubleshoot and repair dehumidifier
- 850Q004 Troubleshoot and repair other small appliances

DUTY R: Troubleshooting and Repairing Bench Power Tools

- 850R001 Troubleshoot and repair table saw
- 850R002 Troubleshoot and repair radial arm saw
- 850R003 Troubleshoot and repair band saw
- 850R004 Troubleshoot and repair scroll saw
- 850R005 Troubleshoot and repair bench lathe
- 850R006 Troubleshoot and repair bench grinder
- 850R007 Troubleshoot and repair planer

ELECTRIC HOME APPLIANCE AND POWER TOOL REPAIRER

850R008 Troubleshoot and repair joiner  
850R009 Troubleshoot and repair bench drill press  
850R010 Troubleshoot and repair shop vac  
850R011 Troubleshoot and repair power miter box  
850R012 Troubleshoot and repair disk and belt sander  
850R013 Troubleshoot and repair other bench power tools

DUTY S: Troubleshooting and Repairing Hand Power Tools

850S001 Troubleshoot and repair circular saws  
850S002 Troubleshoot and repair drills  
850S003 Troubleshoot and repair jig saw  
850S004 Troubleshoot and repair router  
850S005 Troubleshoot and repair rotary sander  
850S006 Troubleshoot and repair belt sander  
850S007 Troubleshoot and repair reciprocating sander  
850S008 Troubleshoot and repair power screwdrivers  
850S009 Troubleshoot and repair staple guns  
850S010 Troubleshoot and repair other hand power tools



**Education  
For  
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Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

**Office Machine/Cash Register Repairer  
\*Employability Skills**

**\*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list**



**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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OFFICE MACHINE/CASH REGISTER REPAIRER

DUTY A: Applying Safety Practices

- 855A001 Apply basic emergency first aid techniques
- 855A002 Complete accident report
- 855A003 Inspect work area and equipment for safe working environment
- 855A004 Report shop, environmental and equipment safety violations
- 855A005 Demonstrate use of fire extinguishers
- 855A006 Participate in shop safety committee
- 855A007 Correct safety hazards
- 855A008 Demonstrate cardiopulmonary resuscitation (CPR) techniques

DUTY B: Analyzing DC Circuits

- 855B001 Read and interpret color codes
- 855B002 Analyze, construct and troubleshoot series circuits
- 855B003 Analyze, construct and troubleshoot parallel circuits
- 855B004 Analyze, construct and troubleshoot series-parallel circuits
- 855B005 Analyze, construct and troubleshoot voltage dividers
- 855B006 Analyze, construct and verify maximum power theory
- 855B007 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits

DUTY C: Analyzing AC Circuits

- 855C001 Set up and operate frequency counters and signal generators for AC circuits
- 855C002 Analyze, construct and troubleshoot AC capacitive circuits using a schematic
- 855C003 Analyze, construct and troubleshoot AC inductive circuits using a schematic
- 855C004 Analyze and apply principles of transformers to AC circuits using a schematic
- 855C005 Analyze, construct and troubleshoot resistor, capacitor and inductor (RCL) circuits using a schematic
- 855C006 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic
- 855C007 Analyze, construct and troubleshoot filter circuits using a schematic

DUTY D: Analyzing Solid State Devices

- 855D001 Analyze, construct and troubleshoot simple common base amplifiers using a schematic
- 855D002 Analyze, construct and troubleshoot simple common emitters using a schematic
- 855D003 Analyze, construct and troubleshoot simple common collectors using a schematic
- 855D004 Examine field effect transistor (FET) characteristics
- 855D005 Analyze, construct and troubleshoot simple common sources using a schematic
- 855D006 Analyze, construct and troubleshoot simple common drains using a schematic

## OFFICE MACHINE/CASH REGISTER REPAIRER

- 855D007 Analyze, construct and troubleshoot simple common gains using a schematic
- 855D008 Analyze, construct and troubleshoot thyristors using a schematic
- 855D009 Analyze, construct and troubleshoot integrated circuit operational amplifiers using a schematic
- 855D010 Analyze, construct and troubleshoot optoelectronic devices using a schematic

### DUTY E: Conducting Shop Operations

- 855E001 Answer customer questions
- 855E002 Troubleshoot customer problems
- 855E003 Perform public relations activities
- 855E004 Establish customer and equipment history file
- 855E005 Establish customer files
- 855E006 Maintain records of service tools and equipment
- 855E007 Maintain equipment inventory
- 855E008 Maintain call record report
- 855E009 Update service manuals
- 855E010 Update parts catalogs
- 855E011 Update on-site maintenance log
- 855E012 Order parts and supplies
- 855E013 Receive and store parts and supplies
- 855E014 Unpack and inspect new equipment
- 855E015 Prepare items for shipping
- 855E016 Demonstrate office equipment functions
- 855E017 Instruct customer in operation and care of office equipment
- 855E018 Complete warranty cards/records
- 855E019 Read maps to locate business
- 855E020 Call for and deliver office machines
- 855E021 Obtain and check work order to determine problem
- 855E022 Determine repair method
- 855E023 Estimate time and cost of office equipment repair
- 855E024 Obtain parts from inventory
- 855E025 Obtain loaner item from inventory
- 855E026 Make out materials lists used on each job
- 855E027 Calculate repair costs
- 855E028 Complete a sales slip
- 855E029 Prepare service bill
- 855E030 Complete work orders
- 855E031 Call office for assistance or next job
- 855E032 Make service calls

### DUTY F: Performing Housekeeping and Recordkeeping

- 855F001 Clean and maintain work area and leave in safe condition
- 855F002 Follow tool crib procedures
- 855F003 Report problems to supervisor
- 855F004 Complete time cards
- 855F005 Complete job status reports
- 855F006 Make equipment failure reports
- 855F007 Use manuals to determine basic maintenance procedures

OFFICE MACHINE/CASH REGISTER REPAIRER

- 855F008 Participate in participation management program (Quality Circles)
- 855F009 Complete logs

DUTY G: Troubleshooting and Repairing Precision Mechanisms

- 855G001 Align and adjust tension of belt drives
- 855G002 Troubleshoot and repair belt drives
- 855G003 Remove and replace belt drive pulleys
- 855G004 Remove and replace drive belts
- 855G005 Clean and lubricate drive systems
- 855G006 Remove and replace gear drives
- 855G007 Troubleshoot and repair gear drives
- 855G008 Align and adjust gear drives
- 855G009 Remove and replace variable speed drives
- 855G010 Troubleshoot and repair variable speed drives
- 855G011 Align and adjust variable speed drives
- 855G012 Remove and replace cycle clutch drives
- 855G013 Troubleshoot and repair cycle clutch drives
- 855G014 Align and adjust cycle clutch drives
- 855G015 Remove and replace chain drives
- 855G016 Troubleshoot and repair chain drives
- 855G017 Align and adjust chain drives
- 855G018 Remove and replace clutch assemblies
- 855G019 Troubleshoot and repair clutches
- 855G020 Adjust clutches
- 855G021 Remove and replace transmissions
- 855G022 Troubleshoot and repair transmissions
- 855G023 Align and adjust transmissions
- 855G024 Troubleshoot and repair couplings
- 855G025 Align and adjust couplings
- 855G026 Remove and replace packings and seals
- 855G027 Troubleshoot and repair bearing assemblies
- 855G028 Remove and replace bearing assemblies
- 855G029 Remove and replace shaft assemblies
- 855G030 Troubleshoot and repair shaft assemblies
- 855G031 Align and adjust shaft assemblies
- 855G032 Remove and replace universal joints
- 855G033 Troubleshoot and repair universal joints
- 855G034 Remove and replace linkages and lever mechanisms
- 855G035 Troubleshoot and repair linkages and lever mechanisms
- 855G036 Align and adjust linkages and lever mechanisms
- 855G037 Remove and replace cam assemblies
- 855G038 Troubleshoot and repair cam assemblies
- 855G039 Align and adjust cam assemblies
- 855G040 Remove and replace door-latch assemblies
- 855G041 Align and adjust door-latch assemblies
- 855G042 Remove and replace door hardware
- 855G043 Align and adjust door hardware
- 855G044 Remove and replace door gaskets
- 855G045 Lubricate office machines
- 855G046 Remove and replace platens
- 855G047 Troubleshoot and repair platens
- 855G048 Align and adjust platens
- 855G049 Remove and replace rollers

## OFFICE MACHINE/CASH REGISTER REPAIRER

855G050 Troubleshoot and repair rollers  
855G051 Align and adjust rollers  
855G052 Remove and replace escapement mechanisms  
855G053 Troubleshoot and repair escapement mechanisms  
855G054 Align and adjust escapement mechanisms  
855G055 Remove and replace print carriers  
855G056 Troubleshoot and repair print carriers  
855G057 Align and adjust print carriers  
855G058 Remove and replace print wheels  
855G059 Remove and replace print unit  
855G060 Remove and replace print head  
855G061 Remove and replace ribbons or cartridge  
855G062 Remove and replace keyboards  
855G063 Troubleshoot and repair keyboards  
855G064 Remove and replace switches on keyboards  
855G065 Clean keyboards

### DUTY H: Maintaining and Repairing Electrical Systems

855H001 Replace fuses  
855H002 Troubleshoot and repair fuse system  
855H003 Troubleshoot electrical control components  
855H004 Replace faulty electrical cords and plugs  
855H005 Remove and replace motor controls  
855H006 Troubleshoot and repair motor controls  
855H007 Lubricate electric motor  
855H008 Remove and replace electric motor  
855H009 Troubleshoot and repair electric motor  
855H010 Remove and replace electric motor starter circuit  
855H011 Calibrate and adjust sensors  
855H012 Remove and replace sensors  
855H013 Troubleshoot and repair sensors  
855H014 Remove and replace power supply  
855H015 Troubleshoot and repair power supply  
855H016 Remove and replace solenoid  
855H017 Remove and replace condensor  
855H018 Remove and replace power transformer  
855H019 Troubleshoot and repair power transformer  
855H020 Remove and replace panel lights  
855H021 Remove and replace relays and timers  
855H022 Troubleshoot and repair relays and timers  
855H023 Remove and replace circuit breakers  
855H024 Check for overloaded circuits  
855H025 Wire parallel circuits  
855H026 Wire series circuits  
855H027 Wire series-parallel circuits  
855H028 Connect single pole switches  
855H029 Install timer or delayed action switches  
855H030 Remove and replace switches  
855H031 Troubleshoot and repair switches  
855H032 Remove and replace defective wiring  
855H033 Clean electrical connections  
855H034 Determine adequacy of office wiring  
855H035 Determine electrical problems using available troubleshooting techniques

## OFFICE MACHINE/CASH REGISTER REPAIRER

- 855H036 Interpret control diagrams for electrical systems
- 855H037 Diagnose malfunctions of electrical systems using test and measurement equipment

### DUTY I: Maintaining and Repairing Electronic Systems

- 855I001 Determine electronic problems using available troubleshooting techniques
- 855I002 Interpret control diagrams for electronic systems
- 855I003 Diagnose malfunctions of electronic systems using available test and measurement equipment
- 855I004 Remove and replace printed circuit boards
- 855I005 Troubleshoot and repair printed circuit boards
- 855I006 Remove and replace logic boards
- 855I007 Troubleshoot and repair logic boards
- 855I008 Remove and replace memory boards
- 855I009 Troubleshoot and repair memory boards
- 855I010 Remove and replace chips
- 855I011 Remove and replace transistors
- 855I012 Remove and replace electronic components
- 855I013 Clean connections on electronic components
- 855I014 Set configuration switches
- 855I015 Set user switches
- 855I016 Troubleshoot and repair electronic components

### DUTY J: Maintaining and Repairing Mechanical Typewriters

- 855J001 Diagnose mechanical typewriter problems
- 855J002 Operate mechanical typewriter to determine if problem is equipment or operator related
- 855J003 Clean mechanical typewriters
- 855J004 Disassemble mechanical typewriters
- 855J005 Remove and replace worn parts on mechanical typewriters
- 855J006 Lubricate mechanical typewriters
- 855J007 Assemble mechanical typewriters
- 855J008 Adjust mechanical typewriters
- 855J009 Perform minor maintenance on mechanical typewriters
- 855J010 Troubleshoot and repair mechanical typewriters

### DUTY K: Maintaining and Repairing Electromechanical Typewriters

- 855K001 Diagnose electromechanical typewriter problems using schematic and block diagrams and test equipment
- 855K002 Operate electromechanical typewriter to determine if problem is equipment or operator related
- 855K003 Troubleshoot and repair op-cam shaft problems on electromechanical typewriters
- 855K004 Remove and replace op-cam shafts on electromechanical typewriters
- 855K005 Adjust op-cam shafts on electromechanical typewriters
- 855K006 Perform preventive maintenance on electromechanical typewriters
- 855K007 Troubleshoot and repair electromechanical typewriters

OFFICE MACHINE/CASH REGISTER REPAIRER

DUTY L: Maintaining and Repairing Electronic Typewriters

- 855L001 Diagnose electronic typewriter problems using schematic and block diagrams and test equipment
- 855L002 Operate electronic typewriter to determine if problem is equipment or operator related
- 855L003 Troubleshoot and repair electronic typewriter displays
- 855L004 Remove and replace electronic typewriter displays
- 855L005 Clean electronic typewriter
- 855L006 Perform preventive maintenance on electronic typewriter
- 855L007 Troubleshoot and repair electronic typewriters

DUTY M: Maintaining and Repairing Printing Calculators

- 855M001 Diagnose printing calculator problems using schematic and block diagrams and test equipment
- 855M002 Operate printing calculator to determine if problem is equipment, software or operator related
- 855M003 Clean electronic printing calculator
- 855M004 Troubleshoot and repair electronic printing calculator

DUTY N: Maintaining and Repairing Cash Registers

- 855N001 Diagnose cash register problems using schematic and block diagrams and test equipment
- 855N002 Operate cash register to determine if problem is equipment, software or operator related
- 855N003 Troubleshoot and repair cash registers
- 855N004 Remove and replace cash register cash drawers
- 855N005 Adjust cash register cash drawers
- 855N006 Perform preventive maintenance on cash registers

DUTY O: Maintaining and Repairing Copy Machines

- 8550001 Diagnose copy machine problems using schematic and block diagrams and test equipment
- 8550002 Operate copy machine to determine if problem is equipment or operator related
- 8550003 Perform preventive maintenance on copy machine
- 8550004 Troubleshoot and repair copy machine optic system
- 8550005 Remove and replace copy machine optic system
- 8550006 Adjust copy machine optic system
- 8550007 Perform preventive maintenance on copy machine optic system
- 8550008 Clean copy machine optic system
- 8550009 Replace copy machine developer and toner
- 8550010 Clean copy machine mirrors
- 8550011 Troubleshoot and repair copy machine rollers
- 8550012 Remove and replace copy machine rollers
- 8550013 Remove and replace copy machine wiper blades
- 8550014 Remove and replace copy machine lamps
- 8550015 Troubleshoot and repair copy machine wiring
- 8550016 Remove and replace copy machine wiring harness

OFFICE MACHINE/CASH REGISTER REPAIRER

- 8550017 Clear copy machine paper jams
- 8550018 Troubleshoot and repair copy machine paper feed mechanism
- 8550019 Remove and replace copy machine paper feed mechanism
- 8550020 Troubleshoot and repair copy machine sorters/collator
- 8550021 Remove and replace copy machine sorters/collator
- 8550022 Remove and replace copy machine drums
- 8550023 Troubleshoot and repair copy machine document feeders
- 8550024 Remove and replace copy machine document feeders
- 8550025 Replace copy machine defuser oil
- 8550026 Remove and replace copy machine stapler
- 8550027 Troubleshoot and repair copy machine stapler
- 8550028 Replace copy machine staples





**Education  
For  
Employment  
Task Lists**

**Illinois  
State Board of  
Education**

**Adult  
Vocational and  
Technical Education**

# **INDUSTRIAL OCCUPATIONS 1988**

**Telephone and Cable TV Line  
Installers/Repairers  
\*Employability Skills**

**\*Employability skills are a vital component of  
vocational education programs and should be  
incorporated into each occupational task list**

**NOTE:**

The duties and tasks found in these matrices form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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DUTY A: Applying Safety Practices

- 860A001 Comply with shop and equipment safety rules
- 860A002 Apply basic emergency first aid techniques
- 860A003 Complete accident report
- 860A004 Inspect work area and equipment for safe working environment
- 860A005 Report shop, environmental and equipment safety violations
- 860A006 Demonstrate use of fire extinguishers
- 860A007 Correct safety hazards
- 860A008 Demonstrate cardiopulmonary resuscitation (CPR) techniques
- 860A009 Participate in safety training program

DUTY B: Planning Day's Activities

- 860B001 Prepare for the day's work
- 860B002 Organize workload
- 860B003 Determine route
- 860B004 Check stock and equipment

DUTY C: Traveling to Job Site

- 860C001 Inspect vehicle
- 860C002 Drive defensively
- 860C003 Locate the address
- 860C004 Park vehicle
- 860C005 Secure vehicle
- 860C006 Protect work area (WAP)

DUTY D: Communicating with Customer

- 860D001 Identify self
- 860D002 Verify the work order
- 860D003 Explain work to be done
- 860D004 Present added service options for possible sale
- 860D005 Get customer/owner approval for work to be done

DUTY E: Planning Job on the Job Site

- 860E001 Visualize total job
- 860E002 Identify potential safety hazards
- 860E003 Organize tools and materials
- 860E004 Determine most efficient route to job site

TELEPHONE AND CABLE TV LINE INSTALLERS/REPAIRERS

DUTY F: Performing Work Assignment or Installation

- 860F001 Activate service drop at pole or pedestal
- 860F002 Complete drop work to company specs
- 860F003 Protect or ground service at the house
- 860F004 Perform necessary tests

DUTY G: Performing Work Assignment or Repair Service of Installation

- 860G001 Identify service problem
- 860G002 Isolate service problem
- 860G003 Make repairs on installation
- 860G004 Refer repairs to qualified person if needed
- 860G005 Explain service status to customer

DUTY H: Wrapping-up

- 860H001 Clean up work area
- 860H002 Educate customer on service and equipment
- 860H003 Review service options
- 860H004 Check for customer satisfaction
- 860H005 Close out the job (paperwork/data base)