



TORQ Analysis of Machinists to Electro-Mechanical Technicians

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Machinists	51-4041.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Electro-Mechanical Technicians	17-3024.00	Skills:	Importance Level: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ:



83

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	84	Level	86	Level	79

Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
Visual Color Discrimination	48	29	62	Instructing	63	18	70	Computers and Electronics	69	28	77
Far Vision	51	19	65	Installation	64	5	69	Engineering and Technology	65	15	70
Finger Dexterity	55	16	68	Equipment Maintenance	73	4	81	Mathematics	70	4	76
Reaction Time	51	14	56	Quality Control Analysis	73	4	73				
Perceptual Speed	50	11	65	Troubleshooting	66	2	74				
Number Facility	46	14	50	Reading Comprehension	63	2	73				
Speech Recognition	42	7	59								
Selective Attention	53	5	62								
Written Expression	46	5	56								
Category Flexibility	46	5	53								
Speed of Closure	39	4	50								
Near Vision	59	2	72								
Written Comprehension	55	2	56								

LEVEL and IMPT (IMPORTANCE) refer to the Target Electro-Mechanical Technicians. GAP refers to level difference between Machinists and Electro-Mechanical Technicians.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Machinists	Electro-Mechanical Technicians	Importance
Arm-Hand Steadiness	55	50	72
Near Vision	57	59	72

Inductive Reasoning	53		50	68
Manual Dexterity	55		50	68
Finger Dexterity	39		55	68
Deductive Reasoning	57		53	65
Perceptual Speed	39		50	65
Control Precision	57		55	65
Far Vision	32		51	65
Problem Sensitivity	55		50	62
Information Ordering	67		55	62
Selective Attention	48		53	62
Visual Color Discrimination	19		48	62
Hearing Sensitivity	51		42	62
Speech Clarity	42		41	62
Oral Comprehension	57		57	59
Oral Expression	59		55	59
Flexibility of Closure	48		48	59
Speech Recognition	35		42	59
Written Comprehension	53		55	56
Written Expression	41		46	56
Visualization	60		55	56
Multilimb Coordination	51		41	56
Reaction Time	37		51	56
Auditory Attention	53		51	56
Category Flexibility	41		46	53
Number Facility	32		46	50
Speed of Closure	35		39	50

Skill Level Comparison - Abilities with importance scores over 69

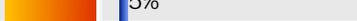
Description	Machinists	Electro-Mechanical Technicians	Importance
Equipment Maintenance	69	73	81
Operation Monitoring	78	71	74
Troubleshooting	64	66	74
Reading Comprehension	61	63	73
Quality Control Analysis	69	73	73
Instructing	45	63	70
Installation	59	64	69

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Machinists	Electro-Mechanical Technicians	Importance
Computers and Electronics	41	69	77
Mathematics	66	70	76

Mechanical	70 	 70	 73
Engineering and Technology	50 	 65	 70

Experience & Education Comparison

Related Work Experience Comparison				Required Education Level Comparison					
Description	Machinists		Electro-Mechanical Technicians		Description	Machinists		Electro-Mechanical Technicians	
10+ years	0%		0%		Doctoral	0%		0%	
8-10 years	0%		0%		Professional Degree	0%		0%	
6-8 years	2%		0%		Post-Masters Cert	0%		0%	
4-6 years	46%		5%		Master's Degree	0%		0%	
2-4 years	4%		55%		Post-Bachelor Cert	0%		0%	
1-2 years	16%		5%		Bachelors	0%		0%	
6-12 months	1%		12%		AA or Equiv	14%		35%	
3-6 months	1%		2%		Some College	2%		5%	
1-3 months	1%		0%		Post-Secondary Certificate	12%		32%	
0-1 month	0%		0%		High School Diploma or GED	69%		25%	
None	24%		17%		No HSD or GED	1%		0%	

Machinists Electro-Mechanical Technicians

Most Common Educational/Training Requirement:

Long-term on-the-job training Associate degree

Job Zone Comparison

<p>3 - Job Zone Three: Medium Preparation Needed</p> <p>Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p>Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.</p> <p>Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.</p>	<p>4 - Job Zone Four: Considerable Preparation Needed</p> <p>A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p>Most of these occupations require a four - year bachelor's degree, but some do not.</p> <p>Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>
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Tasks

Machinists	Electro-Mechanical Technicians
Core Tasks	Core Tasks
<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Controlling Machines and Processes - Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles). • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Getting Information - Observing, receiving, and otherwise obtaining information from 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Monitor Processes, Materials, or Surroundings - Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems. • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.



all relevant sources.

- Handling and Moving Objects - Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
- Monitor Processes, Materials, or Surroundings - Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.

Specific Tasks

Occupation Specific Tasks:

- Advise clients about the materials being used for finished products.
- Align and secure holding fixtures, cutting tools, attachments, accessories, and materials onto machines.
- Calculate dimensions and tolerances using knowledge of mathematics and instruments such as micrometers and vernier calipers.
- Check work pieces to ensure that they are properly lubricated and cooled.
- Clean and lubricate machines, tools, and equipment to remove grease, rust, stains, and foreign matter.
- Confer with engineering, supervisory, and manufacturing personnel to exchange technical information.
- Confer with numerical control programmers to check and ensure that new programs or machinery will function properly, and that output will meet specifications.
- Design fixtures, tooling, and experimental parts to meet special engineering needs.
- Dismantle machines or equipment, using hand tools and power tools, to examine parts for defects and replace defective parts where needed.
- Establish work procedures for fabricating new structural products, using a variety of metalworking machines.
- Evaluate experimental procedures, and recommend changes or modifications for improved efficiency and adaptability to setup and production.
- Fit and assemble parts to make or repair machine tools.
- Install experimental parts and assemblies such as hydraulic systems, electrical wiring, lubricants, and batteries into machines and mechanisms.
- Install repaired parts into equipment, or install new equipment.
- Lay out, measure, and mark metal stock to display placement of cuts.
- Machine parts to specifications using machine tools such as lathes, milling machines, shapers, or grinders.
- Maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and

- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Specific Tasks

Occupation Specific Tasks:

- Align, fit, and assemble component parts, using hand tools, power tools, fixtures, templates, and microscopes.
- Analyze and record test results, and prepare written testing documentation.
- Develop, test, and program new robots.
- Inspect parts for surface defects.
- Install electrical and electronic parts and hardware in housings or assemblies, using soldering equipment and hand tools.
- Operate metalworking machines to fabricate housings, jigs, fittings, and fixtures.
- Read blueprints, schematics, diagrams, and technical orders to determine methods and sequences of assembly.
- Repair, rework, and calibrate hydraulic and pneumatic assemblies and systems to meet operational specifications and tolerances.
- Test performance of electromechanical assemblies, using test instruments such as oscilloscopes, electronic voltmeters, and bridges.
- Train others to install, use, and maintain robots.
- Verify dimensions and clearances of parts to ensure conformance to specifications, using precision measuring instruments.

Detailed Tasks

Detailed Work Activities:

- analyze technical data, designs, or preliminary specifications
- analyze test data
- calculate engineering specifications
- communicate technical information
- develop plans for programs or projects
- evaluate engineering data
- examine engineering documents for completeness or accuracy
- fabricate, assemble, or disassemble manufactured products by hand
- inspect facilities or equipment for regulatory compliance
- install electronic equipment, components, or systems
- install/connect electrical equipment to

machining procedures.

- Measure, examine, and test completed units to detect defects and ensure conformance to specifications, using precision instruments such as micrometers.
- Monitor the feed and speed of machines during the machining process.
- Observe and listen to operating machines or equipment to diagnose machine malfunctions and to determine need for adjustments or repairs.
- Operate equipment to verify operational efficiency.
- Position and fasten work pieces.
- Prepare working sketches for the illustration of product appearance.
- Program computers and electronic instruments such as numerically controlled machine tools.
- Select the appropriate tools, machines, and materials to be used in preparation of machinery work.
- Set controls to regulate machining, or enter commands to retrieve, input, or edit computerized machine control media.
- Set up and operate metalworking, brazing, heat-treating, welding, and cutting equipment.
- Set up, adjust, and operate all of the basic machine tools and many specialized or advanced variation tools to perform precision machining operations.
- Study sample parts, blueprints, drawings, and engineering information to determine methods and sequences of operations needed to fabricate products, and determine product dimensions and tolerances.
- Support metalworking projects from planning and fabrication through assembly, inspection, and testing, using knowledge of machine functions, metal properties and mathematics.
- Test experimental models under simulated operating conditions for such purposes as development, standardization, and feasibility of design.

Detailed Tasks

Detailed Work Activities:

- adjust production equipment/machinery setup
- advise clients or customers
- confer with engineering, technical or manufacturing personnel
- design tools or mechanical devices
- determine tasks needed to complete machined products
- examine products or work to verify conformance to specifications
- fabricate, assemble, or disassemble manufactured products by hand

power circuit

- modify electrical or electronic equipment or products
- operate precision test equipment
- precision assemble electronic, electrical, or electromechanical equipment
- prepare technical reports or related documentation
- read blueprints
- read manufacturing outlines for electronic products
- read schematics
- read technical drawings
- record test results, test procedures, or inspection data
- repair or replace electrical wiring, circuits, fixtures, or equipment
- set up and operate variety of machine tools
- solder electrical or electronic connections or components
- test equipment as part of engineering projects or processes
- understand engineering data or reports
- understand service or repair manuals
- understand technical operating, service or repair manuals
- use combination welding procedures
- use electrical or electronic test devices or equipment
- use hand or power tools
- use knowledge of metric system
- use oscilloscopes in electronics repair
- use precision measuring devices in mechanical repair work
- use precision measuring tools or equipment
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems

Technology - Examples

- follow statistical process control procedures
- identify base metals for welding
- install equipment or attachments on machinery or related structures
- lay out machining, welding or precision assembly projects
- load or unload material or workpiece into machinery
- maintain or repair industrial or related equipment/machinery
- maintain welding machines or equipment
- monitor production machinery/equipment operation to detect problems
- move or fit heavy objects
- operate metal or plastic fabricating equipment/machinery
- perform safety inspections in manufacturing or industrial setting
- program computer numerical controlled machines
- read blueprints
- read specifications
- read technical drawings
- recognize characteristics of alloys
- recognize characteristics of metals
- set up and operate variety of machine tools
- set up computer numerical control machines
- set up production equipment or machinery
- solve machine tool problems
- understand machine setup instructions
- understand technical operating, service or repair manuals
- use arc welding equipment
- use drafting or mechanical drawing techniques
- use hand or power tools
- use knowledge of fire suppression methods in industrial emergencies
- use knowledge of metric system
- use machining practices
- use non-destructive test equipment
- use precision measuring tools or equipment
- use robotics systems technology
- use technical information in manufacturing or industrial activities
- use x-ray or magnetic inspection techniques
- weld together metal parts, components, or structures

Technology - Examples

Analytical or scientific software

- Armchair Machinist software
- CNC Consulting Machinists' Calculator

- EditCNC software

- Kentech Kipware Software

- Kentech Trig Calculator

Computer aided design CAD software

- Autodesk AutoCAD software

- Computer aided design CAD software

Computer aided manufacturing CAM software

- CNC Mastercam

- CNC TurboCAD/CAM

- Computer aided manufacturing CAM software

- JETCAM software

Electronic mail software

- Microsoft Outlook

Facilities management software

- Faster Fleet Management software

Industrial control software

- Pro CNC software

Office suite software

- Microsoft Office

Project management software

- Kentech Kipware PLN

- Kentech Kipware QTE

- Kentech Kipware TRK

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Adjustable wrenches

- Anvils

- Grinding wheel arbors

- Bandsaws

- Grinding dogs

- Milling vises

- Chamfer tools

- Jointers

- Torches
- Boring bars
- Broachers
- Calipers
- Chucks
- Cold chisels
- Combination wrenches
- Deburring tools
- Desktop computers
- Center drills
- Side cutting pliers
- Angled feeler gauges
- Files
- Forklifts
- Marking blocks
- Brazing equipment
- Angle plates
- Shapers
- Crankshaft grinders
- Ball peen hammers
- Clamps
- Gauges
- Hex keys
- Edge finders
- Hydraulic presses
- Ladders
- Laser printers
- Breaker lathes
- Spirit levels
- Channel lock pliers
- Magnetic retrievers
- Microscopes

- Rubber mallets
- Metal inert gas MIG welders
- Prick punches
- Inside micrometers
- 3-axis computerized numerical control CNC machines
- Milling machines
- Needlenose pliers
- Personal computers
- Personal digital assistants PDA
- Pipe wrenches
- Screw pitch gauges
- Planers
- Plasma welders
- Platforms
- Sandblasters
- Buffers
- Chippers
- Combination drills
- Cylindrical grinders
- Sanders
- Cold saws
- Vernier bevel protractors
- Pry bars
- Putty knives
- Ratchet sets
- Reamers
- Resurfacing machines
- Welding lenses
- Hacksaws
- Phillips head screwdrivers
- Scribes
- Cylinder honers

• Metal shears
• Shims
• Machine shop rigging equipment
• Socket sets
• Soldering equipment
• Machinists' squares
• Steel rules
• Swaging equipment
• Taps
• Thread gauges
• Threading machines
• Pipe threaders
• Aviation snips
• Tongs
• Bending machines
• Tungsten inert gas TIG welding equipment
• Radial drills
• Utility knives
• Steel wedges
• Arc welders
• Welding shields
• Metal spray equipment
• Cranes
• Arbor presses

Labor Market Comparison

Description	Machinists	Electro-Mechanical Technicians	Difference
Median Wage	\$ 41,560	N/A	N/A
10th Percentile Wage	\$ 26,250	N/A	N/A
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$ 48,290	N/A	N/A
90th Percentile Wage	\$ 56,030	N/A	N/A

Mean Wage	\$ 41,780	N/A	N/A
Total Employment - 2007	1,860	200	-1,660
Employment Base - 2006	1,832	230	-1,602
Projected Employment - 2016	1,905	141	-1,764
Projected Job Growth - 2006-2016	4.0 %	-38.7 %	-42.7 %
Projected Annual Openings - 2006-2016	35	5	-30

National Job Posting Trends

Trend for Machinists Trend for Electro-Mechanical Technicians



Data from [Indeed](http://Indeed.com)

Recommended Programs

No program data for the occupation.

Maine Statewide Promotion Opportunities for Machinists

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
51-4041.00	Machinists	100	3	1,860	\$41,560.00	\$0.00	4%	35
51-4111.00	Tool and Die Makers	85	3	160	\$51,670.00	\$10,110.00	-11%	2
51-4192.00	Lay-Out Workers, Metal and Plastic	82	2	180	\$43,870.00	\$2,310.00	-24%	3
51-4012.00	Numerical Tool and Process Control Programmers	79	3	60	\$43,530.00	\$1,970.00	21%	2

49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	78	3	440	\$49,450.00	\$7,890.00	-19%	15
17-3023.01	Electronics Engineering Technicians	76	3	430	\$45,180.00	\$3,620.00	-20%	9
17-3023.03	Electrical Engineering Technicians	75	3	430	\$45,180.00	\$3,620.00	-20%	9
49-2095.00	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	75	5	20	\$60,790.00	\$19,230.00	5%	1
49-9012.00	Control and Valve Installers and Repairers, Except Mechanical Door	74	3	170	\$47,860.00	\$6,300.00	-9%	3
49-9061.00	Camera and Photographic Equipment Repairers	73	3	0	\$44,660.00	\$3,100.00	0%	0
49-3011.00	Aircraft Mechanics and Service Technicians	73	3	210	\$44,280.00	\$2,720.00	-2%	2
51-8013.00	Power Plant Operators	73	3	480	\$50,240.00	\$8,680.00	10%	21
17-3027.00	Mechanical Engineering Technicians	72	3	130	\$44,890.00	\$3,330.00	2%	3
53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	72	3	60	\$42,890.00	\$1,330.00	5%	2
47-4021.00	Elevator Installers and Repairers	72	4	0	\$50,960.00	\$9,400.00	0%	0

Top Industries for Electro-Mechanical Technicians

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Navigational, measuring, electromedical, and control instruments manufacturing	334500	16.01%	2,520	2,412	-4.26%
Semiconductor and other electronic component manufacturing	334400	12.68%	1,995	1,744	-12.59%
Research and development in the physical, engineering, and life sciences	541710	5.42%	854	911	6.69%
Professional and commercial equipment and supplies merchant wholesalers	423400	4.40%	693	808	16.57%
Communications equipment manufacturing	334200	4.38%	690	696	0.79%
Electric power generation, transmission and distribution	221100	4.18%	658	606	-8.03%
Electrical and electronic goods merchant wholesalers	423600	3.86%	608	717	17.90%
Computer and peripheral equipment manufacturing	334100	2.75%	432	283	-34.54%

Colleges, universities, and professional schools, public and private	611300	2.60%	409	457	11.87%
Other fabricated metal product manufacturing	332900	1.95%	307	272	-11.39%
Employment services	561300	1.87%	294	372	26.56%
Medical equipment and supplies manufacturing	339100	1.74%	274	280	2.29%
Other general purpose machinery manufacturing	333900	1.72%	270	244	-9.73%
Industrial machinery manufacturing	333200	1.05%	166	136	-18.07%
Self-employed workers, primary job	000601	1.01%	159	169	6.54%

Top Industries for Machinists					
Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Machine shops	332710	18.50%	73,341	63,702	-13.14%
Metalworking machinery manufacturing	333500	6.55%	25,986	22,339	-14.03%
Motor vehicle parts manufacturing	336300	6.18%	24,524	20,501	-16.40%
Employment services	561300	6.04%	23,956	31,835	32.89%
Aerospace product and parts manufacturing	336400	4.53%	17,976	19,223	6.94%
Other general purpose machinery manufacturing	333900	4.05%	16,052	15,215	-5.21%
Other fabricated metal product manufacturing	332900	3.34%	13,262	12,338	-6.96%
Turned product and screw, nut, and bolt manufacturing	332720	2.38%	9,427	7,174	-23.90%
Industrial machinery manufacturing	333200	2.04%	8,073	6,944	-13.98%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	1.97%	7,831	7,872	0.53%
Plastics product manufacturing	326100	1.87%	7,414	8,252	11.30%
Engine, turbine, and power transmission equipment manufacturing	333600	1.70%	6,751	5,949	-11.87%
Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	811300	1.55%	6,143	6,826	11.11%
Architectural and structural metals manufacturing	332300	1.55%	6,163	6,912	12.14%
Self-employed workers, primary job	000601	1.47%	5,836	6,528	11.86%