



TORO Analysis of Mechanical Engineering Technicians to Electronic Drafters

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Mechanical Engineering Technicians	17-3027.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Electronic Drafters	17-3012.01	Skills:	Importance Level: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ:		91
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Ability TORQ		Skills TORQ		Knowledge TORQ	
Level		96	Level		86
			Level		91

Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
No Critical Gaps Recorded!				Operations Analysis	66	11	70	No Knowledge Upgrades Required!			
				Critical Thinking	64	10	70				
				Active Listening	68	5	77				
				Equipment Selection	66	3	69				

LEVEL and IMPT (IMPORTANCE) refer to the Target Electronic Drafters. GAP refers to level difference between Mechanical Engineering Technicians and Electronic Drafters.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Mechanical Engineering Technicians	Electronic Drafters	Importance
Near Vision	64	53	68
Oral Comprehension	69	62	65
Written Comprehension	71	59	65
Oral Expression	69	60	65
Written Expression	62	51	65
Deductive Reasoning	71	51	59
Inductive Reasoning	66	51	59
Information Ordering	67	48	59



Description	Mechanical Engineering Technicians	Electronic Drafters	Importance
Visualization	64	50	59
Speech Clarity	44	39	59
Speech Recognition	42	39	53
Problem Sensitivity	66	50	50
Category Flexibility	59	42	50
Selective Attention	44	42	50
Finger Dexterity	53	39	50
Skill Level Comparison - Abilities with importance scores over 69			
Description	Mechanical Engineering Technicians	Electronic Drafters	Importance
Active Listening	63	68	77
Critical Thinking	54	64	70
Operations Analysis	55	66	70
Equipment Selection	63	66	69
Knowledge Level Comparison - Knowledge with importance scores over 69			
Description	Mechanical Engineering Technicians	Electronic Drafters	Importance

Experience & Education Comparison					
Related Work Experience Comparison			Required Education Level Comparison		
Description	Mechanical Engineering Technicians	Electronic Drafters	Description	Mechanical Engineering Technicians	Electronic Drafters
10+ years	10%	20%	Doctoral	0%	0%
8-10 years	1%	0%	Professional Degree	0%	0%
6-8 years	7%	17%	Post-Masters Cert	0%	0%
4-6 years	2%	0%	Master's Degree	0%	2%
2-4 years	39%	16%	Post-Bachelor Cert	0%	0%
1-2 years	10%	9%	Bachelors	43%	22%
6-12 months	0%	20%	AA or Equiv	23%	36%
3-6 months	4%	0%	Some College	0%	2%
1-3 months	11%	1%	Post-Secondary Certificate	14%	21%
0-1 month	0%	0%	High School Diploma or GED	16%	14%
None	11%	14%	No HSD or GED	0%	0%
Mechanical Engineering Technicians			Electronic Drafters		
Most Common Educational/Training Requirement:					
Associate degree			Postsecondary vocational award		
Job Zone Comparison					
3 - Job Zone Three: Medium Preparation Needed 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.			3 - Job Zone Three: Medium Preparation Needed 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.		



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.

Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

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Tasks

Mechanical Engineering Technicians

Core Tasks

Generalized Work Activities:

- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Specific Tasks

Occupation Specific Tasks:

- Analyze test results in relation to design or rated specifications and test objectives, and modify or adjust equipment to meet specifications.
- Calculate required capacities for equipment of proposed system to obtain specified performance and submit data to engineering personnel for approval.
- Confer with technicians and submit reports of test results to engineering department and recommend design or material changes.
- Devise, fabricate, and assemble new or modified mechanical components for products such as industrial machinery or equipment, and measuring instruments.
- Discuss changes in design, method of manufacture and assembly, and drafting techniques and procedures with staff and coordinate corrections.
- Draft detail drawing or sketch for drafting

Electronic Drafters

Core Tasks

Generalized Work Activities:

- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment - Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.

Specific Tasks

Occupation Specific Tasks:

- Assemble documentation packages and produce drawing sets which are then checked by an engineer or an architect.
- Confer with engineering staff and other personnel to resolve problems.
- Determine the order of work and the method of presentation, such as orthographic or isometric drawing.
- Draft working drawings, wiring diagrams, wiring connection specifications or cross-sections of underground cables, as required for instructions to installation crew.
- Draw master sketches to scale showing relation of proposed installations to existing facilities and exact specifications and dimensions.
- Explain drawings to production or



room completion or to request parts fabrication by machine, sheet or wood shops.

- Estimate cost factors including labor and material for purchased and fabricated parts and costs for assembly, testing, or installing.
- Evaluate tool drawing designs by measuring drawing dimensions and comparing with original specifications for form and function using engineering skills.
- Inspect lines and figures for clarity and return erroneous drawings to designer for correction.
- Operate drill press, grinders, engine lathe, or other machines to modify parts tested or to fabricate experimental parts for testing.
- Prepare parts sketches and write work orders and purchase requests to be furnished by outside contractors.
- Read dials and meters to determine amperage, voltage, electrical output and input at specific operating temperature to analyze parts performance.
- Record test procedures and results, numerical and graphical data, and recommendations for changes in product or test methods.
- Review project instructions and blueprints to ascertain test specifications, procedures, and objectives, and test nature of technical problems such as redesign.
- Review project instructions and specifications to identify, modify and plan requirements fabrication, assembly and testing.
- Set up and conduct tests of complete units and components under operational conditions to investigate proposals for improving equipment performance.
- Set up prototype and test apparatus and operate test controlling equipment to observe and record prototype test results.
- Test equipment, using test devices attached to generator, voltage regulator, or other electrical parts, such as generators or spark plugs.

Detailed Tasks

Detailed Work Activities:

- analyze engineering design problems
- analyze engineering test data
- analyze technical data, designs, or preliminary specifications
- calculate engineering specifications
- communicate technical information
- conduct performance testing
- confer with engineering, technical or manufacturing personnel
- develop plans for programs or projects

construction teams and provide adjustments as necessary.

- Measure factors that affect installation and arrangement of equipment, such as distances to be spanned by wire and cable.
- Prepare and interpret specifications, calculating weights, volumes, and stress factors.
- Reproduce working drawings on copy machines or trace drawings in ink.
- Review completed construction drawings and cost estimates for accuracy and conformity to standards and regulations.
- Study work order requests to determine type of service, such as lighting or power, demanded by installation.
- Supervise and train other technologists, technicians and drafters.
- Use computer-aided drafting equipment and/or conventional drafting stations, technical handbooks, tables, calculators, and traditional drafting tools such as boards, pencils, protractors, and T-squares.
- Visit proposed installation sites and draw rough sketches of location.
- Write technical reports and draw charts that display statistics and data.

Detailed Tasks

Detailed Work Activities:

- analyze technical data, designs, or preliminary specifications
- communicate technical information
- compute cost estimates of construction or engineering projects
- conduct training for personnel
- confer with engineering, technical or manufacturing personnel
- create mathematical or statistical diagrams or charts
- direct and coordinate activities of workers or staff
- draw prototypes, plans, or maps to scale
- estimate time needed for project
- examine engineering documents for completeness or accuracy
- inspect manufactured products or materials
- prepare technical reports or related documentation
- read blueprints
- read schematics
- read specifications
- read technical drawings
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use computer aided drafting or design software for design, drafting, modeling, or



- diagnose mechanical problems in machinery or equipment
- draw prototypes, plans, or maps to scale
- estimate cost for engineering projects
- evaluate engineering data
- examine engineering documents for completeness or accuracy
- fill out purchase requisitions
- follow manufacturing methods or techniques
- follow statistical process control procedures
- inspect facilities or equipment for regulatory compliance
- modify electrical or electronic equipment or products
- operate metal or plastic fabricating equipment/machinery
- operate pneumatic test equipment
- operate precision test equipment
- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- read vehicle manufacturer's specifications
- recommend solutions to engineering problems
- record test results, test procedures, or inspection data
- set up and operate variety of machine tools
- 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 drafting or mechanical drawing techniques
- use electrical or electronic test devices or equipment
- use knowledge of metric system
- use precision measuring tools or equipment
- use robotics systems technology
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems

Technology - Examples

Analytical or scientific software

- ANSYS Mechanical
- MSC Software Adams

other engineering tasks

- use drafting or mechanical drawing techniques

Technology - Examples

Computer aided design CAD software

- Autodesk AutoCAD software
- Dassault Systemes CATIA software
- Pro-E CAD software
- PTC Pro/ENGINEER software
- SofTech CADRA
- UGS Solid Edge

Computer aided manufacturing CAM software

- 1CadCam Unigraphics

Data base user interface and query software

- Design specification database software
- Microsoft Access

Electronic mail software

- IBM Lotus Notes

Enterprise resource planning ERP software

- Bowen & Groves MI ERP
- Enterprise resource planning ERP software
- Epicor Vantage
- Exact Software Macola ERP
- Made2Manage Systems M2MERP
- Manufacturing resources planning MRP software
- Sage Accpac ERP
- SoftBrands Fourth Shift Edition

Office suite software

- Microsoft Office

Project management software

- JD Edwards EnterpriseOne Project Management
- PTC Pro/INTRALINK

Spreadsheet software

- Microsoft Excel

Tools - Examples

- Desktop computers
- Drafting machines



- Spectral Dynamics STARAcoustics

- Spectral Dynamics STARModal

- The Mathworks MATLAB

- Wolfram Research Mathematica

Computer aided design CAD software

- Autodesk AutoCAD Mechanical

- Autodesk Inventor

- Bentley MicroStation

- Computer aided design CAD software

- IBM CATIA V5

- PTC Pro/ENGINEER software

- SolidWorks CAD software

Computer aided manufacturing CAM software

- CNC Mastercam

- Computer aided manufacturing CAM software

- Three-dimensional 3D solid modeling software

Development environment software

- Microsoft Visual Basic

- National Instruments LabVIEW

Industrial control software

- Computerized numerical control CNC programming software

- Robotic control software

- Soft Servo Systems LadderWorks PLC

Internet browser software

- Web browser software

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Project management software

- Microsoft Project

Spreadsheet software

- Microsoft Excel

Word processing software

- Corel WordPerfect software

- Personal computers



- Microsoft Word

Tools - Examples

- Accelerometers
- Adjustable wrenches
- Air compressors
- Clamp-on ammeters
- High-voltage amplifiers
- Anemometers
- Optical microscopes
- C clamps
- Dial calipers
- Electronic comparators
- Compression testing machines
- Coordinate measuring machines CMM
- Dynamometers
- Extrusion machines
- Fatigue testers
- Mill files
- Fluid meters
- Rotameters
- Force sensors
- Plane-parallel gauge blocks
- Arc welding equipment
- Bore gauges
- Go/no-go gauges
- Safety goggles
- Digitizing tablets
- Surface grinders
- Polishing machines
- Claw hammers
- Durometers
- Vernier height gauges



- Hex keys
- Impact testers
- Heat treatment furnaces
- Injection molders
- Metallographs
- Computerized numerical control CNC lathes
- Spirit levels
- Granite surface plates
- Load cells
- Locking pliers
- Long nose pliers
- Metal inert gas MIG welding equipment
- Marking gauges
- Bend test fixtures
- Programmable logic controllers PLC
- Micrometers
- Microprocessors
- Combination milling machines
- Milling machines
- Digital multimeters
- Laptop computers
- Nut drivers
- Oscilloscopes
- Personal computers
- Drafting plotters
- Positioning jigs
- Power drills
- Cylindrical grinders
- Belt sanders
- Band saws
- Pressure sensors
- Safety gloves



- Protractors
- Center punches
- Hacksaws
- Offset screwdrivers
- Scribes
- Shear testing fixtures
- Power shears
- Signal conditioners
- Signal generators
- Arc-joint pliers
- Socket sets
- Soldering equipment
- Combination squares
- Steel rules
- Strain gauges
- Wire strippers
- Measuring tapes
- Dies
- Temperature sensors
- Tensile testers
- Dynamic mechanical analyzers DMA
- Snap gauges
- Screw thread gauges
- Tungsten inert gas TIG welding equipment
- Twin-screw extruders
- Twist drills
- Ultrasound inspection equipment
- Utility knives
- Vacuum molders
- Freon recovery equipment
- Vibration testers
- Spot welders



- Welding masks
- Dry rod ovens
- Wire cutters
- Drill presses

Labor Market Comparison

Description	Mechanical Engineering Technicians	Electronic Drafters	Difference
Median Wage	\$ 44,890	\$ 44,860	\$(30)
10th Percentile Wage	\$ 30,530	\$ 34,650	\$ 4,120
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$ 51,860	\$ 52,200	\$ 340
90th Percentile Wage	\$ 61,330	\$ 60,240	\$(1,090)
Mean Wage	\$ 45,460	\$ 46,680	\$ 1,220
Total Employment - 2007	130	90	-40
Employment Base - 2006	129	90	-39
Projected Employment - 2016	132	76	-56
Projected Job Growth - 2006-2016	2.3 %	-15.5 %	-17.9 %
Projected Annual Openings - 2006-2016	3	3	0

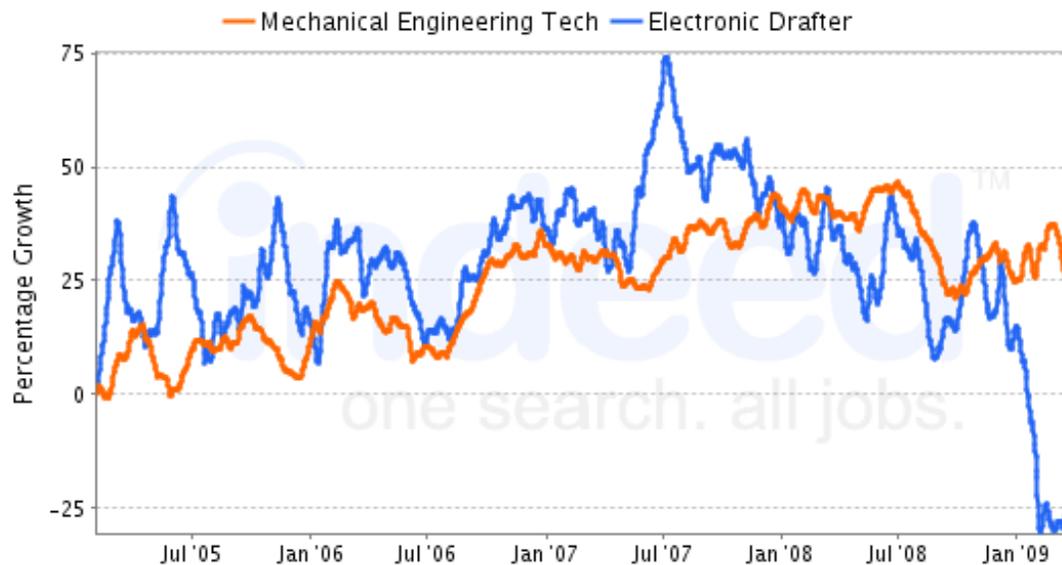
National Job Posting Trends

Trend for Mechanical Engineering Technicians

Trend for
Electronic
Drafters



Job Trends from Indeed.com



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

Recommended Programs

Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD

Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD. A program that prepares individuals to apply technical knowledge and skills to develop working schematics and representations in support of electrical/electronic engineers, computer engineers, and related professionals. Includes instruction in basic electronics, electrical systems and computer layouts; electrode-mechanical drafting; manufacturing circuitry; computer-aided drafting (CAD); and electrical systems specification interpretation.

No schools available for the program

Maine Statewide Promotion Opportunities for Mechanical Engineering Technicians

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
17-3027.00	Mechanical Engineering Technicians	100	3	130	\$44,890.00	\$0.00	2%	3
17-3023.03	Electrical Engineering Technicians	91	3	430	\$45,180.00	\$290.00	-20%	9
27-1021.00	Commercial and Industrial Designers	91	4	140	\$49,170.00	\$4,280.00	5%	5
17-3013.00	Mechanical Drafters	89	3	710	\$46,630.00	\$1,740.00	2%	22
17-2141.00	Mechanical Engineers	89	4	620	\$67,210.00	\$22,320.00	-9%	14
17-2072.00	Electronics Engineers, Except Computer	88	4	210	\$76,420.00	\$31,530.00	-26%	4



17-2112.00	Industrial Engineers	87	4	580	\$68,350.00	\$23,460.00	11%	22
17-2131.00	Materials Engineers	87	4	40	\$70,250.00	\$25,360.00	-7%	1
17-2121.02	Marine Architects	86	4	60	\$75,520.00	\$30,630.00	-9%	1
51-4111.00	Tool and Die Makers	86	3	160	\$51,670.00	\$6,780.00	-11%	2
17-3026.00	Industrial Engineering Technicians	86	3	370	\$51,700.00	\$6,810.00	6%	9
17-2111.03	Product Safety Engineers	85	5	90	\$49,940.00	\$5,050.00	3%	3
17-2031.00	Biomedical Engineers	84	4	20	\$86,560.00	\$41,670.00	-10%	1
17-2071.00	Electrical Engineers	84	4	260	\$73,050.00	\$28,160.00	-10%	6
17-2121.01	Marine Engineers	84	4	60	\$75,520.00	\$30,630.00	-9%	1

Top Industries for Electronic Drafters

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Electrical contractors	238210	9.90%	3,450	3,618	4.86%
Semiconductor and other electronic component manufacturing	334400	6.95%	2,421	2,116	-12.59%
Electric power generation, transmission and distribution	221100	6.73%	2,346	2,157	-8.03%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.70%	1,987	1,902	-4.26%
Plumbing, heating, and air-conditioning contractors	238220	5.36%	1,866	2,107	12.93%
Self-employed workers, primary job	000601	4.97%	1,730	1,843	6.54%
Electrical equipment manufacturing	335300	4.78%	1,665	1,415	-15.03%
Wired telecommunications carriers	517100	3.44%	1,198	940	-21.49%
Communications equipment manufacturing	334200	2.85%	994	1,002	0.79%
Other electrical equipment and component manufacturing	335900	1.75%	610	565	-7.34%
Employment services	561300	1.43%	497	629	26.56%
Computer and peripheral equipment manufacturing	334100	1.31%	457	299	-34.54%
Other building equipment contractors	238290	1.14%	397	430	8.38%
Security systems services	561620	1.06%	370	496	34.30%
Management of companies and enterprises	551100	1.03%	358	412	15.28%



Top Industries for Mechanical Engineering Technicians

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Research and development in the physical, engineering, and life sciences	541710	8.52%	4,072	4,344	6.69%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	6.30%	3,013	2,884	-4.26%
Testing laboratories	541380	5.16%	2,467	3,037	23.12%
Other general purpose machinery manufacturing	333900	5.01%	2,393	2,376	-0.70%
Semiconductor and other electronic component manufacturing	334400	3.33%	1,593	1,392	-12.59%
Aerospace product and parts manufacturing	336400	3.02%	1,442	1,468	1.84%
Agriculture, construction, and mining machinery manufacturing	333100	2.58%	1,234	1,152	-6.63%
Employment services	561300	2.19%	1,047	1,325	26.56%
Industrial machinery manufacturing	333200	2.14%	1,022	921	-9.88%
Engine, turbine, and power transmission equipment manufacturing	333600	2.05%	980	822	-16.07%
Motor vehicle parts manufacturing	336300	2.00%	957	762	-20.39%
Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	333400	1.94%	926	852	-8.01%
Medical equipment and supplies manufacturing	339100	1.78%	851	870	2.29%
Communications equipment manufacturing	334200	1.74%	833	839	0.79%
Commercial and service industry machinery manufacturing	333300	1.63%	780	684	-12.28%