





MECHATRONICS CERTIFICATES



ABOUT PMMI:

- **Founded in 1933**
- **Association for Packaging and Processing Technologies**
- **Representing 600+ packaging and processing supply chain companies**
- **Organizer of PACK EXPO trade shows**



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ABOUT PACK EXPO:

- For end users and suppliers from around the world, the PACK EXPO name stands for a quality tradeshow experience and a wide range of processing and packaging innovations for every vertical market.



What do we do:

- **Market Research – on key market segments and technologies**
- **Global Marketing – to help the industry make connections globally**
- **Education & Workforce Development – to help develop the workforce of today and tomorrow**



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What do we do:

- **Outreach to CPG companies – Alliance for Innovation and Operational Excellence**
- **Bring all segments of industry together**
- **Global resource for packaging and processing**



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Education & Workforce Development:

- **MISSION:** We believe a knowledgeable, skilled and technically educated workforce ensures the success of companies in our industry. The mission of this committee is to elevate awareness of packaging and processing as an industry. We provide information, programs and services to educate and develop packaging and processing professionals throughout the entire industry supply chain.



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PMMI U

- **E-Learning courses for basic skills training**
- **PMMI Certified Trainer – train-the-trainer**
- **Conferences, workshops, webinars – Need 2 Know Safety, Standards and Technology; Risk Assessment**
- **PackPro Jobs – Online job board**
- **JumPPstart – Educate, engage and excite young people about packaging and processing as a career**



PMMI Foundation

- 31 partner schools – 2- and 4-year schools
- Scholarships
- PACK EXPO – Education Pavilion, student & faculty interaction with each other and industry
- How It's Packaged Student Summer Tour
- Packaging Hall of Fame



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Attract

- Attract young people through JumPPstart
- Connection with Technical Colleges
- Articulation with a 4-year school

Support

- While in school, attend PACK EXPO (Travel Scholarships)
- Participate in PACK Solutions Challenge, Amazing Packaging Race
- Earn a Claude Breeden Scholarship
- Take a tour from PMMI Past Chairman

Connect

- Apply for and attend the “How It’s Packaged” Student Summer Tour – connect with PMMI Members & End Users
- Post resume on PackPro Jobs
- Get hired into industry



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Educate

- E-Learning – Basic skills
- Advanced skills – Mechatronics Tests
- Attend Need 2 Know Safety, Standards and Technology Conference and MarketTrends Roundtable

Excite

- Join PMMI Education and Workforce Development Committee
- Subject Matter Expert for Mechatronics Test Development

Engage

- Lead a local JumPPstart group
- Advisory Committee for local technical college
- Evangelist for PMMI and PMMI Education Programs



PROGRAM BACKGROUND:

- Started in 2007
- Designed to improve skills for industrial maintenance
- Involved PMMI members, CPGs, schools , Mid-Atlantic Mechatronics Advisory Council
- Developing skill standards for packaging & processing industry
- Creating assessments and industry credential
- Mechatronics Model recognized by DOL



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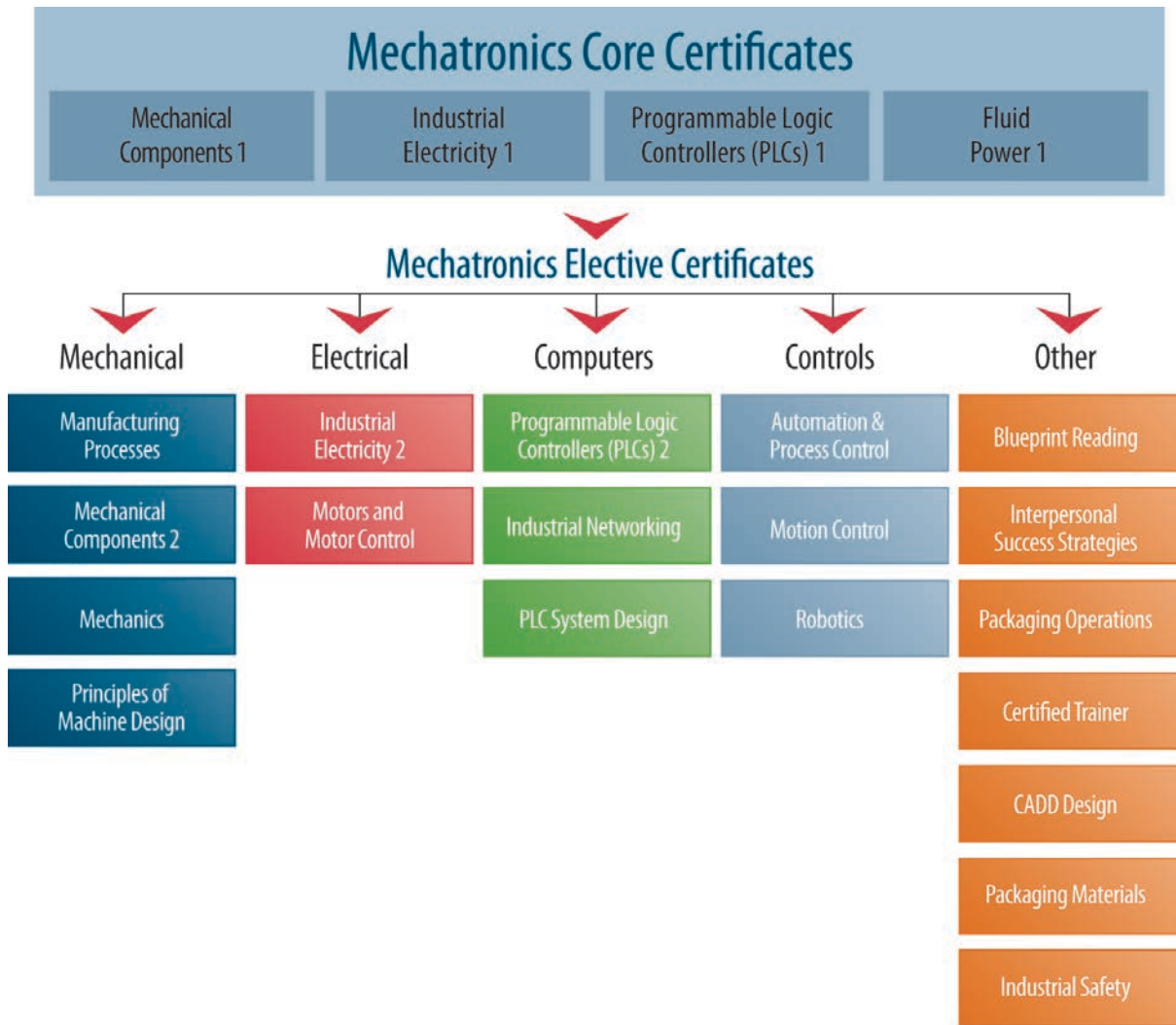


Why we developed these certificates:

- Employers – both PMMI member companies and CPG companies wanted a way to identify skilled workers in the areas of in mechatronics and industrial maintenance.
- Schools were looking for a nationally recognized credential, that had meaning in industry to develop curriculum around.
- Local, State, Federal funding attached to credentials.



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Where are we:

- **5 tests completed**
 - Mechanical Components 1
 - Industrial Electricity 1
 - Programmable Logic Controllers (PLCs) 1
 - Fluid Power 1
 - Industrial Electricity 2
- **Working on hands-on test**
- **Next test: Motors and Motor Control**



Test development process:

- Follow the ANSI process of certification development
- Industry driven and developed
- Third-party validated
- Rigorous process of industry participation
 - Slow process – driven by industry
 - Quality process
 - Always looking for more industry participation to speed up test development



DEVELOPMENT PROCESS INCLUDES:

- **Create test blueprint**
- **Item Writing**
- **Item Review**
- **Pilot**
- **Cut score study**



NAM-endorsed Skills Certification System

- **PMMI Mechatronics Certificates – Recognized by The Manufacturing Institute - Skills Certification System**
- **System of nationally portable, industry-recognized credentials**
- **Partners since 2011**



Recognized by the US Department of Labor

- Added PMMI's skill standards for Mechatronics to its Competency Model Clearinghouse in 2009.
- Currently working in partnership with USDOL and the IMTC to develop national apprenticeship guidelines based on PMMI's Mechatronics credential.



How does the program work:

- Tests available on-line – Fee \$125 per test
- Majority of test takers come to us through community colleges/technical schools
 - Schools partner with PMMI and purchase tests from us in bulk
 - We provide educational discount (\$50 per test)
 - We provide feedback to schools on aggregate student performance
 - Some schools proctor tests



How does the program work:

- Detailed competencies for each test available on pmmi.org/mechatronics
- Professors – free trial of test
- Talking with several curriculum providers – Amatrol, Festo to assist with curriculum development if needed
- PMMI members can participate on advisory board, internships, etc.

PMMI Mechatronics: Fluid Power 1

Fluid Power 1 *Just Released!*

Price: \$125

This certificate covers the function, operation, and application of common components used in fluid power circuits and systems. It also assesses the understanding of how fluid power components and accessories are placed together to create circuits and systems for powering industrial machines. The major emphasis is on pneumatics with a lesser emphasis on hydraulics and vacuum systems. Electro-fluid power troubleshooting is emphasized. Topics include: Circuits and logic, compressors and conditioners, connectors, directional control valves, electro-fluid power, filters, fittings, flow control & relief valves, gages and instruments, hoses, lubricators, metal tubing, motors, pressure sequence valves, pump and reservoir, regulators, safety, theory, threaded pipe, troubleshooting & testing, an vacuum.

This certificate test is intended for entry-level mechanics, technicians and technologists who will be involved in the application, installation, modification or troubleshooting of Fluid Power systems.

IMPORTANT QUESTIONS

Who should take this test?

This certificate is aimed at skilled electrical technicians working relatively independently in the assembly, test, startup, troubleshooting, maintenance, repair or upgrade of electro-mechanical machines or systems. It should be a prerequisite for technicians wishing to move on to industrial machines controlled by PLC's or to industrial machines utilizing velocity, acceleration or other motion control techniques.

How long does it take to complete the test?

Approximately 2 ³/₄ Hours

From the time of purchase, how long to I have to take the test?

You must complete your test within 6 months of completing your purchase. After 6 months, you will no longer have access to your test.

How many times can I attempt the test?

You will have only one attempt at passing the test per purchase.



Competencies listed on pmmi.org/mechatronics

Fluid Power 1

Actuators

Describe the operation of a double-acting pneumatic cylinder and give its schematic symbol
Describe the function of a single-acting pneumatic cylinder and give an application
Describe how cylinder sizes are specified, Size a pneumatic cylinder given a load, and Describe how to size a pneumatic cylinder
Describe five common tie rod cylinder mounting styles and give an application of each
Select a cylinder mounting style for a given application"
Describe the operation of a quick exhaust valve and give its schematic symbol
Describe 6 symptoms of pneumatic cylinder failure
Describe the function of a rotary actuator and give an application
Describe the function of a shock absorber
Describe how to troubleshoot slow actuator speed
Calculate the extension force of a cylinder given its size and pressure

[^ Top](#)

Best Practices

Describe the importance of eliminating air leaks
Describe four common pneumatic component failures and their probable causes
Give five guidelines used in the construction of pneumatic circuits

[^ Top](#)

Circuits and Logic

Describe the function of a pneumatic schematic
Describe the line symbols used with fluid power circuits
Design speed control circuits
Design a pneumatic circuit that uses an externally air-piloted DCV



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Who takes our tests:

- Incumbent workers as part of employer skills development program
- Workers looking to switch careers
- Military in transition
- Technical school/community college students in mechatronics/industrial maintenance programs
- Packaging machinery manufacturers
- Consumer Packaged Goods (CPG) companies



NEXT STEPS:

- **Level 1 Hands-on assessment (in progress)**
- **Motors and Motor Controls (recruiting SMEs now)**
- **Mechanical Components 2**
- **PLCs 2**
- **Level 2 Hands-On Assessment**



How are tests being used:

- **Employers – hiring and advancement tool**
 - **Reports from 2 students from WITC PMMI credential made a difference in the hiring process**
 - **PMMI supplier member Bimba – using our tests as final differentiator when hiring candidates**



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How are tests being used:

- **Schools – Purdue University Calumet**
 - Developing curriculum around PMMI level 1 certificates and will be using 4 of our tests to ensure students achieve the required skills and knowledge.
- **Working with schools around the country –**
 - Industrial Maintenance Training Center schools in Pennsylvania
 - Hennepin Technical College in Minneapolis, MN
 - Bellingham Technical College, Washington State



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In Florida:

- More than 25 packaging and processing machinery manufacturers – PMMI members
- *Over 3,000 individuals working for CPG companies who have attended PACK EXPO*
 - Bacardi, Aubrey Organics, Bausch & Lomb, Chiquita Brands, Coca-Cola, ConAgra, Cott Beverages, Florida's Natural Growers, Heinz, Johnson and Johnson, Kraft Foods, Pepperidge Farm, Pepsico, Tropicana to name just a few that would be looking for workers with mechatronics skills.



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WWW.PMMI.ORG/MECHATRONICS