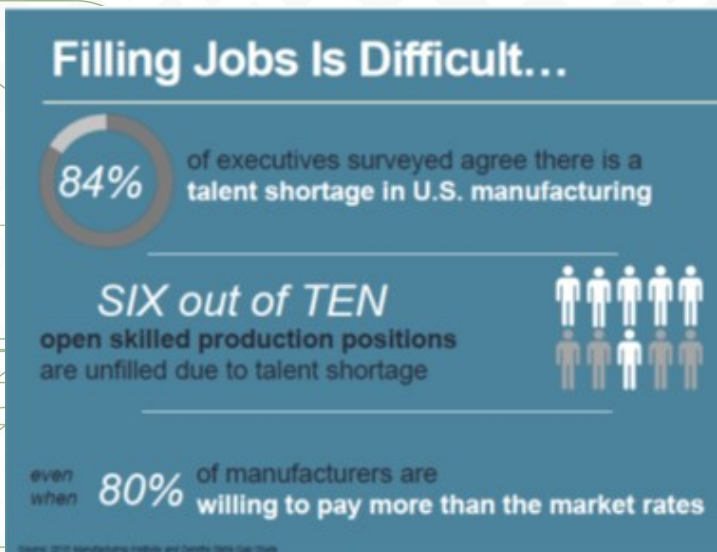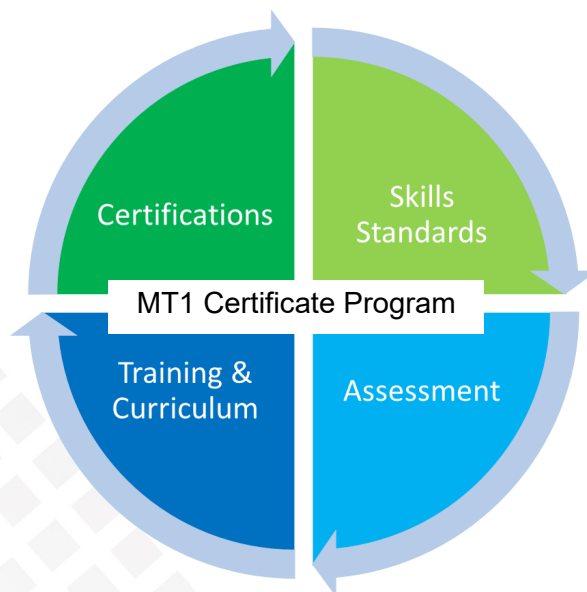# MT1 Certificate Program Return on Value (ROV)

The Manufacturing Technician Level 1 (MT1) workforce solution improves workforce quality and readiness with four components:

- **Industry-endorsed national skills standards**
- **Third-party validated assessment**
- **Training and curriculum**
- **Nationally recognized certifications**

The MT1 value proposition is to reduce employer hiring costs, increase the pool of qualified applicants and enhance the baseline skills of existing workers. The three main factors affecting supply of skilled workers are: increasing technology-intensive nature of manufacturing; retirements; and, competition for talent. This translates into thousands of job openings without qualified candidates to fill them, until now.

MT1 Certificate Program

Certifications — Skills Standards — Assessment — Training & Curriculum

Filling Jobs Is Difficult…

84% of executives surveyed agree there is a talent shortage in U.S. manufacturing

SIX out of TEN open skilled production positions are unfilled due to talent shortage

even when **80%** of manufacturers are willing to pay more than the market rates

The MT1 certificate program addresses the core technical competencies required for skilled production occupations in all sectors of manufacturing. The core technical competencies certified are: (1) Math and Measurement, (2) Manufacturing Technology and Spatial Reasoning, and (3) Business Acumen and Quality. Training modules include quality practices and measurement, manufacturing processes, electrical and mechanical basics ,and maintenance awareness. Optional training module: Industrial Safety Readiness Training (ISRT). There are two levels of certification: Manufacturing Specialist (MS) and MT1. The MT1 certificate program is delivered by MSI Academic Partners serving as authorized MSI Assessment Centers and providing MT1 Certified Trainers (see reverse side).

The MT1 cost savings is realized in the hiring process and daily manufacturing operations. The National Association of Manufacturers estimates **it costs each manufacturer $37,725 to fill five (5) vacancies:**

- Advertising = $17,500
- Interviewing (50 candidates) = $6,750
- Meetings (staff time) = $2,025
- Pre-employment testing = $10,200
- Human resources (staff time) = $1,250

This is $7,545 per new hire. Through the increased use of industry certifications, such as the MS and MT1, employers can reduce hiring costs by an estimated 50% or $18,862.

In addition, employers report the following MT1 results with existing workers:

- Maximizing manufacturing efficiencies;
- Improving quality of product to meet customer requirements;
- Achieving weekly product output goals;
- Assisting engineering with technical tasks, reducing tool downtime and cycle time.

To start using the MT1 workforce solution please contact the MSI workforce solutions team at training@manufacturingskillsinstitute.org or contact a MSI Academic Partner near you (see reverse side). To become an authorized MSI Assessment Center or MT1 Certified Trainer, please email training@manufacturingskillsinstitute.org.

manufacturingskillsinstitute.org

Measurement

Demonstrate

1. Using a Decimal Inch Machinist's Rule to Measure a Length
2. Using a U.S. Ruler and Tape Measure to Measure a Length
3. Using a metric ruler
4. Measuring liquids/weights in Metric and U.S. Customary Units
5. Converting Between Common Fraction Inches and Decimal Inches.
6. Convert Between U.S. Customary Units and SI Metric Units.

Algebra for Manufacturing

1. Perform correct order of operation to simplify mathematical expressions.
2. Generate linear equations with one unknown for situations described in text.
3. Solve simple linear equations with one unknown.

Math For Quality

1. Read and interpret histograms, bar charts, line graphs, and scatter plots.
2. Interpret descriptive statistics: Mean median, mode, and range.
3. Demonstrate *qualitative* reasoning for situations involving statistical data and probabilities.

Spatial Reasoning

1. Visually translate from 2D drawings to 3D images and back
2. Identifying different views for given isometric drawing of an object.
3. Identifying the different elements of an object in various views
4. Predict behavior of visual representations of simple mechanisms

Mechanics

1. Demonstrate qualitative reasoning about mechanical force and systems involving pulleys, levers, and gears.
2. Determine mechanical advantage of different systems of pulleys
3. Determine effects of different lever configurations on the force required to lift an object
4. Generate different configurations of gears and axels to increase power or speed.

Fluid Power and Thermodynamics

1. Generate causal explanations of behavior of (a) simple systems involving changes in pressure, temperature and volume, (b) simple hydraulic/pneumatic devices and (c) principles of heat transfer.
2. Predict the effects of changes in pressure on volume and temperature
3. Predict the effects of changes in temperature on volume and pressure
4. Predict the mechanical advantage of simple hydraulic and pneumatic systems.

Electricity

1. Generate causal explanations of the relationship between electrical and magnetic forces and explanations of how electric motors, generators, solenoids, and relay switches behave.
2. Generate causal explanations and predictions of electric circuit behavior involving simple series and parallel circuits containing relays, capacitors, resistors and simple devices such as light bulbs and pumps.

Chemistry

1. Core Concepts: Classify substances as a molecule, element, mixture, or compound; classify changes in substances as chemical reaction, mixture, or physical change; classify and apply characteristics acids and bases; interpret the periodic chart; and classify methods for separating mixtures (filtration, evaporation, distillation).
2. Chemical Reactions: Explain chemical bonding and structural changes that take place in common chemical reactions and interpret chemical formulas and equations.
3. Polymers: Generate explanations of molecular structural difference and physical characteristics between common types of polymers such as slime, flexi– putty, rubber and plastic bags.

Manufacturing Processes & Control

1. Generates the Sequence of Operation and a Flow Diagram for production tasks and processes.
2. Generate explanations of how electrical–mechanical controls and sensors operate in simple systems and devices.
3. Create flow charts for models (mock–up) of simple computer controlled systems such as a traffic light or washing machine.

Quality and Lean Manufacturing Concepts

1. Identify descriptions of manufacturing quality and lean production initiatives as examples of value stream mapping, waste elimination, 5S, DMAIC, and Total Productive Maintenance (TPM)
2. Create a process map and value stream map to improve a process or reduce waste
3. Demonstrate using a industry standard problem solving method such as DMAIC for improving production processes. Currently using DMAIC.

SPC Basic concepts

1. Determine plausible causes in fluctuations in processes based on statistical information (mean, range, & variation patterns)

Business Acumen

1. Predict how actions, strategies, and decisions impact the bottom line.
2. Classify examples of common business financial terms.