



# Build your own Project

Smart Performance Measure

October 28, 2020





# Questions?

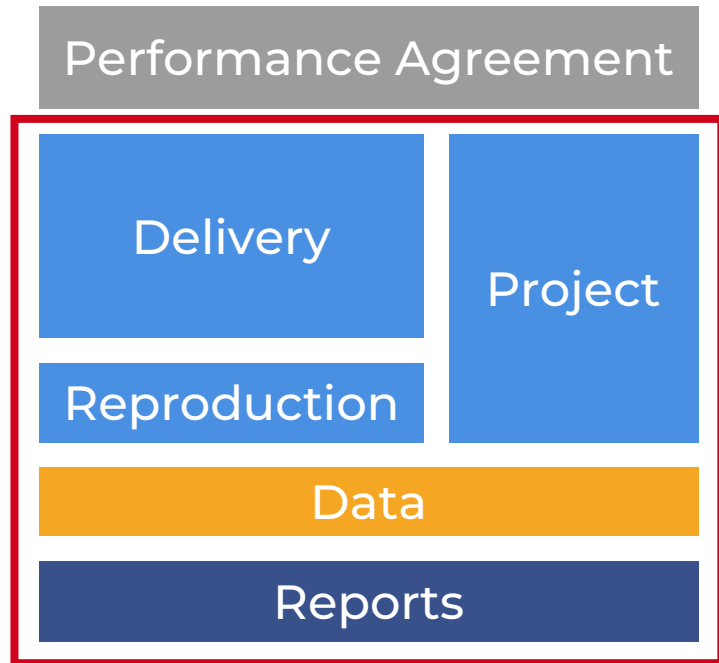
1. Open the **Q&A** button found at the bottom of the Zoom Meeting screen.
2. Type your question in the Q&A box that will pop up and click **send**.

# Agenda

- What is a Performance Measure?
- PM Development Process
- Contest Rules
- Q&A

# Smart Performance Measure

# Performance Measure

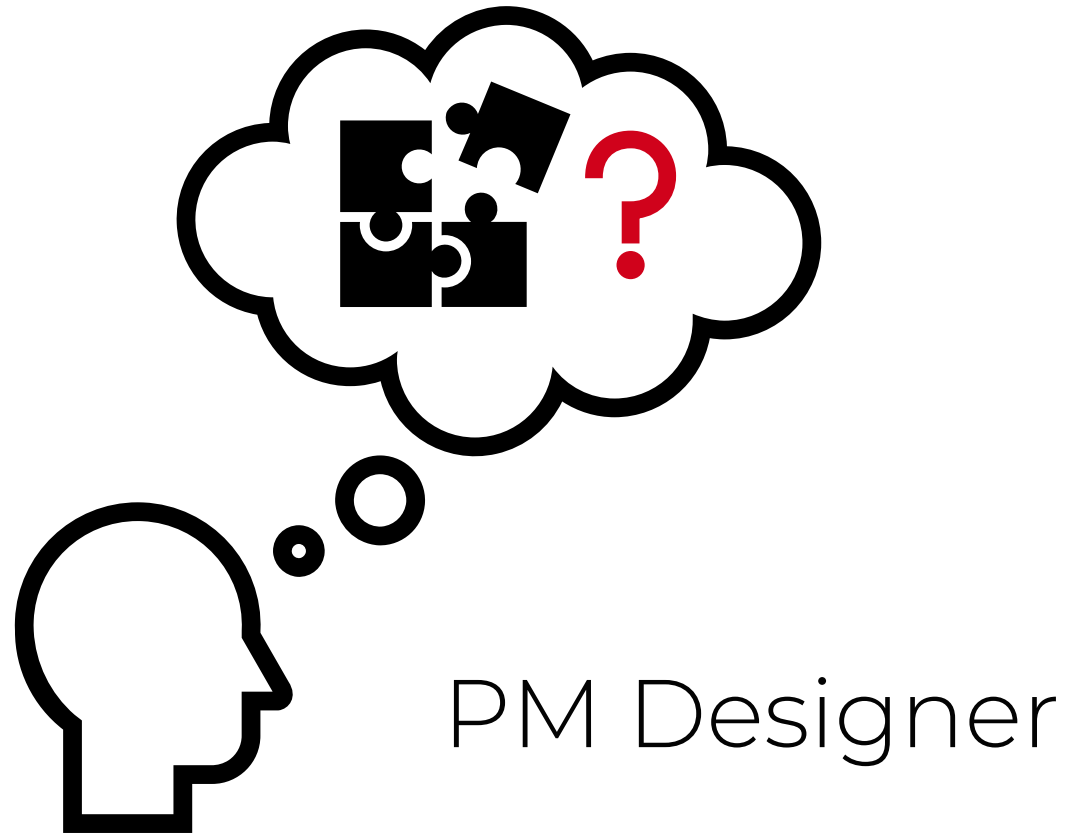


Performance Measure (PM)

- A collection of resources and digital tools that identify key metrics required for true validation of performance.
- It provides a method to systematically develop and implement a mechanism (project) to measure and track performance.
- Validates an individual or team meets the minimum requirements to perform on the job.

# Performance Measurement Development

# Performance Measures



# PM Design

- ☐ Choose the Role
- ☐ Find the Performance Agreement
- ☐ Create PM Identity
- ☐ Review the Standard
- ☐ Plan Validation Group
- ☐ Document PM
- ☐ Review
- ☐ Submit



# Choose the Role

1. **Choose the Role**
2. Find the PA
3. Create PM Identity
4. Review the Standard
5. Plan Validation Group
6. Document PM
7. Review PM
8. Submit



CNC Operator  
CNC Milling Operator  
CNC Turning Operator  
CNC Milling Specialist  
CNC Turning Specialist  
CAM Milling Programmer  
CAM Turning Programmer  
Benchmark Specialist  
**Manual Milling Specialist**  
Manual Turning Specialist

.....

# Performance Agreement

1. Choose the Role
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- Defines the scope and limitations of a PM
- Defines the responsibilities and expectations of each stakeholder and references the standards.
- Ensures PMs are aligned with industry and proprietary standards. This combination enables project developers to create industry-recognized projects that are relevant for their local community or company.

# Performance Agreement

1. Choose the Role
2. Find the PA
3. Create PM Identity
4. Review the Standard
5. Plan Validation Group
6. Document PM
7. Review PM
8. Submit

## Performance Agreement

Number:	PA-000003
Publisher:	NIMS
Standard:	NIMS Machining – 2020 (MAC-2020VI)
Section:	Manual Milling Specialist Role (MAC-012VI)
Time to Complete (max):	N/A
Related Credential(s):	Manual Milling Specialist

## Agreement

All stakeholders are recognized as performers working to validate true job performance. In accordance with referenced standards, (a) Organizations agree to design or select Performance Measures that validate performance requirements of their community and provide resources required for training and learning, (b) Trainers agree to transfer all required knowledge to prepare trainees for successful performance, (c) Trainees agree to utilize all provided resources to learn to the best of their ability.

## Validation Groups

Validation of performance for the duties listed in each Validation Group must take place within a single experience, defined and documented as a Performance Measure (PM). Multiple validation groups may be combined into a single comprehensive PM.

Group	Duty Name	Duty ID
Group 1	Duty 1.01: Process	MAC-MMS-60092VI
	Duty 2.01: Workholding Device Alignment	MAC-MMS-50093VI
	Duty 2.02: Cutting Tool Assembly and Setting	MAC-MMS-50094VI
	Duty 3.01: Part Loading	MAC-MMS-40095VI
	Duty 3.02: Process Execution	MAC-MMS-40096VI
	Duty 4.01: Deburring	MAC-MMS-10097VI
	Duty 5.01: Standardizing	MAC-MMS-80098VI
	Duty 5.02: Measurements	MAC-MMS-80099VI
Group 2	Duty 6.01: Lube and Coolants	MAC-MMS-30100VI

# Performance Agreement

1. Choose the Role
- 2. Find the PA**
3. Create PM Identity
4. Review the Standard
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6. Document PM
7. Review PM
8. Submit

For the list of Performance Agreements (PA) please go to each category's requirements page:

■ [Manual Machining](#)

■ [CNC Machining/CAM Programming \(2-Axis/3-Axis\)](#)

■ [CNC Machining/CAM Programming \(5-Axis\)](#)

■ [ITM](#)

# PM Profile

1. Choose the Role
2. Find the PA
3. **Create PM Identity**
4. Review the Standard
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6. Document PM
7. Review PM
8. Submit

- Number
- Name
- Narrative
- Publisher
- Authors
- Occupation
- Industry
- Performance Agreement Reference (ID and Group)
- Exclusivity (Private or Public)
- Project Description
- Revision Level

# PM Profile

1. Choose the Role
2. Find the PA
3. **Create PM Identity**
4. Review the Standard
5. Plan Validation Group
6. Document PM
7. Review PM
8. Submit

## PM Profile

### PM Narrative

Manual Milling Specialist plans, sets up, and machines part requiring multiple operations on a manual milling machine.

PM Profile Attributes	
Number	PN-MAC004A
Name	Classic Milling 98301
PA ID	PA-000003, Validation Group: 1
Publisher	NIMS
Author	NIMS
Occupation	Machining
Industry	General
Exclusivity	Public
Revision	A

### Project Description

This PM is designed to measure the performance of a Manual Milling Specialist candidate in a scenario where a part with multiple features and feature types, requiring multiple setups, is independently planned, set up, and produced on a manual vertical milling machine.

Given a detail drawing, raw material, and access to a manual milling machine with required accessories, cutting tools, tool holders, hand tools, and precision measuring equipment, Manual Milling Specialist candidate formulates, documents and executes a plan to machines part to specified tolerances.

# Review the Standard

1. Choose the Role
2. Find the PA
3. Create PM Identity
- 4. Review the Standard**
5. Plan Validation Group
6. Document PM
7. Review PM
8. Submit

## NIMS Smart Standards

<https://www.nims-skills.org/industry-standards>

## Machining Standards

<https://www.nims-skills.org/machining-smart>

## ITM Standards

<https://www.nims-skills.org/itm-smart>

# Review the Standard

1. Choose the Role
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- 4. Review the Standard**
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8. Submit

## Manual Milling Specialist

### Planning

Process

### Machine Setup

Workholding Device Alignment

Cutting Tool Assembly

### Machine Operations

Part Loading

Process Execution

### Benchwork

Deburring

### Quality Control

Standardizing

Measurements

### Machine Maintenance

Lube & Coolants



# Validation Group

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Groups of duties that must be validated in a single experience

## Validation Groups

Validation of performance for the duties listed in each Validation Group must take place within a single experience, defined and documented as a Performance Measure (PM). Multiple validation groups may be combined into a single comprehensive PM.

Group	Duty Name	Duty ID
Group 1	Duty 1.01: Process	MAC-MMS-60092V1
	Duty 2.01: Workholding Device Alignment	MAC-MMS-50093V1
	Duty 2.02: Cutting Tool Assembly and Setting	MAC-MMS-50094V1
	Duty 3.01: Part Loading	MAC-MMS-40095V1
	Duty 3.02: Process Execution	MAC-MMS-40096V1
	Duty 4.01: Deburring	MAC-MMS-10097V1
	Duty 5.01: Standardizing	MAC-MMS-80098V1
	Duty 5.02: Measurements	MAC-MMS-80099V1
Group 2	Duty 6.01: Lube and Coolants	MAC-MMS-30100V1

# Validation Group

## Validation Groups

Validation of performance for the duties listed in each Validation Group must take place within a single experience, defined and documented as a Performance Measure (PM). Multiple validation groups may be combined into a single comprehensive PM.

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	Duty 5.02: Measurements	MAC-MMS-80099V1
Group 2	Duty 6.01: Lube and Coolants	MAC-MMS-30100V1

### Planning:

- ✓ Process

### Machine Setup

- ✓ Workholding Device Alignment
- ✓ Cutting Tool Assembly

### Machine Operations

- ✓ Part Loading
- ✓ Process Execution

### Benchwork

- ✓ Deburring

### Quality Control

- ✓ Standardizing
- ✓ Measurements

### Machine Maintenance

- ✓ Lube & Coolants

# Validation Group

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## DUTY AREA 1

- ☒ Duty 1.01
- ☒ Duty 1.02
- ☒ Duty 1.03

## DUTY AREA 2

- ☒ Duty 2.01



## DUTY AREA 1

- ☒ Duty 1.01
- ☒ Duty 1.02
- ☒ Duty 1.03

## DUTY AREA 2

- ☒ Duty 2.01

# Validation Group

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## Credential

### DUTY AREA 1



Duty 1.01



Duty 1.02



Duty 1.03

### DUTY AREA 2



Duty 2.01

## Credential

### DUTY AREA 1



Duty 1.01



Duty 1.02



Duty 1.03

### DUTY AREA 2

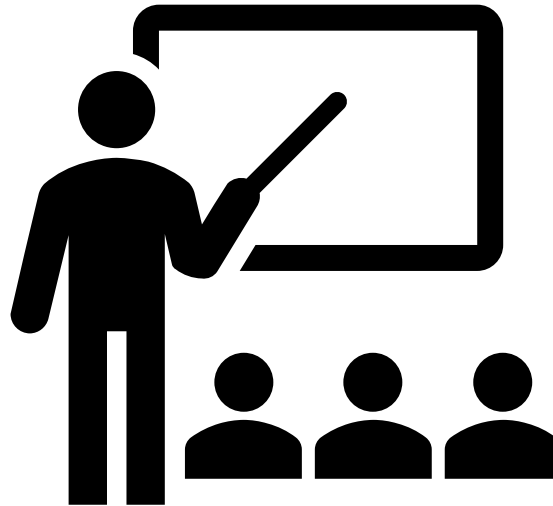


Duty 2.01

# Documentation

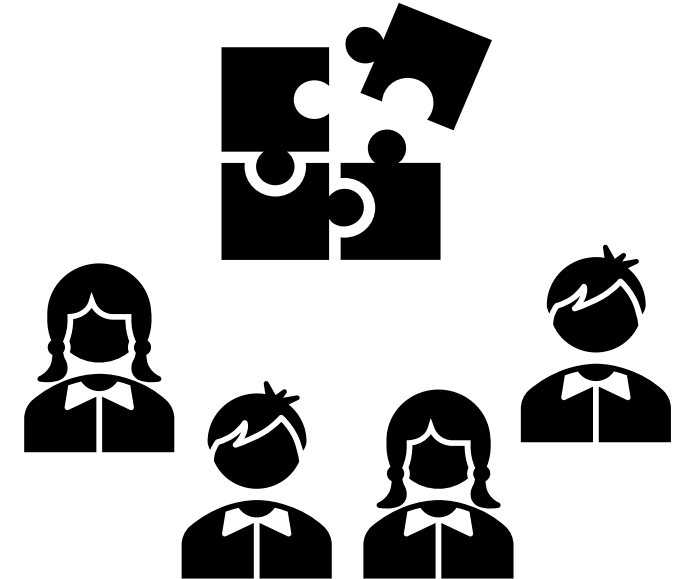
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## Delivery



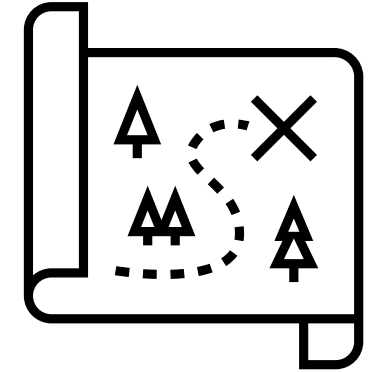
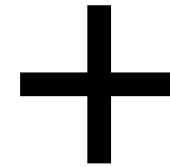
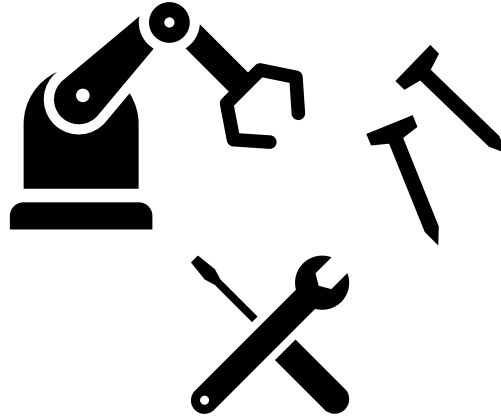
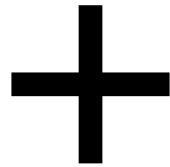
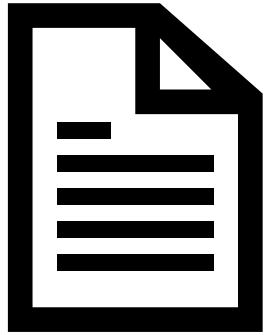
Instructor

## Project



Trainee

# Project



## Instructions

What to do?  
What is expected?  
What to submit?

## Tools & Materials

Tools  
Apps/Software  
Machine

## Resources

Drawings  
Tool List  
NC Program

# Project - Instructions

1. Choose the Role
2. Find the PA
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5. Plan Validation Group
- 6. Document PM**
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8. Submit

## Manual Milling Specialist

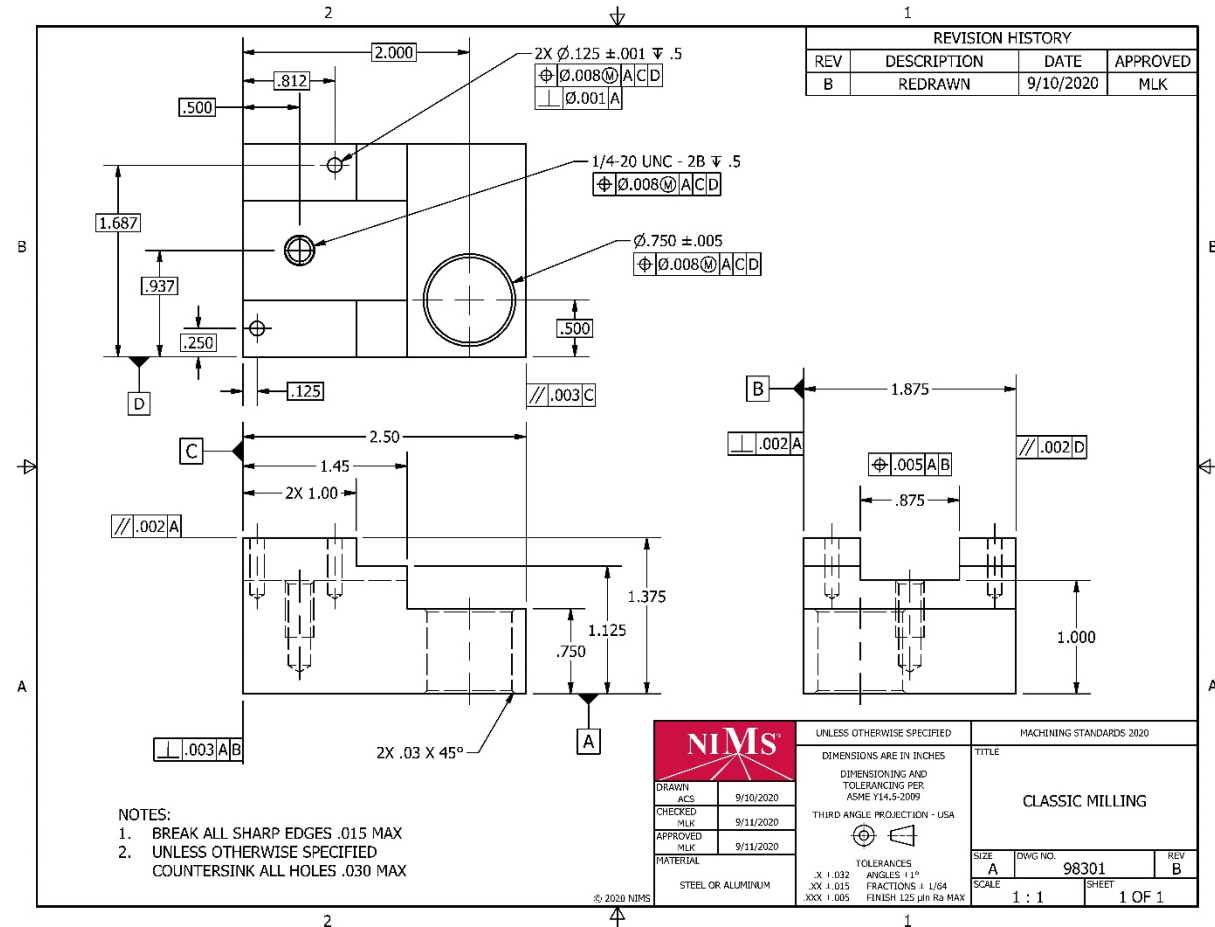
### Instructions

#### Performance Process

1. Create and document a process plan.
2. Verify that tools and equipment required to execute plan are available.
3. Set up machine to perform each operation.
4. Machine all features to print specification and tolerances.
5. Deburr and clean part for inspection.
6. Submit part and process plan to evaluator or instructor.

# Project - Resources

1. Choose the Role
2. Find the PA
3. Create PM Identity
4. Review the Standard
5. Plan Validation Group
6. **Document PM**
7. Review PM
8. Submit





# Drawing Requirements

Project part definition methods allowed:

**(A) Fully annotated 2D engineering drawing with:**

- Sufficient views to fully define geometry
- All features dimensioned and toleranced
- Enough information provided to manufacture part  
(Submit drawing in native CAD and PDF formats)

**(B) Digital product definition data set (3D CAD model and drawing graphic sheet) with:**

- All annotations applied to the drawing graphic sheet
- Sufficient graphic sheet views and annotations to dimension and tolerance all features
- 3D CAD model
- Enough information provided to manufacture part  
(Submit model in native CAD and STEP file formats, submit drawing graphic sheet in native CAD and PDF formats)

## Drawing Standards:

- General engineering drawing practices per ASME Y14 Series standards
- Dimensioning and tolerancing per ASME Y14.5-2009 or 2018
- Digital Product Definition Data Practices per ASME Y14.41-2012 or 2019

# Project - Resources

1. Choose the Role
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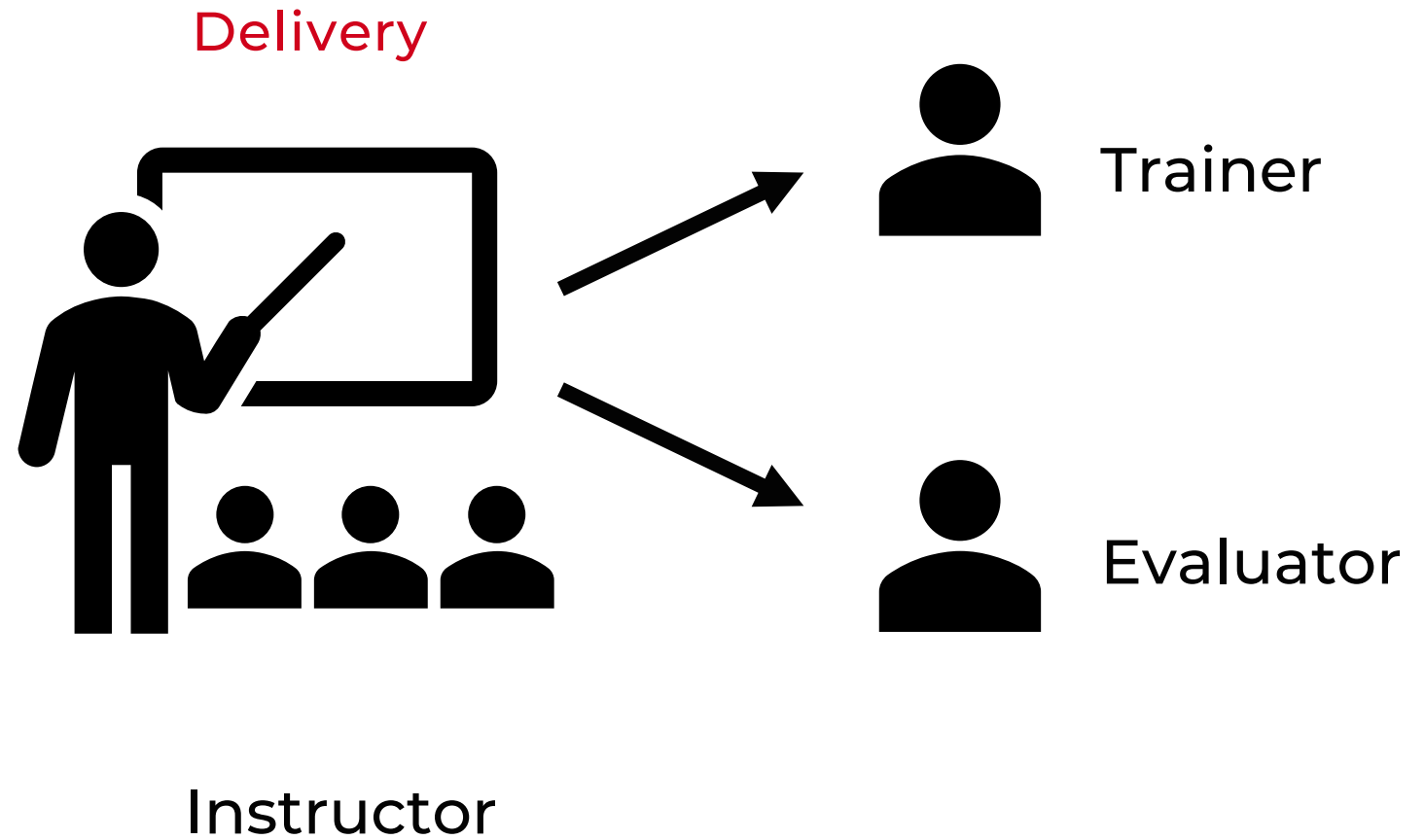
- Engineering Drawing
- 3D CAD Step File
- Assembly Drawings
- Diagrams
- Setup Sheet
- Tool Lists
- NC Program Files (Trainee Version)

For full list of required documents, go to the category's detail page (under Submission Requirements):

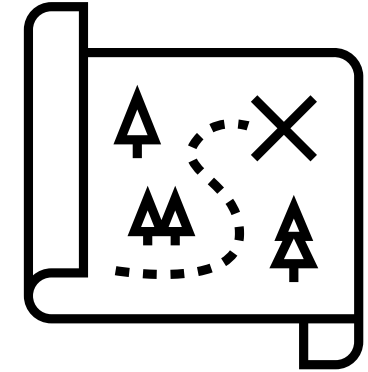
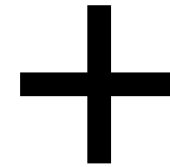
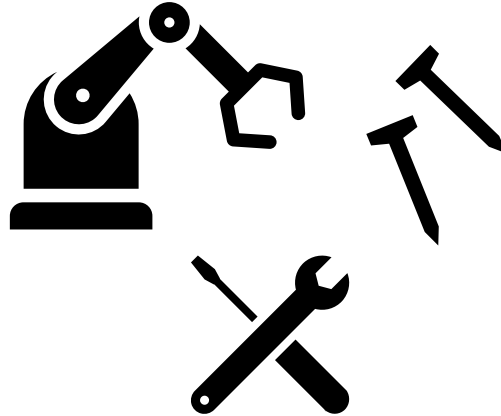
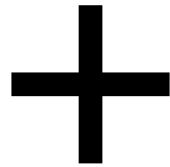
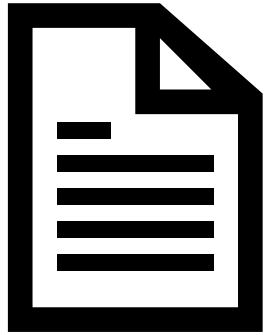
<https://www.nims-skills.org/performance-measure-competition>

# Delivery

1. Choose the Role
2. Find the PA
3. Create PM Identity
4. Review the Standard
5. Plan Validation Group
- 6. Document PM**
7. Review PM
8. Submit



# Delivery



## Instructions

How to deliver?  
What to deliver?  
How to evaluate?  
What to Evaluate?

## Tools & Materials

What to provide?  
Infrastructure

## Resources

Setup Guide  
NC Program  
Evaluation Checklist

# Delivery Instructions

1. Choose the Role
2. Find the PA
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4. Review the Standard
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- 6. Document PM**
7. Review PM
8. Submit

## Instructions

### Roles

Here is a list of all the roles involved in this performance measure.

- **Trainee:** The individual completing the performance that will be assessed.
- **Evaluator:** The individual who inspects the part machined by the Trainee and submits the affidavit online. An organization may choose to use their Trainer as the Evaluator, as an alternative to having a separate Evaluator. Physical part inspection and online affidavit submission, however, must be done by those who are allowed to inspect NIMS parts (MET-TECs or a Trainer with the Inspector credential).
- **Trainer:** The individual who trains the Trainee.

### Performance Process

1. Evaluator provides Trainee with items listed under [Trainee Resources](#).
2. Trainee writes process plan, machines part, and submits part and process plan to the Evaluator.
3. Evaluator observes Trainee performance.
4. Evaluator terminates performance if safety violations are observed.
5. Evaluator inspects the part and uses the provided NIMS checklist to evaluate the process plan. Part must be 100% within the specifications and tolerances listed on the drawing.
6. Evaluator returns failed submissions to Trainee.
7. Trainee may rework or remake the part and resubmit according to policy and time tolerance established by the organization.
8. The Evaluator reviews all documents and submits the affidavit online to NIMS.

### Trainee Resources (Project)

These items must be provided to the Trainee:

- Instructions
- Detail drawing
- Part material (rough stock)
- Access to workstation, and all necessary tools, equipment, and supplies

### Submission Components

The Trainee must submit the following items for evaluation to fully complete the official performance measure for Manual Milling Specialist.

- Process plan
- Machined part

# Delivery Tools & Materials

1. Choose the Role
2. Find the PA
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4. Review the Standard
5. Plan Validation Group
- 6. Document PM**
7. Review PM
8. Submit

## Infrastructure Requirements

### Resource List

The following resources are typically provided to deliver this performance measure. Organizations may customize this list according to their equipment and tooling preferences.

Workstation	
Manual vertical milling machine	Workbench

Workholding devices and accessories	
Machine vise with mounting hardware	Machinable vise jaw blanks (soft jaws)
Hard vise jaws	Parallel set

Hand tools and setup equipment	
Combination or box-end wrenches	Magnetic base, or test indicator holder (Indicol)
Deburring tool set	Soft-faced hammer
Edge finder	Table dressing stone (Burr Buster)
Files	Tap wrench to fit 1/4-20 tap
Hex wrench set	

Cutting tools (Include adequate assortment to machine project part)	
.125" reamer	End mills
1/4-20 UNC tap	Face mill, shell mill, or fly cutter
90° countersink set	Spotting drill or combination drill and countersink
Boring head with boring bar set	Twist drills up to 3/4" diameter

# Delivery - Resources

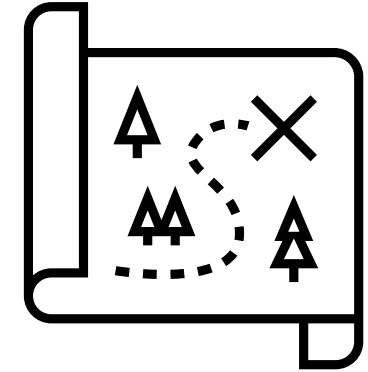
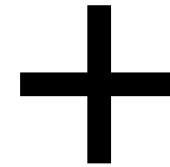
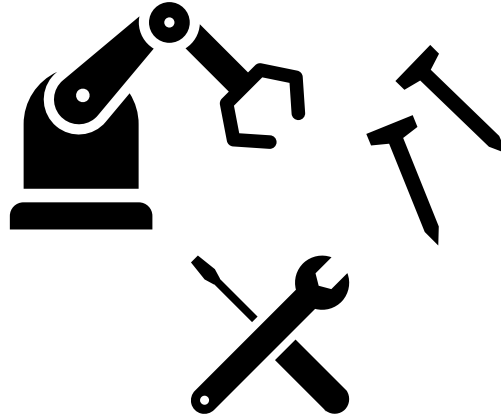
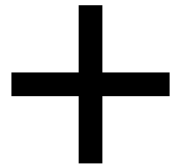
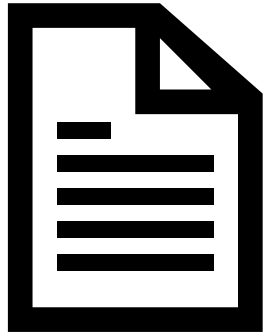
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- Native CAD/CAM Part File
- Native CAD/CAM Drawing File
- 3D CAD Step File
- Evaluation Checklist
- NC Program Files (Evaluator Version)
- Scoring List
- Engineering Drawing with Scored features

For full list of required documents, go to the category's detail page (under Submission Requirements):

<https://www.nims-skills.org/performance-measure-competition>

# Reproduction



## Instructions

What to reproduce?  
How to reproduce

## Tools & Materials

Tools  
Apps/Software  
Machine

## Resources

Drawings  
Tool List  
NC Program



# Review PM

1. Choose the Role
2. Find the PA
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4. Review the Standard
5. Plan Validation Group
6. Document PM
- 7. Review PM**
8. Submit

- Check if PM validates all duties of the role
- Test Project for accuracy
- Documentation is complete
- Review documentation

For complete list, go to the category's detail page:

- [Manual Machining](#)
- [CNC Machining/CAM Programming \(2-Axis/3-Axis\)](#)
- [CNC Machining/CAM Programming \(5-Axis\)](#)
- [ITM](#)

# Submit PM

1. Choose the Role
2. Find the PA
3. Create PM Identity
4. Review the Standard
5. Plan Validation Group
6. Document PM
7. Review PM
8. **Submit**

To submit, go to:

[PM Competition Submission Form](#)

**Submissions will be accepted beginning 9:00AM Eastern  
November 2, 2020**

**Submissions are due no later than 5:00 PM Eastern,  
November 20, 2020**

# Contest Rules

# Purpose of the Contest

- Showcase the best of the best of NIMS programs
- Provide more choices for organizations to measure performance
- Allow students to build portfolios of experiences relevant for local employers
- Increase community engagement with employers

# Terms and Conditions

By entering the NIMS PM Development Competition, you agree to the following terms:

1. You must be at least 18 years old to enter a project in the competition.
2. Your project may be published by NIMS for use in performance evaluation for NIMS standards and credentials.
3. Your project may be modified for use for other credentials or performance measures (PMs) other than that for which you submitted it.
4. If your project is published, your organization will be acknowledged by including your name and logo on the PM documentation.
5. Your project may be specific to an employer or group of employers in your community, but it cannot contain any proprietary information, trade secrets or other intellectual property of the employer(s) without their express written consent.
6. You confirm that you are authorized to submit the content according to these conditions.

# Contest Categories - Machining

## 5-axis

- CNC 5-Axis Milling Operator
- CNC 5-Axis Milling Specialist
- CAM 5-Axis Milling Programmer

## Manual Machining

- Benchwork Specialist
- Manual Milling Specialist
- Manual Turning Specialist

## CNC 3-Axis, 2-Axis

- CNC Operator
- CNC Milling Operator
- CNC Turning Operator
- CNC Milling Specialist
- CNC Turning Specialist
- CAM Milling Programmer
- CAM Turning Programmer

# Contest Categories - ITM

## ITM

- Electrical Systems Specialist
- Electronic Control Systems Specialist
- Hydraulic Systems Specialist
- Maintenance Operations Specialist
- Mechanical Systems Specialist
- Pneumatic Systems Specialist
- Process Control Specialist

# Submission Requirements

## 1. PM Profile

## 2. Project

- Instructions

- Resources

## 3. Delivery

- Instructions

- Tools and Materials

- Resources

For full list of required documents, go to the category's detail page (under Submission Requirements):

<https://www.nims-skills.org/performance-measure-competition>



# Eligibility

All secondary and post-secondary education organizations including:

- Independent school districts
- Public and state high schools and institutions of higher education
- Private high schools and institutions of higher education

# Scoring

Scoring Criteria	Description	Points
Creativity	Appeal to students, applicability to industry	30
Alignment to Standard	All duties are validated	20
Accuracy	Drawings meet identified standard	10
Utility	May be used for other purposes	10
Completeness	Required elements are submitted	10
Practicality	Ease of Distribution (Cost, Simplicity, etc)	10
Industry Vote	2 pts/industry endorsement. Max 5.	10

# Dates

Submission Start Date

**Monday, November 2, 2020 – 9:00 AM Eastern**

Submission Deadline

**Friday, November 20, 2020 – 5:00 PM Eastern**

Announcement of Winners

**Friday, December 11, 2020**

# Prizes - Category



\$5,500 annual subscription

Best of each role/credential\*

\$500 credentialing voucher

\*Only applies to roles/credentials with multiple submissions

Copy of Ultimate Guide to Enhancing  
Your Training Program

# Prizes - Overall



\$5,500 annual subscription

\$2,500 data and reporting tool annual subscription OR program accreditation (application fee and 4 years of maintenance) Winner's choice!

Copy of Ultimate Guide to Enhancing Your Training Program

# Q & A

For more information go to:

[https://www.nims-skills.org/  
performance-measure-competition](https://www.nims-skills.org/performance-measure-competition)

[support@nims-skills.org](mailto:support@nims-skills.org)



# Thank you

