



# Machining Level I Credential Overview

## CNC Mill Programming Setup & Operations

### OVERVIEW

This certification validates that an individual is able to setup and operate a CNC Milling Center; maintain quality and safety standards; keep records; maintain equipment and supplies.

### COMPETENCIES

### KNOWLEDGE + SKILLS

<b>Applied Mathematics</b>	Arithmetic IPM Calculations Pythagorean Theorem Right Angle Trigonometry	SFM to RPM Conversion Sign Numbers Use of Scientific Calculator
<b>Cutting Tool Assembly</b>	Configuration (LOC and EOH) Holder Applications Fitting (tightening and setting)	Inspection of Cutters Inspection of Holders
<b>Cutting Tool Selection</b>	Cutter Applications Cutter Features/Attributes	Manufacturer's Technical Data References
<b>Geometrical Dimensioning and Tolerancing</b>	Datum Reference Frame (DRF) Degrees of Freedom (DOF) Feature Control Frame Geometric Control Symbols	Geometric Tolerancing Categories Geometric Tolerancing Characteristics Geometric Tolerancing Zone Shapes Symbols Associated with Feature Control Frame
<b>Inspection</b>	Feature with Size Verification Feature without Size Verification Flatness Verification Hole Gaging	Perpendicularity Verification Position Verification Profile of a Surface Verification Surface Finish Verification
<b>Machine Maintenance</b>	Coolants Oils and Lubrications	Refractometer Readings
<b>Machine Safety</b>	Machine Guarding	
<b>Machining Applications</b>	Drilling Face Milling Peripheral Milling	Pocket Milling Reaming Tapping
<b>Measurements</b>	Reading Micrometers Reading Steel Rule Reading Vernier Scales Use of Calipers	Use of Dial Indicators Use of Drop Indicators (travel dial) Use of Micrometers Use of Steel Rules
<b>Operations</b>	Deburring Fixture Offset Adjustments Geometry Offset Adjustments Machine Controls	Machine Startup and shutdown Machine warm up Part Loading (vise/fixture) Tool Height Offset Adjustments



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# CNC Milling: Programming Setup & Operations

COMPETENCIES	KNOWLEDGE + SKILLS	
<b>Print Reading</b>	Block Tolerances Line Types and Conventions Orthographic Projection	Surface Finish Requirements Title Blocks and Revisions
<b>Process Planning</b>	Machine Configuration Machine Selection	Operation Sequencing Workholding Concepts/Devices
<b>Programming</b>	Canned Cycles (holes) Cutter Radius Compensation Developing and Interpret Setup Sheets Fixture Offsets Motion Commands	Plotting Coordinates Program Structure and Formats Programming Words (code memory) Rectangular Coordinate System Selecting Program Zero
<b>Setup</b>	Aligning a Vise/Fixture Establish XY Zero from a Hole Establish XY Zero from Two Surfaces	Machine Controls Program Verification (dry run)
<b>Shop Safety</b>	Blood Born Pathogen Fire Prevention/Suppression Hazardous Material Information System (HMIS) Lock Out/Tag Out	Personal Protective Equipment (PPE) Safety Data Sheets (SDS) Waste Removal