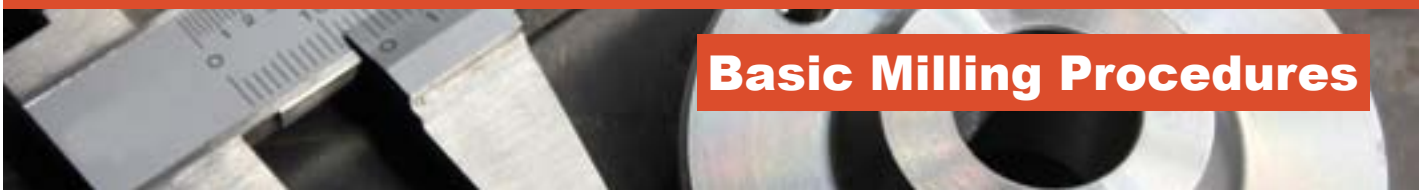

Basic Milling Procedures

Course 326: Basic Milling Procedures

Covers the setup and use of the horizontal milling machine, and describes the functions of basic cutters and attachments. Uses "hands-on" projects so trainees actually gain experience on the milling machine. Includes a work-holding fixture project that can have practical value in the shop when finished.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.

Lesson 1: Using the Horizontal Milling Machine

Topics

Milling Machine Parts and Their Functions; Vertical Milling Attachment; Machine Orientation; Milling Speed Selection; Milling Feed Selection; Depth of Cut; Lubricants and Coolants; Mounting the Workpiece; Using V-Blocks; The Milling Machine Vise; Aligning the Vise on the Table; Installing Work in a Vise

Objectives

- Identify the major parts of a universal horizontal milling machine and their functions.
- Define the use of a vertical milling attachment.
- Compute the milling spindle speed and the machine table feed rate.
- Install and align a workpiece in a V-block.
- Install and align a workpiece in a milling machine vise.

Lesson 2: Slab Milling Procedures

Topics

Special Work-Holding Fixture; Slab Milling the Workpiece; Slab Milling Cutters; Checking the Machine; Installing the Arbor and Cutter; Speed and Feed Selection; Depth of Cut; Cutter Alignment; The Trial Cut; Rough Milling the Workpiece; Taking the Finish Milling Cut; Breaking Down the Setup

Topics

- Select and install a slab milling cutter on a Style B arbor.
- Install a Style B arbor with cutter, spacers, key, and bearing sleeve into a horizontal milling machine.
- Complete a rough slab milling cut on a workpiece.
- Complete a finish slab milling cut on a workpiece.

Lesson 3: Milling Slots and Angles

Topics

Slotting on a Horizontal Milling Machine; Aligning the Cutter and Workpiece; Milling the Slot; Completing the T-Slot; Angle Milling the Workpiece; Making the Cut; Slotting with a Vertical Milling Attachment; Installing the Cutter; Workpiece and Cutter Alignment; Making the Cut; Milling the T-Slot with a Vertical Milling Attachment; Angular Milling with a Vertical Milling Attachment; Milling a Female Dovetail; Milling the Dovetail

Topics

- Mill a slot with the cutter in a horizontal and a vertical spindle position.
- Use a T-slot cutter in both a horizontal and vertical spindle position.
- Angle mill a bevel from both a horizontal and vertical spindle position.
- Use adapters for shank-type cutters.
- Cut a female dovetail in a workpiece using a dovetail cutter.

Lesson 4: Straddle, Side, and Face Milling

Topics

Straddle Milling; Selecting and Mounting the Cutters; Aligning the Cutters and Workpiece; Straddle Milling the Workpiece; Side Milling on a Horizontal Milling Machine; Selecting the Cutter; Setting Up the Machine; Making the First Angle Cut; Using Trig Functions for the Final Cut; Face Milling; Face Milling on a Horizontal Milling Machine; Selecting and Installing the Cutter; Aligning the Cutter and Workpiece; Milling the Workpiece; Vertical Face Milling; Aligning the Cutter and Workpiece

Topics

- Select, set up, and align straddle milling cutters on a Style B arbor.
- Straddle mill a workpiece.
- Cut an angular step using a side milling cutter.
- Face the side of a workpiece with a shell end mill.
- Face a broad workpiece surface using a face mill.

Lesson 5: Milling Keyseats, Squares, and Flats

Topics

Analyzing the Workpiece; Keyseats for Square Keys; Keyseats for Woodruff Keys; Mounting Fixtures; Milling Keyseats for Square Keys; Selecting the Cutter; Installing the Cutter; Laying Off the Keyseat Lengths; Setting Depth of Cut; Speeds and Feeds; Milling the Open-End Keyseat; Milling the Closed-End Keyseat; Installing the Woodruff Keyseat Cutter; Centering the Woodruff Cutter; Cutting the Woodruff Keyseat; Use of Automatic Feed Controls; Milling Squares on Round Work; Mounting the Workpiece; Milling the Square End; Milling Tangs and Flats

Topics

- Select and install a standard Woodruff keyseat cutter.
- Mill a keyseat with rounded ends (for a square key) and a Woodruff keyseat (for a Woodruff key) in a workpiece.
- Make a plunge cut with a two-fluted end mill.
- Mill a square on the end of a shaft.
- Mill a tang and a flat on a cylindrical workpiece.