Mill Safety Competencies

The following list of competencies is presented to ensure the contents of a training program from a perspective of safety. Additional instruction in actual tool use would augment this set of safety competencies.

As a minimum, training would address these competencies, with the potential operator then demonstrating proficiency in these and other areas before being authorized to use the equipment under supervision of a shop supervisor.

Mill Specific Safety Competencies

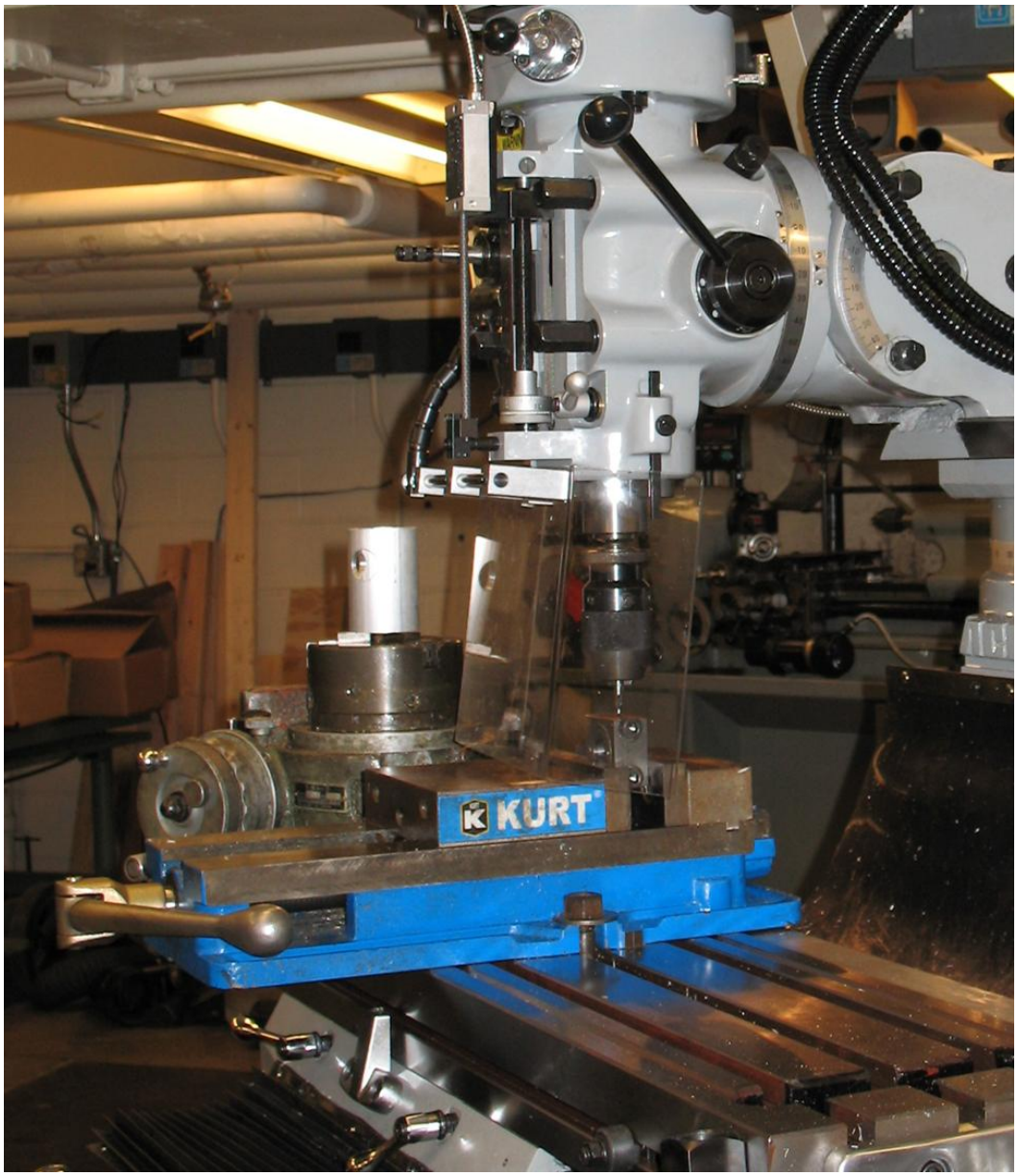
1. Ensure power is off and cutter removed prior to clamping the work piece
2. Securely clamp the work piece and support the work piece so that it cannot shift while being machined
3. Ensure that the clamp and fixtures will not interfere with the cutting tool motion
4. Reinstall all guards and ensure that they will not interfere with the machine or tool motion
5. Only install the cutting tool while the power is off
6. Only turn the power on after the shop supervisor inspects all fixtures
7. When first energized, ensure the cutting tool is rotating in the proper direction
8. Immediately shut down the mill if the cutting tool or work piece vibrates or makes unusual noise
9. Shut down the mill prior to measuring a part
10. Move the work piece away from the cutting tool prior to measuring or inspecting

Mill Startup and Shutdown Competencies

1. Identify the locations for all controls and the machine E-stop
2. Ensure that work piece is securely supported and clamped, and that the machine table is free from any other non-secured items
3. Disengage any machine feeds
4. Ensure that the cutting tool is securely tightened and spindle wrench/key is removed
5. Ensure that the spindle brake is disengaged
6. Select the proper speed range and motor rotation for the required operation
7. Press start
8. For shutdown, use the spindle motor switch or E-Stop

Mill Guarding Competency

1. Ensure that all Guards are in place and properly positioned so that they will not interfere with cutters or machining operations (as indicated below)

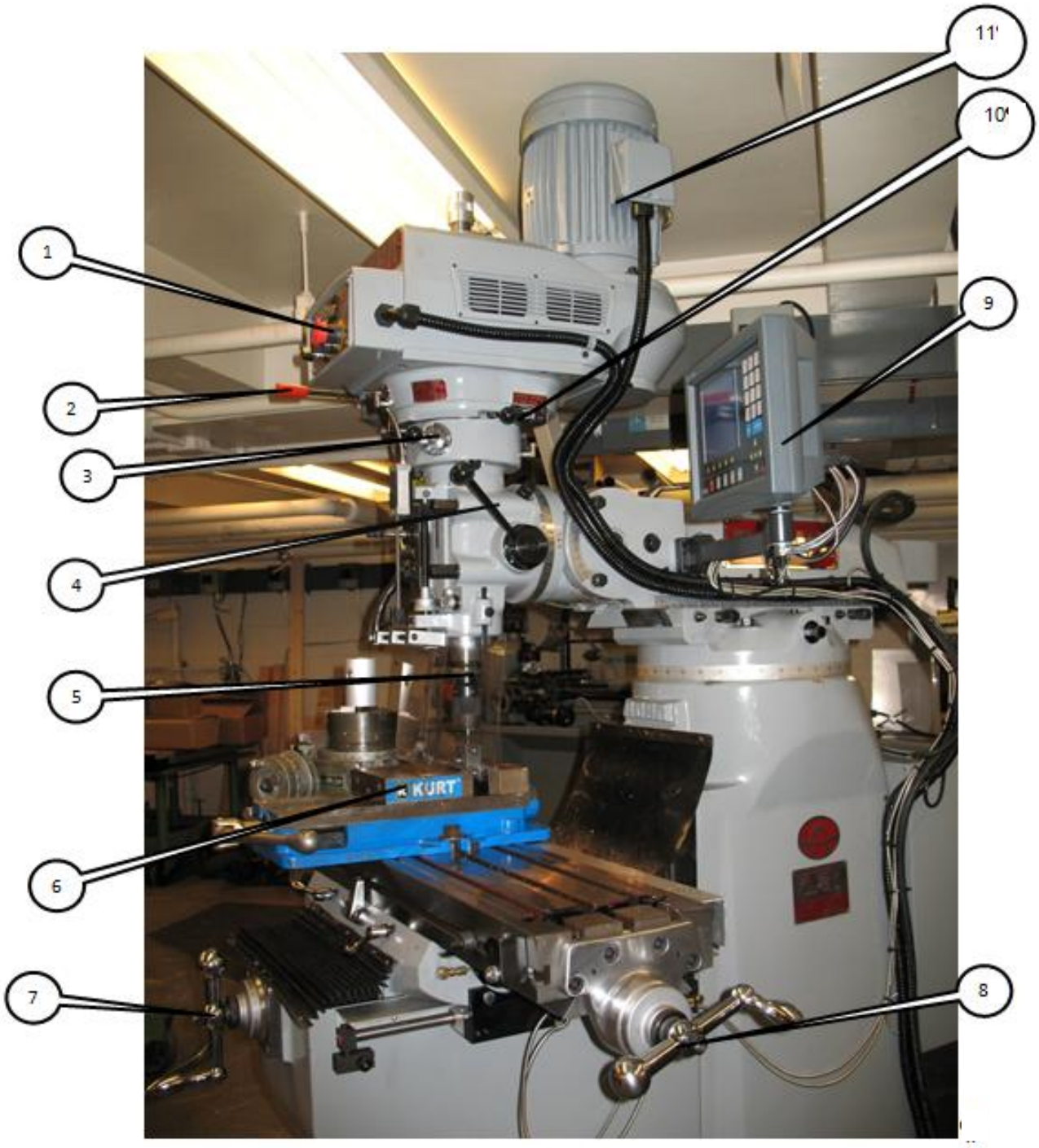


Identification of Mill Major Controls and Components Competencies

1. Identify the location and function of the following components on the mill:

Item #	Name	function
1	E-Stop	
2	Spindle Brake	
3	Quill Feed Drive Engagement	
4	Quill Feed Handle	
5	Spindle	
6	Workpiece Vice	
7	Cross Feed Crank handle	
8	Longitudinal Feed Crank handle	
9	Table Position Digital Readout	
10	Spindle Speed Range Control	
11	Spindle Motor	
12	Spindle Forward/ Reverse	
13	Spindle Speed Indicator	
14	Spindle Speed Control	
15	Power Feed Speed range	
16	Power Feed Engagement	
17	Spindle Guard	
18	Spindle Chuck	
19	Spindle Depth Lock	
20	Unassigned Pointer	
21	Work light	
22	Rotary Work Piece Vice	
23	Main Power Shutoff	
24	Table Elevation Locks	
25	Table Cross Feed Locks	
26	Machine Oiler	
27	Table Elevation Crank	
28	Table Longitudinal travel locks	

Mill Components and Controls Reference



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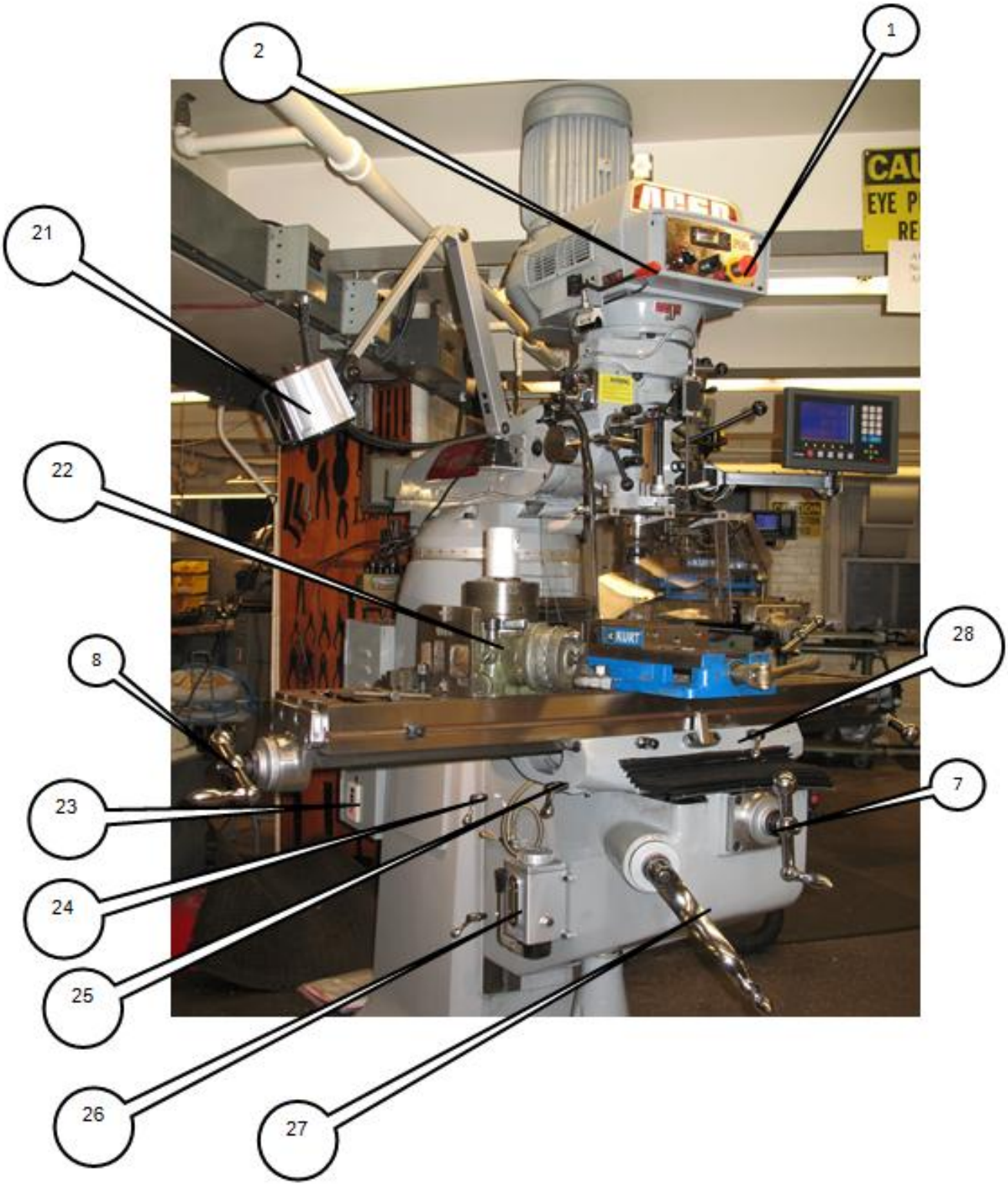

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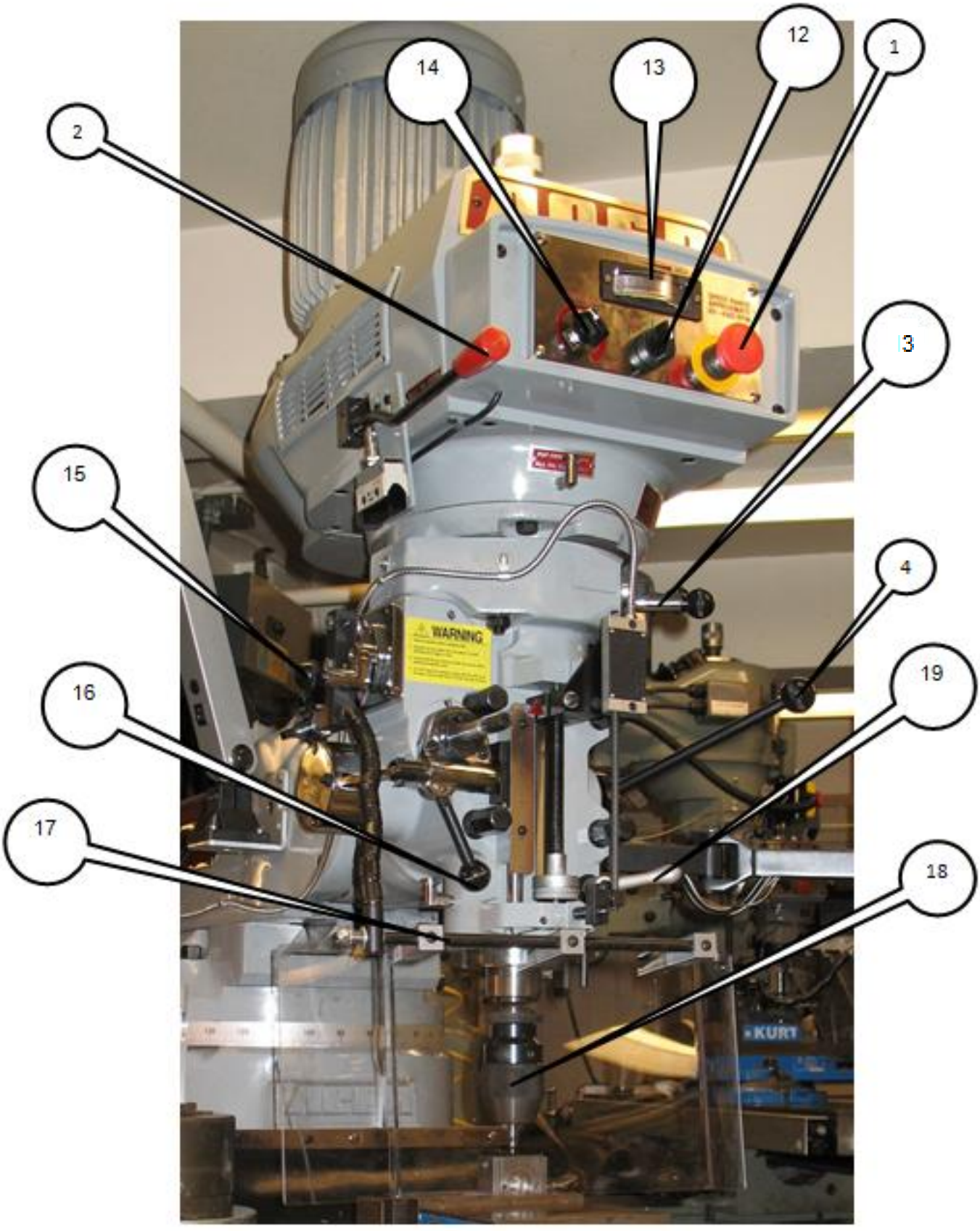

Instructor Guide

The role of the instructor is to evaluate the student against the competencies, ideally in a “practical test” during which the student will demonstrate the competencies. In some cases, students may have a project that can serve this purpose. In other cases, a test sample may be used. The objective of the practical test is to have the student operate as many of the controls as possible, demonstrating an understanding of the function of each part of the milling machine.

Example Practical Test

"Fabricating an Aluminum Base Plate"

Give the student a drawing of the part to be made. The part should require squaring off the end of both ends of the stock, drilling 2 holes of different sizes and milling a slot.

Prior to the student beginning the mill practical test

2. Set the machine speeds to inappropriate levels for aluminum.
3. Have the student cut stock to an approximate length on saw.
4. Verify that the student has reviewed written material at least 24 hours prior to practical test.

During the test

1. Observe student.
2. Let student make mistakes, as long as they do not create a safety hazard.
3. After the project is completed, have the student cleaning the machine and require the use of a brush and vacuum cleaner, followed by a wipe down of the mill.

After the test

1. Measure the part and report back to the student regarding safety improvements, as well as machinery skills associated with accuracy, surface finish or other aspects that would improve their technique.
2. Maintain a paper record of the feedback.

A one-page checklist for the instructor follows.

Instructor Checklist for Mill Practical Exam

Student Name_____ Instructor Name_____

Observe PPE on student	
Check that part is properly fixture/clamped	
Observe installation and tightening of cutting tool	
Observe student placing guard in proper location	
Observe student using locks on vertical and horizontal ways	
Observe student milling an edge of stock square	
Observe proper removal of cutting tool	
Observe student changing cutting speed	
Observe student drilling hole	
Observe use of cutting oil	
Observe demonstration of safe mill practices	
Observe …	
Observe cleaning of machine using vacuum and rags	
Comments:	

Part measurements relative to drawing:

Technique comments: