

## Saws (Horizontal and Vertical Band Saw)

This study guide will cover the major working parts, functions, and machining techniques that can be found/used on most Saws (Horizontal and Vertical Band Saw).

This study guide has been designed to directly represent the questions that will be found on the open book written assessment and as an aid for the hands-on usability assessment. Both assessments will also include questions related to standard machine shop safety and APS internal user safety guidelines.

Answering the questions found at the end of the study guide will enable the user to successfully pass the hands-on usability and written assessments. Study guide practice test and answers can be found at the end of the guide.

Band saws are often the most efficient metal removal machine tools in the shop. Most materials, from wood and plastics to aluminum and steel, can be cut on the two band saws in the shop. Certain metals require specific blades, so check with someone in the shop before cutting steels or hardened materials.

### Horizontal Saw

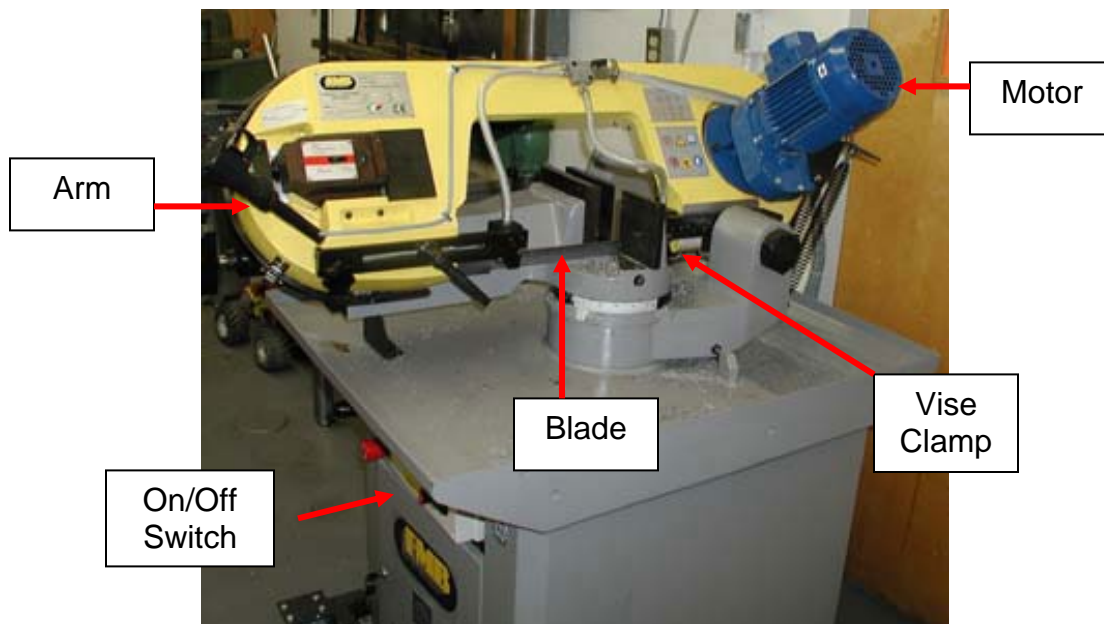


Fig. 1 Horizontal Saw

Most shops will have one or both types of saws (Vertical Band saw (fig. 1) and/or a Horizontal Saw) fig. 2. The horizontal saw has the ability to swivel and thus can make mitre (angular) cuts. Generally the Horizontal saw is used to saw steel and other hard materials, while the Vertical Band saw is used for soft plastics, wood, and non-ferrous metal alloys. Always use the widest blade possible for the job being done.

### **Safety and operations guide lines:**

- Blade guide must be set to just clear the top of the work piece.
- Hold round stock in an inverted vise(up-side down).
- When feeding the work by hand be sure that your fingers are clear of the blade.
- Analyze any chatter. Note: Chatter is a sign that something is loose, or speeds/feeds are excessive. Correct these conditions before proceeding.
- Use a stick, block of wood or a machine vise to feed the work piece into the saw blade.
- Do not change speeds without consulting a technician or the speed/feed chart.

## **Vertical Band Saw**

Vertical band saws, also known as contour saws, perform metal removal jobs that save time and material. Large sheets and bars of material can be cut to size or shape without creating too many chips in a short period of time. Most materials, from wood and plastics to aluminum and steel, can be cut on the two band saws in the shop. Certain metals require specific saw bands in order to be cut, so check with someone in the shop before cutting steels or hardened materials.

## Vertical Band Saw

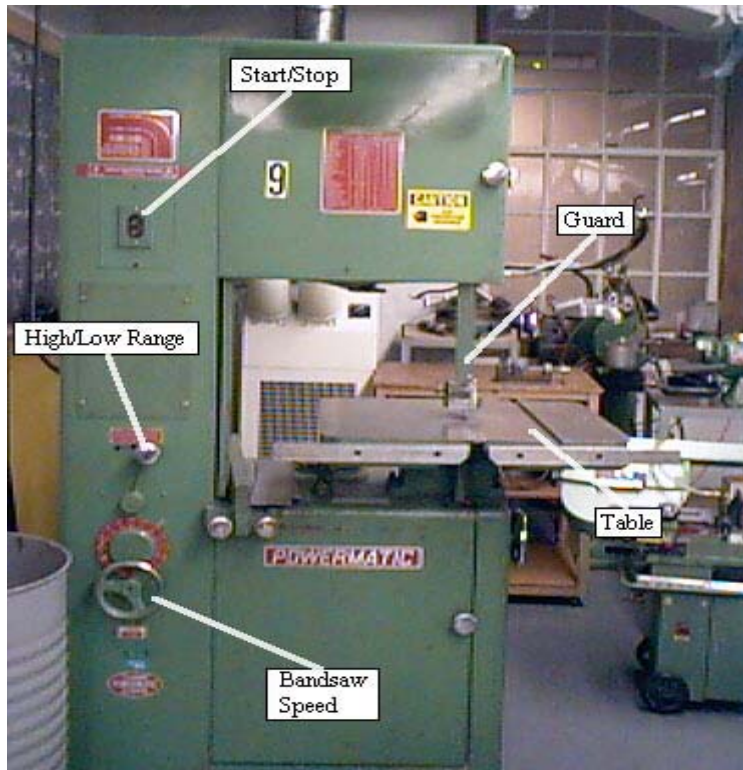


Fig. 2 Vertical Band Saw

### THE CONTROLS

#### START/STOP

The green button will start the band saw, the red button will stop it. The band saw will coast to a stop, so wait until the blade has stopped moving before removing your part or scrap pieces from the table.

#### HIGH/LOW RANGE

Most band saws have a high speed and low speed gear that can be changed with this lever. The band saw must be stopped before attempting to change the range.

#### BANDSAW SPEED

The speed of the band saw may also be changed with a hand-wheel. The band saw must be running to adjust the variable speed.

**Safety Note:** The Vertical Band saw is used not only for softer materials such as aluminum, brass, copper, plexi-glass and wood but also mild steels. Special precautions should be taken to cut materials that are hard such as: tool steels, stainless steels, or any other semi hardened metals. For the semi-harder types of materials adjusting the cutting speed or blade pitch/set is required.

When using a saw (Horizontal or Band type) the widest blade the machine will accommodate for the job will make the best cuts.

Saw blade have different sets, pitches, and tooth forms. Saw blade types are determined by the material being cut. For best performance at least three teeth should be in contact with the work during cutting

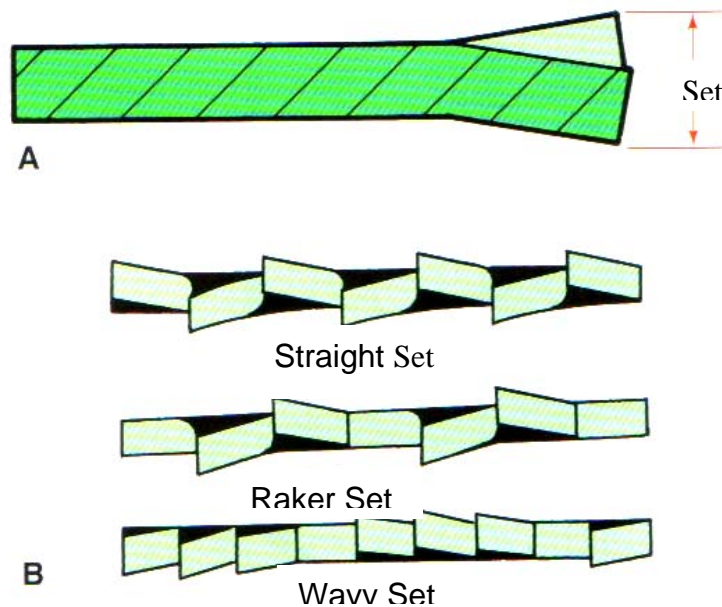
## Blade Set

Set provides clearance for the blade back ( fig. 3 A). The term blade set refers to the side angle of the teeth

**Straight set** is specified for free cutting materials, such as aluminum and magnesium. (fig. 3 B)

**Raker set** is recommended for cutting large solids or thick plates. (fig. 3 B)

**Wavy set** should be used for work with varying thickness, such as pipe, tubing, and structural materials. (fig. 3 B)



**Fig. 3** Blade Set

## Blade Forms

There are three basic forms of saw blades. Each has its specific application.

**Standard tooth blades**, with well-rounded gullets, are usually best for most ferrous metals, hard bronze, and brass.

**Skip tooth blades** provide more gullet and better chip clearance without weakening the blade body. They are recommended for most aluminum, magnesium, and brass alloys.

**Hook tooth blades** offer two advantages over the skip tooth blade. Blade design makes it feed easier and its chip breaker design prevents gumming up.

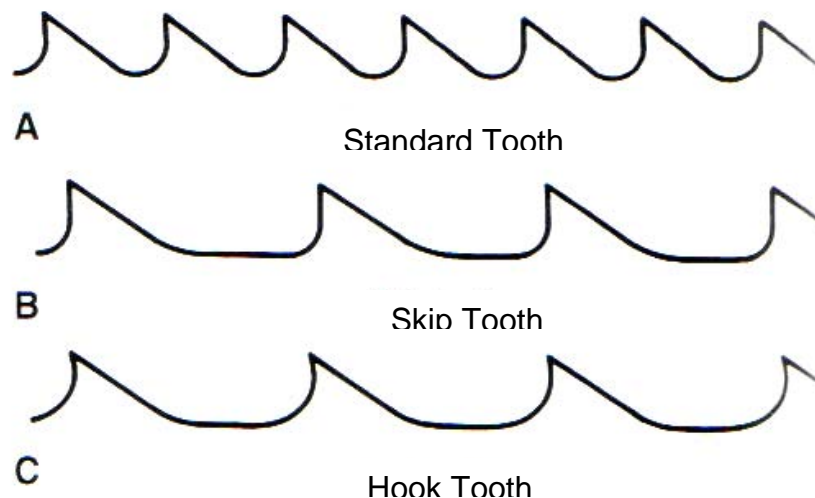


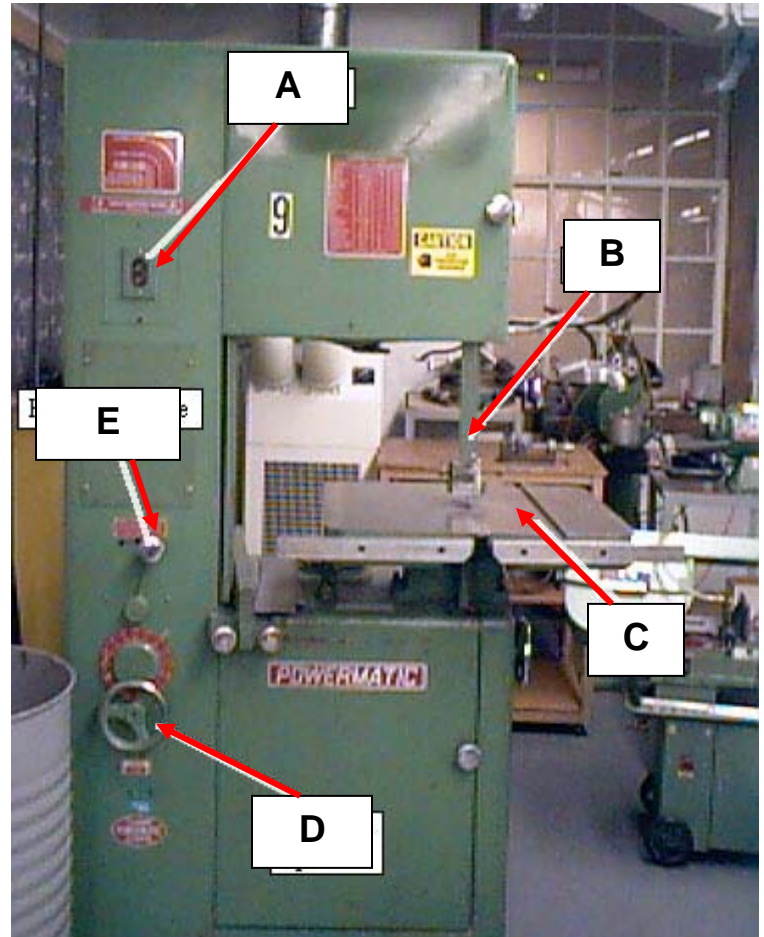
Fig. 4 Three basic forms of saw blades

**Practice Test**

The following questions have been designed to directly represent the questions that will be found on the open book written assessment and as an aid for the hands-on usability assessment.

**Identify the parts of a Vertical Band Saw**

1. \_\_\_\_\_ High/Low Range
2. \_\_\_\_\_ Band Saw Speed
3. \_\_\_\_\_ Start/Stop Button
4. \_\_\_\_\_ Table
5. \_\_\_\_\_ Guard

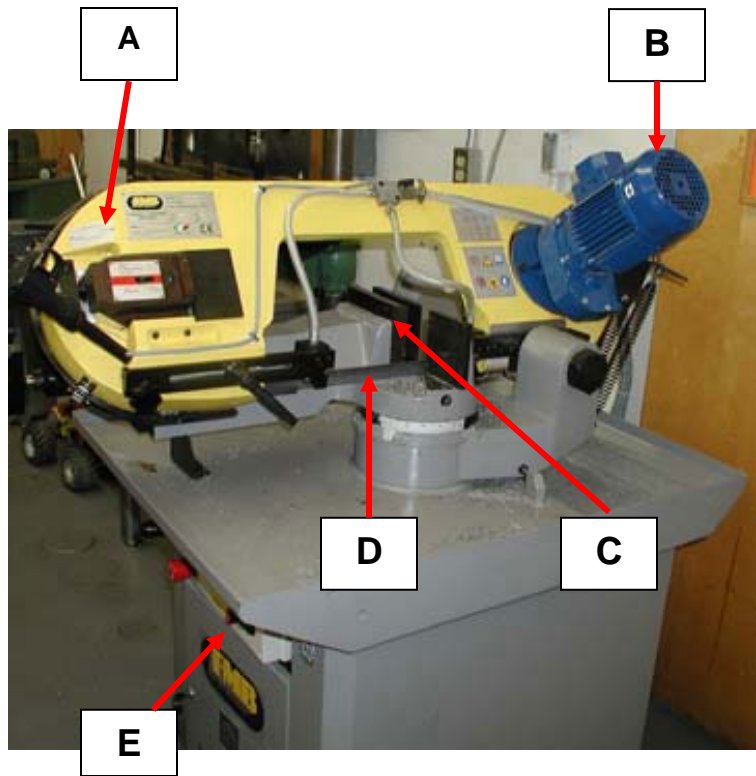


6. When cutting of a piece of stock in a horizontal saw make sure that the saw blade does not drop on the work piece when cutting begins.  
True    False
7. Clean up work area before leaving the shop.  
True    False

8. When sawing a part in a horizontal saw, at least \_\_\_\_ teeth should be in contact with the part during the cutting operation.
- A. 2
  - B. 4
  - C. 3
  - D. 5

**Identify the parts of a Horizontal Saw**

- 9. \_\_\_\_\_ On/Off Button
- 10. \_\_\_\_\_ Arm
- 11. \_\_\_\_\_ Vise/Clamp
- 12. \_\_\_\_\_ Motor
- 13. \_\_\_\_\_ Blade

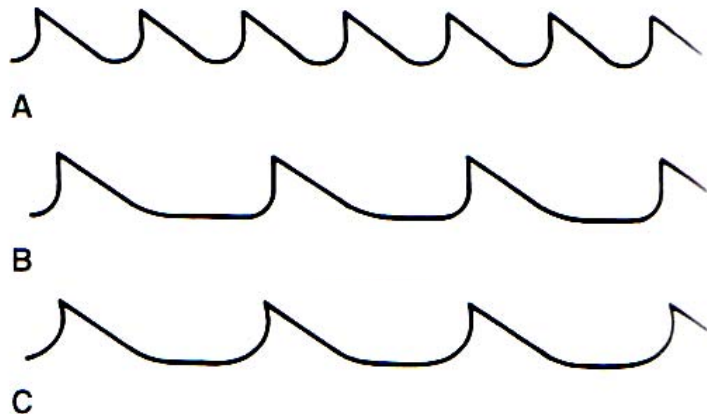


14. Be thoroughly familiar with the placement of the machine's “stop” switch or lever.  
True    False
15. Never attempt to measure a part on a saw while the blade is turning.  
True    False

- 16. Always keep hands at a safe distance from moving machine parts.  
True False
- 17. When sawing a small part on a Vertical Band Saw it is best to feed it with your fingers for more control.  
True False
- 18. Blade guide must be set 2 inches above the top of the work piece for safe cutting operations.  
True False

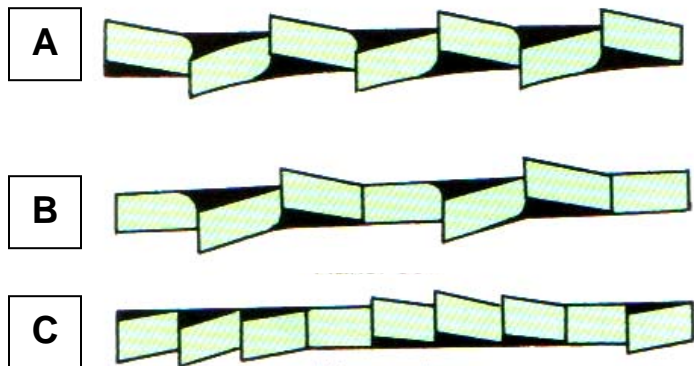
**Identify the three basic saw blade forms.**

- 19. \_\_\_\_\_ Hook tooth
- 20. \_\_\_\_\_ Standard tooth
- 21. \_\_\_\_\_ Skip tooth



**Identify the three types of set on a band saw blade.**

- 22. \_\_\_\_\_ Wavy set
- 23. \_\_\_\_\_ straight set
- 24. \_\_\_\_\_ Raker set





**Study Guide**  
**Answer Sheet**

- |         |           |
|---------|-----------|
| 1. E    | 13. D     |
| 2. D    | 14. True  |
| 3. A    | 15. True  |
| 4. C    | 16. True  |
| 5. B    | 17. False |
| 6. True | 18. False |
| 7. True | 19. C     |
| 8. C    | 20. A     |
| 9. E    | 21. B     |
| 10. A   | 22. C     |
| 11. C   | 23. A     |
| 12. B   | 24. B     |