

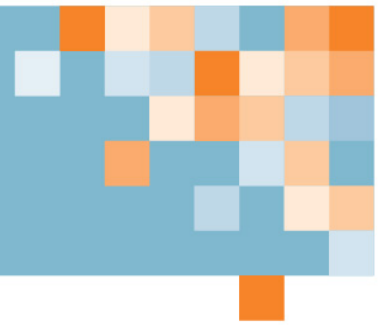
Saw Filer Level 1, Certificate of Qualification, and Benchperson
Endorsement

Formulas

General Formulas	
Pulley speeds	$S \times D = s \times d$
Surface feet per minute	$sfp\text{m} = \frac{\text{diameter in inches} \times 3.14 \times \text{rpm}}{12}$
Revolutions per minute	$\text{rpm} = \frac{sfp\text{m} \times 12}{3.14 \times \text{diameter in inches}}$
Circumference	Diameter in inches X 3.14

Band Saw Formulas	
Band Saw Maximum Tooth Bite	
10 inches wide <i>Where: TB = Tooth Bite PT = Plate Thickness SW = Saw Width</i>	$TB = PT$
More than 10 inches wide	$TB = PT + (SW - 10) (.04 \times PT)$
Less than 10 inches wide	$TB = PT - (10 - SW) (.04 \times PT)$
Alternate Method for calculating Maximum Tooth Bite:	
<ul style="list-style-type: none"> • Start with 1.00 • Add 0.04 for every 1 inch of saw width over 10 inch • or • Subtract 0.04 for every 1 inch of saw width under 10 inch • Multiply answer by the plate thickness 	
More than 10 inches wide	$TB = (\text{Add } 0.04 \text{ to } 1.00 \text{ for every } 1 \text{ inch of saw width}) \times \text{Plate thickness}$
Less than 10 inches wide	$TB = (\text{Subtract } 0.04 \text{ from } 1.00 \text{ for every } 1 \text{ inch of saw width}) \times \text{Plate thickness}$
Band Saw Tooth Bite (actual)	$\text{Tooth bite} = \frac{\text{tooth pitch} \times \text{feed speed in ft/min}}{sfp\text{m}}$

Key number for calculating band saw feet speed	$\text{Key number} = \frac{\text{sfpm} \div \text{sawlength in feet}}{12}$
Band saw feed speed (key number method)	$\text{Feed speed} = \text{Key number} \times \text{Distance between scratch marks}$
Minimum tooth bite	$\text{Tooth bite} = \frac{\text{kerf} - \text{saw plate thickness}}{2}$
Band saw teeth per minute	$\text{Teeth per minute} = \frac{\text{sfpm} \times 12}{\text{tooth pitch}}$
Gullet size (area)	$\text{Gullet area} = \frac{\text{tooth pitch} \times \text{gullet depth}}{1.75}$
Gullet feed index (GFI)	$\text{GFI} = \frac{\text{Tooth bite} \times \text{Cutting depth}}{\text{gullet area}}$
Band saw plate thickness	$\text{Band saw plate thickness} = .001 \times \text{Wheel diameter in inches}$
Band saw kerf	$\text{Band saw kerf} = \text{plate thickness} + (\text{saw plate width} \times \text{standard clearance})$ <small>standard clearances= 0.006" dry wood, 0.007" frozen wood, and 0.008" green wood</small>
Band saw feed speed	$\text{Band saw feed speed} = \frac{\text{Teeth per minute} \times \text{Tooth bite}}{12}$
Strain	
Strain (headsaw)	$\text{Strain} = \text{Width in inches} \times \text{Thickness in thousands} \times 10$
Strain (resaw)	$\text{Strain} = \text{Width in inches} \times \text{Thickness in thousands} \times 8$
Weight required for given strain	$\text{Weight} = \frac{\text{Strain}}{\text{Long arm} \div \text{Short arm}}$
Weight required for given strain including top wheel	$\text{Weight} = \frac{\text{Strain} + \text{Weight of top wheel assembly}}{\text{Long arm} \div \text{Short arm}}$
Strain to weight ratio	$\text{Ratio} = \frac{\text{Long arm}}{\text{Short arm}}$
Compound strain	$\left(\frac{\text{length of 1st long arm}}{\text{Length of 1st short arm}} \right) \times \left(\frac{\text{Overall length of 2nd arm}}{\text{Length of 2nd short arm}} \right)$



Circular Saw Formulas	
Tooth bite	$\text{Tooth bite} = \frac{\text{Feed speed in inches}}{\text{rpm} \times \text{Number of teeth}}$
Key number	$\text{Key number} = \frac{\text{rpm}}{12}$
Feed speed (key number method)	$\text{Feed speed} = \text{Key number} \times \text{Distance between tooth marks}$
Feed speed (tooth bite method)	$\text{Feed speed} = \frac{\text{rpm} \times \text{number of teeth} \times \text{tooth bite}}{12}$
Number of teeth required	$\text{number of teeth required} = \frac{\text{feed speed} \times 12}{\text{desired tooth bite} \times \text{rpm}}$
Horsepower required per saw	$\text{horsepower required per saw} = \frac{\text{Depth of cut} \times \text{Feed speed} \times \text{Kerf} \times \text{Energy factor}}{144}$
Saw kerf	$\text{Saw kerf} = \text{plate thickness} + \text{left clearance} + \text{right clearance}$
Gullet feed index (GFI)	$\text{GFI} = \frac{\text{Tooth bite} \times \text{Cutting depth}}{\text{gullet area}}$
Tooth pitch	$\text{Tooth pitch} = \frac{\text{saw diameter} \times 3.14}{\text{number of teeth}}$
Gullet size (area)	$\text{Gullet size} = \frac{\text{tooth pitch} \times \text{gullet depth}}{1.75}$

NOTE You do not need to bring this formula sheet to your exam. These formulas will be included in the exam reference materials.