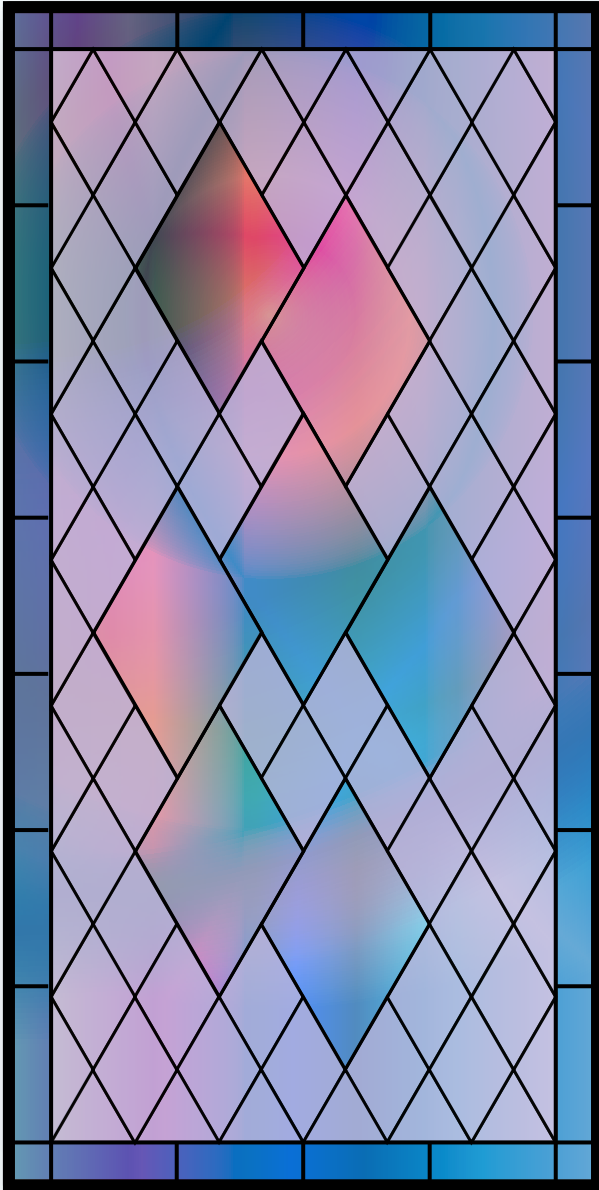


# Portable Glass Shop

*User Directions for the PGO1B - Version two+*



**Morton Glass Works, Inc.**

**309-266-5712**

**fax 309-263-8376**

**email [mgw@mortonglass.com](mailto:mgw@mortonglass.com)**

*We have been steadily adding to the content of our web site. It now includes many free podcasts, videos and projects that will aid you in learning about Morton products. In early 2010 we will have a "Version 3" PGO1B web manual. Version 3 uses audio and video to show all the how to's of the Portable Glass Shop.*

*In the future, all updates and additions to the instructions will be done through the web. To assist you in keeping up with changes at our site, we have a "Notify Me" sign up list that we hope you will join.*

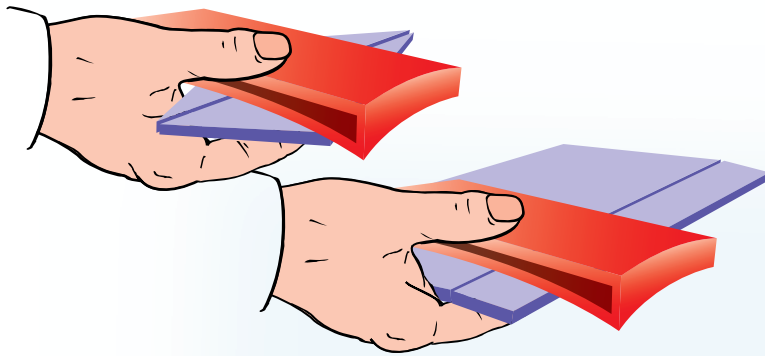
*Please visit us often at  
**[www.mortonglass.com](http://www.mortonglass.com)***

## ***Important User Information***

- *The ruler, in the PGO1B, is now white plastic with a inch scale on one side and a metric scale on the other. Several illustrations, in this manual, show an aluminum ruler with inch and metric scales on one side. The 45° line, shown on the ruler in the manual, is not on the white ruler in your PGO1B.*
- *Page 14 - The alternative strip cutting shown on the lower half of the page is a valid option but less important due to the development of the Fence Extension (PGO2B) shown on page 15.*
- *Pages 17 and 19 - Disregard any mention of a 45° line on the ruler. Using the 90° Fast Angle method to make octagons, right triangles and mitered corners has proven to be the better of the two options.*
- *Audio CD - In the first three tracks, there may be some track number to page number inconsistencies. If they are present on your audio CD they are minor and will present no problems.*

# A third of your Glass Shop accuracy will happen after the score!

**Setup + Score + Break = Glass Shop Accuracy**



The detailed Safety Break instructions make scoring and breaking glass easier. Download a copy to keep on your computer at [www.mortonglass.com](http://www.mortonglass.com)

## A perfect addition to your PG01B Safety Break (SB01)

The running tool is the most versatile part of the Safety Break. Most glass shapes created on the Glass Shop can be broken with the runner and your finger... the advantage is a better quality break.

The box shape of the runner, placed over the score, and the end of your finger pushing up under the scored glass gives a very centered and torque free break. The results are square breaks free of flares and burrs.

Being able to start the break away from the glass edge is one technique used to eliminate burrs and flares. Unlike pliers, the runner is easily positioned in from the glass edge and does not need to be centered to give a square break.

## Before You Get Started

*Audio Track 1*

Thank you for purchasing the Portable Glass Shop. The first Glass Shop in 1980 had wooden fixtures and very few features. The first model was replaced in 1984 by a version with plastic fixtures. For 20 years, from 1984 to 2004, the Glass Shop remained unchanged except for the directions, and they have changed dramatically. With the PG01B, a lot has changed with the product and the directions.

The Squaring Fence now reverses for thick and thin glass. The Small Squaring Fence will give you more space on the Mini Surface. An extra Squaring Block now makes it possible to have setups on two Surfaces. We have even added a new surface size that is sold with a shorter cutting bar. The new Super Mini is for people who have limited space. The 15" bar will replace your 22½" PG01B cutting bar. The Super Mini and the shorter bar will give you a lot of Glass Shop function in a much smaller space. You will love the Fast Angle fixtures. Fast Angles are cool, fun and easy to use. Removing the ruler from the Squaring Fence and going to a single ruler was a big change for PG01 users. The Fence Extension, (PG02B), is an accessory you can add to your PG01B to get the ruler back on the fence. The PG06B accessory can be added to give you extra Glass Stops that match the new design. A new feature in version two is the shuttle strip. If you work with glass shapes smaller than the surface squares you will like the shuttle strip.

The audio CD was a new idea for us in 2004. After two years we are happy that people are finding it very helpful. The audio turns this manual into a powerful "PowerPoint" like instruction. The audio points out the things many people wouldn't know. The results are nothing short of amazing. People went from hating the older directions to thinking the new ones were well written and clear. You don't know what you don't know and the audio CD will fill in those blanks. Use the CD by listening to a section and then read the written portion. Then listen to the section again. To some of you this stuff will come easy. To most of you, all written directions of new to you concepts are a challenge. Sooner or later you will have to take up the glass cutter and start making strips. Don't be afraid to make mistakes. Mistakes are part of the learning. Then listen to the audio again.

Don Abel, President  
Morton Glass Works, Inc.

## Supplies Shopping List

### Must have items

- Soft lead pencil
- Black sharpie
- Masking tape
- Window glass

### May need items

- Nail polish remover
- Q-tips
- Emery board
- Paraffin wax \*

### Should have items

- Safety Break (SB01)
- GS Assembly Tray (PG05)
- Portable CD player

## Contact Information

**Morton Glass Works, Inc.**  
**170 E. Washington St.**  
**Morton, Illinois 61550**  
**United States**

**Email Audio CD comments to:**  
**[mgw@mortonglass.com](mailto:mgw@mortonglass.com)**

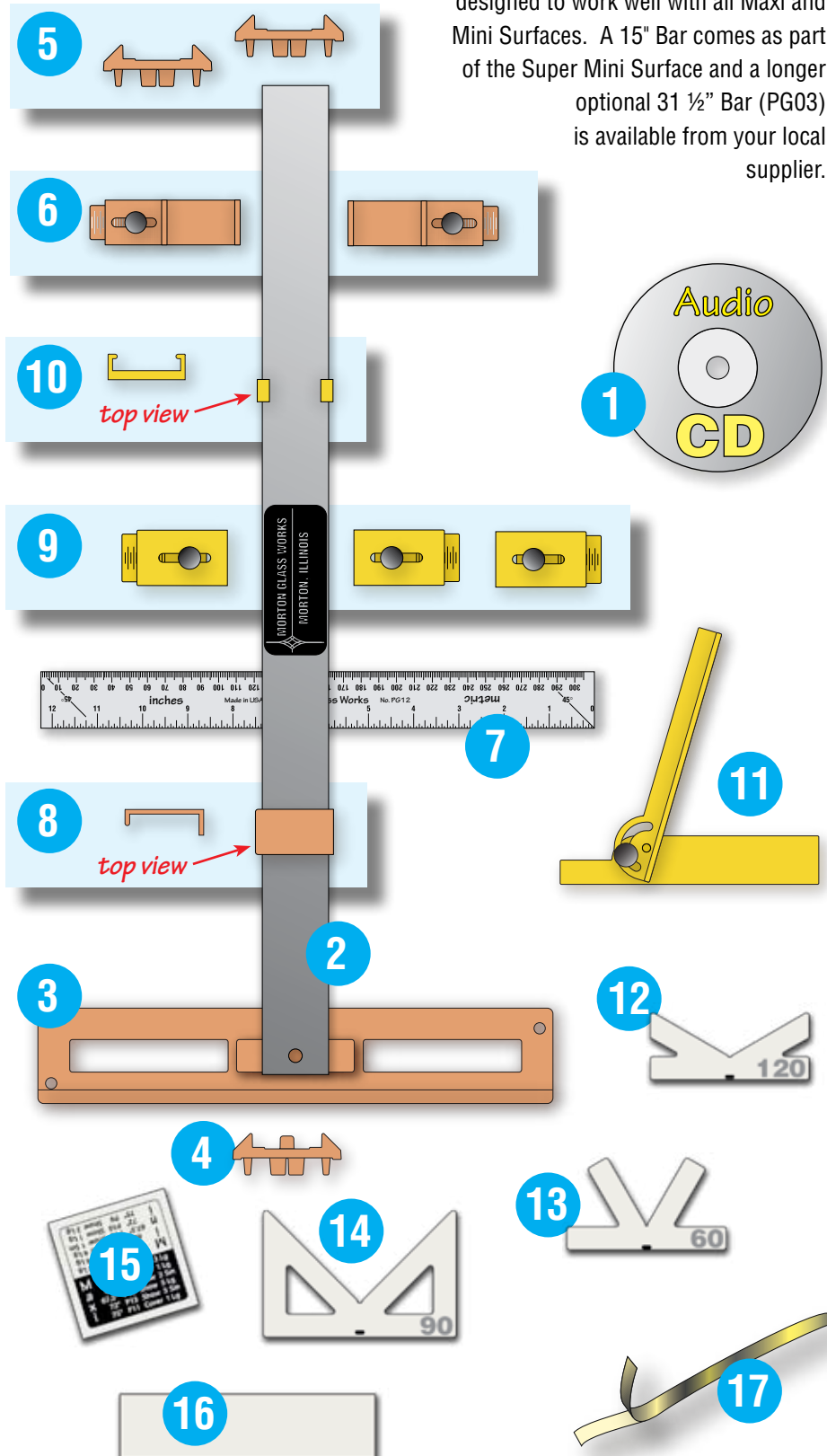
\* Paraffin wax is sold in bar form at grocery stores. I use it as a lubricate on the plastic fixtures, Cutting Bar and the Surfaces. If a fixture is sticking in the Surface, rub a little wax on it. There is no right or wrong way to use this excellent lubricant.

# Portable Glass Shop Components

Audio Track 2

**1 Audio CD, "Learning the Glass Shop"** - Get started in the right direction. A portable player is ideal but use what you have. The upper right corner of each page gives the relevant audio track number.

**2 Cutting Bar** - 22 ½" long and is designed to work well with all Maxi and Mini Surfaces. A 15" Bar comes as part of the Super Mini Surface and a longer optional 31 ½" Bar (PG03) is available from your local supplier.



**3 Squaring Fence** - Beveled edge up for thinner glass, reverse for thicker glass.

**4 Small Squaring Fence** - Used in 90° strip cutting setups on the Mini Surface.

**5 Squaring Block** - Holds the top end of the Bar at 90°. The extra Squaring Block can be used with the Small Squaring Fence and optional Studio Cutting Bar to create a strip cutting station on a second Surface.

**6 Bar Locks** - Used with the Squaring Fence and Bar to set left and right angles.

**7 GS Ruler** - Designed to work well with other parts of your Glass Shop. The zero location of the ruler make it important to always use this ruler for your settings.

**8 Cutter Gauge** - The thickness of the long leg allows for the glass cutter against the Cutting Bar. Throughout this manual the long leg is on the right unless marked.

**9 Glass Stops** - Used to set sizes and hold the "Fast Angle" fixtures in place.

**10 Bar Spacer** - Used to level the Bar when setting angles. The side legs are the same as the Cutter Gauge and are used when making the Octagon.

**11 Angle Copy** - Used to copy angles from patterns and then used to set the Bar.

**12 120° Fast Angle** - Used to make equal triangles and hexagons.

**13 60° Fast Angle** - Used to split 60° diamonds and equal triangles.

**14 90° Fast Angle** - Used to make right triangles, octagons and mitered corners.

**15 4 inch plastic square** - Used with Fast Angles (page 17). Has a handy angle chart for both Surfaces on the back.

**16 Shuttle Strip** - 2" by 8" white plastic strip. Used when cutting very small glass shapes. See page 3.

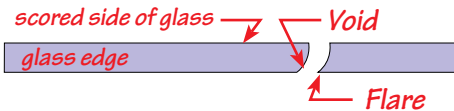
**17 Foil Tape** - May be needed to fix a thin cell wall on some Surfaces. Pages 5 & 9.

# Things You Need To Know

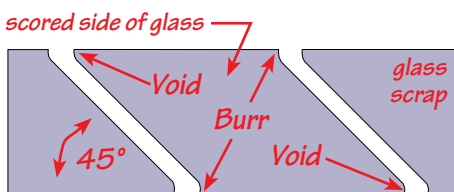
Audio Track 3

**Allowing for the glass cutter** - When the glass cutter head is against the Cutting Bar, the wheel is  $\frac{1}{2}$  the width of the cutter from the Bar. In every measurement or setup this  $\frac{1}{2}$  cutter head allowance must be made. Our primary tool for glass cutter allowance is the long leg of the Cutter Gauge. The sides of the Bar Spacer can also be used. On page 17, dot 9, the Bar Spacer and Cutter Gauge are used together. Although the Cutter Gauge is usually your best option, you can always hold your cutter to the Bar and make the allowance by setting to the wheel. Because glass cutters can vary, we have a test to check your glass cutter with the fixtures (see page 29).

**Flares, burrs and voids** - These are our terms to identify unwanted results when scoring and breaking glass. They are important because they result in changes to the size and shape of your glass.



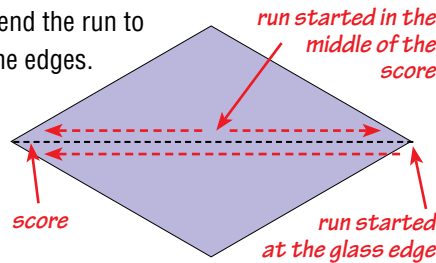
With a flare, the glass will break accurately along the scored edge, but run at an angle to the bottom edge. The diagram above shows the flare on one side and missing glass on the other. We are calling the missing glass a void. The flare can be removed by grinding but the void remains.



Burrs are usually caused by the angle of the score to the glass edge. When you bend the glass to start the break, and the run nears the glass edge, it will run out of the score line and produce the burr. The 45° angle used in a mitered corner will almost always yield a burr. The diagram above shows the burr on one side and missing glass on the other. We are calling the missing glass a void.

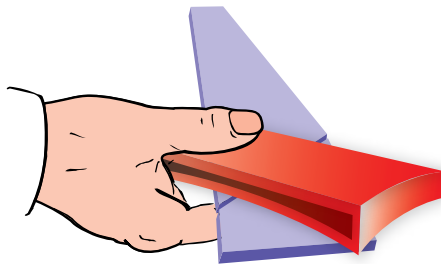
**Preventing flares and burrs** - Good scoring and breaking techniques can prevent many flares and burrs. The Morton Runner of the Safety Break (SB01) was developed for the type of breaking encountered when using your Glass Shop. The instruction manual of the Safety Break is a comprehensive document on scoring and breaking glass. The instructions are included with the Safety Break or you can download them at [www.mortonglass.com](http://www.mortonglass.com).

**Break from the middle** - If you use running pliers, breaking from the middle is a technique you have not tried. Running pliers work only from the glass edge. The Morton Runner can start a run from the edge, but also start a run from the middle of the score and send the run to the edges.



Breaking from the middle is a huge advantage in preventing flares and burrs.

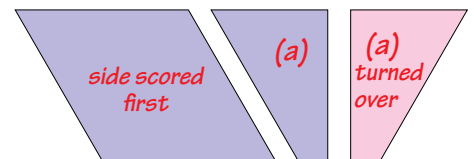
**Even breaking pressure** - The same pressure on each side of the score with the fulcrum directly under the score is what gives a square break. If the pressure is uneven, or the fulcrum is not centered under the score, you can get a flare or burr.



The Morton Runner keeps the pressure even on each side of the score. The Runner goes on top of the score and the breaking pressure is directed upward from the underside of the glass.

**Steady Pressure** - It takes time for the break, that was started by the score, to travel through the thickness of the glass. As you add pressure to break the glass, a slow steady squeeze and hold type of pressure, is much more effective than a quick hard squeeze with no holding pressure.

**Purple and pink glass** - When you get to the step-by-step setups, the glass will be purple on the side that is to be scored first. To show that the glass has been turned over, the color of the glass will be pink.



**Arrows on the glass** - In the step-by-step setups, the glass is sometimes turned or rotated. We use a black arrow, on the glass, to show this movement. If you have trouble following the sequence it may be helpful to draw arrows on your glass.

**Surface** - When we use the term Surface we are referring to a Morton Mini, Super Mini or Maxi Surface. Because the Mini and Super Mini use the same markings the word Mini applies to both. When we mean one or the other we will use Mini or Maxi.

**Knob, round post and number** - In the directions you are told to locate the Bar Lock or Glass Stop in a numbered square or column. Below the black knob is a round post. It is this post that is inserted into the numbered square or column.

**Scale end** - The Bar Lock and Glass Stop have scales made up of large and small white lines. If a Glass Stop or Bar Lock is placed to the left of the Surface's center, the scale is to your left. If placed to the right, the scale is to your right.

**Match the scales** - After setting the first Glass Stop or Bar Lock, the scales are butted together and adjusted to match. See pages 13 & 24.



# Things You Need To Know

Not covered on Audio CD

**Using the Shuttle Strip** - The "Shuttle Strip" is a 2" by 8" thin plastic strip. This is a new feature that will not appear elsewhere in this manual. The strip is used to cover the surface cells when working with thin glass and small glass shapes. Positioning and holding small pieces for scoring can be a challenge due to the width of the cutting bar. The strip is used as a shuttle to position and then remove the scored pieces for breaking.

The five pictures are showing how ¼-inch by ½-inch rectangles being made from a ½-inch strip (13 mm) glass strip using the "Shuttle Strip".

**1** & **2** shows how the "Shuttle Strip" is used as a platform for the ½-inch strip. This is a good idea when you are working with thinner glass.

**3** **4** & **5** are showing how the "Shuttle Strip" and the 120° Fast Angle or a glass scrap can be used to make the small rectangles once the strip is shorter. The glass to be scored is held to the yellow Glass Stop as shown in **5**.

To break the scored glass the "Shuttle Strip" is then moved out from the Cutting Bar, as viewed in **3**.

Now that you have the general idea, practice using the "Shuttle Strip" with some small pieces of glass.



## Quick Reference Guide

Page	Audio Track
<b>Inside Front Cover: Safety Break</b>	
<b>information and Shopping List</b>	<b>1</b>
1. PG01B components.	2
2. Things you need to know.	3
3. <b>More</b> - Things you need to know.	
4. Preparing your Mini Surface.	4
5. Preparing your Mini Surface.	4
6. Mini Surface angle settings.	5
7. Mini Surface angle settings.	5
8. Preparing your Maxi Surface.	6
9. Preparing your Maxi Surface.	6
10. Maxi Surface angle settings.	7
11. Maxi Surface angle settings.	7
12. Strip cutting options.	8
13. Strip cutting options.	8
14. Strip cutting options.	8
15. Strip cutting options and two accessory items for the PG01B.	
16. Squares - Octagons	9
17. Octagons - Right Triangles	9
18. Rectangles	10
19. 45° mitered corner	10
20. Diamonds	11
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22. Diamonds	11
23. Equal Triangles - Hexagons	11
23. <b>Tutorial</b> (from page 17) Exercise for squares and right triangles.	
23. <b>Tutorial</b> (from page 19) Exercise for rectangles and 45° corners.	
24. Trapezoids	12
25. Trapezoids	12
26. Pentagons	13
26. <b>Tutorial</b> : Scoring on either side of the Cutting Bar.	
27. Pentagons	13
28. <b>Tutorial</b> : (from page 24) Trapezoids and the Angle Copy.	
29. (from page 14) Alternative strip cutting chart explained.	
29. (from page 14) High speed squares for mosaics.	
29. <b>Tutorial</b> : Tape test for glass cutter allowance.	
<b>Back Cover: GS Assembly Tray and Circle &amp; Border System</b>	

If your surface has several black, red and green dots... go to **Step 1**.

If you have a **Super Mini Surface**... go to **Step 2**.

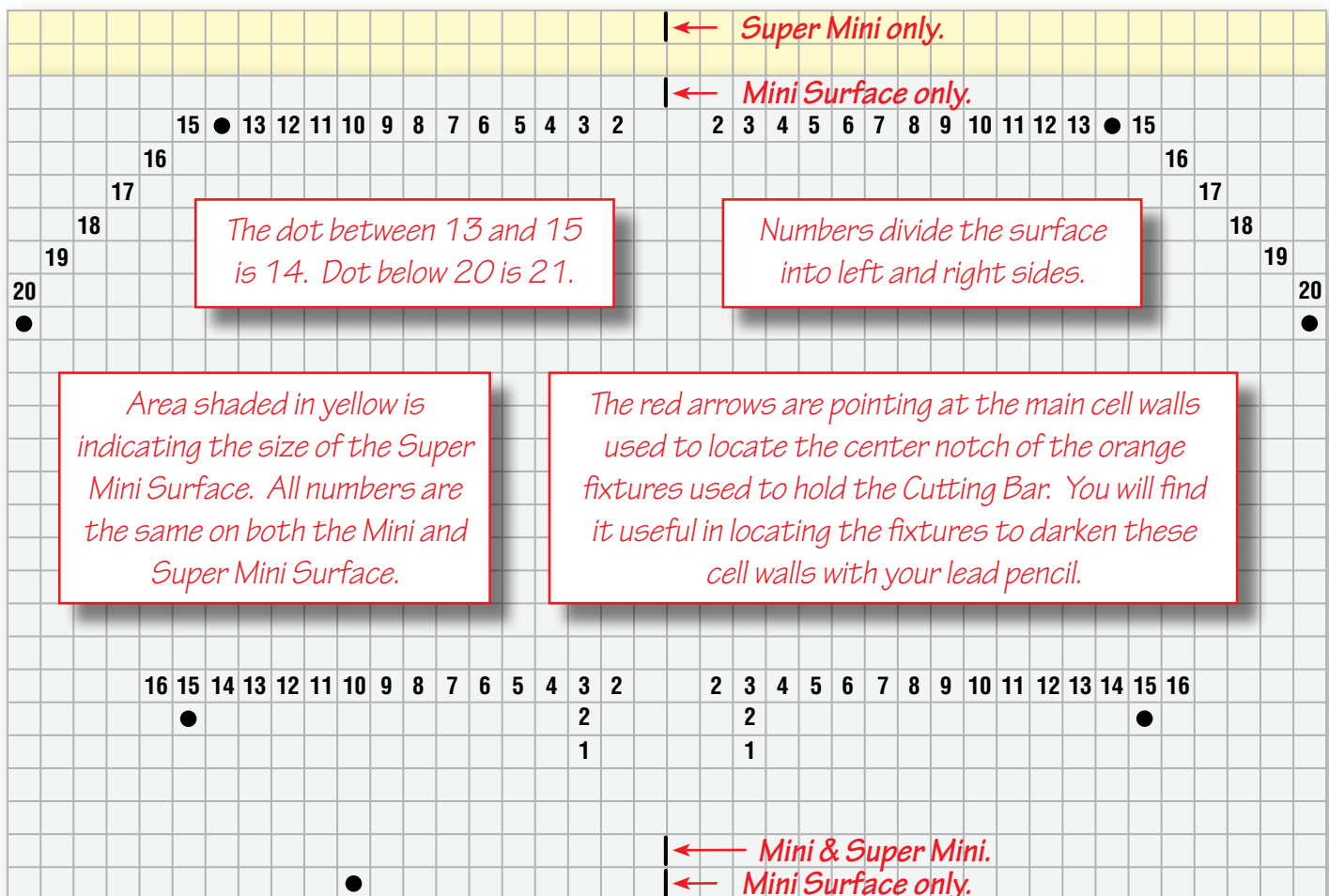
Things you will need: • Nail Polish Remover • Several Q-Tips

- Soft lead pencil with a good eraser.

**B...** Remove all dots except the 7 marked dots. Pour a small amount of the nail polish remover into a small cup. Wet the end of the Q-tip in the nail polish remover and dab a small amount on a dot to be removed... with a clean dry Q-Tip, wipe out the dot. Using less remover and clean Q-Tips will work the best.

**C...** If your Mini Surface has any numbers written in to it, they must be removed before adding the new numbers in Step 2. If the numbers are in pencil, use the pencil eraser to remove them. If your numbers are not in pencil you may need to remove them with the nail polish remover.

**Step 2...** Use a soft lead pencil and add all the numbers below to your Mini Surface. Use the 7 dots as reference points.



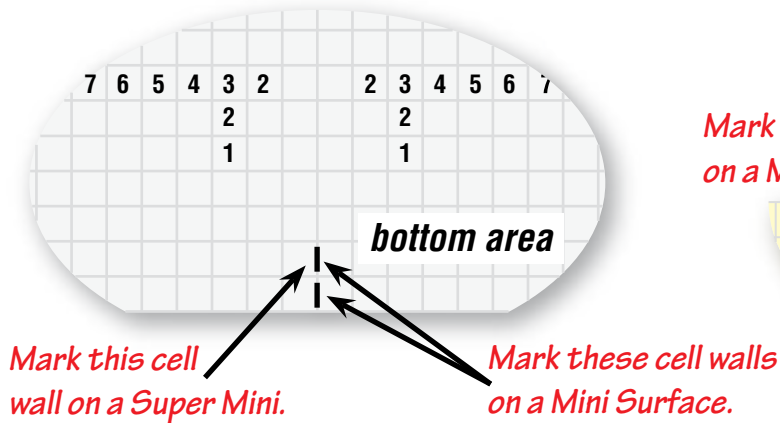
## Preparing Your Mini or Super Mini Surface

Audio Track 4

**Step 3...** Some Surfaces have a thin cell wall in an area where a Glass Shop fixture must be located. If you have a thin cell wall on your Surface it is easy to fix.

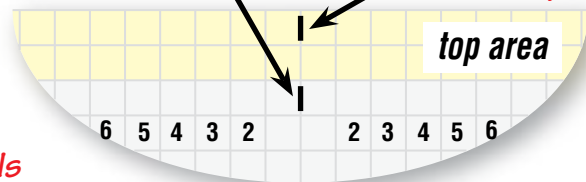
### To check your Surface...

Locate and mark with a lead pencil the three cell walls shown in the diagrams below. Use your surface numbers as a reference to find the correct cell walls.

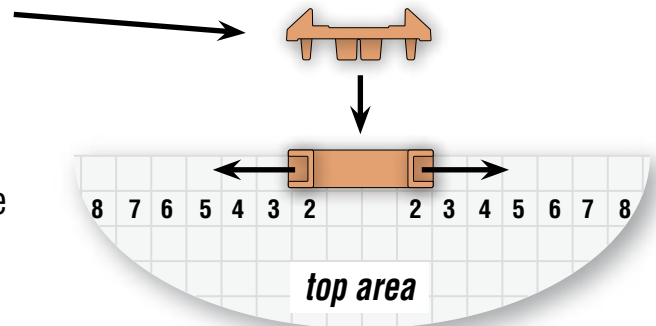


Mark this cell wall on a Mini Surface.

Mark this cell wall on a Super Mini.

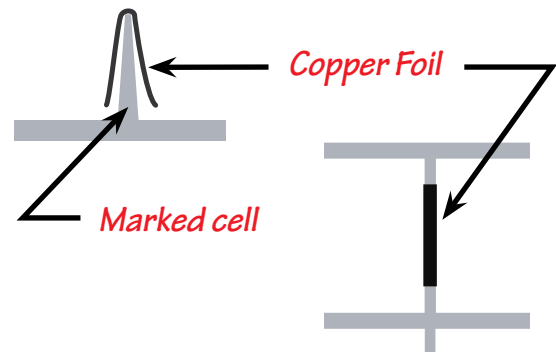


**From your Glass Shop...** take one of the orange plastic Squaring Blocks and place the center notch over a marked cell wall. With the Squaring Block firmly set into the surface try to move it to the left and right. If you have little or no side movement the cell wall is correct.



### If you feel side movement...

- Find the 4" strip of copper foil tape included with your Glass Shop.
- Cut a  $\frac{1}{2}$ " to  $\frac{3}{4}$ " strip of foil, remove the back and stick the tape to the cell by folding it over the cell wall as shown.
- Use the Squaring Block to test the results of the foil tape.



### Why the numbers are important...

Your home or business has an address. Without addresses we would have quite a mess finding a location for the first time. The numbers you have just added are the addresses for the squares on your Mini Surface. We use these addresses to tell you where to locate your Glass Shop fixtures. As you work your way through the directions you will appreciate the importance of the surface markings.

# Mini & Super Mini Surface Angle Settings

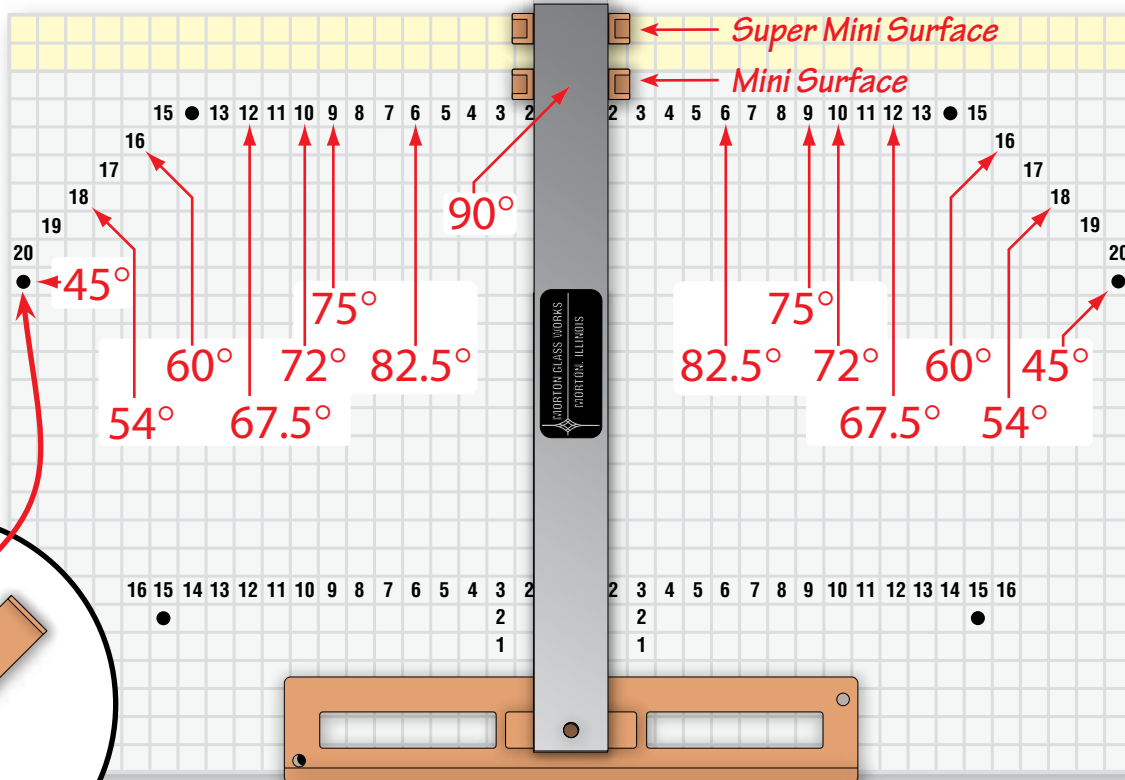
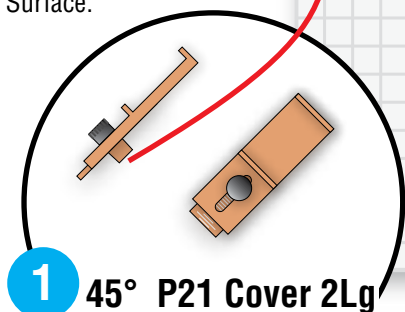
Audio Track 5

The Super Mini Surface is two rows of cells taller than the Mini Surface and comes with a 15" Cutting Bar. In this diagram the shaded yellow area is the height of the Super Mini and the 15" Bar is in the foreground. The shaded area above the 15" Bar is the regular 22½" Cutting Bar that came with your PGO1B.

The dot between 13 and 15 assumes the number 14. The black dot below number 20 would be number 21.

Plug the round post of the orange Bar Lock into a numbered or dotted square (i.e. P21).

The end of the Bar Lock that holds the Bar is to the right when using the left side of the Surface and to the left when using the right side of the Surface.



Track 5 audio pause at 00:54 minutes.

**Recipes for setting the angle of the Cutting Bar on the Mini Surface...**

Each setting has two angles, one less than 90°

called "closed" and one greater than 90° called "open". The "open angle" and "closed angle" always equal 180°. These angle settings are used to make the four common shapes and borders shown at the bottom of the next page.



**45° & 135°  
P21 Cover 2Lg**

Position 21 Cover the 2nd Large Line



**54° & 126°  
P18 Show 4Lg**

Position 18 Show the 4th Large Line



**60° & 120°  
P16 Cover 4Lg**

Position 16 Cover the 4th Large Line



**67.5° & 112.5°  
P12 Show 1Sm**

Position 12 Show the 1st Small Line



**72° & 108°  
P10 Show 1Lg**

Position 10 Show the 1st Large Line

**P = Position  
Show = Show the line  
Cover = Cover the line  
Sm = Small line  
Lg = Large line**

The scale end... of the orange Bar Lock has large lines (Lg) and small lines (Sm). When you slide the Bar Lock top on the Bar Lock base you hide or expose scale lines. The angle recipes simply tell you which lines to **Cover** or **Show**.



**75° & 105°  
P9 Show 2Lg**

Position 9 Show the 2nd Large Line



**82.5° & 97.5°  
P6 Show 3Sm**

Position 6 Show the 3rd Small Line



## Mini & Super Mini Surface Angle Settings

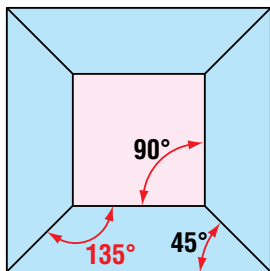
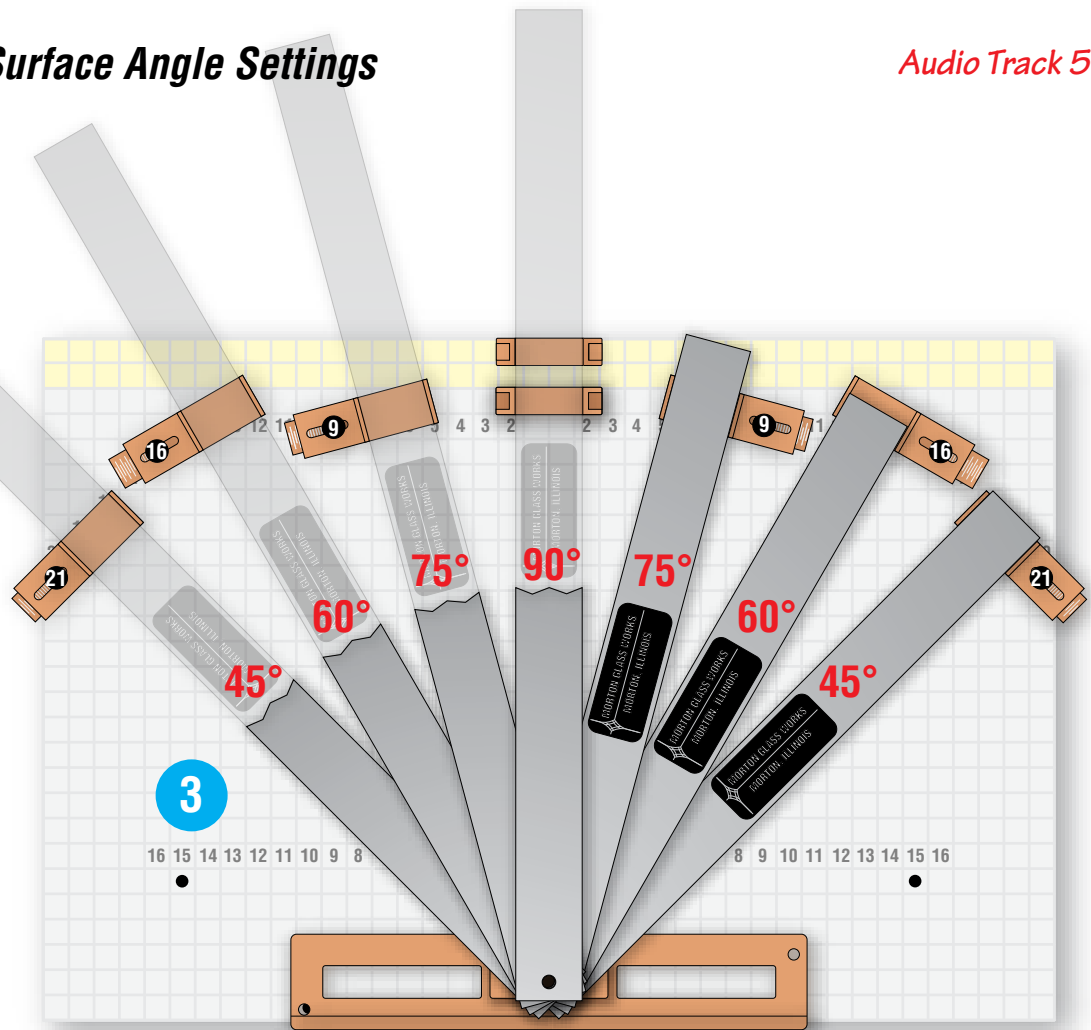
Audio Track 5

**1** Example of how the angle recipe tells which square is used to locate the round post of the Bar Lock...

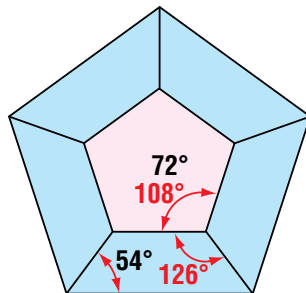
Angles to the left have the Bar Lock scale on the left side of the Bar. Angles to the right have the scale on the right side of the Bar.

**2** All the angle settings for your Glass Shop and Mini Surface... Use the white plastic square with the angle chart label when using the PG01B. Always use the Squaring Block for 90°.

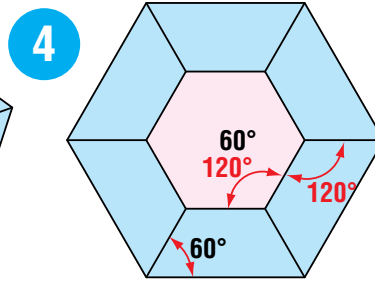
**3** Most of the step-by-step directions will only show a partial Bar with the angle written in red... This example shows the complete setup for the Cutting Bar and Bar Lock. The right side of the diagram is showing the 15" Cutting Bar of the Super Mini.



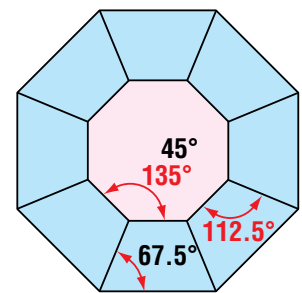
**Square (4 sides)**



**Pentagon (5 sides)**

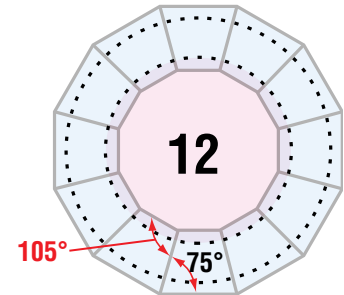
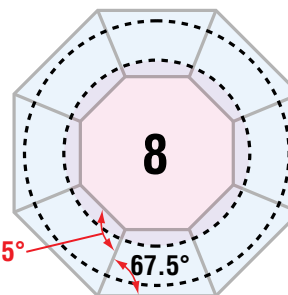
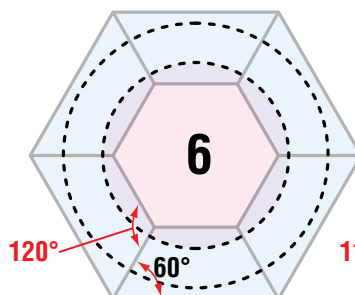


**Hexagon (6 sides)**



**Octagon (8 sides)**

**4** Use the angle settings shown for the Mini Surface to make common shapes and the borders that go around them... An excellent training exercise is to make these shapes from clear window glass.



**Note:** the above diagrams labeled 6, 8 and 12 are showing how trapezoids are made into a ring and then with the Circle & Border System (CBS1 - Fall 2006) are made into border pieces. The border pieces then go around circles for plates and bowls.

# Preparing Your Maxi Surface

Audio Track 6

## Important... do the following before using the Glass Shop

If your surface has several black, red and green dots... go to **Step 1**.

If your Surface has only 7 black dots... go to **Step 2**.

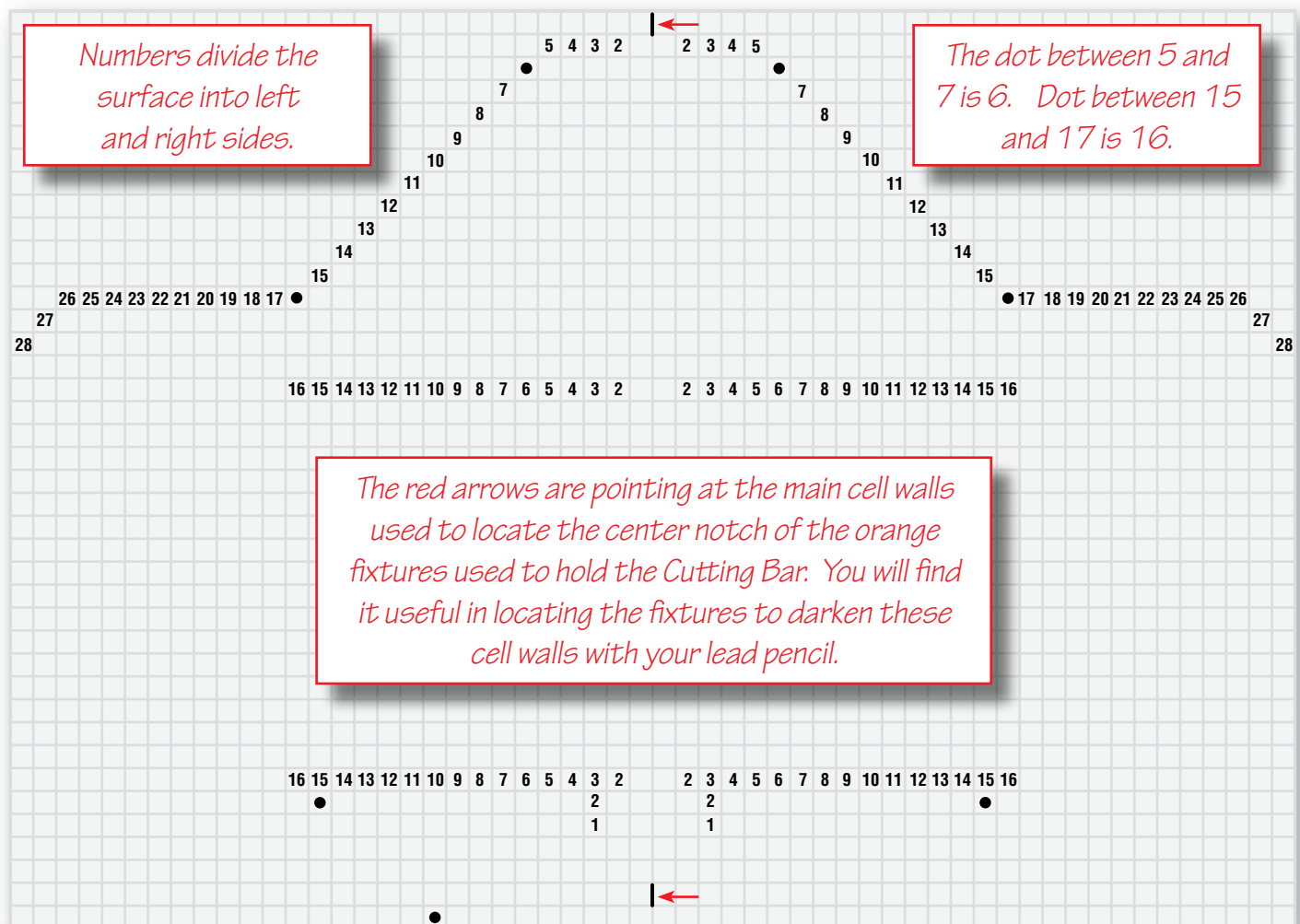
**Step 1...** Removing extra dots... Things you will need: • Nail Polish Remover • Several Q-Tips  
• Soft lead pencil with a good eraser.

**A...** Use the Maxi Surface diagram below as a guide. Locate and mark the 7 dotted squares shown in the diagram... place a small object in the dotted squares to mark them.

**C...** If your Maxi Surface has any numbers written in to it, they must be removed before adding the new numbers in Step 2. If the numbers are in pencil, use the pencil eraser to remove them. If your numbers are not in pencil you may need to remove them with the nail polish remover.

**B...** Remove all dots except the 7 marked dots. Pour a small amount of the nail polish remover into a small cup. Wet the end of the Q-Tip in the nail polish remover and dab a small amount on a dot to be removed... with a clean dry Q-Tip, wipe out the dot. Using less remover and clean Q-Tips will work the best.

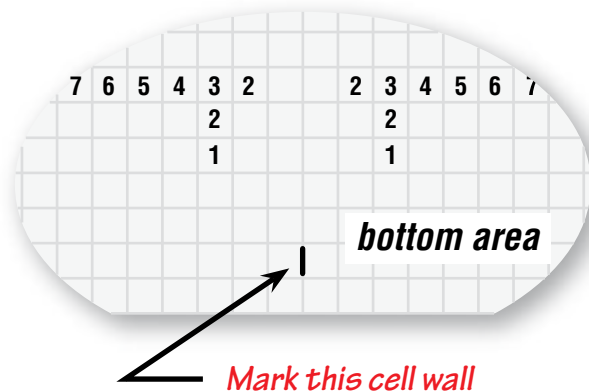
**Step 2...** Use a soft lead pencil and add all the numbers below to your Maxi Surface. Use the 7 dots as reference points.



## Preparing Your Maxi Surface

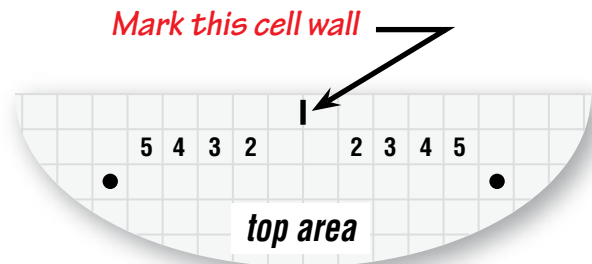
Audio Track 6

**Step 3...** Check your Maxi Surface in two key areas for a thin cell wall. It is unlikely you have a problem, but if you do, your Maxi Surface is easy to fix.

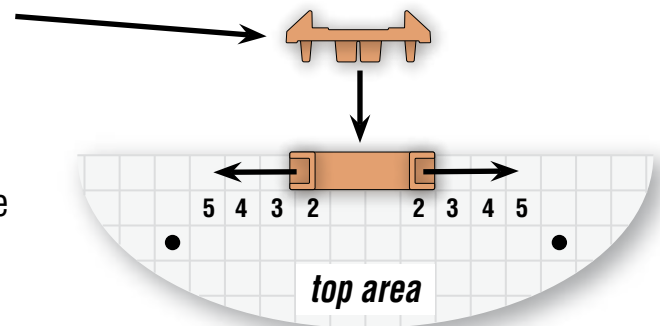


### To check your Maxi Surface...

Locate and mark with a lead pencil the two cell walls shown in the diagrams below. Use your surface numbers as a reference to find the correct cell walls.

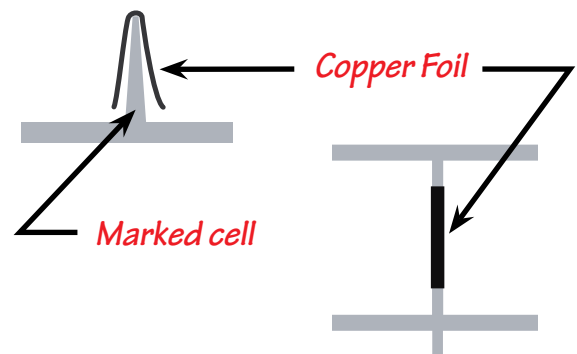


**From your Glass Shop...** take one of the orange plastic Squaring Blocks and place the center notch over a marked cell wall. With the Squaring Block firmly set into the surface try to move it to the left and right. If you have little or no side movement the cell wall is correct.



### If you feel side movement...

- Find the 4" strip of copper foil tape included with your Glass Shop.
- Cut a  $\frac{1}{2}$ " to  $\frac{3}{4}$ " strip of foil, remove the back and stick the tape to the cell by folding it over the cell wall as shown.
- Use the Squaring Block to test the results of the foil tape.

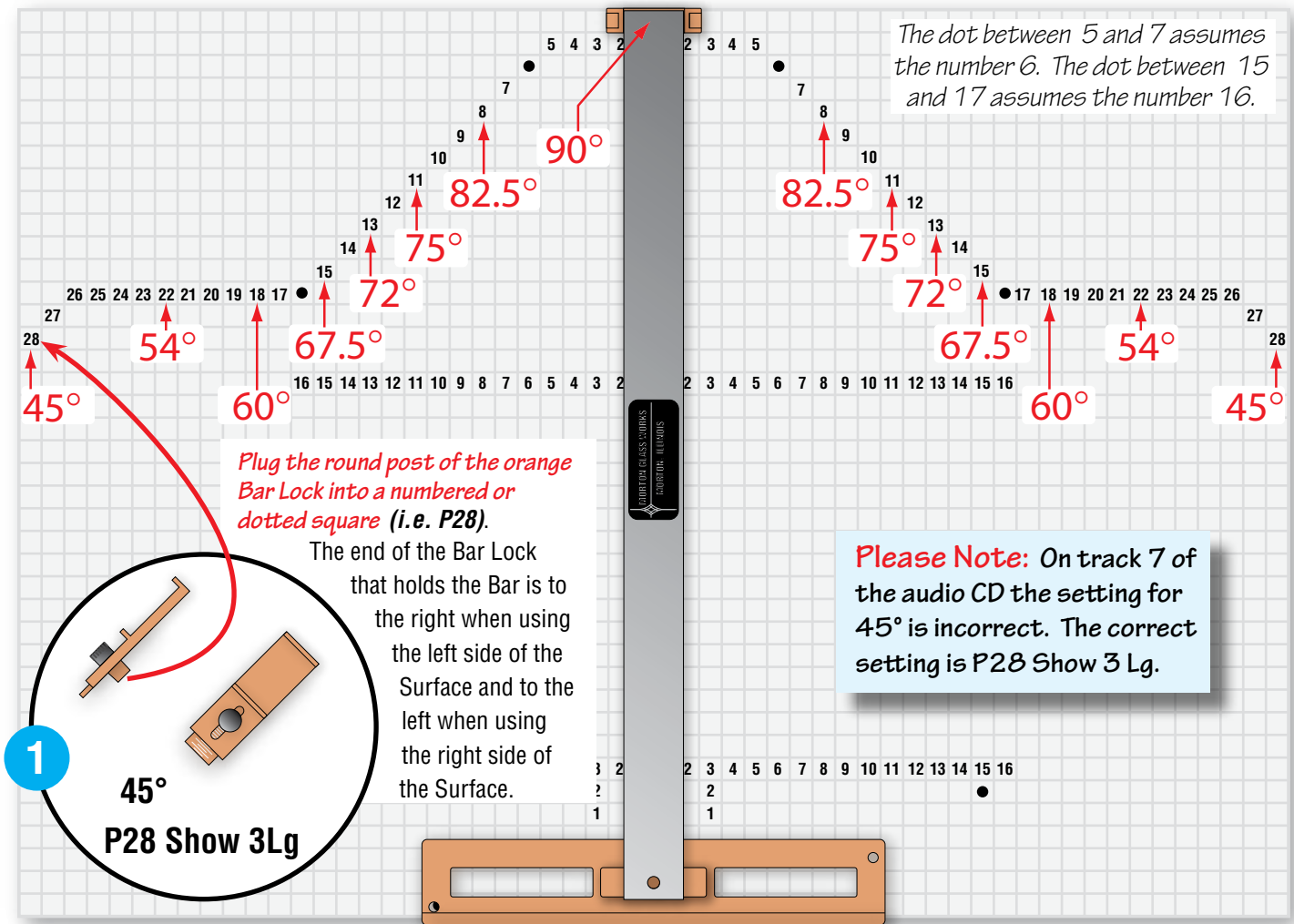


### Why the numbers are important...

Your home or business has an address. Without addresses we would have quite a mess finding a location for the first time. The numbers you have just added are the addresses for the squares on your Maxi Surface. We use these addresses to tell you where to locate your Glass Shop fixtures. As you work your way through the directions you will appreciate the importance of the surface markings.

# Maxi Surface Angle Settings

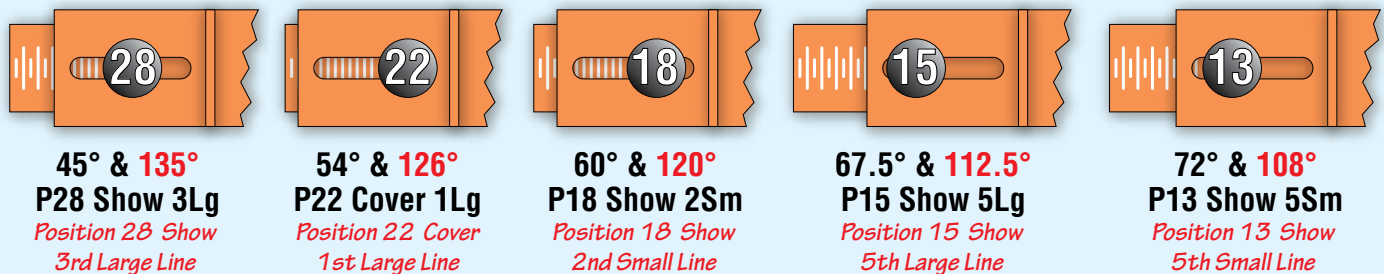
Audio Track 7



Track 7 audio pause at 00:54 minutes.

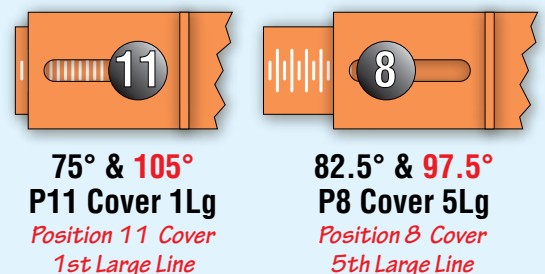
**Recipes for setting the angle of the Cutting Bar on the Maxi Surface...** Each setting has two angles, one less than 90° called “closed” and one greater than 90° called “open”. The “open angle” and “closed angle” always equal 180°. These angle settings are used to make the four common shapes and borders shown at the bottom of the next page.

2



**P = Position**  
**Show = Show the line**  
**Cover = Cover the line**  
**Sm = Small line**  
**Lg = Large line**

*The scale end...* of the orange Bar Lock has large lines (Lg) and small lines (Sm). When you slide the Bar Lock top on the Bar Lock base you hide or expose scale lines. The angle recipes simply tell you which lines to **Cover** or **Show**.





# Maxi Surface Angle Settings

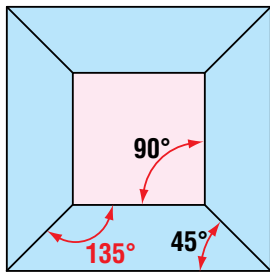
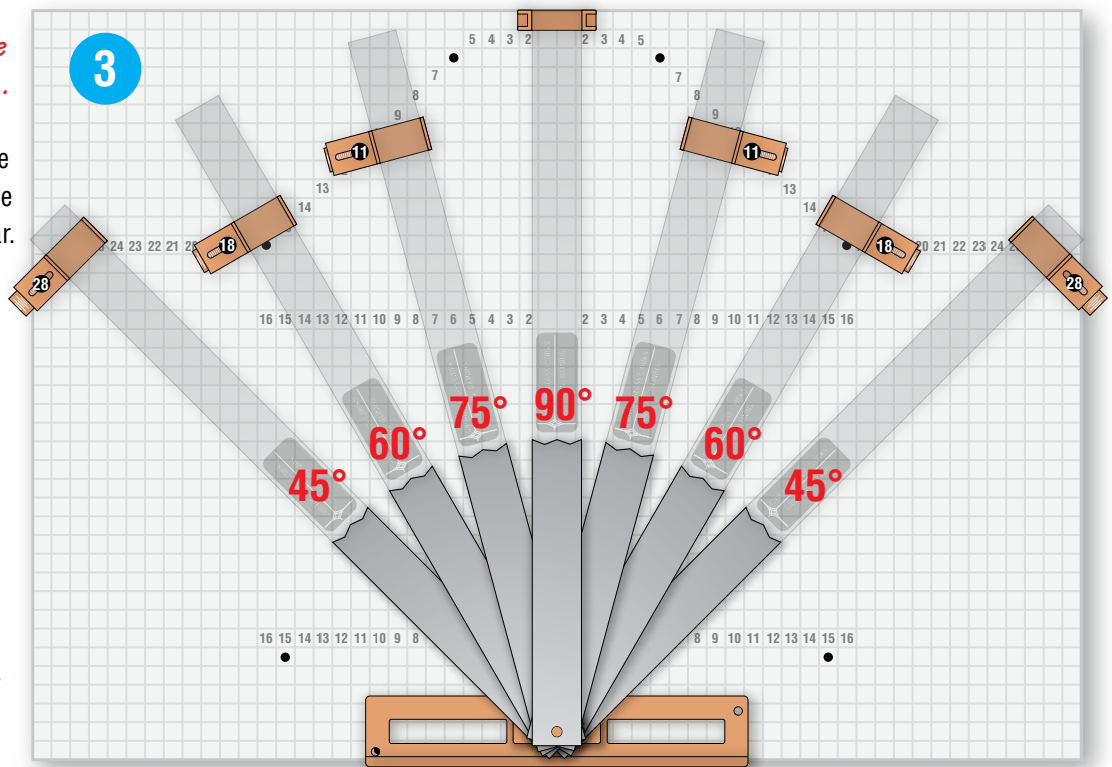
Audio Track 7

**1** Example of how the angle recipe tells which square is used to locate the round post of the Bar Lock...

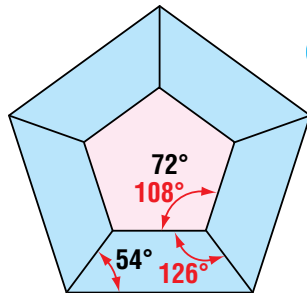
Angles to the left have the Bar Lock scale on the left side of the Bar. Angles to the right have the scale on the right side of the Bar.

**2** All the angle settings for your Glass Shop and Maxi Surface... Use the white plastic square with the angle chart label when using the PG01B. Always use the Squaring Block for 90°.

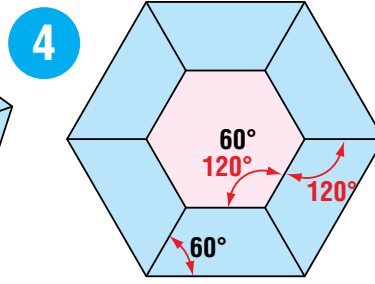
**3** Most of the step-by-step directions will only show a partial Bar with the angle written in red... This example shows the complete setup for the Cutting Bar and Bar Lock.



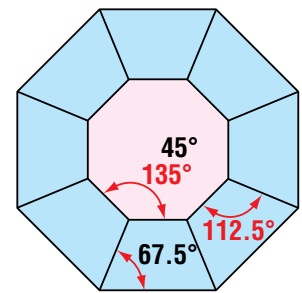
**Square (4 sides)**



**Pentagon (5 sides)**

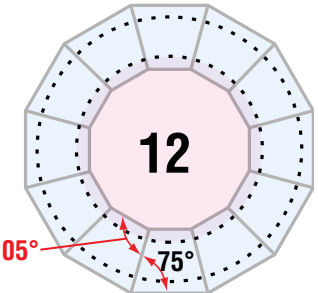
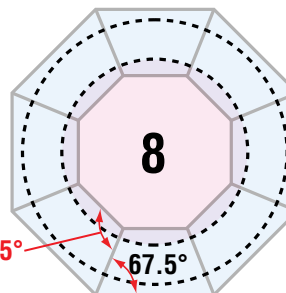
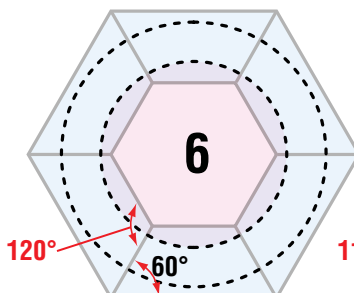


**Hexagon (6 sides)**



**Octagon (8 sides)**

**4** Use the angle settings shown for the Maxi Surface to make common shapes and the borders that go around them... An excellent training exercise is to make these shapes from clear window glass.

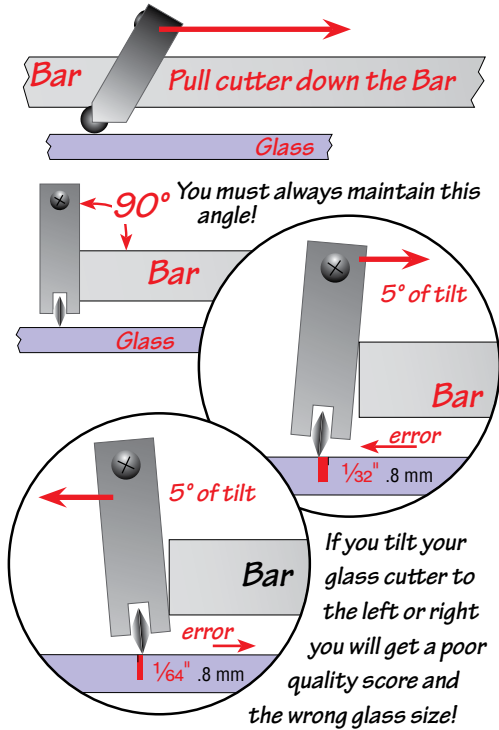


**Note:** the above diagrams labeled 6, 8 and 12 are showing how trapezoids are made into a ring and then with the Circle & Border System (CBS1 - Fall 2006)) are made into border pieces. The border pieces then go around circles for plates and bowls.

# Strip Cutting Options - Maxi & Mini Surfaces

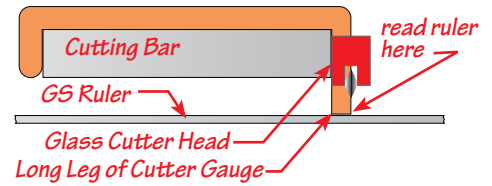
Audio Track 8

Parallel strips are important because most shapes are made from strips. The setup will be determined by which Surface is used, left or right handedness and the glass size..

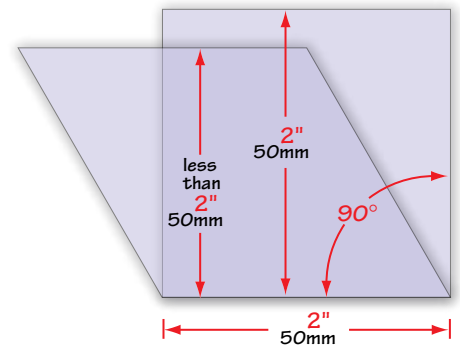


How you hold the glass cutter to the Cutting Bar is important. Learning to pull the glass cutter down the bar smoothly without tilting it left or right is only a matter of practice. If your glass cutter feels like it is digging into the Cutting Bar you may have a sharp edge or burr on your cutter that needs to be dulled or removed. A more common reason for the glass cutter to drag on the Cutting Bar is excessive side pressure. Practice using less side pressure, you will quickly find that very little is needed. When your setup is correct and your results are incorrect, the problem is usually between your elbow and your finger tips. Review the diagrams.

Because the wheel is held away from the Cutting Bar by the sides of the glass cutter, an allowance must be made to get the correct glass size. The orange Cutter Gauge is designed to make the allowance. Page 29 has a good exercise to check your Cutter Gauge and other fixtures for accuracy with your glass cutter.

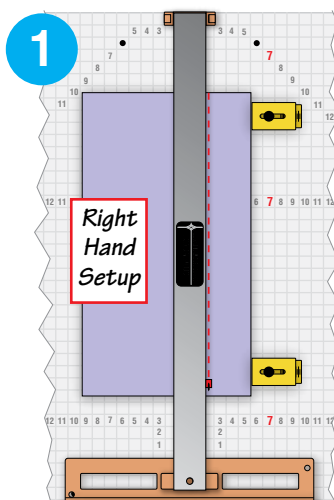


The size of many shapes like the square and diamond are determined by the strip width. Both the square and diamond have four equal sides. If you have a 2" (50mm) square, the strip width is 2" (50mm). A diamond, with four 2" (50mm) sides, will be made with a less than 2" (50mm) wide strip. When you measure for the strip width of a diamond, measure from one side to the opposite side at a 90° angle.



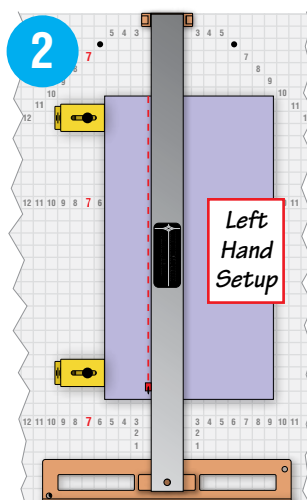
## 90° setups for the Maxi Surface, Mini Surface and Super Mini Surface

Standard 90° setup for a right handed person.



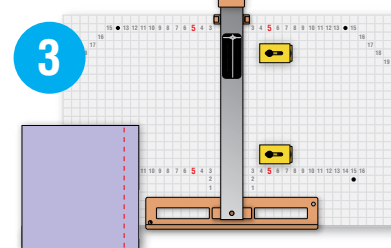
1 Hold the glass to the yellow Glass Stops with your left hand. Score on the right side of the Bar.

Standard 90° setup for a left handed person.



2 Hold the glass to the yellow Glass Stops with your right hand. Score on the left side of the Bar.

Standard 90° setup for a Mini Surface

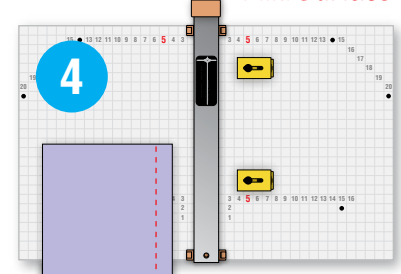


4 When the Small Squaring Fence is used the maximum glass height is 12¾ inches (324mm) on the Mini and 14 inches (356mm) on the Super Mini.

Because glass is often sold in 12 inch squares, this setup is ideal for the Mini Surface but not necessary when using the Super Mini Surface.

3 With a standard 90° setup the maximum size for glass is about 11¼ inches (286mm) on the Mini Surface and 12½ inches (318mm) on the Super Mini. You can use this setup with the Super Mini to strip 12 inch squares of glass but not the Mini Surface.

Optional 90° setup for Mini Surface



## Strip Cutting Options - Maxi & Mini Surfaces

## Audio Track 8

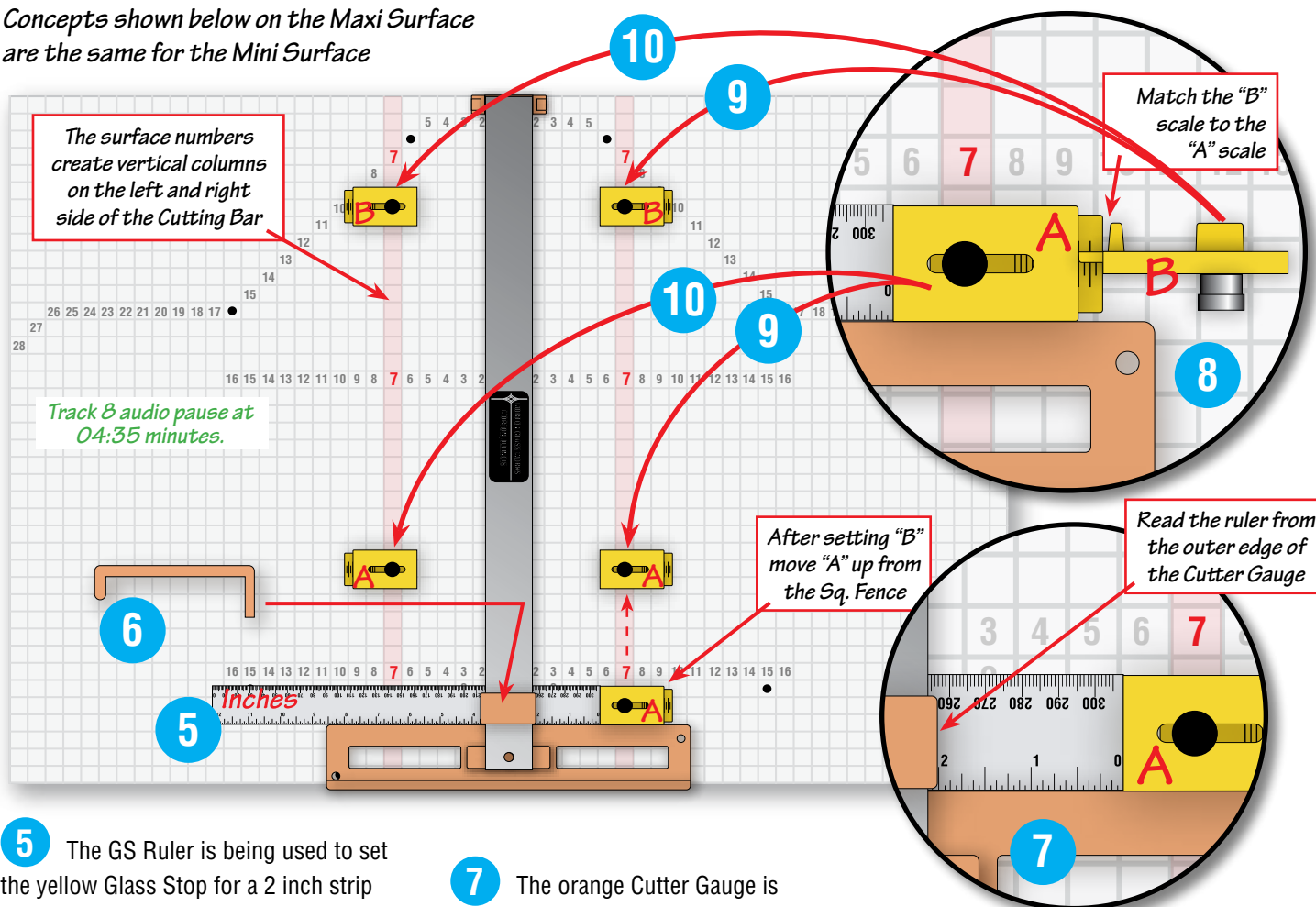
The diagram below is setting up for a 2 inch strip. When you add the glass, if you are right handed, it will look like **1** on page 12. If left handed, it will look like **2**.

*Window glass direction strip*

*If your glass has a pattern or texture, how the strips are made will determine how the final glass shape will look. A clear glass strip and a sharpie is an easy way to get it right every time. Any size of strip width and length will work. With the sharpie, sketch the shapes you are going to make on glass strip. Draw lines to represent the pattern or texture. Now lay the strip on your glass and match the pattern or texture lines with that of the glass to see which way the strip must run.*

## Basic concepts for right handed and left handed stripping setups

*Concepts shown below on the Maxi Surface  
are the same for the Mini Surface*



**5** The GS Ruler is being used to set the yellow Glass Stop for a 2 inch strip (*use 50mm for metric*). You are using the GS Ruler correctly for inches if the word "Inches" is readable and "Metric" is upside-down. To read the ruler in millimeters turn the ruler so the word "Metric" is readable.

**6** The outer edge of the orange Cutter Gauge, on the longer end, is used to read the GS Ruler and also allow for the glass cutter... *make sure the long leg is on the right side of the bar.*

**7** The orange Cutter Gauge is being used to make a 2" setting (*50mm for metric*). The yellow Glass Stop is positioned so the black knob is under the number "7". Slide the top half of the Glass Stop to the GS Ruler and tighten.

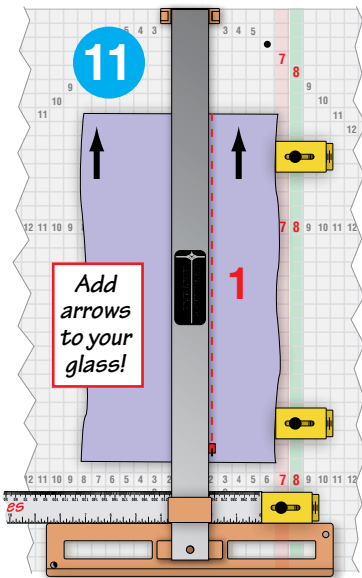
**8** Set the “B” Glass Stop to the same scale setting as the “A” Glass Stop. Loosen the black knob on the “B” Glass Stop and interlock the two scales as shown. Tighten the black knob on the “B” Glass Stop.

**9** The red arrow shows the “B” Glass Stop in right column “7” and the “A” Glass Stop being moved straight up. Scales are on the right side.

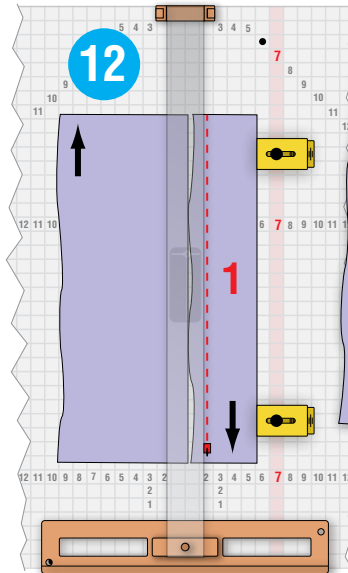
**10** The red arrow shows the “B” Glass Stop being located in left column “7” and the “A” Glass Stop moved up and over to the left side. Scales are on the left side.

# Strip Cutting Options - Maxi & Mini Surfaces

Audio Track 8



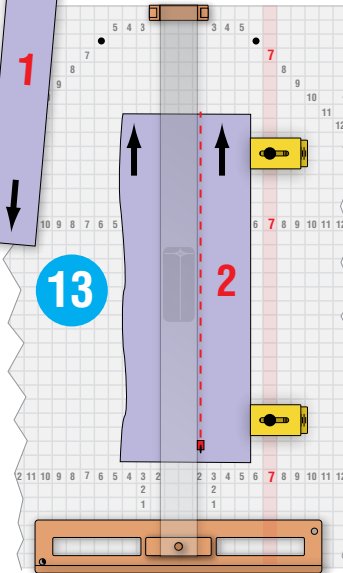
**11** The Glass Stops are first set to the strip size needed. To allow for the irregular edge, both Glass Stop are then shifted one column to the right. This allows about  $\frac{1}{16}$ " (15mm) for scrap. Remove the ruler and Cutter Gauge before you score and break the first strip.



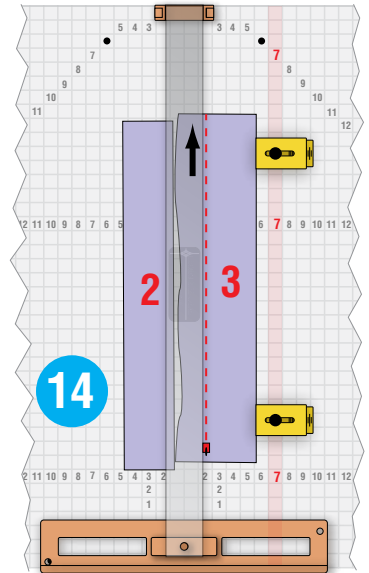
**12** **NOTE:** Move the Glass Stops back to the starting column. Rotate the 1st strip and use the remaining glass to hold the strip to the Glass Stops. Make the second score and remove the uneven scrap from the 1st strip.

When the glass edge is irregular, use this method to cut the first strip!

Draw the black arrows on your glass, it will help you follow the diagrams.



**13** Place the remaining glass to the Glass Stops. Score and break the 2nd strip.



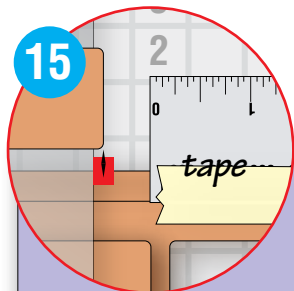
**14** To finish the last strip, use one of the previous made strips to hold the glass to the Glass Stops.

## Alternative strip cutting method for small strips.

Not covered on Audio CD

With this method you will make all the scores first and then break the strips.

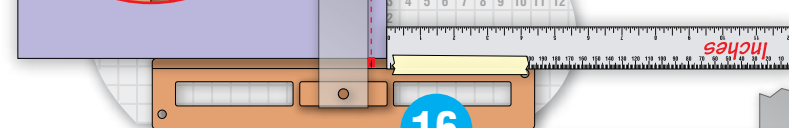
Repeat strip width chart



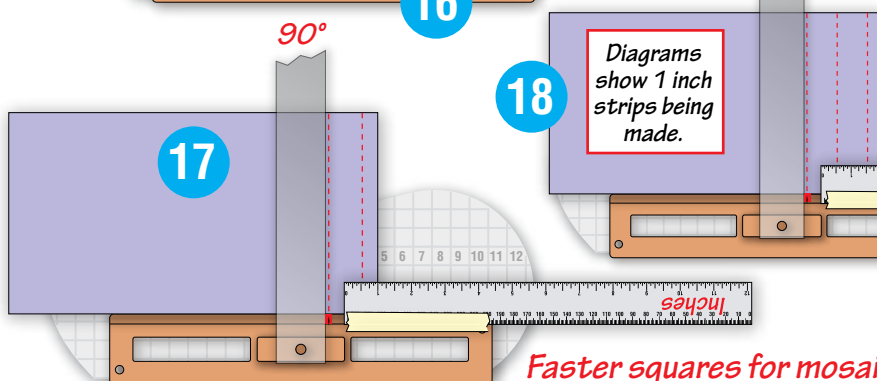
**15** Turn the beveled side of the Squaring Fence up. Turn the Ruler so the "0" is top left. Allow for the cutter and a small strip of glass (used to square the strip end). Masking tape the GS Ruler to the Squaring Fence as shown.

strip	1/4"	3/8"	1/2"	5/8"	3/4"
units	inch	mm	inch	mm	mm
1	1/4"	10	1/2"	15	20
2	1/2"	20	1"	30	40
3	3/4"	30	1 1/2"	45	60
4	1"	40	2"	60	80

Chart details on page 29.



**16**



**17**

**18**

Diagrams show 1 inch strips being made.

Faster squares for mosaics, see details on page 29.

**16** Size the width of the glass to the length of the strips needed. Move the right edge of the glass to the Ruler and make the first score.

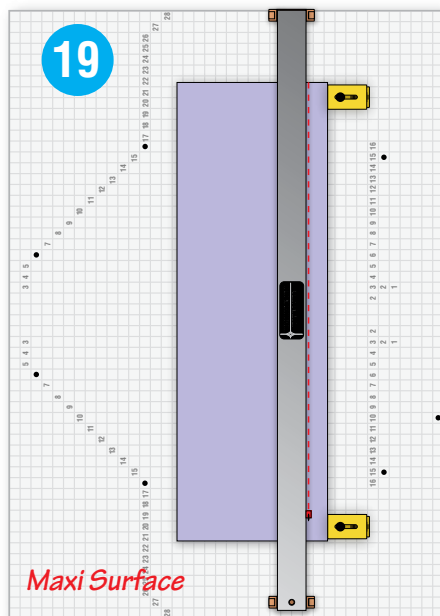
**17** Lift the ruler edge and slide the right edge of the glass to the size of the strip width and score the first strip.

**18** Move the strip edge to the next ruler setting for the second strip. Keep moving the strip to the next setting on the Ruler.



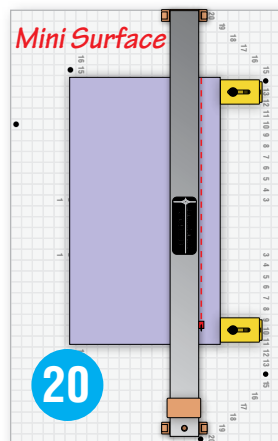
# Options - Maxi & Mini Surfaces

*Alternative strip cutting method for larger strips.*



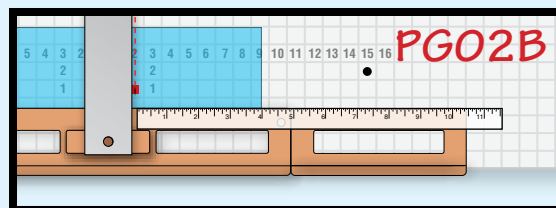
**19** When the glass is over 20 inches, you can turn the Maxi Surface as shown. Use the Small Squaring Fence, Squaring Block and optional 31 1/2" (800mm) Studio Cutting Bar (PG03). With this option, you can strip glass up to 29" (738mm).

**20** When the glass is over 12 inches, you can turn the Mini Surface as shown. Use the Small Squaring Fence and the Squaring Block. With this option, you can strip glass up to 20" (508mm).

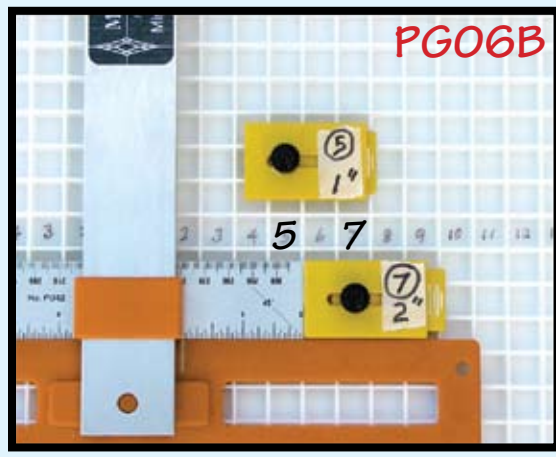


## Accessory Products for the PGO1B

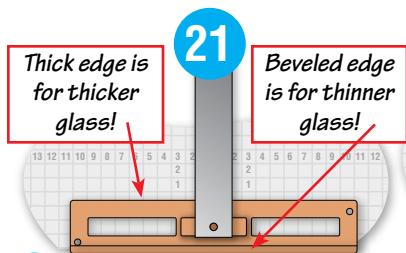
The "Fence Extension" (PGO2B) adds a ruler to the squaring fence. The old PGO1 has a ruler on the Squaring Fence and fans of this function want it for the PGO1B. The ruler has inches on one side and metric on the other and is attached to the extension by the user when it is needed. The extension adds 5" to the PGO1B Squaring Fence and comes with both left and right handed rulers.



It is easy to save various size settings in a project. Set a size, add masking tape and record the column and size (see picture). The more Glass Stops you have, the more sizes you can keep track of. Additional Glass Stops are sold in packs of five under the name "Extra Glass Stops" and PGO6B.

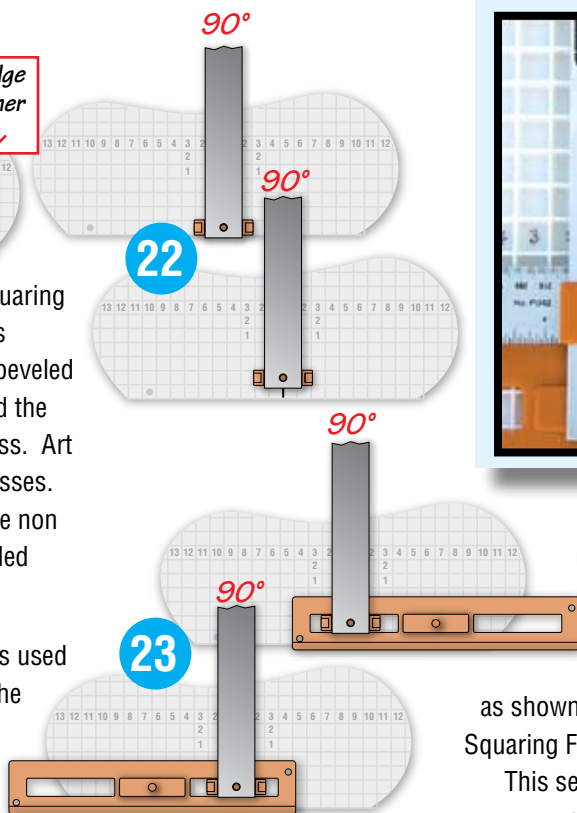


## Squaring Fence options for the Maxi & Mini Surfaces

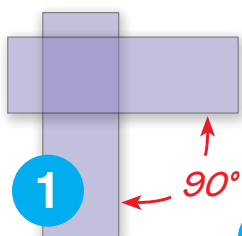


**21** When you examine your Squaring Fence you will find that one edge is beveled and the other is not. The beveled edge is used with thinner glass and the other edge is used with thicker glass. Art glass comes in a variety of thicknesses. When your glass is thinner than the non beveled edge, always use the beveled edge.

**22** The Small Squaring Fence is used for 90° setups only. It is used in the bottom row with the Mini Surface but is moved up one row when used with the Maxi Surface.



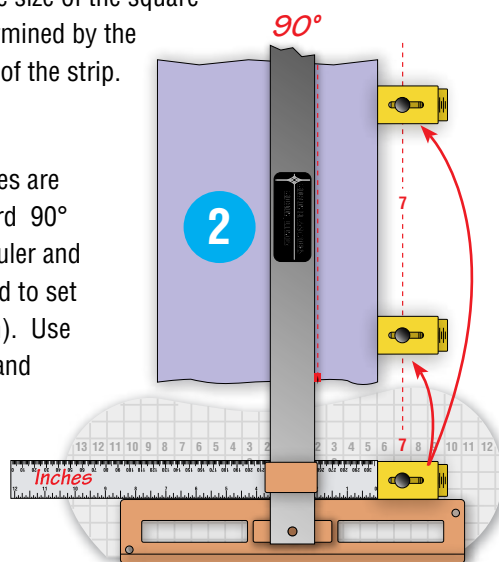
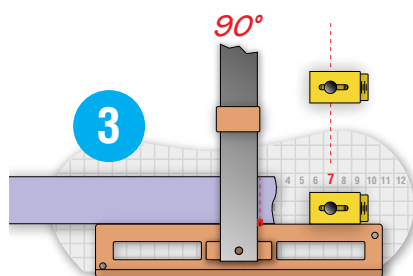
**23** The Small Squaring Fence can also be used with the Squaring Fence. Place the Small Squaring Fence on your center mark one row up from the bottom. Position the Squaring Fence to the left or right as shown in the diagrams. Turn the beveled edge of the Squaring Fence up for thinner glass and down for thicker. This setup can be used for special repeat strip cutting setups. The audio CD will give you more detail.



**1** The size of the square is determined by the width of the strip.

**2** Squares are made with the standard 90° setup. This setup shows the GS Ruler and the orange Cutter Gauge being used to set the yellow Glass Stop to 2" (50mm). Use the first Glass Stop to set the 2nd and 3rd Glass Stops to the same scale settings. The dotted red line is showing all Glass Stops being in column "7". Place the glass to the two upper yellow Glass Stops. Score and break a 2" (50mm) glass strip.

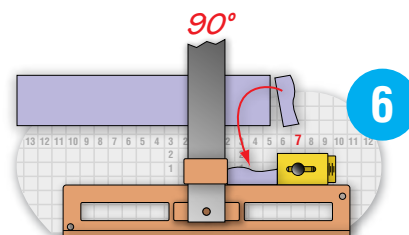
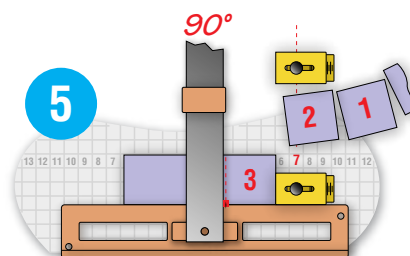
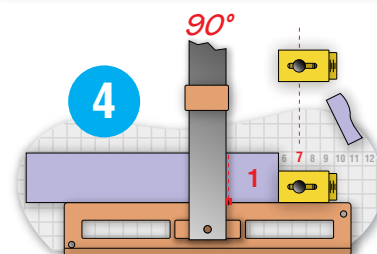
**3** Square the strip end by placing a strip against the orange Squaring Fence as shown. Score and remove the scrap.



**4** Because the 1st Glass Stop is already set to the strip width, just place the strip to the yellow Glass Stop, as shown, and score and break the 1st square.

**5** Continue making squares. By leaving all three yellow Glass Stops set you can return to strip cutting as needed. Square the end of each new strip.

**6** Because the end scrap is the same width as the strip, you can use it to set the Glass Stop for a square. Use the Cutter Gauge to allow for the cutter.

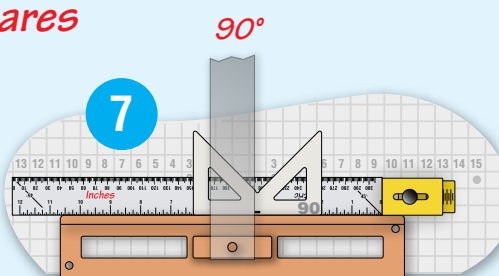
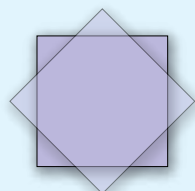


## Left Handed

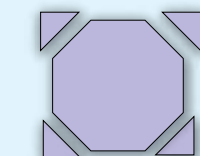
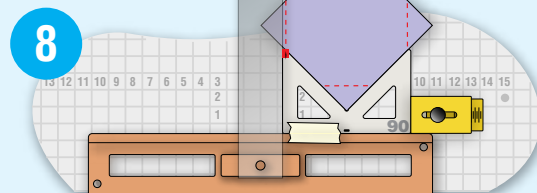
The person who designed your Glass Shop is left handed. In his opinion, strip cutting (page 12), is the only setup that must be left handed. The rest can be done from the right handed setups.

## Octagons from Squares

### 90° Fast Angle



You will get burrs and flares, touch up all the corners with your grinder.



Not covered on Audio CD

The 90° Fast Angle is offset, to the right, ½ width of the square (i.e. 4" square, offset 2"). The masking tape will hold the Fast Angle to the Glass Stop and the Squaring Fence.

**7** Position your GS Ruler under the Fast Angle. Holding the Fast Angle to the Cutting Bar, move the Ruler until ½ the width of the square is exposed on the right edge of the Fast Angle. Set the yellow Glass Stop at the end of the Ruler as shown.

**8** Move the Fast Angle to the Glass Stop (tape in place as shown). Position the square, as viewed in the diagram, and score across the corner. Rotate the square to the next corner. Score all four corners.

## Octagons from Squares

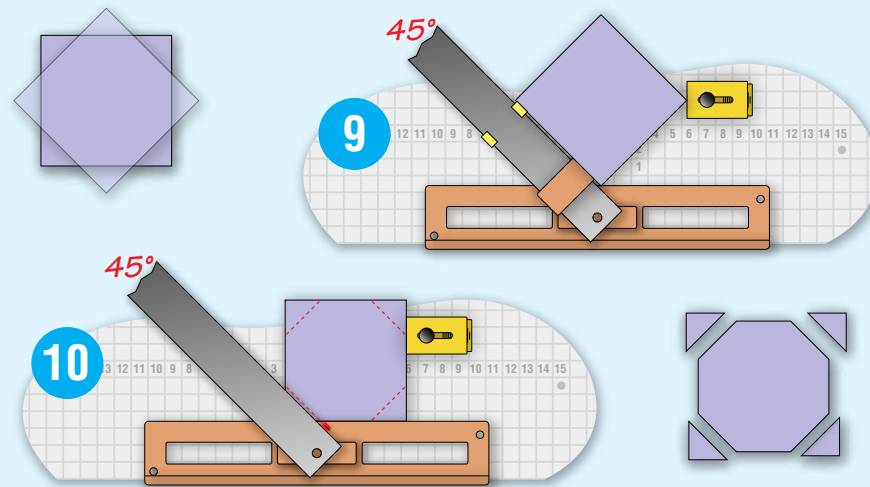
With larger octagons, this is a good option to the 90° Fast Angle!

You will get burrs and flares, touch up all the corners with your grinder.

**9** With the Bar set to 45°, use your orange Cutter Gauge and yellow Bar Spacer, as shown. Place a perfect square to the Bar Spacer and Cutter Gauge first. Carefully slide the square down to the Squaring Fence as viewed in the diagram. Set the yellow Glass Stop as shown.

**10** Position the square, as viewed in the diagram, and score across the corner. Rotate the square to the next corner. Score all four corners.

Not covered on Audio CD

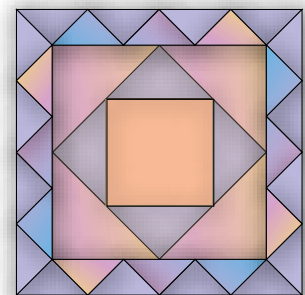


## Right Triangles from Squares

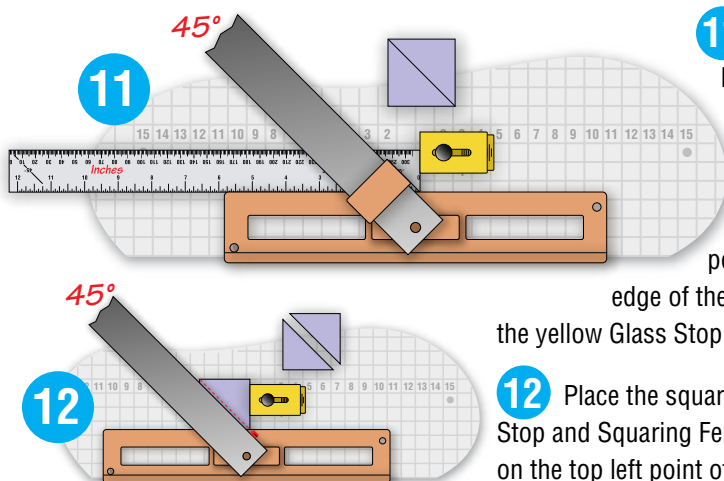
An option to the 90° Fast Angle

**11** With a 45° setup, position the Cutter Gauge and GS Ruler as viewed. The 45° line on the Ruler end is positioned to the outer edge of the Cutter Gauge. Set the yellow Glass Stop as viewed.

**12** Place the square to the yellow Glass Stop and Squaring Fence. Start your score on the top left point of the square.



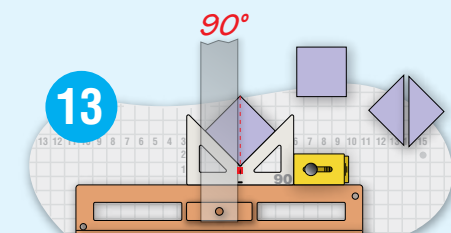
This design is a fun practice project. You can cut the squares and triangles out of single strength window glass in a few minutes. Page 23 will tell you how!



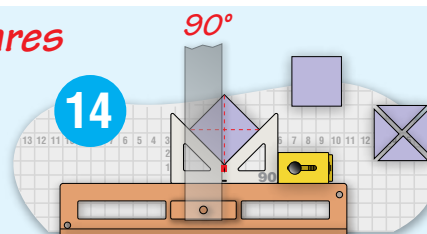
## Right Triangles from Squares 90° Fast Angle

**15** You can divide the triangle into two smaller triangles.

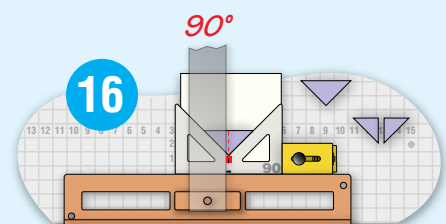
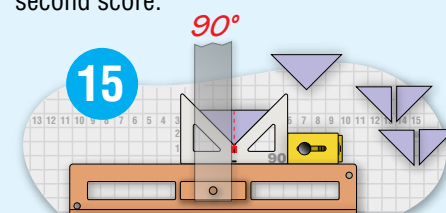
**16** If the squares and triangles are quite small, slide the 4 inch plastic square under the Fast Angle to prevent small pieces from falling into the cells. Watch for, and remove any glass chips that can build up.



**13** Position the 90° Fast Angle as viewed. Adjust the yellow Glass Stop to hold the fixture to the Cutting Bar. Place a glass square into the Fast Angle. Score from the top point to the bottom point.

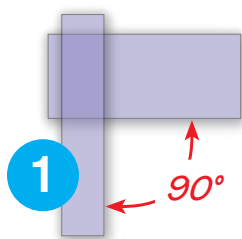


**14** After making your first score, rotate the square ¼ turn and make a second score.



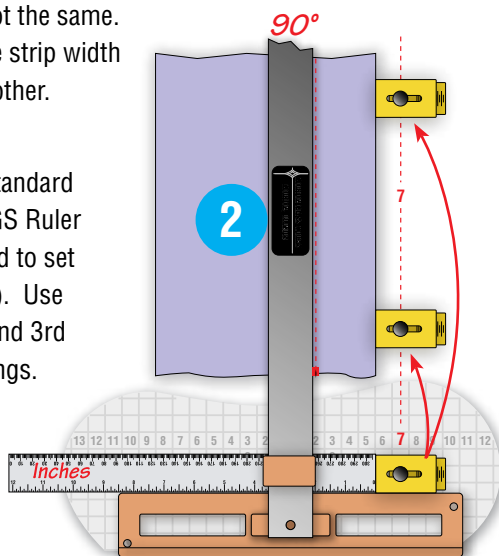


# 90° Rectangles & Related Shapes - Maxi & Mini Surfaces Audio Track 10



**1** With rectangles, the height and width are not the same. Make the strip width one or the other.

**2** Make your rectangles with standard 90° setups. Setup is showing the GS Ruler and orange Cutter Gauge being used to set the yellow Glass Stop to 2" (50mm). Use the first Glass Stop to set the 2nd and 3rd Glass Stops to the same scale settings. The dotted red line is showing all Glass Stops being in column "7". Place the glass to the two upper yellow Glass Stops. Score and break a glass strip.



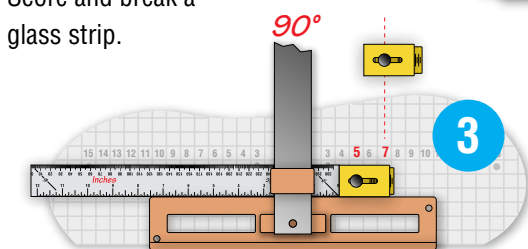
## Practice Practice Practice

Over the past 25 years, I have been trying to figure out why very smart people have trouble reading the directions that I have written.

Over the past 4 years I have been looking at different concepts to help people understand the instructions to our products. I began noticing how quickly, the people, who would call with problems, could be steered in the right direction by just reading portions of the directions to them. The quick understanding over the phone has given birth to the audio CD that came with this version of the Portable Glass Shop.

Because the page is so blank when I start writing the Instructions, I thought sharing with you how I learn the Glass Shop, might be helpful. The secret is practice. I try to make a square or diamond in every way that I can imagine. Usually they all turn out the same. I pick a method that will work for the beginner and the professional, and I label it a basic concept.

Start with the basics, and if you teach others, start them with the basics. Practice the basics until you are comfortable with them. Once you have mastered the basics, look for that better way to do things through practice.

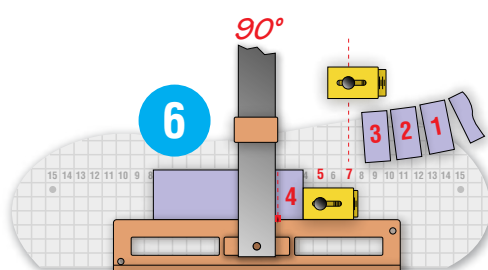
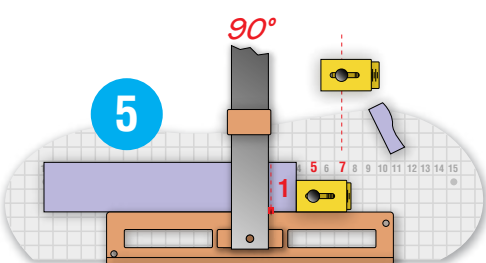
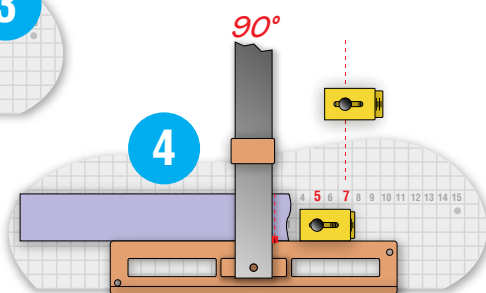


**3** Use the GS Ruler and the Cutter Gauge to reset the Glass Stop. Diagram is showing a 1" (25mm) setting.

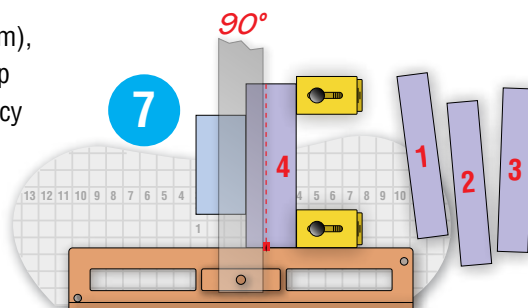
**4** Square the strip end by placing the strip against the orange Squaring Fence as shown. Score and remove the scrap.

**5** Place the strip to the reset Glass Stop as shown. Score and break the 1st 1" by 2" (25mm by 50mm) rectangle.

**6** Continue making rectangles. By leaving the two upper Glass Stops set to 2" (50mm), you can return to strip cutting as needed. Square the end of each new strip.



**7** For strips wider than 3" (75mm), set a second Glass Stop as your strip gets shorter. This will insure accuracy to the last rectangles. As you get to the end of your strip, the Cutting Bar prevents you from holding the glass to the Glass Stops. Use a previous made rectangle or a glass scrap to hold the last rectangles to the Glass Stops.

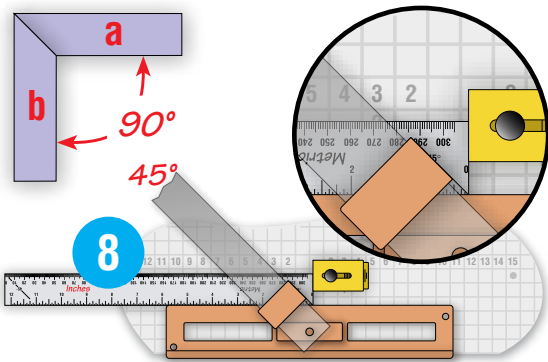




# 90° Rectangles & Related Shapes - Maxi & Mini Surfaces Audio Track 10

## 45° Mitered Corner

*The mitered corner is easy to make, but burrs and flares are always a problem. To make sizing easier, a rectangle is sized to the correct length and then mitered.*

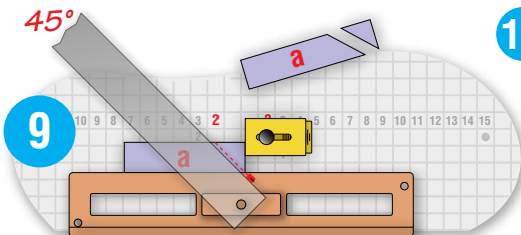


**8** With a 45° setup, position the Cutter Gauge and GS Ruler as viewed. The 45° line on the Ruler end is positioned to the outer edge of the Cutter Gauge. Set the yellow Glass Stop as viewed.

*Purple glass is the side you scored first.*

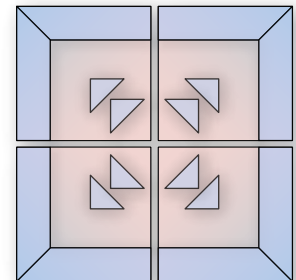
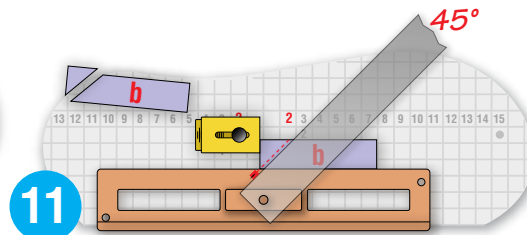
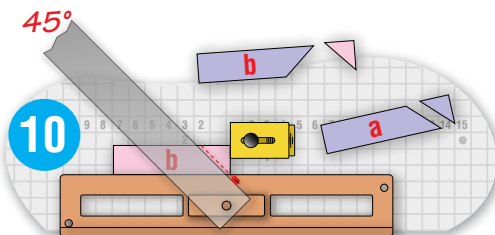
*Pink glass is back side of purple glass.*

**9** Measure the long side of the glass piece needed. Make a rectangle that size. Position the glass to the stop and score.



**10** Measure the long side of the glass piece needed. Make a rectangle that size. Position the glass to the stop and score.

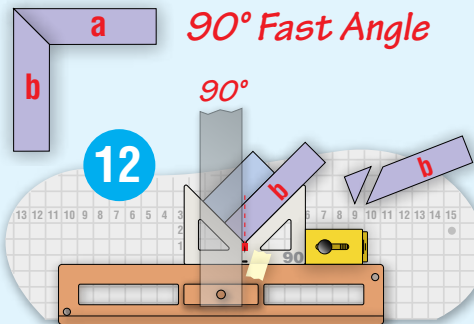
**11** If you can only score one side of the glass, set the Cutting Bar to 45° right and reverse the yellow Glass Stop to the same but opposite column. Score on the left side of the Bar to make the "b" side.



*This design is a fun practice project. You can cut the rectangles and squares out of single strength window glass in a few minutes. Page 23 will tell you how!*

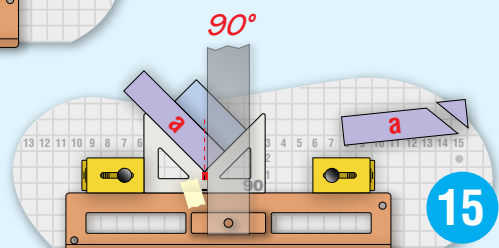
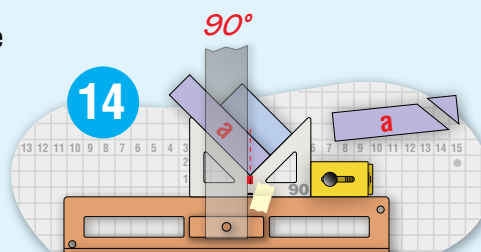
## 45° Mitered Corner 90° Fast Angle

*The mitered corner is easy to make, but burrs and flares are always a problem. To make sizing easier, a rectangle is sized to the correct length and then mitered.*



**12** Position the 90° Fast Angle as viewed, and adjust the yellow Glass Stop to hold the fixture. A small piece of tape (optional) will help hold the fixture in place. Place the glass into the Fast Angle as viewed. A glass scrap (optional) is used to hold the glass in place. Start the score on the scrap glass and make the "b" leg.

**13** If the glass can be scored on either side, you can make the "a" leg by turning the glass over.

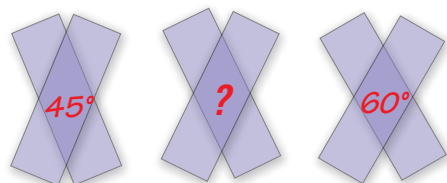


**14** The "b" leg can be made, without turning the glass over, by placing the glass in the Fast Angle as viewed.

**15** The Fast angle can be moved to the left side of the Bar to make the "b" leg.

# Diamonds - Maxi & Mini Surfaces

Audio Track 11



Diamonds come in all shapes. The size and shape of your diamond will be determined by the strip width and the angle of the Cutting Bar. The diagrams above have the same strip width, yet they are all different in size and shape. The diagram with the question mark is using an angle that is unknown. If you are building a diamond window, your strip width and angle are copied from the pattern and you never need to know the angle. The 45° and 60° diamonds are used to make other shapes and geometric designs.

The diagram below shows how diamonds come from a strip. Page 12 has information about making strips and Page 13, "Window glass direction strip", will help you get the texture running the direction you want it.



The glass colors used in the diagrams will tell you which side of the glass is turned up. The diagram below should help.

Purple glass is the side you scored first.

Pink glass is back side of purple glass.

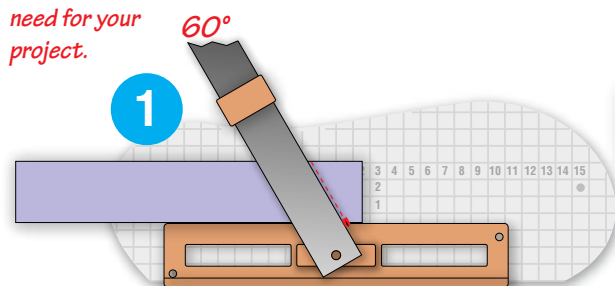
Although your angles and strip sizes will change, always follow the same five step sequence as shown below.

## GS Assembly Tray

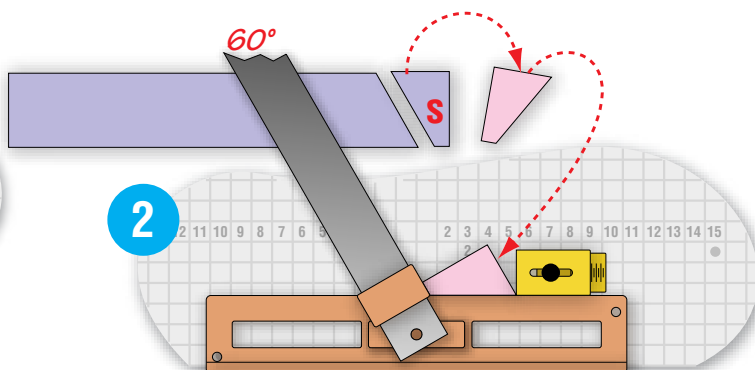
*I think the GS Assembly Tray, shown on the back cover, is our most innovative product. In the middle eighties, I was bragging about how fast I could make pentagons to one of our customers. He told me he had never made or wanted to make a pentagon. He also said that even if he did make a pentagon he would have no idea what to do with it. After hearing what my customer was saying, I worked non stop until I had the perfect answer to his concerns. The GS Assembly Tray will give you several good reasons to make a pentagon.*

Use the angle you need for your project.

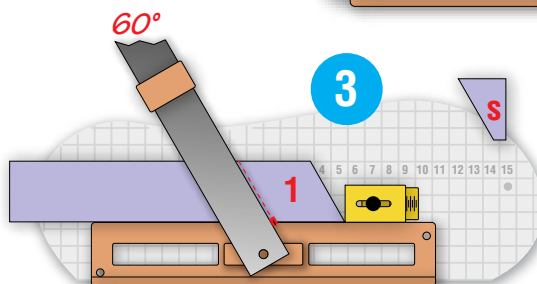
## Five Steps to a Perfect Diamond



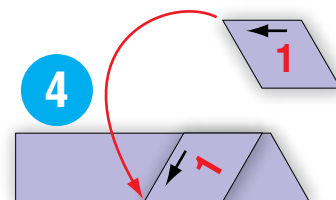
**1** Determine the strip width and set the Cutting Bar angle. Score and remove a small scrap from the strip as shown.



**2** Use the orange Cutter Gauge and the scrap from Step 1 to set the yellow Glass Stop. The scrap is first turned over (pink glass) and placed to the orange Squaring Fence as shown. Hold glass scrap to the orange Cutter Gauge and set the yellow Glass Stop to the point of the glass scrap.



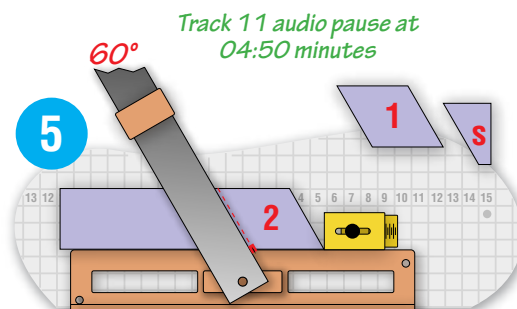
**3** Move the glass strip to the yellow Glass Stop as shown. Score and remove the 1st diamond. Do not skip Step 4.



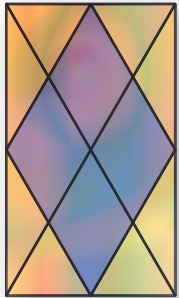
**4** After making the 1st diamond, check your accuracy by rotating the diamond to the strip as shown. The diamond, in this position, must be the same width as the strip. If the diamond is not the same width, adjust the Glass Stop.

If strip is wider, adjust Glass Stop right.  
If diamond is wider, adjust Glass Stop left.

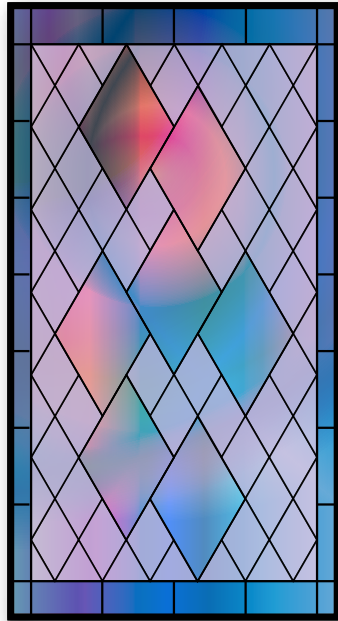
**5** If you made adjustments to the yellow Glass Stop, recheck the 2nd diamond.



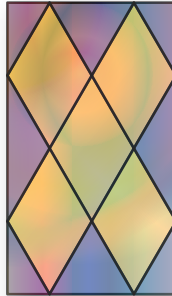
Track 11 audio pause at 04:50 minutes



The corners of a diamond panel should be made up of two  $\frac{1}{2}$  or one  $\frac{1}{4}$  diamonds



Diamonds are split in half vertically and horizontally to square the outer edges



The diamond pattern on the left and the diamond pattern on the front cover both use the same diamonds. The overall size, however, is quite different. The diamond portion, of the pattern on the left, has been shortened by removing a half diamond at the top and bottom. The width of the border at the top and bottom has been increased to adjust to the new size. The side borders are altered to get the overall width correct.

Both patterns are unconventional because the top and bottom corners do not match. The pattern on the cover uses a  $\frac{1}{4}$  diamond in the two top corners. The pattern on the left uses two  $\frac{1}{2}$  diamonds on each top corner.

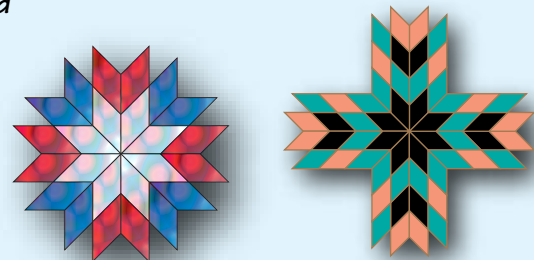


60° Diamonds

Practice making these shapes from single strength clear glass. Remember that it is the strip width and the angle that will determine the size and shape of the glass pieces.



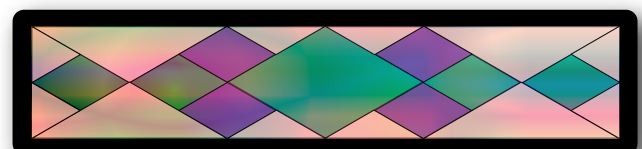
45° Diamonds



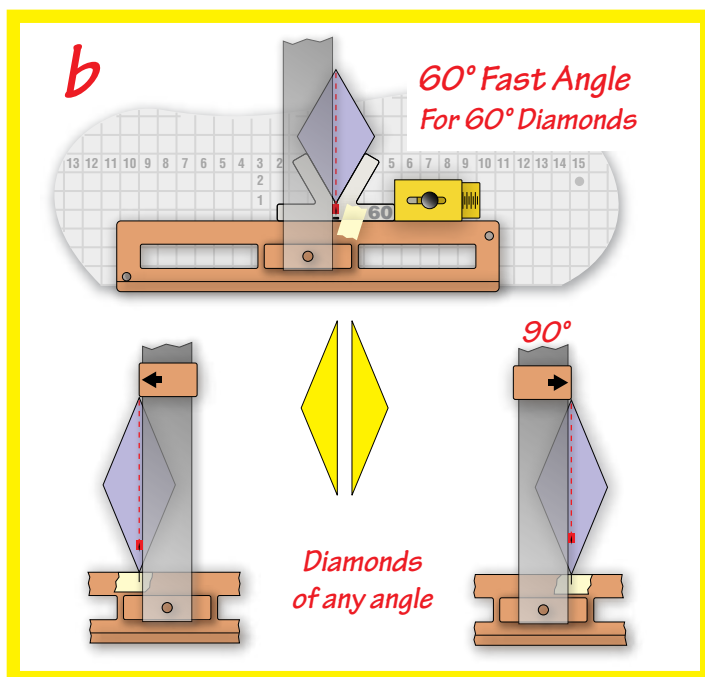
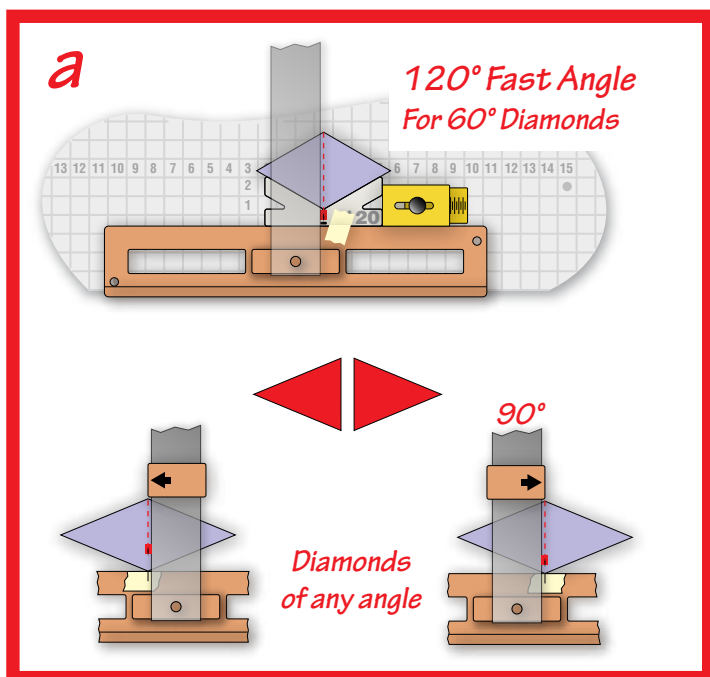
60° Diamonds can be used in a number of ways. The ball is made from 20 equal triangles. The triangles are made by first making a diamond with a 60° Cutting Bar angle. The pencil holder is a modified version of the ball. Nine 60° diamonds are used to make the blocks. Although it gives the illusion of being dimensional, it is a flat panel. The lower rectangular design could be a small fused piece or a much larger panel design.



60° Diamonds



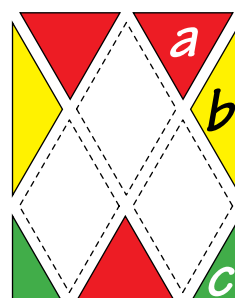




## Any Angle Diamonds

Both right and left setups are shown. There is no right or wrong side to score down the Bar. I am left handed and I often find the right hand setups easier for me to hold the glass in place while making the score. "Scoring on either side of the Cutting Bar" (page 26) is a practice session that helps you learn to accurately score on either side of the Cutting Bar.

The orange Cutter Gauge can be used at the top of the glass to help you allow for the glass cutter. The arrow is pointing to the long leg. Use your glass cutter wheel, to make a mark on the masking tape shown on the Squaring Fence. The cutter mark is where the point of the glass should be located. You can make the mark darker with a pencil.

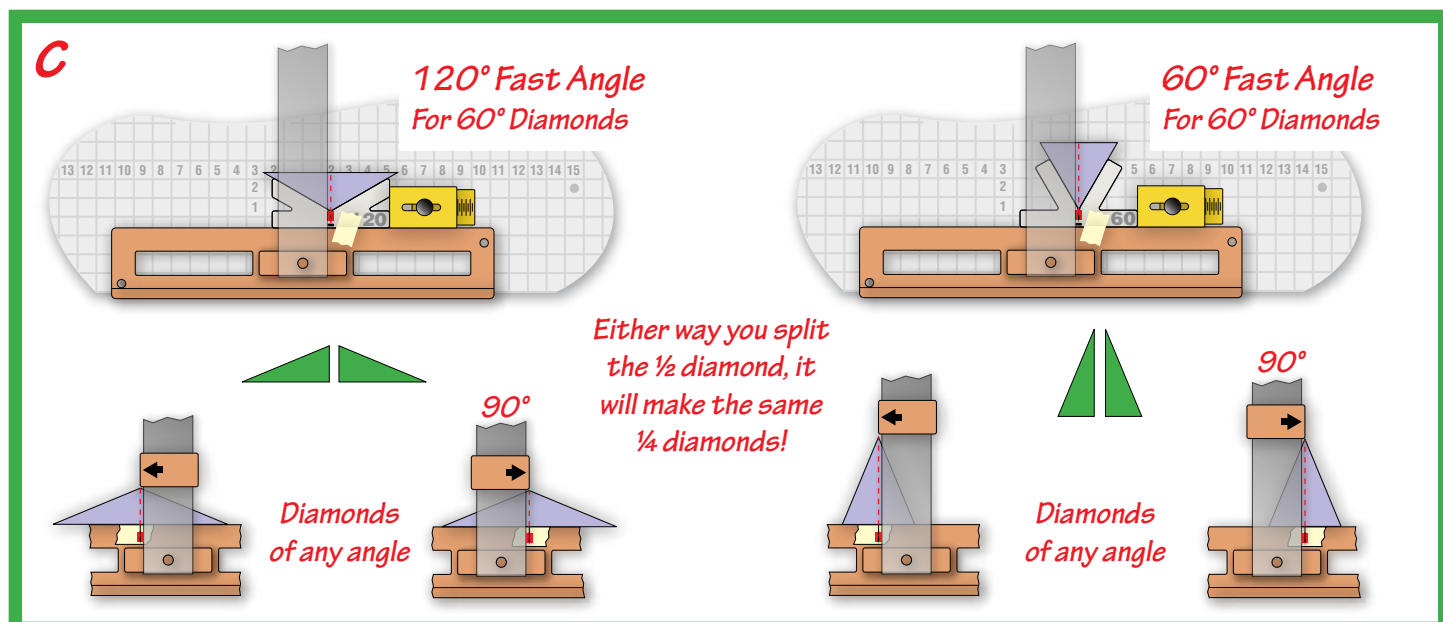


The corners have two ½ diamonds or one ¼ diamond!

## 60° Diamonds Only

The 60° and 120° Fast Angles are designed to be switched without changing the yellow Glass Stop. They can be used on either side of the Cutting Bar for right and left hand setups.

The masking tape shown on the Fast Angle diagrams is optional. Try using the fixtures with and without the tape to see what is best for you.



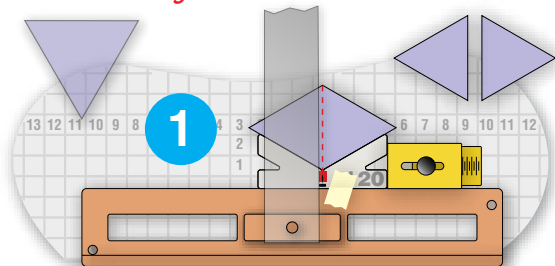
# 60° Diamonds & Related Shapes - Maxi & Mini Surfaces

Audio Track 11

## Equal Triangles from 60° Diamonds

120° Fast Angle

90°



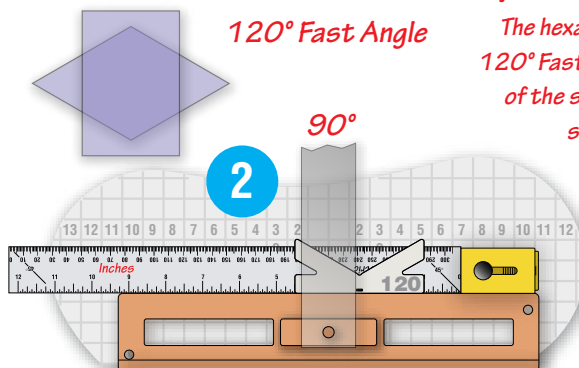
1

Use a 60° angle setting to make the diamonds. The 120° Fast Angle can be used on either side of the Cutting Bar. Start the break in the middle of the score to prevent flares and burrs.

## Hexagons & Related Shapes from 60° Diamonds

120° Fast Angle

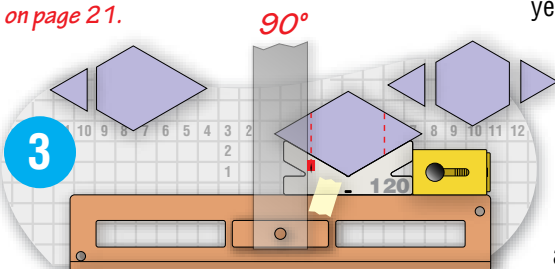
90°



2

The hexagon is made from a 60° diamond. The 120° Fast Angle is offset, to the right, ½ width of the strip used to make the diamond (i.e. 2" strip, offset 1"). The masking tape will hold the Fast Angle to the Glass Stop and the Squaring Fence.

If you score only one point, you get an irregular pentagon. Look for how this shape is used on page 21.



3

Position your GS Ruler under the Fast Angle. Holding the Fast Angle to the Cutting Bar, move the Ruler until ½ the width of the diamond strip width is exposed on the right edge of the Fast Angle. Set the yellow Glass Stop at the end of the Ruler as shown.

3

Move the Fast Angle to the Glass Stop (tape in place as shown). Position the diamond, as viewed, and score across the point. Rotate the diamond and make a second score. Once broken, you have a hexagon and two equal triangles.

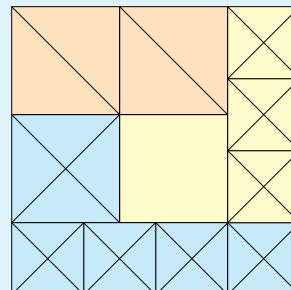
To make more of the equal triangles, to vary the color in a design, use a strip ½ the width of the original strip, make 60° diamonds and split them into equal triangles.

From page 17

Not covered on Audio CD

### Tutorial Exercise

Use single strength window glass to practice the design.



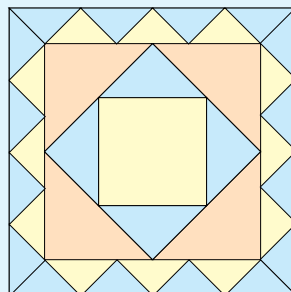
Inches: Make four 1½" squares and seven 1" squares.

Metric: Make four 37.5mm squares and seven 25mm squares.

Use the 90° Fast Angle setup on page 17, dots 13, 14 or 16.

- Half two 1½" (37.5mm) squares.
- Quarter one 1½" (37.5mm) squares.
- Quarter all 1" (25mm) squares.

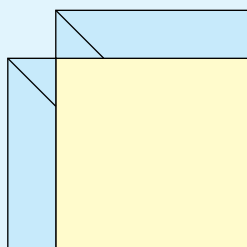
Arrange the pieces as shown in the diagram below.



From page 17

### Tutorial Exercise

Use single strength window glass to practice the design.



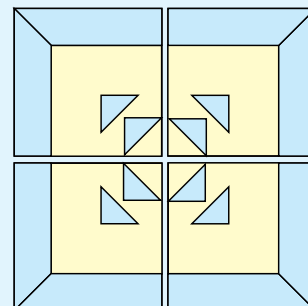
Inches: Make four 4" squares and eight 1" by 4" rectangles.

Metric: Make four 100mm squares and eight 25mm by 100mm rectangles.

Use the 90° Fast Angle setup on page 19, dots 12, 14 and 15.

- Miter the eight rectangles. Try the different setups. If you have trouble with dot 15, you may want to look at the tutorial on page 26.

Not covered on Audio CD



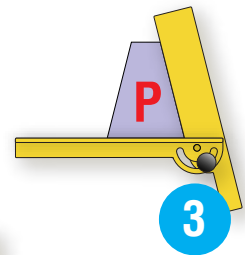
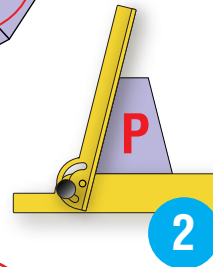
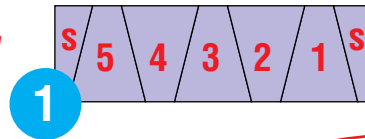
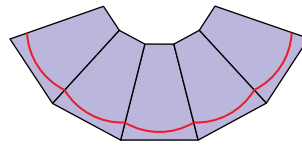
Arrange the pieces as shown in the diagram above.



# Trapezoids - Maxi & Mini Surfaces

Audio Track 12

Trapezoids have 2 angles to deal with. Most of the time, the size and angle will be copied from a pattern. Quite often the pattern is distorted. This distortion must be corrected before making the trapezoid. The Angle Copy is used to find the angle, correct any distortion in the pattern and set the angle of the Cutting Bar.



Track 12 audio pause at 02:22 minutes

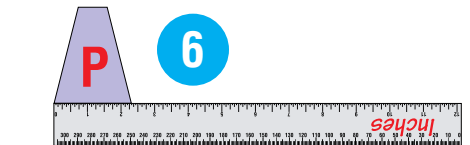
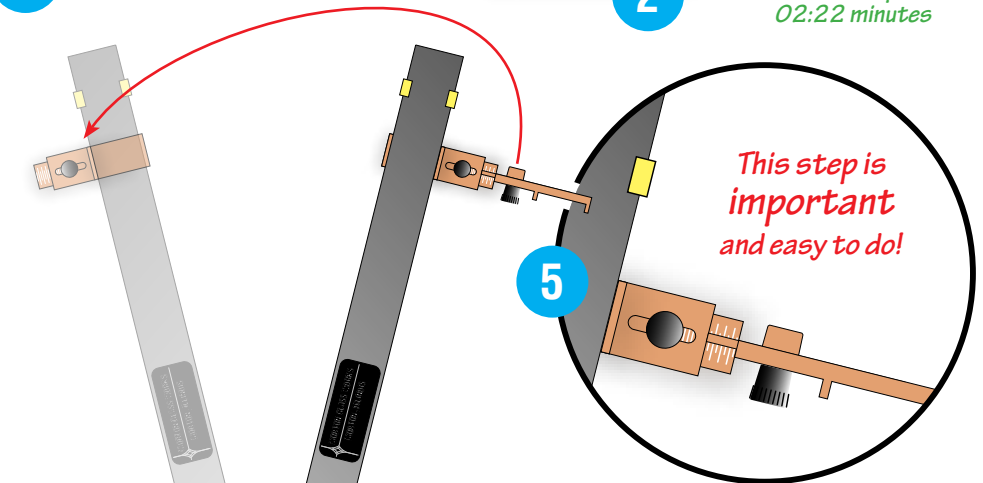
**1** First determine the strip width needed. Use the "Window glass direction strip" (page 13) to determine direction of pattern or texture in the glass.

**2** Use the Angle Copy on the lower left corner of the pattern (see diagram).

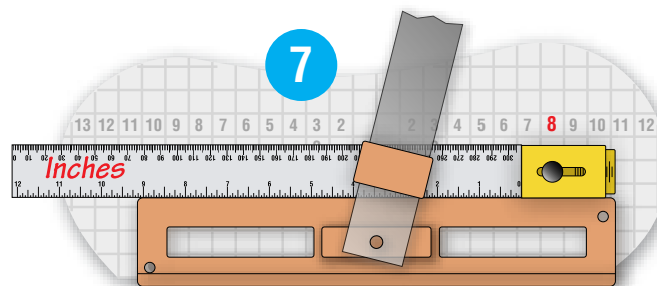
**3** Leave the Angle Copy set and rotate it to the lower right corner as shown. If both angle match exactly there is no distortion in the pattern and the angle you have copied can be used to set the angle of the Cutting Bar. If it does not match, both angles are incorrect. Determine the difference, split-the-difference and adjust the Angle Copy to the new angle. The tutorial on page 28 covers this procedure in detail.

**4** Use the Angle Copy to set the angle of the Cutting Bar. The yellow Bar Spacer holds the Bar level while you determine where to locate the orange Bar Lock. Always find the right angle first. Only use the numbered squares near the top of your Mini or Maxi Surface. Use the diagram as a guide **but do not position the Bar Lock yet**. Find the first numbered, and completely exposed, square to the right of the Cutting Bar. **Now place the Bar Lock** in the selected square and loosen the knob. Carefully set the Cutting Bar angle and tighten the knob.

**5** After setting the right angle with the 1st Bar Lock, set the left angle by butting the scale end of the 2nd Bar Lock to the scale end of the 1st. Follow the diagram, tighten the knob and locate the 2nd Bar Lock in the same numbered square on the left side of your Mini or Maxi Surface.

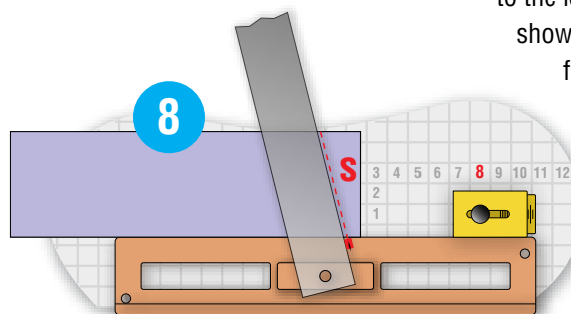


**6** Measure the base of your pattern with the GS Ruler. **Note:** Some find the metric ruler easier in this situation. Instead of 2  $\frac{3}{32}$  inches it would be a hair width under 58mm.



**7** Use the orange Cutter Gauge and the GS Ruler to set the yellow Glass Stop to the base size of your pattern as shown.

**8** Once you have set both angles, move the Cutting Bar to the left Bar Lock. Position your strip as shown. Score and remove a small scrap from the end of your glass strip.

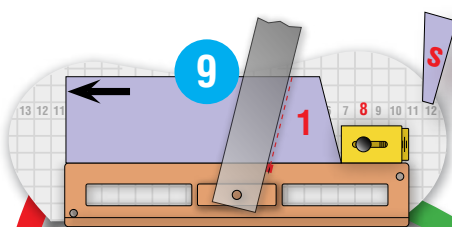


**9** In the next step you must determine if the glass you are using can be scored on one or both sides (i.e. window glass is both sides and glue chip is one side). Use the appropriate option.

# Trapezoids - Maxi & Mini Surfaces

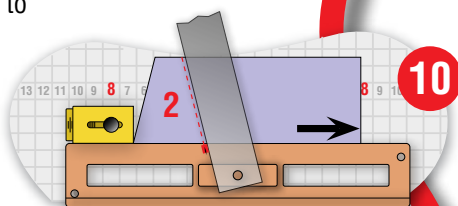
Audio Track 12

**9** Draw the arrow on your glass strip as shown. Bar in right Bar Lock. Position glass as shown, score and break the 1st trapezoid. If the glass can be scored on either side, go to "green 10", if not, go to "red 10".



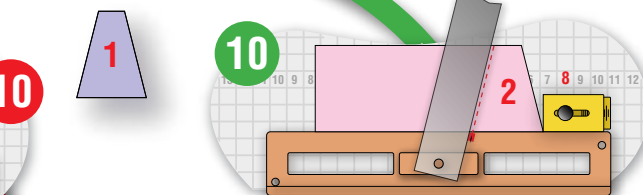
Purple glass is the side you scored first.

Pink glass is back side of purple glass.

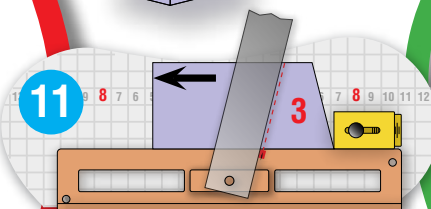


**10** Move the Glass Stop to the left side, use the same, but opposite, column number. Bar in left Bar Lock. Turn the glass strip so the arrow is the same as the diagram. Score and break the 2nd trapezoid.

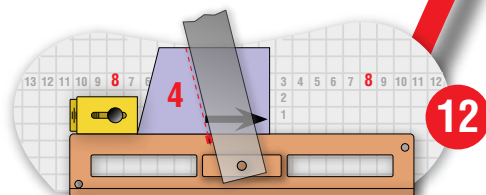
**11 11** Move the Glass stop to the right side. Bar in right Bar Lock. Turn the glass strip so the arrow is the same as the diagram. Score and break the 3rd trapezoid.



**10** Keeping the setup the same, as the previous step, turn the glass over as shown in the diagram. Score and break the 2nd trapezoid.

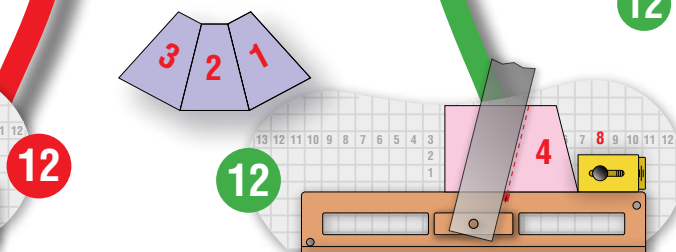


**11 11** Keeping the setup the same, as the previous step, turn the glass over as shown in the diagram. Score and break the 3rd trapezoid.

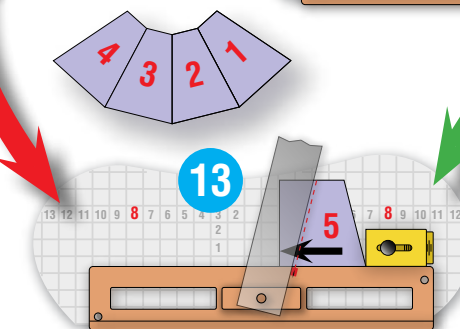


**12** Move the Glass Stop to the left side. Bar in left Bar Lock. Turn the glass strip so the arrow is the same as the diagram. Score and break the 4th trapezoid.

**13 13** Move the Glass stop to the right side. Bar in right Bar Lock. Turn the glass strip so the arrow is the same as the diagram. Score and break the 5th trapezoid.



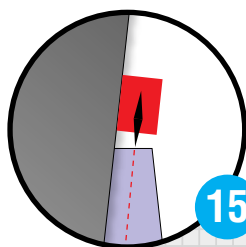
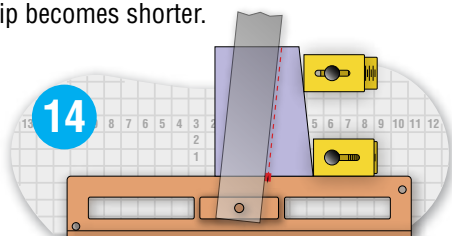
**12** Keeping the setup the same, as the previous step, turn the glass over as shown in the diagram. Score and break the 4th trapezoid.



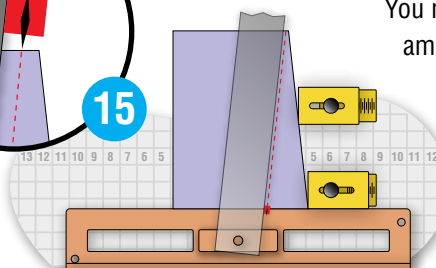
**13 13** Keeping the setup the same, as the previous step, turn the glass over as shown in the diagram. Score and break the 5th trapezoid.

## General Information for Trapezoid Setups

**14** When you work with wider glass strips, it is important that you set two Glass Stops. This will maintain your angle as the strip becomes shorter.



**15** You cannot start the glass cutter on the outer edge in this type of situation. You must blunt the point as shown. The amount you allow will be determined by the type of glass and your skill level. If the base width is important, you can make your strip width less wide to account for the missing point.



# 72° Pentagons - Maxi & Mini Surfaces

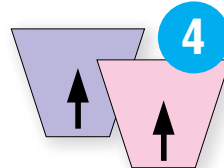
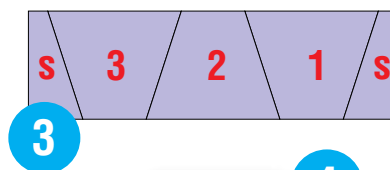
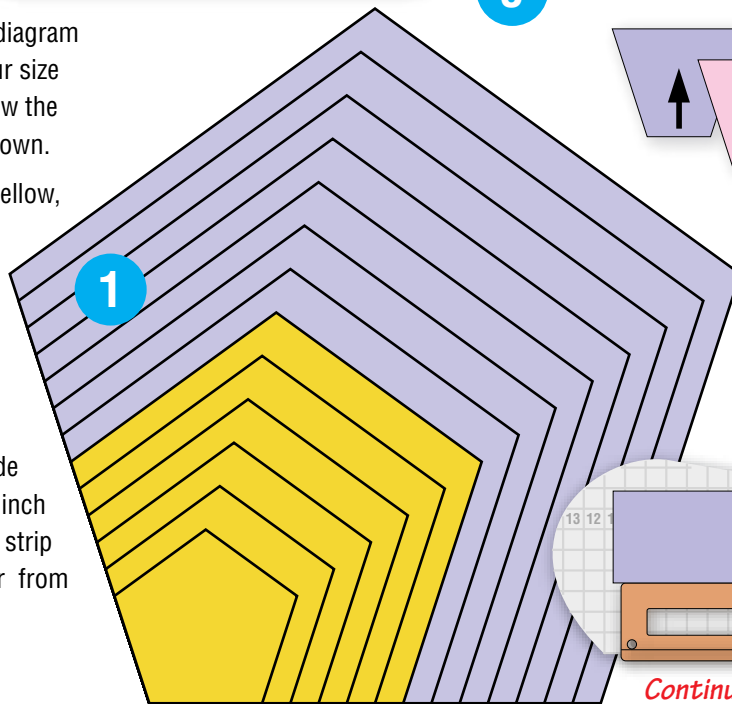
Audio Track 13

**1** Like most shapes, the pentagon is made from a strip. Because the strip width is hard to determine, the diagram is used to help you find it. If your size falls into the purple you will follow the diagrams on the next page as shown.

**2** If your size falls into the yellow, you must place the yellow Bar Spacer between the Glass Stop and the glass strip on every diagram on the next page.

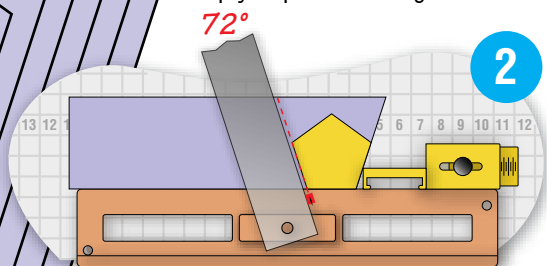
**3** The strip width needs to be taller than the pentagon. Measure from the middle of a side to the opposite point and add  $\frac{3}{8}$  inch (10mm). You also can size your strip by measuring 2 pentagons larger from the pentagon chart.

Purple glass is the side you scored first.  
Pink glass is back side of purple glass.



**3** Pentagons start by making a trapezoid with the Bar angle at 72°. It is important to make the trapezoid with the small end down.

**4** After you have a trapezoid, made with 72°, mark both sides with an arrow as shown. The diagrams, on the next page, have an arrow to help you position the glass.



Continue Pentagons on the next page!

## Tutorial Exercise - Scoring on either side of the Cutting Bar — Not covered on Audio CD

*Learning to score against the Cutting Bar effortlessly is important to your success with the Glass Shop. As you become comfortable scoring on either side of the Bar you will be ready to successfully undertake any setup your glass art demands.*

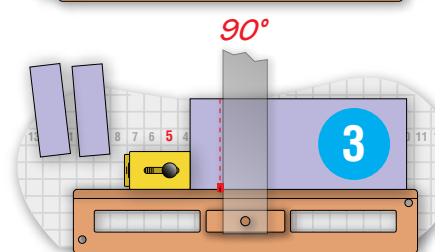
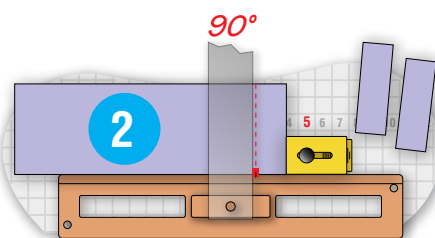
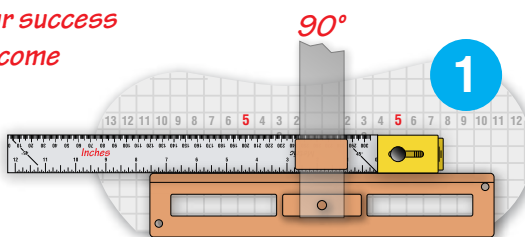
Use single strength window glass and make 3" (76mm) wide glass strips. Any length over 6" (153mm) will do. Pages 12-15 show several strip cutting setups. Pick a setup that applies to the Surface and the glass size you are starting with.

The object of this exercise is to learn to score accurately on either side of the Bar. Throw away the 1st piece from the strip because it may not be square. If the 2nd and 3rd pieces are not the same you are tilting the cutter to the left or right (or both) during the score. When your pieces match and you are comfortable with your scoring switch to the other side of the Bar. As you practice, all pieces must match.

This means that pieces made on one side match pieces made on the other side.

**1** Use a 90° setup with the beveled edge of the Squaring Fence turned up. Use the GS Ruler and the orange Cutter Gauge to set the yellow Glass Stop to a 1" (25mm) setting. If you are right handed, do dot 2 first. If left handed, do dot 3 first.

**2 3** Score and break 1" (25mm) pieces until you completely comfortable with the score and break. Have someone watch you score to be sure you are not tilting your glass cutter (page 12 for detail). Keep comparing your pieces, the goal is to make them all the same.

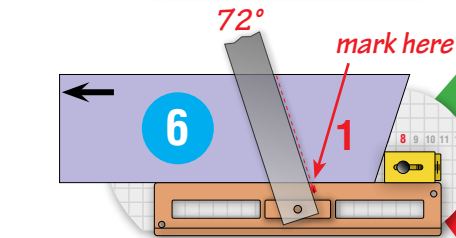
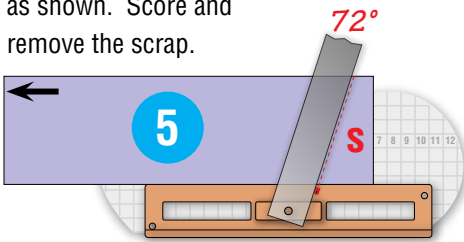


**2 3** When you are comfortable with your starting setup, reverse the setup, and start learning to score on the opposite side of the Cutting Bar. If you are scoring on the opposite side of the Cutting Bar, hold the glass strip to the Glass Stop and Squaring Fence by crossing your free hand up and over. It will feel awkward at first but this is why you are doing this exercise. Keep comparing your pieces, the goal is to make them all the same.

# 72° Pentagons - Maxi & Mini Surfaces

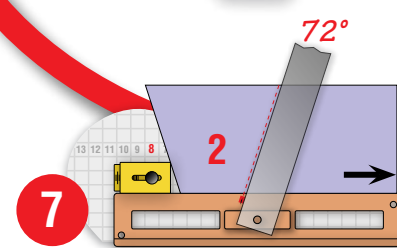
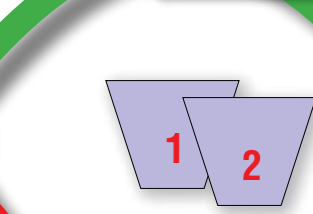
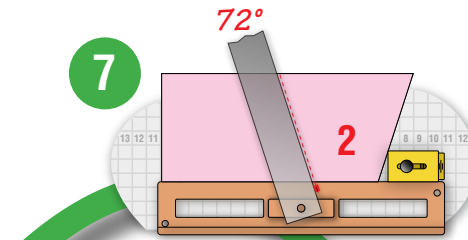
Audio Track 13

**5** If your glass can only be scored on one side, draw an arrow on your strip as shown. Score and remove the scrap.



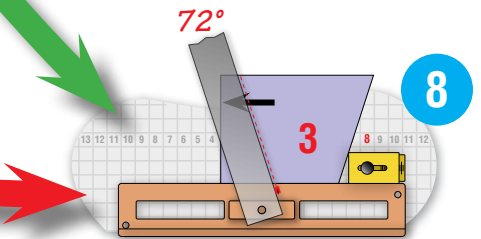
**6** This is where the pentagon is sized. Measure and mark your strip to the size needed. Allow for the glass cutter by holding your cutter to the Bar and moving the mark on the strip to the cutter wheel. Set the yellow Glass Stop.

**7** If you can score on either side of the glass, use this method. Turn the glass over and score and break the 2nd Trapezoid.

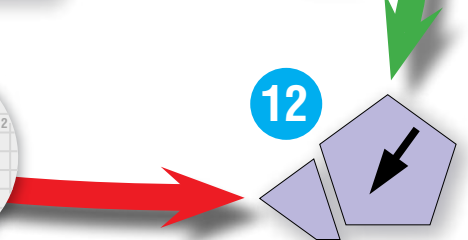
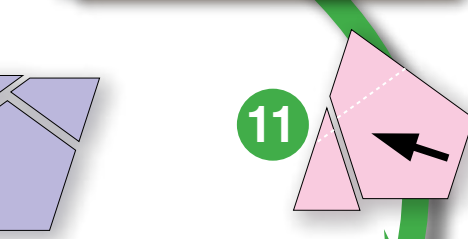
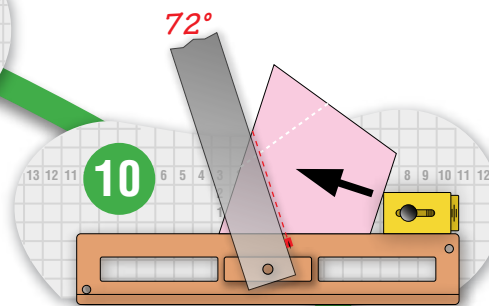
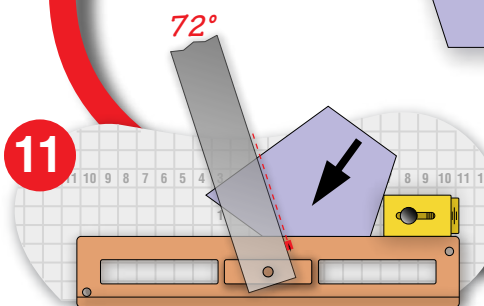
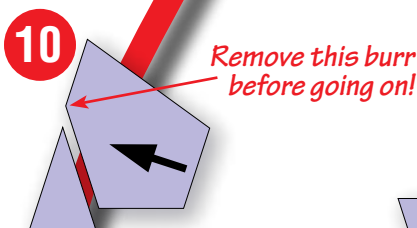
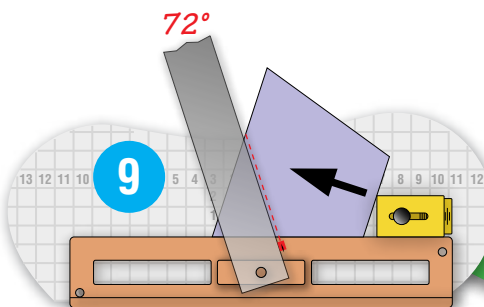


**7** When you can only score on one side of the glass, you must reverse the setup. Move the Bar to the right 72° setting. Move the Glass Stop to the same but opposite square on the left side. Rotate the strip as shown. Score and break the 2nd trapezoid.

**8** If you can score on either side, just turn the glass over and score and break the 3rd trapezoid. If you can score on one side only, reverse the setup. Move the Bar to the left and the Glass Stop to the right. Rotate the strip as shown and score and break the 3rd trapezoid.



*When you finish making the trapezoids, leave the yellow Glass Stop set in the same position as used for trapezoids.*



**9** Position the trapezoid to the Glass Stop as shown and score.

**10** If you can score on either side, turn the glass over as shown, make a 2nd score on the back side.

**10** If you can only score on one side, you must remove the scrap now. You will get a burr that must be removed.

**11 12** With a score on each side of the glass, break one of the scores. Turn the glass over and break the other score.

**11 12** Position the glass as shown. Score and break the glass.



# Trapezoid Tutorial - Maxi & Mini Surfaces

The object of this exercise is to use the Angle Copy to correct pattern distortion. Without the correction the trapezoid will not be the correct size or shape. Single strength window glass and the Squaring Fence with the beveled side up is a good choice for this exercise.

**1** Determine the strip width needed by measuring the pattern from the base to the top. The size is 2" (51mm) but do the measuring for practice. Make a 2" (51mm) strip, any length over 6" (153mm). Use audio track 8 to review strip cutting.

**2** Position the Angle Copy on the lower left corner, of the **full size pattern**. Use diagram **2** as a guide. When you are aligned with the base and left side, tighten the black knob.

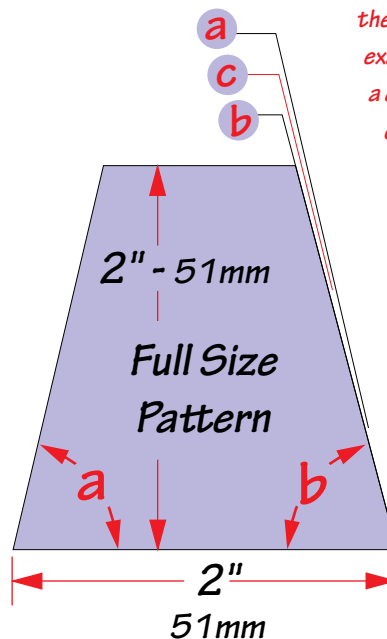
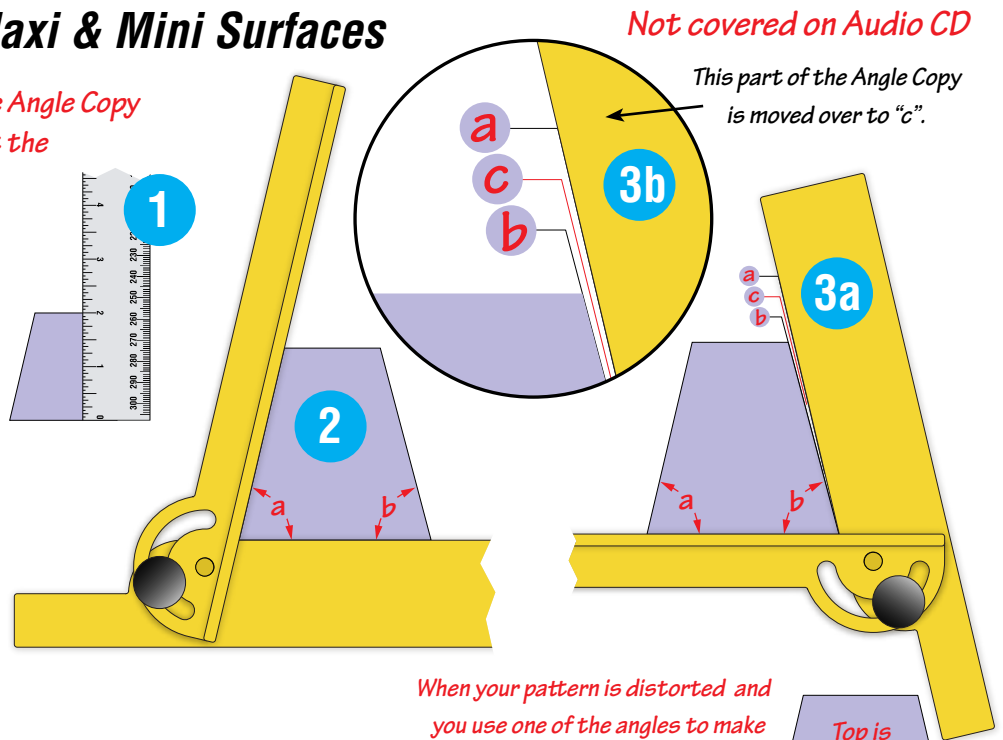
**3a** Leave the Angle Copy set and rotate it to the lower right corner of the **full size pattern**. Use diagram **3a** as a guide. If both angles match the pattern is correct and the angle can be used to set the Cutting Bar. If it does not match, both angles are incorrect.

**3b** If you have a difference between the "a" and "b" angles, the angle you want is "c" which is half way between "a" and "b". While holding the arm of the Angle Copy to the base of the pattern, loosen the knob and change the angle to "c" (called splitting the difference). Tighten the knob. You now have a corrected angle and the top of your trapezoid will be the same as the pattern.

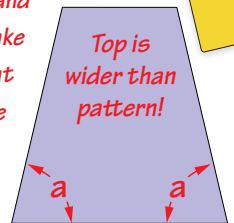
**4 5** Follow the directions for setting the angle on page 24. Use your **set** Angle Copy to do **4** and **5**. Return to this page and continue with **6** and **7**.

**6** Measure the base of your pattern with the GS Ruler.

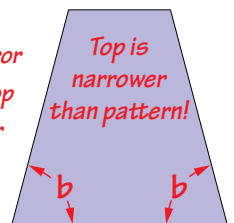
**7** Use the orange Cutter Gauge and the GS Ruler to set the yellow Glass Stop to the base size of your pattern as shown.



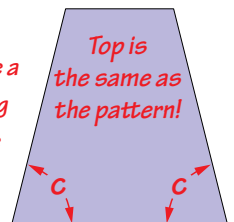
When your pattern is distorted and you use one of the angles to make the trapezoid, the result is seen at the top. Using our pattern as the example, the "a" angle produces a double error causing the top of the trapezoid to be much wider than the pattern.



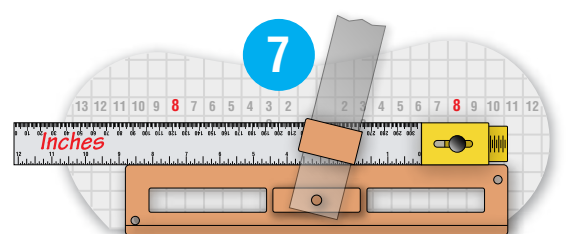
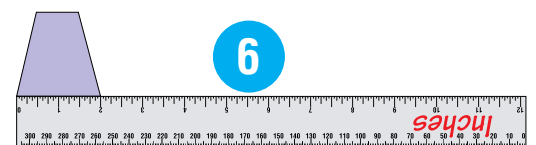
If you use the "b" angle, the error doubles and gives you a top that is much narrower than the pattern.



When you find the difference between "a" and "b", and split that difference, you create a new "c" angle. Using the "c" angle the top matches the pattern.



**8** Return to **8** on page 24. Use your 2" (51mm) wide strip to start making your trapezoids. When you get to **9** on page 25, follow the green arrow for glass that can be scored on either side. After making your first trapezoid, match it to the pattern. If it matches, congratulations, if not, square the end of the strip and start over. Use audio track 12 for help with trapezoids





With this method you will make all the scores first and then break the strips.

### Repeat strip width chart

strip	1/4"	3/8"	1/2"	5/8"	3/4"
units	inch	mm	inch	mm	mm
1	1/4"	10	1/2"	15	20
2	1/2"	20	1"	30	40
3	3/4"	30	1 1/2"	45	60
4	1"	40	2"	60	80

## Alternative Strip Cutting

Advancing the strip with this alternative method is easy if you are making 1" or 25mm strips. The idea of this chart is to make some other strip width just as easy. Because your GS Ruler has both inches and metric, we can use both to make the strips.

The metric sizes are not exact to the inch sizes. The reason for using the metric is the ease of going 10 - 20 - 30

## Not covered on Audio CD

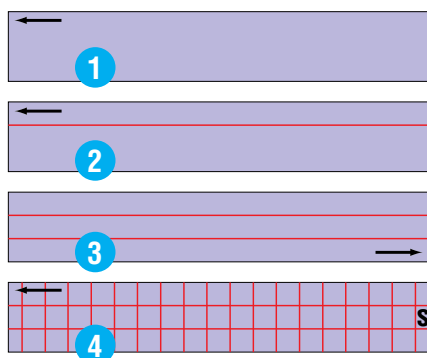
rather than  $\frac{3}{8}$  -  $\frac{3}{4}$  -  $1\frac{1}{8}$ . A 10mm strip is about  $\frac{1}{64}$ " less than  $\frac{3}{8}$ " strip. A 15mm strip is about  $\frac{1}{32}$ " less than  $\frac{5}{8}$ " strip. A 20mm strip is about  $\frac{1}{32}$ " less than  $\frac{3}{4}$ " strip.

To use the chart, pick one of the strip widths given. If the units are "inch" use the inch side of the ruler. If the units are "mm" use the metric side of the ruler. Advance the glass strip by the amounts shown in the column below the strip width.

## High Speed Squares for Mosaics

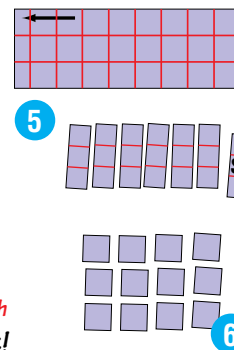
## Example is for 1" squares.

Red lines on the glass are unbroken scores.



- 1 Make a 3" glass strip.
- 2 With strip cutting setup for 1", make a score on the 3" strip.
- 3 Turn the strip end for end and make a second score.
- 4 Setup as shown on page 14, dots 15, 16, 17 and 18. Make repeated 1" scores on the strip.

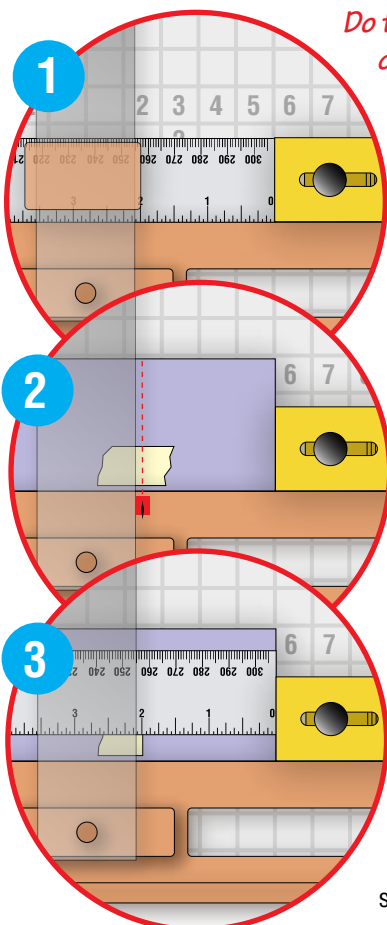
- 5 With the Safety Break runner, remove the squares in groups of three. Start the run in the middle of the score.
- 6 Break the groups of three into 1" squares. *The Morton Runner is capable of breaking both scores at the same time. Try it!*



## Tutorial Exercise - Tape Test for Glass Cutter Allowance

## Not covered on Audio CD

Do the scoring tutorial, on page 26, before doing this tutorial. Most of the popular cutters are about the same width. The Toyo Supercutter is an example of a glass cutter that works well. If your test yields a significant difference, consider changing your glass cutter. Use your standard 90° setup for these tests.



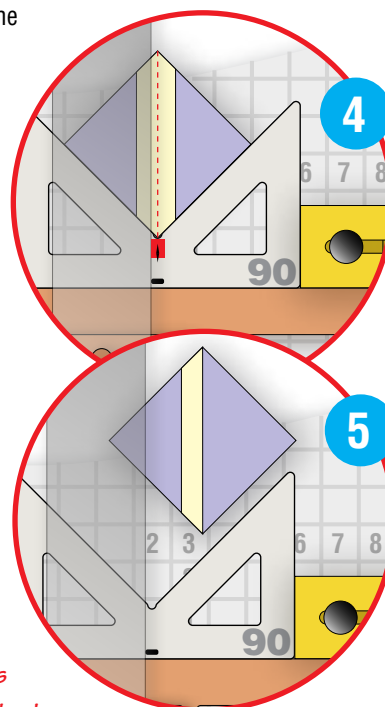
- 1 Use the Cutter Gauge and GS Ruler to set the Glass Stop at 2" or 50mm.
- 2 Square the end of a 2" or 50mm glass strip. Stick a piece of masking tape on the glass as shown. Make a regular score. The cutter will cut the tape. Remove the tape on the right side of the score.
- 3 The cut tape is where the cutter wheel is running. Check to see how the cut tape lines up with the 2" or 50mm setting.

All three Fast Angles use the same glass cutter allowance. Use the 90° Fast Angle for this test. See page 11, diagram 13.

- 4 Start with a 2" or 50mm square (page 16). Tape the glass, as shown, and trim the edges with a knife. Use regular pressure and score the tape.

- 5 Remove the tape on the right side of the score and look carefully to see if the cutter wheel is starting and ending on the points.

*If you have a problem, please email us with as many details as possible. We will respond back.*



# Exciting products for the Portable Glass Shop user!

GS  
Assembly Tray  
(PG05)

6

Squares make a Cube

12

Pentagons make a Ball

Each pocket forms one corner of the shape shown. Getting the corners correct is the secret to perfect assembly.

20

Equal Triangles make a Ball

Step-by-step directions for these eight designs are included.

## Circle & Border System

(CBS1 - Fall 2006)

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