

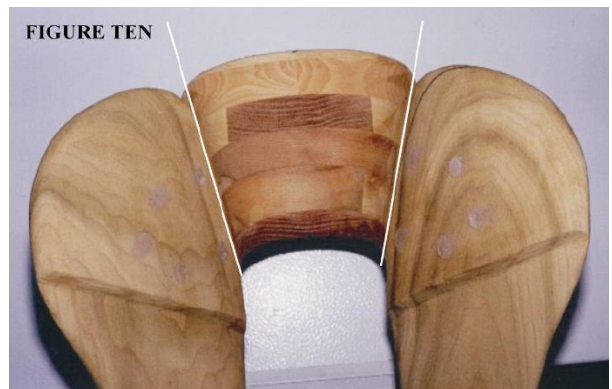
Using Hand Hole versus Gullet Measurements

Traditionally, the gullet width measurement has been used, supposedly to set the spread between the bars. The gullet height measurement has been used to help determine the clearance there is for the horse's withers. However, the front of the gullet is a very inconsistent place to measure for bar spread, since we can make it measure almost anything we want without changing the real spread between the bars. As for wither clearance, the gullet can hit the withers at more places than just the lip. This is where the hand hole measurements come in handy.

Gullet and Hand Hole Width

The gullet width is the traditional measurement for setting how far apart the bars are placed. We don't measure this at all, but use hand hole width instead, because the gullet width measurement is often different even with the same distance between bars. This is due to two factors: stock thickness and bar shape.

Stock thickness: (Figure 10) The bars flare out as they go forward, so as the stock gets thicker, the points where the gullet joins the bars get further apart. This means gullet width measurement increases as the stock thickness increases, but with no change in the spread between the bars.



Bar shape: (Figure 11) The bar tip can be brought up (our normal bars in the picture) or cut down (white lines drawn on the bars), and this will affect the gullet width measurement with no difference in the distance between the bars. We make our bars with a fairly high bar tip. This works to put more surface area on the horse's back and distribute weight better, and also results in a narrower gullet width measurement. Our trees may look

narrower compared to other trees with the same hand hole width, and this is the reason why. Some people have been concerned that a higher bar tip will "pinch" a horse's wither, but a horse's wither doesn't go straight up - it narrows. We have not found it to be a problem.

These are the reasons we use the hand hole width to set the spread between the bars. This is consistent between all types and styles of forks. Bar widths come from 3 ¾" to 4 ½" hand hole measurement. Note that this is measured in the wood, not in the rawhide, on our trees.

A general comparison between the two measurements would as follows:

Traditional Gullet Width Measurement	Our Hand Hole Measurement
6 - 6 ¼"	3 ¾"
6 ¼ - 6 ½"	4"
6 ½ - 6 ¾"	4 ¼"
6 ¾ - 7"	4 ½"

Gullet and Hand Hole Height

There are two components that, added together, set both gullet height and hand hole height. One contributor is the fork, and the other is the bars. (Figure 12) The fork component goes from the top of the hand hole down to where the fork joins the bars. The bar component goes from this level down to the table. It is important to understand that these can be changed independently of each other. Changing the fork component will change the hand hole height and the gullet height without changing the fit of the bars. Changing the bars may or may not change the gullet height and hand hole height, or the fit. Our Wade pattern will increase both measurements approximately 1/8" compared to our regular pattern, yet fit the horse the same because the difference is in the depth of the bar. The bottom of the bar will be ¼" lower on the horse's side, but the top of the bar will be in the same spot. Changing the angle from 90 to 93 to 95 degrees will lower both measurements 1/16" to 1/8", and will also affect how the tree fits a horse. Widening the bar spread from 4 to 4 ¼" will definitely affect how the tree will fit the horse, making it sit lower with less clearance. But the gullet height and hand hole height measurement will be the same. So neither measurement can give a totally accurate picture of clearance, especially considering the diversity of shapes of horses' withers. The shape of the gullet is important in clearance as well, and we try and make it as scooped out as possible so that the lowest point is at the hand hole.

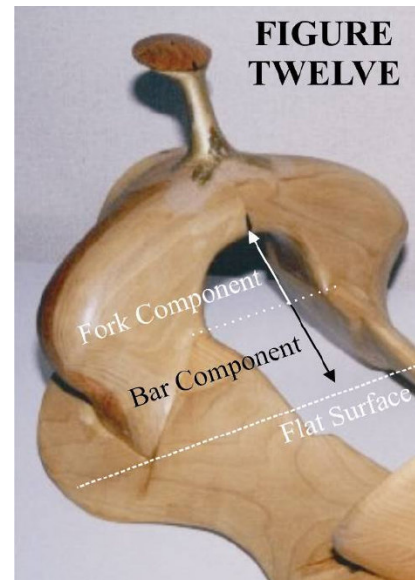
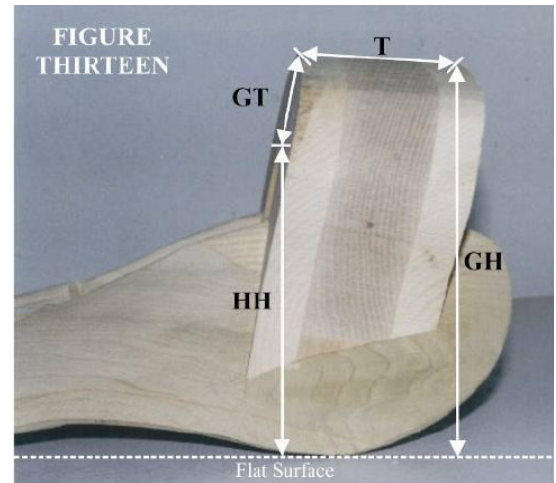


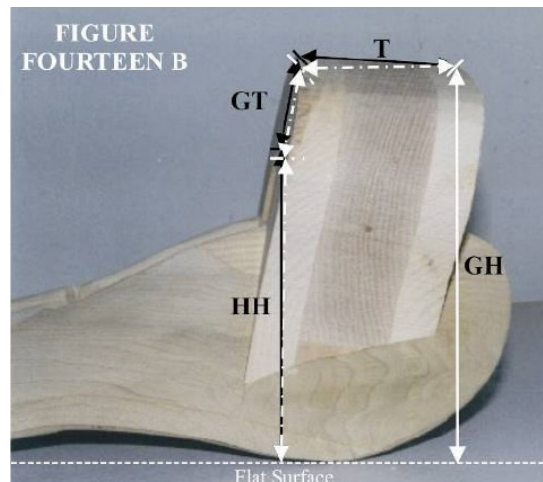
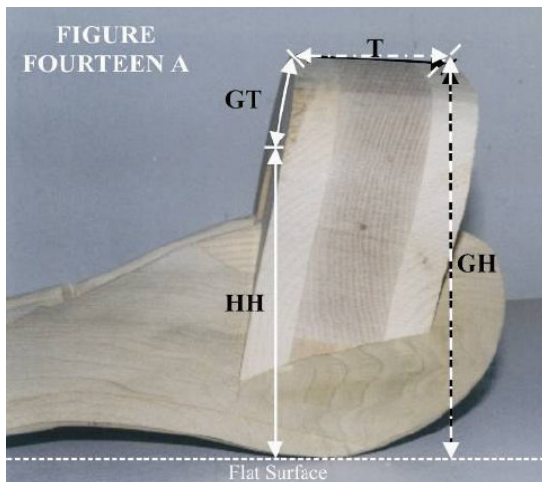
FIGURE TWELVE

Hand hole height is a good measurement to use along with gullet height to approximate clearance. The gullet lip is only going to be the first place to contact the horse if it sticks out a long way and the withers rise quite steeply in front of the tree. Otherwise, the withers will most likely contact closer to the hand hole than to the lip. A lot of horses have withers that start to rise ahead of or above the shoulders, but some have withers that start to rise back of the shoulders. It is this second group for which having enough clearance at the hand hole is important.

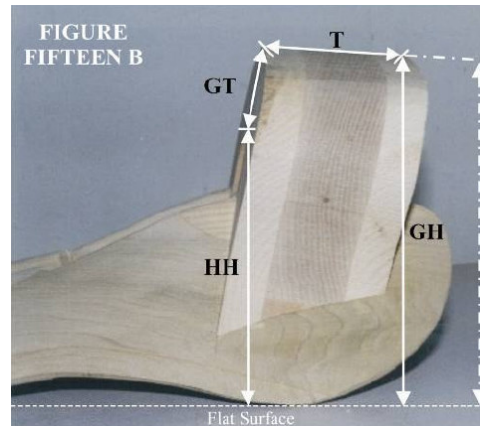
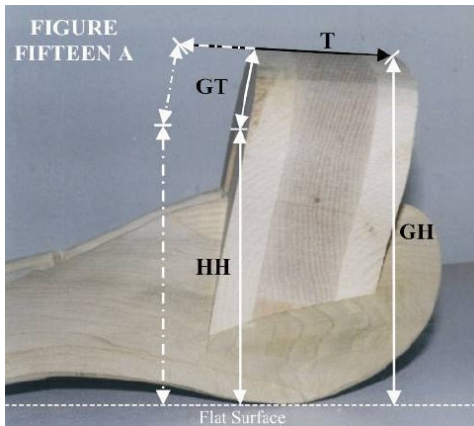
It is also important to recognize that the gullet height will change due to four factors that don't affect the hand hole height: the top cut angle, the stock thickness, the gullet thickness (top of hand hole to top of fork) and the angle of the fork. A fork is cut out of a block of wood that is flat on the back and the front. Figure 13 shows a swell fork attached to the bars prior to any shaping being done. Imagine a shape as drawn in Figure 13, with T as the top of the fork, GT as the gullet thickness, HH as the hand hole height and GH as the gullet height.



Top cut angle: A stood up front is cut at 0 degrees, or 90 degrees to the back. A swell fork tree (stock thickness 3 ¾") will be cut at 7.5 degrees, which rises slightly compared to the back, as in Figure 13. A metal horn slick fork (3B with 4 ¼" stock, Taylor with 4 ½" stock) will be cut at 12 degrees, rising more. A Wade (5" stock) will be cut at 15 degrees, rising the most. These angles have basically been chosen due to the look of the finished tree, so trees with thicker stock don't look too 'downhill'. The result is that as you increase the top cut angle, the gullet height will increase, while the hand hole height stays the same. (Figure 14A) Conversely, with the same stock thickness, gullet thickness, and gullet height, you have a lower hand hole height with a slick fork cut at 12 degrees than a swell fork cut at 7.5 degrees. (Figure 14B)

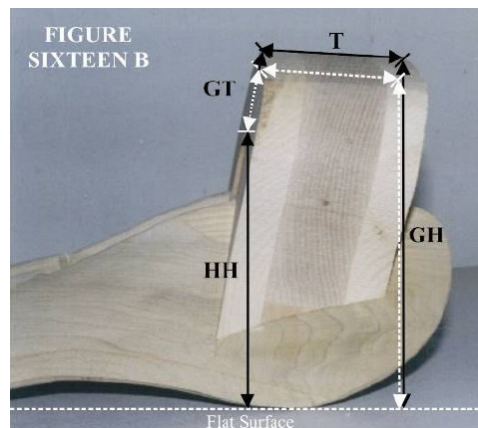
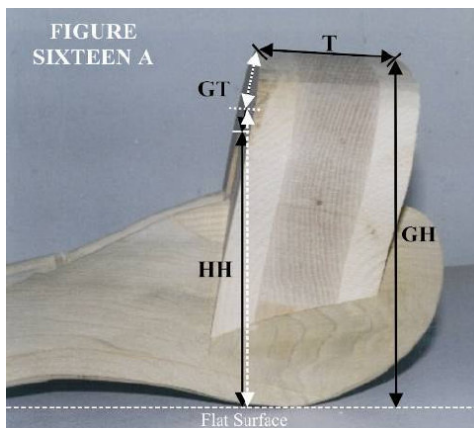


Stock thickness: If the top of the fork was horizontal, the stock thickness would not make a difference. But forks do slope down once they are mounted on the bars, so the thicker the stock, the higher the hand hole height gets for the same gullet height. (Figure 15A) Conversely, if you keep the same hand hole height and thicken the stock, the gullet height gets lower. (Figure 15B) This explains why the 4 ¼" stock 3B tree will have a higher hand hole height than the 3 ¾" stock Weatherly when mounted on the same bars.



Note: It is due to these last two factors that we cut our Weatherlys at 7.5 degrees. The high gullet height needed to get a decent hand hole height makes the lower top cut angle a better choice. If you want the neat old-time look of the 12 degree top cut, then the gullet height needs to be a absolute minimum of 8 ¼" to clear the average horse.

Gullet thickness: The gullet thickness, measured before the fork is shaped, is the distance between the top of the fork and the top of the hand hole at the back. It primarily depends on whether the tree has a metal horn or a wood post horn. For a metal horn tree, the gullet thickness is 2 1/8" thick to accommodate the length of the screws attaching the horn. If you put a wood post horn on any fork, you can make the gullet thinner, which increases the hand hole height while the gullet height stays the same. (Figure 16A) Or you could lower the gullet height and keep the same hand hole height. (Figure 16B)



On a Wade tree, the gullet thickness is only needs to be 1 ¼” thick to be strong enough to handle any normal use, including roping. We could make all wood post trees with that thickness of gullet. But the problem with lowering the gullet height too far is that you will distort the shape of a swell fork tree, or the look of a Taylor or 3B. So we have set the gullet thickness for swell fork wood post trees at 1 ¾”, and for non-Wade wood post slick forks at 1 ½”. This keeps the hand hole from being miles above the horses' withers, yet leaves the shape of the fork intact.

Angle of the fork: Most forks lean ahead once they are mounted on the bars. If you stand a fork up, and keep everything else the same, the hand hole height gets dramatically lower for the same gullet height. However, when we stand a fork up we also change the top cut angle so it doesn't point upwards too much. The net result is that the hand hole height is about 1/8” lower on a stood up fork than the same fork leaned ahead normally.

The chart below gives a basic idea of how the different styles of forks compare in regard to gullet height and hand hole height on our trees. While gullet height still needs to be noted, the hand hole height is the measurement that often really gives the best approximation of clearance and should be considered when ordering a tree.

Gullet Height versus Hand Hole Height for Regular Bars at 90 Degrees

Hand hole Height	Wade 15 degrees	Swell Fork 7.5 degrees	3B, Taylor 12 degrees	Stood Up Swell Fork 0 degrees	Wood Post Swell Fork 7.5 degrees
6 ¾”	8”	8 ¼”	8 5/8”	8 3/8”	7 7/8”
6 ½”	7 ¾”	8”	8 3/8”	8 1/8”	7 5/8”
6 ¼”	7 ½”	7 ¾”	8 1/8”	7 7/8”	7 3/8”
6”	7 ¼”	7 ½”	7 7/8”	7 5/8”	7 1/8”

- Note: - Wade bars measure approximately 1/8” higher than regular bars (used on any tree with a stock thickness of 4 ½” and greater, or on request)
 - 93 degree bars measure 1/16” to 1/8” lower than 90 degree bars
 - These changes affect both hand hole height and gullet height on metal horn trees.
 - These changes affect only hand hole height on wood post trees as we have a bit of room to manoeuvre gullet height on them.