

The Box-Tang

Procedure to create effectively a full tang handle without any possibility of rust

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0. Starting point - The blade for a full-tang knife is finished, pin locations are planned and drilled, bolsters (if any) are fixed in place. The hole size should be slightly larger than the planned pin size. For example, if the pin material diameter is 1/8" (0.125"), use a #30 bit (0.128"). The reason for this practice is to eliminate cracking a scale when the pin hits the edge of the hole as it is being inserted. Remove approximately an 1/8" from the tang profile - typically by a few minutes on the grinder. Pommel is in place if used. While the tang profile can virtually be any shape, the work is easier if the profile approximates a rectangle with equal thickness along the length or gradually tapers to the end.
1. Select wood - typically 1.5" wide by 12" long by 3/8" thick. Wood selection - highly figured & dark woods or black micarta are good choices. Decide the length of the finished handle (example: 4.5"). Mark twice that length on the wood and decide the front and back layout. Typically the surface towards the tip is perpendicular to the blade & the rear surface is sloped (longer on the spine side, shorter on the belly side). If there is no pommel, the sloped surfaces should be adjacent, thus creating a wedge shape between them. If using a highly figured wood, this will produce a pleasing junction of the grain patterns.
2. Flatten surfaces & equalize thicknesses. Clamp scales together & machine all edges to match. Prepare front surfaces to whatever the final finish will be if there is not a guard. After the scales are in place, these surfaces will be difficult to finish.
3. Lock a scale to the tang (use a couple of C-clamps). Optimally, the spine will run parallel to the upper edge of the scale. Use a drill press or mill to drill pin holes undersized. For example, if using 1/8" diameter pins (=0.125"), use a #31 drill (=0.120"). Have several temporary pins at hand (ex: #31 drill rod ~ 1.5" long, bend at 90 degrees at the 1/3 length point with the long leg ground to a point). Once the first hole is drilled, insert a pin. Expect to move the clamps a bit to do the drilling, so the pins will help keep everything in register.
4. With the pins in place, trace tang outline on one of the scales. A combination of a sharp pencil and needle stylus will leave a visible line.
5. Measure tang thickness (dial caliper is optimal). Divide by half & add 10 thousands of an inch. This is the depth of the cut.(=D). Write that number down on the outside of the scale or just remember it.
6. Go to the mill. Touch off on surface with the tracing and then raise the table by D. Etch-a-sketch the cavity. Try to cut the lines in half. If using a drill press with cross-feed vise, you will need a shim of D thickness. Clamp the scale, touch the wood with the end-mill, lock the spindle. Move the end-mill to clear and slip the shim under the wood to bring the surface up by D. Proceed like using the mill.
7. Verify that the tang fits into the cavity. If not, you can use a stylus (or needle-point file) to trace the outline again to identify what needs to be removed. A micro air-die grinder is the optimal tool for this.
8. Clamp the scales together and drill through the holes to replicate the holes in the other scale.
9. Repeat Steps 4, 6, 7 and 8.

10. Sketch the handle shape on one scale & saw out. Transfer shape to other scale & saw out.
11. Tape the blade (way easier than removing epoxy later!). Adjust 3 c-clamps to handle thickness. Insert alignment pins in one scale.
12. Mix epoxy with colorant. Butter the scale with the pins. Insert the tang into cavity. Butter the other scale. Clamp scales together & remove pins. Use needle probe to remove epoxy from holes. Let it harden.
13. Cut actual pins longer than needed. Add point on one end. A repurposed fencing tool makes this real easy.
14. Drill out holes with the correct bit, i. e., 1/8" bit.
15. Insert the sharpened end of the pins just enough to stay put. Butter with epoxy. Use machinist's vise & scrap wood to force pins home so that pins stick out on both sides of handle
16. Shape & finish handle.
17. If using bolsters or guard, make sure that scale front ends fit well before starting this procedure. If a pommel is involved, either very carefully measure angles and length or use a free floating pommel. If there is a free-floating pommel, be sure to allow for a tab extending into the tang and for a pin location in that tab consistent with the other pin locations.

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