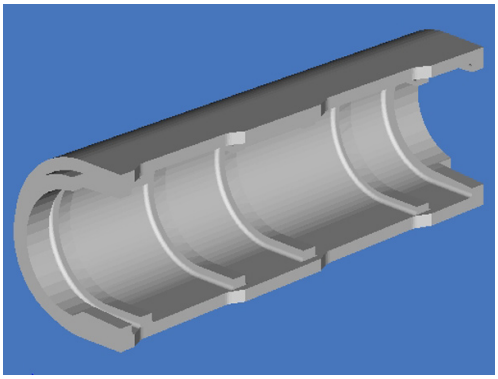
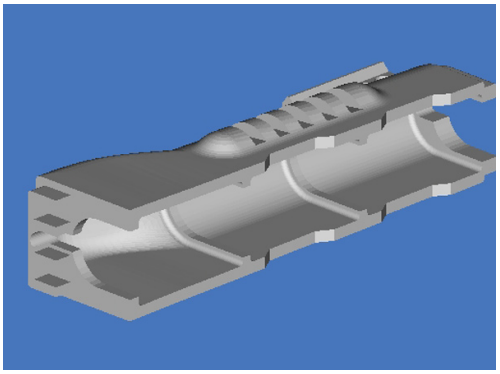
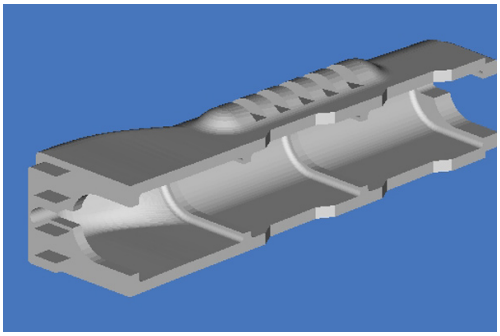


The top portion of the stock is the same for both variations of the design.





In these CAD screen shots of the AK-47 bottom stock grips, notice the flashlight holding elements on the top image.

Prototyping for an AK-47 Assault Rifle

First manufactured in 1947, the AK-47 is often considered one of the most reliable battle rifles produced. There are somewhere in the neighborhood of 30 million in service around the world. The rifles can operate as a semi-automatic or fully automatic rifle. It fires a 7.62 x 39mm shell, and has a magazine capacity of 20, 30, or 100 rounds using a detachable magazine. It can fire at a cyclic rate of 700 rounds per minute.

The AK-47 was originally designed by Mikhail Timofeevich Kalashnikov. Now there are literally thousands of Kalashnikov models, clones, and copies being bought and sold. However, according to reviews, the rifle's function remains the same no matter what adjustment has been made to it. The rifle's standard gun length is a little over 34 inches, barrel length is 16.34 inches, and it weighs about 9.5 pounds.

> *"There were a lot of nooks and crannies that had to fit into place. It all worked perfectly." —Larry Baucom*

Larry Baucom is a gun consultant. He works with a number of customers who are involved in the assault rifle, semi-automatic business. The weapons are often sold as kits for people who wish to experience the build process. But he also produces components and accessories for companies who manufacture the weapons.

Larry has produced replacement parts as well as prototypes for almost every component in the AK-47. "I'm retired now and just do this for a few people, but it appears as though I have more work than I expected," he says. "Weapon accessories are a big business."

A recent consulting job had Larry creating new outside stock grips for an AK-47. "I needed prototypes for two different variations of the grips," he said. The grips themselves come in two parts, uppers and lowers. For the project he was working on, the two upper grips were to be the identical, but the lower grips were different. One set of lowers was to look like the standard AK-47 component, but the other set was designed to posses a flashlight holder.

Standard AK-47 assault rifles are readily available for sale around the world.

After creating the design using SolidWorks CAD software, Larry formatted and downloaded STL files through the ZoomRP.com website to get overnight delivery on the parts. “I couldn’t have gone down the street and received the parts as quickly,” he said. “The turnaround is amazing. I never even had to talk with anyone at the company.” According to Larry, he used ZoomRP.com’s quick quote section and within 30 seconds of downloading the files he had a quote. The parts shipped the next day to arrive by the guaranteed “ship tomorrow” timeframe for SLS parts.

The parts were made using SLS (Selective Laser Sintering) technology. The SLS process used to prototype the parts allows models to be produced in a very short period of time. As with the AK-47 parts, designs are created in any 3D CAD system and the data is saved in an STL format. The STL file is then mathematically sliced in software to form 2D cross-sections of the part. From there the parts are scanned and sintered using CO2 laser energy. New layers are sintered (fused) to the preceding layers until the part is completed.

SLS is an additive manufacturing process that builds three-dimensional parts by using a laser to fuse a powdered material layer by layer. Layer thicknesses can be as small as 16 microns (0.00063-inches). Although the components are produced in an off-white Nylon material, they can be painted after minimal preparation.

While SLS production began as a way to build prototype parts like the ones Larry needs, the system is also being used to produce manufactured parts for end-use. Industries now using the system for production parts include aerospace, automotive, consumer, and medical. Because SLS parts and models are rugged enough to provide workable models in industrial applications, it was obvious that it was the perfect system to use for the AK-47 application. “It’s a very tough material,” Larry said.

The AK-47 stock grip design was prototyped to test for functional form and fit. “There were a lot of nooks and crannies that had to fit into place,” Larry said. “It all worked perfectly.” In addition, to make the model more realistic, Larry stained the material black. “I didn’t have to do any additional sanding or prep work, the stain made the stock look like a finished part.”

Larry Baucom works on a lot of firearm and firearm accessory projects and the AK-47 stock grips are only one example of how well rapid prototyping works. According to Larry, “The best part of the design was to get the parts right away so you actually see and feel what you had worked on at the computer screen.”