



Use Case – Pressure Check Hand Tool

Customer Profile

Graco Inc. supplies technology and expertise for the management of fluids and coatings in both industrial and commercial applications. It designs, manufactures and markets systems and equipment to move, measure, control, dispense and spray fluid and powder materials.

Challenge

Paint sprayers on Graco's assembly line require pressure control checks. The hand tool to adjust the pressure incorporates splines to engage and turn the control knob. However, the splines on the existing ABS plastic tool typically wear out after repeated use. This requires the manufacture of new tools regularly. The desired solution was an easily fabricated new tool with extended life that did not have to be machined.

Solution

With the acquisition of a new F370[®]CR composite 3D printer, Graco engineers opted to print the tool using FDM[®] Nylon-CF10 thermoplastic. This material is filled 10% by weight with chopped carbon fiber, providing it with greater strength and toughness than ABS. An added benefit of Nylon-CF10 is its fine surface finish on printed parts. This characteristic resulted in better-defined splines, resulting in a more positive engagement with the pressure control knob.

Impact

After several months of typical use, a review of the tool showed no signs of wear or indications of a compromise in functionality. Graco engineers expect at least a 10X life improvement of the tool over the previous ABS version. Additionally, the 3D printed tool was a less costly solution and offered the design freedom to make an ergonomic handle faster and easier than a machined alternative.



The old ABS hand tool (yellow) is shown, engaging the adjustment knob on a pressure control device.



The 3D printed hand tool socket, showing the splines and the smooth as-printed surface finish.

10X



**Extended
Tool Life**

**Lower
Cost Than
Machined
Alternative**

