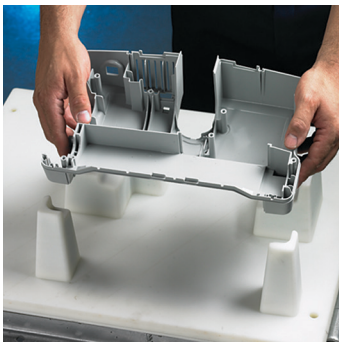
Custom Assembly Solutions

ADDITIVE MANUFACTURING REDUCES FIXTURING COSTS UP TO 65 PERCENT

"With some traditional fixture projects costing over $100,000, the savings can be substantial."

– Bill Fish, Oreck

CASE STUDY



Oreck uses additive manufacturing to produce custom assembly pallets. During assembly, a vacuum top cover is placed into the pallet upside down.

For every series of vacuum that Oreck Manufacturing makes, it produces 40 to 50 identical assembly pallets. This was the case for the company's Titanium Series, the XL21 upright commercial vacuum. This high-end unit provides the user with features such as hypo-allergenic filtration, adjustable two-speed motor and advanced sound-dampening technology.

The production floor pallets secure the top cover of the vacuum in a precise position so that the vacuum can be assembled quickly and easily. After placing the motor, fan housing and other support components into the stationary top cover, the bottom cover is attached.

Simplified Assembly

Each assembly fixture consists of four plastic posts that attach to a standard Bosch assembly pallet. Besides being specifically aligned to accept the cover housing, the fixture components maintain tolerances of 0.003 inch (0.0762 mm) so that the cover is held firmly in place.

Oreck's engineering team designs the components needed for each fixture using standard CAD tools. According to Oreck Senior Model Maker Bill Fish, "Designing the fixture components is fairly easy. We already have a file for standard support posts. So, we add the 3D top cover, embed it into the support post, then blow away the cover. The whole job takes about an hour and a half."

In the past, Oreck used only traditional methods to produce the assembly fixtures. These included silicone or epoxy molds and urethane castings with inserts. Several years ago Oreck added two large Fortus 3D Production Systems, which use FDM Technology. With FDM, Oreck has the option of using additive manufacturing to create the fixtures, which they take advantage of whenever possible.

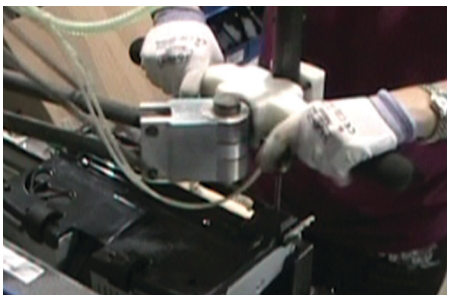
"Using additive manufacturing reduces fixture production costs by up to 65 percent, because we produce the fixtures in-house," said Fish. "With some traditional fixture projects costing over $100,000, the savings can be substantial." At this rate, machines can pay for themselves with just a small number of projects.

3D Printing for the Whole Business

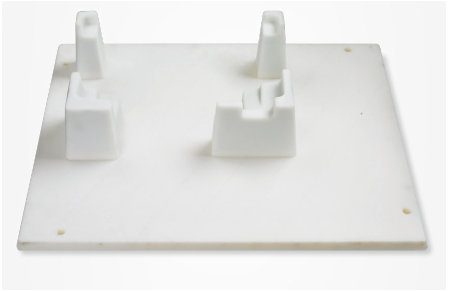
3D printing the pallet assembly fixture is only the beginning. Maintaining the pallets in a tough production setting is as important as getting original parts. "If for some reason a fixture component is chipped or broken during use, we can replace it quickly and easily in-house. Anything that takes a pallet off line costs us money," said Fish.

"We keep the Fortus systems working 24/7," said Fish. Besides creating fixtures, Oreck uses FDM technology extensively to produce prototypes, as well as models for marketing photos and commercials. "We also use the machines to produce specialized assembly tools, CMM (coordinate measuring machine) fixtures engineering test fixtures and CNC milling fixtures. We also make complete mockups. The machines are only limited by your imagination."

The motor, brush, and other components are assembled inside the cover.



The bottom cover is then positioned and fastened down.



The custom assembly pallets consist of four plastic posts on a Bosch aluminum pallet base. The unit with plastic base shown here is used as a backup.

METHOD	COST
Traditional Molding & Casting	$100,000
FDM	$35,000
Savings	$65,000 (65%)

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