

3D printing helps in the fight against viral infection

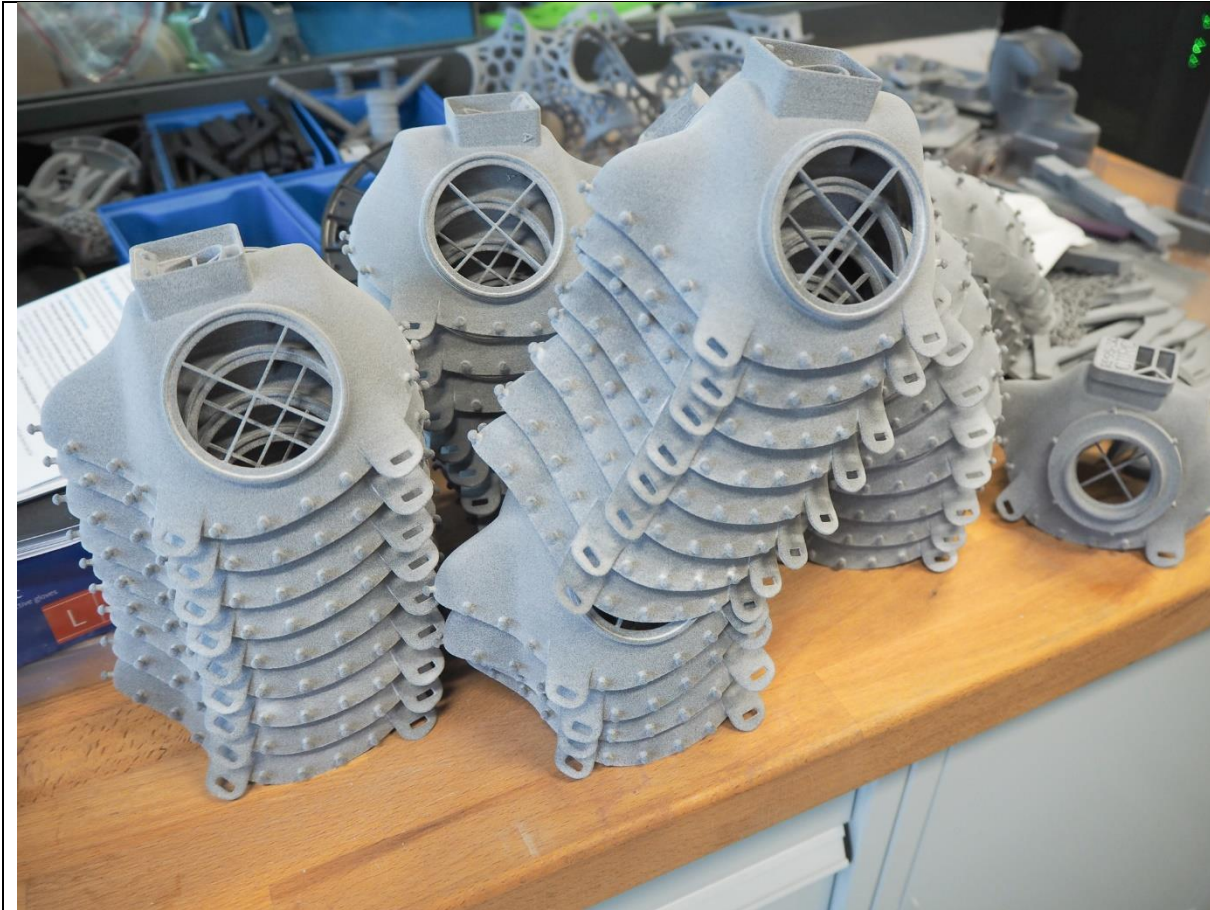
Technical University of Liberec (TUL) responded to a call from the Czech Technical University in Prague (ČVUT) and printed first respirators for paramedics and rescuers on a special 3D printer. TUL also coordinates volunteers who print filters to full-face diving masks that reliably protect against viruses.

ČVUT started the cooperation with the Ministry of Health of the Czech Republic this week to supply new top-class respirators for teaching hospitals. TUL can take part in this challenge because, as one of the few workplaces in the country, it has the most advanced 3D Jet Printer Hewlett-Packard Fusion 4200, which prints non-porously. This means that the finished material is impermeable to water and viruses. One advantage of the device is also its high speed: it can print one layer in eight to nine seconds and the products of this printer are comparable in quality to the injection molded products. Despite this, the print of sixty respirators is too long. It takes about 17 hours. Heating and subsequent cooling of the machine must also be considered. After printing, the parts still need to be cleaned. The first sixty masks were sent to 3Dees Industries for final silicone sealing and sterilization. Then the masks will be delivered to the Ministry of Health, which will distribute them to individual hospitals. This type of respirator should be used not only by medical workers in the care of infected with a new type of coronavirus, but also by dentists.

3D printed respirators are currently being printed also at the University of West Bohemia in Pilsen, 3Dees Industries, Škoda Auto and 3D Tech. Seven machines are now working on their production. They all use the same material and the respirators have the same parameters. This challenge shows the power of 3D printing, which is based on the rapid production of smaller series. These will help medical professionals in the first wave of fighting the virus. In the long term, however, 3D printing is not sustainable for mass production. That is why the preparations for mass production of the more efficient and cheaper injection molding technologies are running.

While the Hewlett-Packard Jet Fusion 4200 printer is a top-notch special device, many people now help with 3D printing of medical or paramedic equipment, even at home. TUL is also involved in another call from CTU, which encourages volunteers to help print filter adapters for diving masks that sell Decathlon and Sportissimo, the stores with sports equipment. These masks provide protection at an even higher level than respirators by covering the entire face. The diving mask is an improvised solution designed for everyone who is exposed to a high risk of contact with Covid-19 and is unable to access the FFP3 respirator and shield. These are not only health professionals, but also pharmacists or shop workers. Since Wednesday 25 March, 25 printers have been working. Eighty percent of these are people from the TUL, people from companies are also reporting. About one hundred fifty to two hundred additional adapters could be printed each day.

A big thank you to all those involved in the challenge of responding to the acute shortage of respirators and protective equipment in the Czech Republic. At the same time, these activities illustrate how 3D printing technology can be readily used in a crisis.



Respirators printed at the Technical University of Liberec