

3D printing at The Technical University of Liberec helps to the city hospital

The Regional Hospital in Liberec started testing several innovative products that will help better protect healthcare workers from coronavirus infection. The products were designed and printed on the best university 3D printer HP Jet Fusion 4200 by a team of scientists from the Department of Industrial Technologies of the Institute of Nanomaterials, Advanced Technologies and Innovations (Cxi) at the Technical University of Liberec.

1. Special door adapter

No more touch the door handle! Doctor can now open the door with the forearm using a special adapter printed on the 3D printer. Thanks to detailed scans, the adapters are precisely adapted to the handle of the Liberec hospital. There is no danger of them slipping or moving during operation. The university has already supplied several sets of adapters to smaller and larger hospital doors. TUL scientists are ready to print adapters on any hospital handles in hours.

The adapters are currently in the anaesthesiology and resuscitation department, where they will help maintain the cleanest possible environment. Professionals from this department of Liberec hospital evaluate the benefits of adapters: Although, despite disinfection, wearing two or three gloves, all surfaces that the health care professionals have to touch are at risk of transmitting infection. Door adapters allow lower risk opening of handles.



2. Respirators with more efficient filters

The new high-class respirators were created from ordinary breathing masks originally used in a hyperbaric chamber. Doctors from the anaesthesiology and resuscitation department had them in stock and they wanted to use them as respirators. They therefore addressed scientists from Cxi. Scientists have developed and printed filter tips for them. This has made masks reliable respirators for use in virus-infected environments. Filter tips are replaceable and sterilizable. In addition, the HP Jet Fusion printer is the only technology that proves that the finished product has a minimal porosity. This means, viruses will not penetrate it and respirators provide a high degree of protection.



3. Modified polycarbonate head shields

The third innovative medical protection product is a modified polycarbonate head shield. The highest level of protection (respirator and shield) should be used in contact with a patient who has a confirmed or suspected coronavirus disease. Personnel must be in close contact with them and this is highly risky in terms of transmission of infection.

Scientists from TUL modified the shields at the request of hospital doctors so that they also cover a person who has special glasses and the above-mentioned respirator on his face. The original shields used by the hospital did not fit properly when using the above respirators. The polycarbonate boards, from which the shield is partially made, were a gift from Titan Multiplast for these purposes. The boards had to be laser-cut into precise shapes, and an individual head shield was created in conjunction with the 3D printed part. Scientists handed over the first prototypes to Liberec regional hospital for testing. Another thirty pieces will be delivered subsequently.

Other health professionals will also benefit from the idea of Liberec scientists. Škoda Auto wants to produce shields according to the Liberec design and supply them to the hospital in Mladá Boleslav.

