



Alderley Park, December 2023

British face covering manufacturer, Virustatic® SHIELD, wins UK Innovation Funding to develop data-backed face masks for future pandemic preparedness.

- Innovative UK face covering manufacturer has won funding to bring together world-class researchers to develop better standards for face mask efficacy testing
- PPE used during the Covid-19 pandemic had known shortcomings
- Existing standards prevent new, more innovative products coming to market
- Experts say the time is now to develop better products and develop new standards in advance of the next pandemic

Virustatic, the UK company that developed the Virustatic SHIELD®, has won Innovate UK funding for a prestigious partnership with the National Physical Laboratory (NPL) and University of Oxford's industrial filtration modelling group, through the Newton Gateway to Mathematics.

The funding has been awarded through the Innovate UK Analysis for Innovators programme and will bring together a world-class research team to generate data and test improvements to protocols that will present a step change in how filtration is tested and generate data to inform how future face masks are designed.

The Covid-19 pandemic put a spotlight on the shortcomings of PPE masks and the [vast swathes of plastic pollution that came with them](#).

Compounded by the knowledge that most PPE masks contain 'forever chemicals' such as [PFAS and phthalates](#), the innovators behind the Virustatic SHIELD® say the time is now to invest in PPE and PPE testing innovation to bolster Britain's readiness in advance of any future pandemic threat, and create the mask of the future.

Crucially, this work will also pave the way to making PPE, and its design and fit, more equal across different genders and ethnicities. Whilst PPE is generally promoted and thought of as gender neutral, the vast majority has been [modelled and designed on white, male faces](#). Most healthcare staff in the UK are female, who tend to have smaller faces, therefore putting them at increased risk when using fit-tested PPE that has not been designed for them.

A study in the British Journal of Anaesthesia showed that [twice as many female healthcare workers failed the respirator fit test compared to their male counterparts](#). Furthermore, different ethnicities, that have different facial geometry, are also at a troubling disadvantage when using current standard issue PPE.



Lucy Hope, development director at Virustatic® SHIELD:

“PPE really is a symbol of last century technology and the time is now for innovation: the majority of masks is made from fossil fuel plastics, their design is structurally sexist, and, ironically, given their function is to protect us, they’re full of chemicals that are known to harm the health of humans and the planet.”

The next generation of face masks needs: improved comfort and breathability; fit flexibility to support a broad population; safe reusability; and elimination of fit testing. However, the current test methods for masks and respiratory devices do not allow the flexibility to enact many of these improvements whilst still adhering to the test methods’ protocols.

Paul Hope, technical director at Virustatic® SHIELD:

“Having researched pandemic preparedness and respiratory devices for over 12 years, we identified a failing of current standardised test methods for material viral filtration, specifically in the application of face masks for airborne, infectious viral aerosols, which is inadvertently preventing new, more innovative products to come to market.”

Virustatic’s flagship product, the Virustatic® SHIELD is a breathable face covering that boasts improved fit and leakage reduction. It comprises a novel, award-winning glycoprotein coating to increase its efficacy allowing for a more breathable product that is comfortable for long wear.

However, when testing the Virustatic® SHIELD product to the existing standard tests, it was found that none of the current face mask standards adequately measured the effectiveness of a face mask or face covering in a real-world scenario taking into consideration fit, leakage and filtration efficacy against the viral and bacterial aerosols in question.

Daniel Povey, Higher Scientist from the National Physical Laboratory (NPL):

“Through this project we’re aiming to support the development and build of a modifiable system to test the filtration efficiency of the Virustatic® SHIELD system and other face masks to provide unique data for product validation and model testing.”

The NPL team will be developing a robust testing method for the fit and filtration efficacy of face masks and, through the data generated, the developed simulation model can then be used to intelligently select material and fabric structure parameters for the future face mask needs.

The team at NPL will generate breathability and filtration values, defined through experimental testing on a custom-built rig at NPL, and feed them into the simulation



model developed by the team at Oxford. This simulation model will then be able to screen potential new materials that are more sustainable, more breathable, and more technologically advanced.

Professor Ian Griffiths from The University of Oxford:

“We are thrilled at this opportunity to apply our expertise in filtration processes to face coverings. By developing novel mathematical models for both the Virustatic® SHIELD and more traditional face coverings, we will gain a greater mechanistic insight into how different design choices affect their ability to protect the wearer and others, and provide a tool which can make quantitative predictions of their efficacy.”

Alongside the Analysis for Innovators award, the team at Virustatic has been working with colleagues at the Liverpool School of Tropical Medicine to characterise the activity of the Virustatic SHIELD® against aerosolised pathogens. Their innovative approach to testing allows for the assessment of biological activity, something which is not currently a component of established standards.

Dr Shaun Pennington from the Liverpool School of Tropical Medicine:

“Conventional testing standards evaluate the effectiveness of filters through particle size discrimination, thereby limiting approval to materials serving as physical barriers. The methods that we have developed allow us to assess more forward-thinking solutions that deactivate pathogens while maintaining optimal air flow. We hope that these methods can be integrated into established pipelines for assessing technologies targeting aerosolised pathogens, thereby supporting innovation.”

Unfortunately, the next pandemic is not a question of ‘if’ but of ‘when’ and it is of utmost importance to innovate now to develop the masks of the future, based on innovative and sustainable materials, with data-driven design, to protect the whole population equally.

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Organisation overview:

Virustatic® develops eco-friendly, protein-based antimicrobial coatings. Its most famous innovation to date is the MediWales Innovation Award-Winning [Virustatic® SHIELD](#).



Virustatic® Shield is a patented snood-style face covering which is the result of over 12 years of UK research and development into pandemic preparedness.

The Virustatic Shield is coated with Viruferrin® a patented protein compound created by Virustatic, containing lactoferrin.

The Virustatic® SHIELD was developed specifically to respond to the requirements of a respiratory pandemic and avoid the overuse of single-use plastics, sustainability has been fundamental to Virustatic Shield® product and material development.