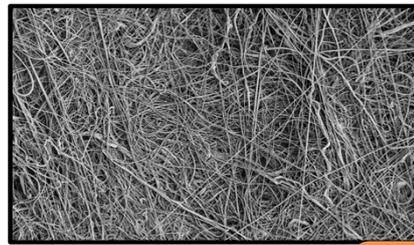


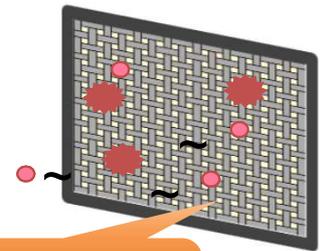
## A solution to the mask shortage!

A mask filter that can be repeatedly used with minimal performance degradation  
**YAMASHIN starts manufacturing and supplying nanofiber mask filters.**

The world's first mask inner sheet made with the proprietary 3D-structure nanofiber filter  
 technology of the world's leading construction machinery hydraulic filter company



Enlarged image of fibers



Traps viruses etc. in 3D  
nanopores (nano-level  
voids between fibers)

YAMASHIN-FILTER CORP. (President: Atsuhiko Yamazaki) has established a mass production system to manufacture large quantities of mask filters made with the YAMASHIN Nano Filter™, the company's proprietary mass-producible synthetic polymer nanofiber material, and started supplying them to mask makers and suppliers in Japan.

Amid the recent worldwide shortage of raw materials for masks due to the effects of the new coronavirus, YAMASHIN developed the world's first mask inner sheet made with a 3D-structure nanofiber filter. This inner sheet, which is inserted into the inside of a mask to enhance filtration performance, was originally created to safeguard the health of the company's own employees. YAMASHIN has been manufacturing the inner sheets in small quantities and offering them for use by its employees. Now the company has succeeded in constructing a system to mass-produce these inner sheets for mask filtration and is supplying them to mask manufacturers and suppliers. Leveraging the product development know-how that it has cultivated over more than 60 years during its evolution into a global multi-field filter manufacturer, YAMASHIN will continue to contribute to society by helping to alleviate the recent mask shortage as much as possible.

### ◆ High filtration efficiency and sustained performance of YAMASHIN Nano Filter™\*1

#### Ultra high collection efficiency due to 3D structure

The YAMASHIN Nano Filter™, which can be mass-produced using the company's unique technology, consists of fibers of 200-800 nm in diameter\*2 formed into a wadded 3D structure with innumerable nano-level voids. Foreign substances such as viruses are efficiently captured in these gaps. Synthetic fibers used in mask filters generally available on the market are about 3 μm, or 3,000 nm, in diameter, and their filtration efficiency is not high because those fibers are woven into a flat structure.

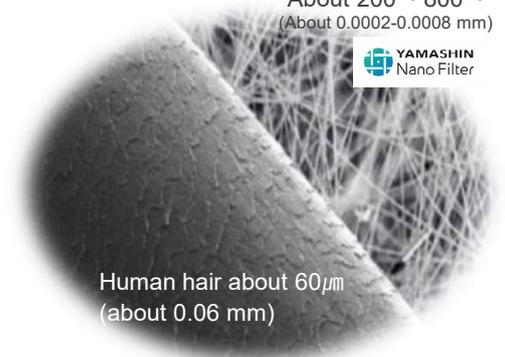
\*1: YAMASHIN Nano Filter™ is a Japanese trademark of YAMASHIN-FILTER CORP.

\*2: 1 nm is one billionth of a meter.

#### Sustained performance

Many of the disposable masks commonly sold on the market capture viruses, etc. by means of static electricity. However, the filtration performance of these masks decreases significantly due to the moisture of exhalation adhering to the mask and with the passage of time. YAMASHIN's in-house tests have proven that the company's mask filter shows almost no decrease in filtration performance even after prolonged use because it does not rely on static electricity for filtration.

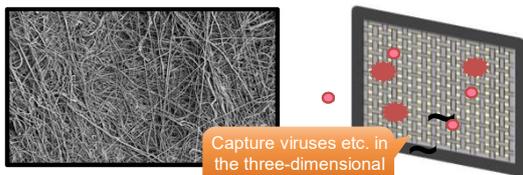
About 200 ~ 800 ~  
(About 0.0002-0.0008 mm)



Human hair about 60 μm  
(about 0.06 mm)

"YAMASHIN Nano Filter™"  
Electron microscope image

## ◆ Features of mask filters using the "YAMASHIN Nano Filter™"



Common mask



Enlarged image of fiber

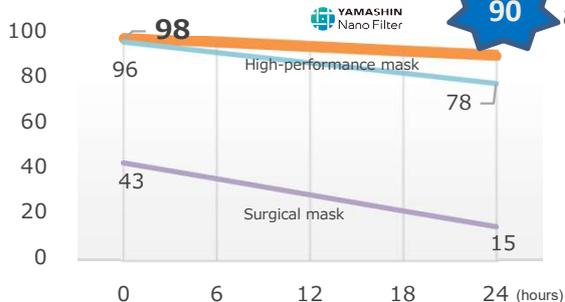
### Feature 1: High collection performance is achieved by [ultra-fine fibers in a three-dimensional structure]

The diameter of each synthetic fiber used in ordinary masks is about 3 μm and they are woven into a flat (almost 2D) structure, whereas the fibers of the YAMASHIN Nano Filter™ range from 0.2 to 0.8 μm in diameter and are formed into a wadded 3D structure.

The YAMASHIN Nano Filter™ has hundreds of millions of ultra-fine holes that effectively capture foreign substances such as viruses.

### Performance change over 24 hours of use

Sustained performance)



\* Based on in-house evaluation results (measurement condition: particles of 0.3 μm in diameter)

\* The particle filtration performance of static electricity gradually decreases due to the moisture of exhalation and with the passage of time.

### Feature 2: Minimal degradation in performance even after prolonged use]

While generally available masks use static electricity to trap dust and viruses, YAMASHIN's mask filter does not rely on static electricity. As a result, the reduction of its filtration performance is minimized even after prolonged use. In contrast to ordinary surgical masks and even high-performance masks whose filtration performance drops to about 15% and 78%, respectively, over time, masks made with YAMASHIN's filter maintain about 90% of their performance.

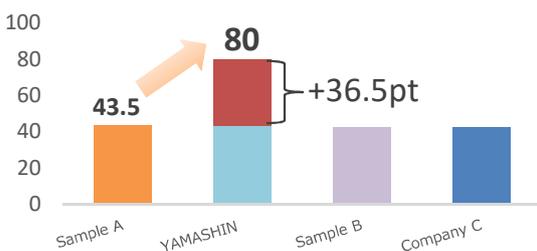


### Feature 3: Production in Japan to secure a stable supply

Currently, 80% of masks supplied in Japan are manufactured overseas<sup>\*3</sup>. YAMASHIN's mask filters are manufactured at its own factory in Saga prefecture in Japan, allowing it to stably supply the filters without being affected by overseas conditions. With the know-how it has cultivated as a manufacturer of construction machinery filters that require high filtration performance, YAMASHIN is capable of manufacturing inner sheets of uniform thickness.

\*3: Source: Japan Hygiene Products Industry Association (JHPIA)

### Performance test (mask + inner sheet)



Based on in-house evaluation results (measurement condition: particles of 0.3 μm in diameter)

Details of samples

Details of samples

Sample A: Commercially available mask (after use)

YAMASHIN sample: Commercially available mask (after use) + YAMASHIN nanosheet

Sample B: Commercially available mask (after use) + medical gauze

Sample C: Commercially available mask (after use) + replacement sheet for commercially available masks

### Feature 4: An inner sheet that restores the filtration performance of masks

Commercially available inner sheets for masks provide excellent hygiene but have almost no filtration function.

YAMASHIN's inner sheet is highly effective in terms of both hygiene and filtration performance. When the sheet is attached to a commercially available mask with lowered filtration performance after use, the performance of the mask will be significantly restored..

