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Rethink Type II Reusable Surgical Filter Reuse Test Report

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1. Abstract

A study was conducted by SNC to validate the disinfection and reuse of the Rethink Reusable Surgical Masks™ up to ten times by testing the filtration efficiency of the filters over a number of disinfection cycles as per the instructions for use. The results showed that the masks retained Type II particle filtration efficiency of $\geq 98\%$ for up to 12 disinfection cycles.

2. Introduction

Unlike traditional single-use masks, nanofiber filters rely primarily on mechanical filtration mechanisms rather than electrostatic filtration, and therefore are not impacted by wetting. This allows them to be disinfected with boiling water and reused multiple times.

Filtration efficiency testing is separated into “Bacterial Filtration Efficiency” (BFE) and “Particulate Filtration Efficiency” (PFE). The requirement for BFE is $\geq 98\%$ for Type II surgical face masks, as defined by EN 14683:2019. A study comparing the results for BFE and PFE found no significant difference in filtration efficiency measured with the two methods.¹ Previously, samples submitted by SNC for testing for both methods were compliant with the filtration efficiency required for Type II surgical masks ($\geq 98\%$), and were within the variance between test methods noted by the study.¹ This data supports the use of PFE as a substitute for BFE testing for these filter materials, and therefore PFE testing with NaCl was used throughout the reusability study.

3. Test Method Outline

Each cycle consisted of placing a filter inside a compatible cloth mask, handling (bending) for five minutes, and then removing the filter and following the instructions for use in disinfection with boiling hot water. Twenty filters of each were subjected to 8, 10 and 12 disinfection cycles and sent for PFE and breathing resistance testing at Protechnik Laboratories.

4. Results and Discussion

Handling during testing was an approximation of the handling required to insert and remove the filter from the mask, as well as a limited amount of wear from movement on the face. The results showed that all of the samples retained particle filtration efficiencies above 98% as required by the Type II surgical mask requirements. Figure 1 is an example of the filtration efficiency of the *Rethink Type II Reusable Surgical Filters* and illustrates that the samples retained particle filtration efficiencies above

¹ Rengasamy, S., Shaffer, R., Williams, B., Smit, S., 2017. J. Occup. Environ. Hyg. 14, 92–103.

98%, with small drop but little difference in the filtration efficiency after 12 disinfection cycles. The maximum drop in efficiencies observed across all samples and construction types was $1.12\% \pm 0.88\%$.

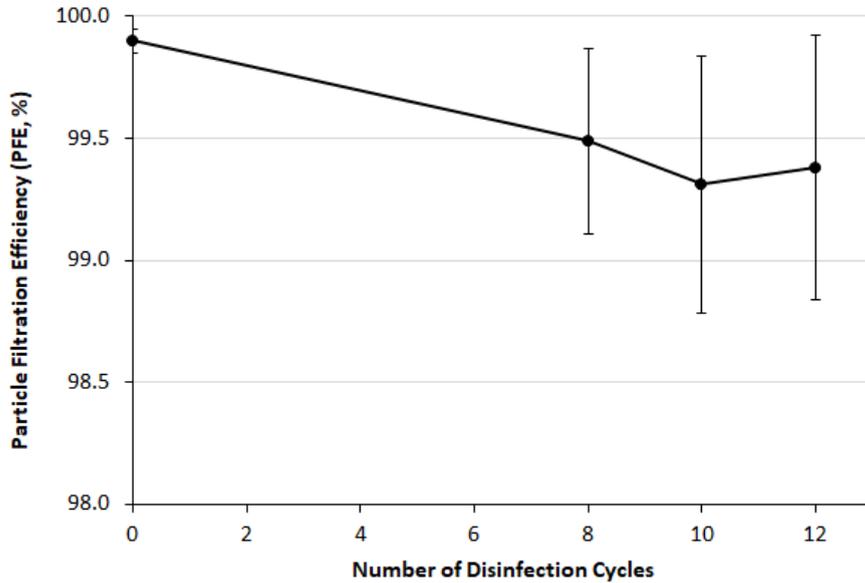


Figure 1. Results of the Particle Filtration Efficiency (PFE) testing, shown as percent filtration efficiency (PFE, %) after 0, 8, 10 and 12 cycles of disinfection.

5. Conclusion

The Rethink Type II Reusable Surgical Filters showed good filtration efficiency throughout its lifespan. The results confirmed that the nanofiber filters could be safely disinfected with boiling water while retaining their filtration efficiency and remained within the requirements needed to comply with Type II surgical masks. The reusability of the filters for up to 12 disinfection cycles, as well as the applicable instructions for use were successfully validated.

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