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## Management Summary



### *Legionella pneumophila* removal on Norit Filtrix Capfil Microfiltration Membranes MF 02 M12 LE sp

#### **General**

Three microfiltration membrane cartridges, containing Norit Filtrix Capfil Microfiltration Membranes type MF M12 LE sp, were tested under test conditions which are based on NSF Protocol P231 "Microbiological Water Purifiers" at Vitens Laboratories, Leeuwarden, The Netherlands. Tests were performed in order to show that the cartridges have a bacterial retention level of  $\geq \log 6$  required by NSF protocol P231 for the bacteria *Legionella pneumophila*.

#### **Used methods**

The testing was performed on three cartridges from 2<sup>nd</sup> July 2009 onward. Tests were performed under test conditions which are based on NSF protocol P231 for microbiological water purifiers. First the cartridges were flushed with 50 L filter sterilized water, followed by a challenge of 5 L water with a minimum concentration of  $8 \times 10^8$  *Legionella pneumophila* (serotype 9) per liter. Effluent samples were taken at the end of the challenge followed by flush with 200 L filter sterilized water. The procedure was repeated 3 times per week over a period of 5 weeks. The feed and effluent samples taken from the challenge tests were analyzed by Vitens Laboratory, Leeuwarden, The Netherlands. Analysis of the samples was conducted within 24 hours after the testing. Detection and enumeration of the *Legionella pneumophila* (serotype 9) was done according to NEN 6265:2007.

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### Test results

The table below displays the results of the *Legionella pneumophila* challenge experiments, using the data from the analytical report of Vitens.

Filter	1	2	3
	Log retention of effluent samples		
Start of test	>6.8	>6.8	>6.8
After 4 days	>7.0	>7.0	>7.0
After 5 days	>7.5	>7.5	>7.5
After 1 week	>7.6	>7.6	>7.6
After 1 week and 4 days	>8.6	>8.6	>8.6
After 1 week and 5 days	>7.5	>7.5	>7.5
After 2 weeks	n.d.	n.d.	n.d.
After 2 week and 4 days	>8.5	>8.5	>8.5
After 2 week and 5 days	>7.2	>7.2	>7.2
After 3 weeks	>7.1	>7.1	>7.1
After 3 week and 4 days	>7.0	>7.0	>7.0
After 3 week and 5 days	>6.9	>6.9	>6.9
After 4 weeks	>7.0	>7.0	>7.0
After 4 week and 4 days	>7.1	>7.1	>7.1
After 4 week and 5 days	>7.1	>7.1	>7.1
After 5 weeks	>7.1	>7.1	>7.1

n.d.: no data due to an error in sample analysis

### Conclusion

The results of the retention tests are all above log 6.8, which is more than the minimum requirement of log 6 by NSF protocol P231.

It can be concluded that the Norit Filtrix Capfil Microfiltration Membranes meet the NSF retention requirements for *Legionella pneumophila*.