

NANOCERAM FILTERS FOR WINERIES

Key Features

- High solids loading.
- Quantitatively removes particles, stems, debris, yeast and bacteria
- Sterilizing filter- 0.2 micron nominal (filters *Brevundimonas diminuta* (B. Diminuta) > 6 LRV)
- High flow rate (10 to 100 X greater than ultra porous membranes)
- NASA-derived technology
- Fits standard residential and industrial housings (no fuss, no mess)
- Certified to NSF-ANSI 42/53 Health and Safety Standards
- Assembled using only FDA-compliant materials
- Tear resistant, 0.8 mm thick and robust fibrous media

What is NanoCeram?

Figure 1 shows a microglass fiber that is completely covered by hair-like fibers (2 nanometers diameter and approximately 250 nm high) of the mineral boehmite, whose chemical composition is aluminum oxyhydroxide (AlOOH). In water, boehmite is colloidal and is electropositively charged. Such whiskers have been safely used as additives (adjuvants) in vaccines, where they are adsorbents for insulin and antigens for typhoid and diphtheria. AlOOH has been safely used as an adjuvant in hundreds of billions of vaccine doses since FDA first approved its use in 1950.

NanoCeram, a reaction product—is bonded -AlOOH to micro glass or cellulosic fibers and then produced into a non-woven filter media. Figure 2 shows a collection of pleated cartridges produced from such media.

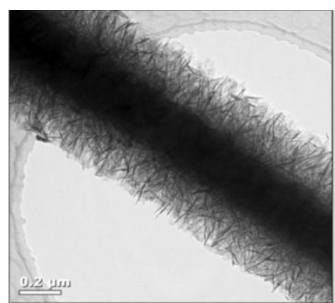


Photo courtesy of R. Ristau, IMS, Univ. of Conn.

Figure 1 – AlOOH bonded to Microglass



Figure 2 – NanoCeram Cartridges

The media is 0.8 mm thick and the resulting pore size is 2 microns, consisting of approximately 400 asymmetric pores from surface to surface, that a bacteria or particle must traverse when passing through the filter. In water or alcohol, virtually all particles are electronegative. The



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All Nanoceram standard products have been tested and certified by IAPMO R&T to meet NSF/ANSI std. 53 for Material Safety only.

AlOOH surface on the other hand is inherently electropositive, +50 mv at pH7. So, electronegative bacteria would have to pass through approximately 400 pores of a tortuous trap of electropositive cells that are like a magnet. This causes a very high efficiency of its capture- in effect sterilizing the wine by removing yeast and other tiny particles. Typically, a 2.5 X 10” NanoCeram cartridge when used with municipal water would filter the bacteria to >6 LRV (>99.9999%) and virus to > 4 LRV (> 99.99%). Preliminary testing with one brand each of a white and a red table wine showed no performance loss in bacterial retention after ten days of dwelling exposure to both wines.

Sterilization Testing

NanoCeram sterilization capability was tested against ASTM F838-05 with B. diminuta. Three 2.5x10” double pleated cartridges were tested at three different flow rates. The results are presented in table 1.

Table 1 - Results from protocol F838-05

Units (Flow rate)	B. Diminuta (LRV) 2 x 10 ⁶ CFU/mL
U1S1 (0.5 GPM)	7.8
U2S1 (0.75 GPM)	>8.3
U3S1 (0.25 GPM)	7.5

NanoCeram- A Versatile and Cost-Effective Filter

Over the last decade winemakers have shifted their filter preference from filter pads to membrane cartridges, giving them greater capability, cleanliness and handling. At the same time, filter suppliers also have offered an array of different pore size filters. Unfortunately, both prices and pressure drop increase as the pore sizes decrease. So too does the capacity due to clogging. NanoCeram breaks that mold with higher flow rates and higher dirt holding capacity.

Recommended for:

- Purifying water in bottling
- As a clarification/polishing filter (0.65 or 0.45 absolute micron rating) , downstream of a prefilter
- As a standalone (no prefilter) with lighter solid loads

Materials of construction

- NanoCeram media: micro glass, AlOOH, cellulose
- Support: Polypropylene, hot melt.



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Cartridge Availability and Flowrate

Table 2 – Cartridge availability and flowrate

Cartridge Type		Nominal, GPM	Maximum, GPM
NanoCeram	2.5 D X 10"	4	10
NanoCeram	2.5 D X 20"	8	20
NanoCeram	2.5 D X 40"	16	40
3 micron polypro	2.5 D X 10"	8	20

Cartridges are available in single open end, double open end and custom configurations. We also offer two different diameter (2.5" and 4.5") polypropylene filters (3 micron) that can be used as prefilters upstream of NanoCeram.

How to Use NanoCeram Cartridges

If you have ever used membrane filters and housings, converting to NanoCeram is very simple. As inferred in the text above, the membrane that serves as the bacteria control filter can be merely swapped out by the equivalent size NanoCeram, using the same pre-filter. We would suggest a prefilter with a pore size rating between 1 - 5 microns. We do offer a 3-micron polypro DOE cartridge.

Sanitization

Argonide has initiated a study to determine the most effective means of sanitizing after using the cartridge. –Flushing the cartridge with water may be adequate inasmuch as any trace bacteria would be retained in the filter. This distinction is under laboratory evaluation. Also under evaluation is sanitizing the cartridge-with potassium sulfate-citric acid solution. Another option is the use of our cartridge that contains silver zeolite, called Agion. The silver serves as a biostatic control to prevent bacterial proliferation. In the case of wine use, its use could potentially eliminate the need for sanitization other than rinsing the cartridge of wine residuals and proper cartridge storage.



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