

# GFguard<sup>®</sup>

Glass Microfiber Depth Filter Cartridge



High-Capacity Clarification & Particle Reduction for  
Pharmaceutical and Bioprocess Applications

VANGUARD

## CLARIFICATION WITH DEPTH

GFguard® Glass Microfiber Filter Cartridges are designed for high-capacity clarification and particle reduction of pharmaceutical and bioprocess fluids.

The depth structure of the glass microfiber media provides a tortuous filtration pathway that captures suspended solids throughout the media matrix rather than relying solely on surface retention. This combination of depth capture, high permeability and high contaminant-loading capacity makes GFguard® particularly suitable for demanding prefiltration and clarification duties.

GFguard® cartridges can be positioned upstream of critical downstream operations to help reduce particulate loading, extend downstream filter service life and improve overall process robustness.

### Key Benefits

#### High Dirt-Holding Capacity

The three-dimensional glass microfiber matrix provides efficient depth capture of particulate and colloidal contaminants, supporting extended throughput before terminal differential pressure is reached.

#### High Flow at Low Differential Pressure

Highly permeable microfiber media provides efficient clarification while maintaining comparatively low initial flow resistance.

#### Depth-Based Particle Capture

Particles are retained both within the depth of the media structure and at its surface, providing higher loading capability than conventional surface-only filtration.

#### Protection of Critical Downstream Operations

Reduction of suspended particulate load can help improve the operating life and consistency of downstream membrane filtration, chromatography and UF/DF operations.

#### Robust Cartridge Construction

Polymeric structural components and thermally bonded cartridge construction provide a mechanically stable configuration for pharmaceutical process filtration.

#### Multiple Retention Grades

Available in selected particle-retention grades to support staged clarification and prefiltration strategies.

### Engineered for Downstream Protection

GFguard® is particularly suited for protecting:

- Sterilizing-grade membrane filters
- Bioburden-reduction filters
- Chromatography columns
- Ultrafiltration and diafiltration systems
- TFF systems
- Process equipment and fluid-transfer systems

### Typical Applications

- Designed for Modern Pharmaceutical & Bioprocess Clarification. GFguard® cartridges can be evaluated for clarification and prefiltration of:
- Biopharmaceutical Processing
- Cell-culture harvest clarification
- Protein-containing process streams
- Fermentation broths, media and feeds
- Intermediate process pools
- Vaccine and biological-product process fluids
- Upstream and downstream process prefiltration
- Plasma & Protein Processing
- Serum and plasma fractions
- Pre-filtration before membrane filtration
- Pre-filtration before chromatography
- Protection of UF/DF and TFF systems
- Particle reduction before bioburden-reduction filtration
- Pharmaceutical Solutions
- Large-volume parenteral process streams
- Ophthalmic process solutions
- Viscous pharmaceutical solutions
- Process fluids containing colloids, lipids or suspended particulate contaminants

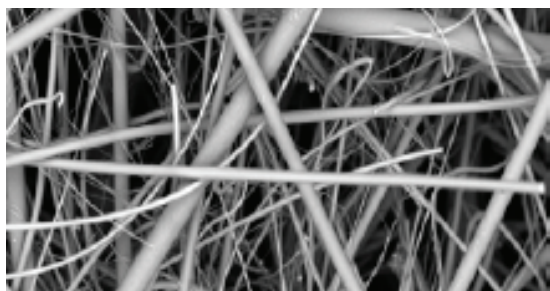
GFguard® is intended as a clarification and particle-reduction filter. Selection of the appropriate grade should be based on the characteristics of the process fluid and the required downstream protection objective.

## Product Specifications

### Materials of Construction

|                     |                  |
|---------------------|------------------|
| Filter Media:       | Glass Microfiber |
| Upstream Support:   | Polypropylene    |
| Downstream Support: | Polypropylene    |
| Core/Outer Guard:   | Polypropylene    |
| End Cap:            | Polypropylene    |
| Sealing Method:     | Thermal Bonding  |
| O-ring/Gasket Seal: | EPR, silicone    |

GFguard® filters are manufactured in conformance to cGMP. All materials of construction listed above are FDA approved for food contact use per 21 CFR 177. GFguard® filters meet the requirements as specified in the current USP Class VI plastics, cytotoxicity and pyrogenicity tests. No binders, adhesives or surfactants are used in its construction. The filters comply with European Commission Directive 2002/72/EC and subsequent amendments up to 2008/39/EC and Commission Regulation (EU) No 10/2011.



GFguard® SEM

### Extractables & Process Compatibility

For biopharmaceutical processing, qualification of product-contact components is increasingly important.

Vanguard recommends that users assess the suitability of GFguard® for the intended process conditions, including:

- Process-fluid chemistry
- Exposure time
- Temperature
- Sterilization conditions
- Downstream purification requirements
- Extractables risk
- Required regulatory documentation

### Filtration Ratings

Pore Sizes:  
0.6µm and 1.2µm

### Cartridge Dimensions

Diameter: 2.75" (7cm)  
Lengths: 10", 20", 30", 40" (25cm, 50cm, 75cm, 100cm)  
Effective filtration area per 10" length: 0.45m<sup>2</sup>

### Maximum Operating Temperature And Pressure

Δp 80 psi @ 32 °F to 100 °F (Δp 5,5 bar @ 0 °C to 38 °C)  
Δp 60 psi @ 150 °F (Δp 4,1 bar @ 66 °C)  
Δp 30 psi @ 180 °F (Δp 2,1 bar @ 82 °C)

### Sterilization

Steam-in-place (SIP):  
Saturated steam @ 121-135 °C, 30 minutes @  
15 psi (1 bar) to 30 psi (2 bar).

Autoclave: 121-135 °C, 30 minutes @ 2 bar.

GFguard® cartridges are capable of repeated sterilization cycles. For applications requiring autoclave/SIP, a stainless steel reinforcement ring must be ordered. See "Reinforcement Ring Option" within "Ordering Information".

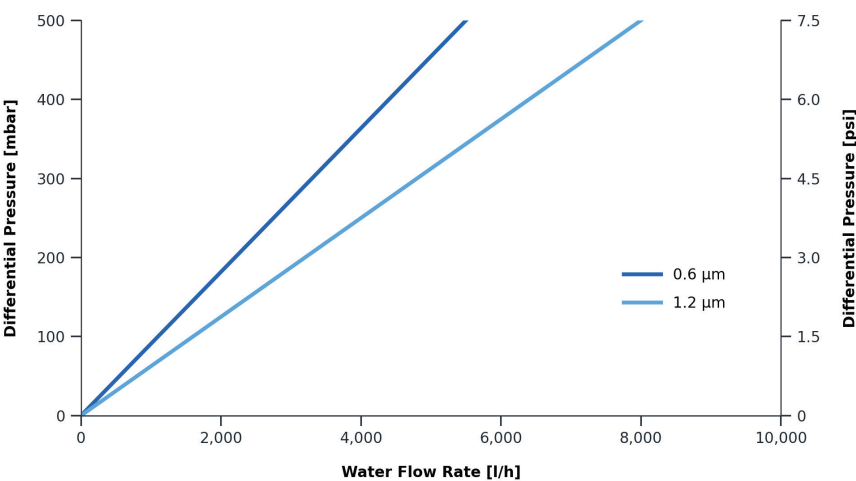
### Quality & Documentation

Documentation may be offered according to the qualification level established for the GFguard® product family.

Recommended documentation package:

- Certificate of Conformance
- Lot traceability
- Materials-of-construction declaration
- Manufacturing specification
- Finished-product dimensional inspection
- Differential-pressure / flow data
- Sterilization validation, where applicable
- Biological safety documentation, where applicable
- Extractables characterization, where applicable
- Food-contact declarations for applicable polymer components
- Change-notification policy

# End Cap Configuration



External -226 O-ring with locking tab; open end for C6 and F6 SOE configurations



External -222 O-ring with locking tab; open end for C2 and F2 SOE configurations



Flat Gasket; open end for OO DOE configurations



Fin; Close end for B2, F2, B6 and F6 configurations



Button Cap; Close end for B2, F2, B6 and F6 configurations



Flat Gasket; open end for OO DOE configurations

DOE = Double Open End  
SOE = Single Open End

## Ordering Information

| Filter Media          | Rating (µm) |             | Cartridge Length |      | End Cap Configuration                                        |  | Reinforcement Ring Option                                                  |                             | Seal Material (O-ring or Gasket) |
|-----------------------|-------------|-------------|------------------|------|--------------------------------------------------------------|--|----------------------------------------------------------------------------|-----------------------------|----------------------------------|
| GF                    | 1.2         | -           | 3                |      | F2                                                           |  | R                                                                          |                             | S                                |
| GF = Glass Microfiber | 0.6         | 1           | 10" (25cm)       | OO = | DOE; Flat gaskets (9.75", 19.5", 29.25", 39" length filters) |  | (Blank) = Standard - no reinforcement ring                                 | O-ring Seal<br>S = Silicone |                                  |
|                       | 1.2         | 2           | 20" (50cm)       | B2 = | SOE; -222 O-ring, button cap end                             |  | R = Reinforcement ring; required for autoclave/SIP applications (not "OO") |                             |                                  |
|                       |             |             |                  | F2 = | SOE; -222 O-ring, fin end                                    |  |                                                                            |                             |                                  |
|                       |             | 3           | 30" (75cm)       | B6 = | SOE; -226 O-ring, button cap end                             |  |                                                                            |                             |                                  |
|                       |             |             |                  | F6 = | SOE; -226 O-ring, fin end                                    |  |                                                                            |                             |                                  |
|                       | 4           | 40" (100CM) |                  |      |                                                              |  |                                                                            |                             |                                  |