FILPURE®

Ultrafiltration Product Manual
Outside in series

VERSION 1

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1. INTRODUCTION

FILPURE® Ultrafiltration (UF) modules utilize pressure-driven, hollow fiber membrane technology for removal of particulate and microbial contaminants from water. Operating at feed pressures of 4 to 100 psig, these UF systems offer low labor requirement and long membrane life. UF membranes typically reject bacteria, viruses, and substances larger than 0.03 µm, while allowing smaller solutes to pass through. Molecular Weight Cut-Off (MWCO) is typically 0.03 µm (30 nm).

2. DESCRIPTION OF FILPURE®

ULTRAFILTRATION MODULE

2.1 Module Features

- **0.03 µm nominal pore diameter** for effective removal of bacteria, viruses, and particulates (including colloids).
- **Hydrophilic PVDF hollow fiber membranes** for high mechanical strength, chemical tolerance, and easy cleaning.
- **Outside-In flow configuration** for higher tolerance to feedwater solids and effective air scour cleaning.
- **UPVC housings** that eliminate need for separate pressure vessels and resist UV light.
- Fiber outside diameter: **1.3 mm**; inside diameter: **0.7 mm**.

2.2 Module Specifications

Module Properties	OSM-2660	OSM-2860	OSM-2880
Length (L)	1860 mm	1860 mm	2360 mm
Diameter (D)	165 mm	225 mm	225 mm
Surface Area	33 m²	51 m²	77 m²
Volume per Module	16 L	35 L	39 L
Weight (water filled)	41 kg	83 kg	100 kg
Housing	UPVC	UPVC	UPVC
Fiber Count	5,760	9,000	10,000

Module Connections:

- Feed/Product Port: DN 50 Victaulic (OSM-2660: Feed DN50, Conc. DN32 Threaded)
- Air: 3/8” Threaded

2.3 Module Installation

Refer to manufacturer's installation drawings for recommended skid layouts and module orientations. Modules should be installed vertically with appropriate support and proper connection to feed, filtrate, concentrate, and air ports.

3. SHIPPING AND STORAGE

- Modules are shipped pre-wetted in pH-buffered 1% sodium metabisulfite solution.
- For freezing risk, 20% glycerine may be added.
- Uninstalled modules: Store horizontally, connections facing up, away from sunlight, at 20–35°C.
- Do not allow modules to dry out; permanent loss of flux may result.
- If off-skid storage, seal ports and store in plastic bags/boxes.
- Follow the storage duration chart:

Storage Duration	Recommended Steps
0–48 hrs	Air scour, backwash, close valves
2–7 days	Air scour, backwash, periodic operation or add preservative
7–90 days	Add preservative, renew every 3 months
>90 days	Contact FILPURE technical support

4. PROCESS DESCRIPTION

4.1 Process Operations

Typical Operating Conditions:

Parameter	Value
Max Feed Pressure @20°C	6.25 Bar (93.75 psi)
Max TMP	2.1 Bar (30 psi)
Filtrate Flux @25°C	40–120 L/m²/h
Temperature Range	1–40°C
Operating pH Range	2–11

- **Operating cycle:** 20–60 minutes per filtration.
- **Backwash:** After each filtration cycle, with/without air scour.

4.2 Pretreatment

Parameter	Design Basis	Maximum Allowable
Turbidity (NTU)	<50	300
TOC (mg/L)	<10	40
Particle Size (µm)	<150	300
TSS (mg/L)	50	100
Oil/Grease (mg/L)	0	<2
pH	6–9	2–11
Temperature (°C)	25	40

Feed screens (150–300 µm) recommended.

4.3 Cleaning

Cleaning Step	Frequency	Chemicals	Concentration
Backwash	20–60 min	—	—
Air Scour	Each backwash	Oil-free air	5–12 Nm³/h/module
Chem. Backwash	As needed	NaOCl, HCl, NaOH	0.1–0.2%
CIP	TMP↑>1.0 bar	Acid/Alkali mix	per manual

Summary of cleaning solutions:

- 0.1% HCl, 2% Citric, 2% Oxalic
- 0.1% NaOCl, 0.05% NaOH for CEB
- 0.2% HCl, 2% Citric, 2% Oxalic, 0.1% NaOH + 0.2% NaOCl for CIP
- Cleaning flux: 1.0–1.5 m³/h/module; Temp: 10–40°C

4.4 Fouling

- **Particulate:** Air scour, backwash
- **Biological:** CEB with oxidizers/biocides
- **Inorganic:** CEB with acid (pH 2)
- **Organic:** CEB with alkali (pH 12)

5. OPERATING INFORMATION

5.1 Start-up

Pre-start checks:

- Confirm pretreatment system and chemical addition points.
- Check drain/waste collection and control logic.
- Flush piping (no modules) to remove debris.
- Remove air from system before startup.

Startup sequence:

1. Set all valves closed, pumps off.
2. Align, lubricate, and check pumps.
3. Start feed pump and fill equipment.
4. Initiate flush to remove storage preservative.
5. Start backwash pump, set pressures and time intervals as needed.

Module Flushing (for potable applications):

- 40 LMH feed, 4hrs minimum (160 LMH total).
- Bleed concentrate at 0–20%, rest filtrate.
- Waste initial filtrate; do not consume.

5.2 Integrity Testing

- **Bubble Test:** Pressurize module with air to 2 bar (29 psi); check for bubbles in filtrate (broken fibers).
- **Pressure Hold/Decay:** Pressurize to 2 bar, close valves, hold 10 min. Failure: drop >0.2 bar in 10 min.

5.3 Shutdown

- For <2 days, air scour/backwash; close valves.

- For >2 days, operate 30–60 min/day or apply preservative/air scour.
- For >7 days, add preservative (1% sodium metabisulfite), check monthly.

5.4 Data Logs

FILPURE® Ultrafiltration Data Log Sheet

(*see sample at end — fill parameters as per operation*)

FILPURE® Ultrafiltration CIP Record Sheet

(*see sample — record cleaning agents, conditions, remarks*)

6. REFERENCES

- FILPURE® technical literature, guidelines, and warranty terms.

Appendices

A. Sample Data Log Sheet

Date/Time	Module ID	Feed Pressure	Filtrate Flow	TMP	Backwash time	Chemical doses	Remarks

B. Sample CIP Record Sheet

Date	Module	Chemicals Used	Concentration	Time	Temp	Results	Remarks

Trademark Statement:

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