



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 22, 2023

Mr. Thomas Poschmann  
Beijing Scinor Membrane Technology Co., Ltd  
16 Mallard Cove  
Centerpoint, New York 11721

Re: Beijing Scinor Membrane Technologies SMT 600-P50 Hollow Fiber Membranes  
Review and Approval of Challenge Testing for the Removal of Microbial  
Contaminants  
Application of Test Data to Additional Models - Beijing Scinor Membrane  
Technologies SMT600-P51, SMT600-P52, SMT600-P53, SMT600-P55, SMT600-P56,  
SMT600-P57, SMT600-P60, SMT600-P72, SMT600-P80, SMT600-P81 Hollow-Fiber  
Membranes

Dear Mr. Poschmann:

Membrane filtration systems installed on, or replaced after, April 1, 2012 for the removal of *Cryptosporidium* and *Giardia* must undergo challenge testing to evaluate the membrane's removal efficiency and for the Texas Commission on Environmental Quality (TCEQ) to establish a challenge test log removal value ( $LRV_{C-TEST}$ ) as required by Title 30 of the Texas Administrative Code (30 TAC) §290.42(g)(3). In addition, these TCEQ regulations require a membrane manufacturer to provide the non-destructive performance test (NDPT) and associated quality control release value (QCRV) that will be used to verify that all manufactured membrane modules, which were not subject to challenge testing, will achieve at least the same log removal as those that were challenge tested.

Previously, on August 21, 2015, the TCEQ approved the challenge study for the SMT600-P50 and SMT600-P80 UF modules. On January 11, 2023, the TCEQ received a copy of the Test Report (Report) by NSF International (NSF), dated January 6, 2021, for the 5-Year recertification challenge study conducted on the Beijing Scinor Membrane Technologies (BSMT) SMT 600-P50 hollow fiber (HF) ultrafiltration (UF) membrane modules. The  $LRV_{C-TEST}$  discussed in this letter for SMT600-P50 is also for the review and approval of the BSMT UF modules listed below:

SMT600-P51, SMT600-P52, SMT600-P53, SMT600-P55, SMT600-P56, SMT600-P57, SMT600-P60, SMT600-P72, SMT600-P80, SMT600-P81.

This letter replaces and supersedes the TCEQ Challenge Study letter dated August 21, 2015, for the Scinor SMT 600-P50 and SMT 600-P80 UF membrane modules.

The Report provided information required for review and approval in accordance with §29.42(g)(3)(A). This challenge study was conducted in accordance with NSF/American National Standards Institute (ANSI) Standard 419-2018: Public Drinking Water Equipment Performance - Filtration. According to the Test Report, the NSF/ANSI Standard 419 is based on the Environmental Technology Verification (ETV) *Generic Protocol for the Product Specific Challenge Testing of Microfiltration or Ultrafiltration Modules* (May 2011) and the product-specific challenge testing requirements in the United States Environmental Protection Agency (USEPA) Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The NSF certification of performance is only based on reduction of *Cryptosporidium* as it is linked to the QCRV.

**CHALLENGE STUDY DATA FOR SMT600-P50 UF MEMBRANE MODULES**

We reviewed the submitted challenge study data for compliance with the *Cryptosporidium* treatment requirements in the LT2ESWTR. The criteria for compliance are found in Title 40 of the Code of Federal Regulations (40 CFR) §141.719(b)(2). Additional guidance for compliance with these requirements can be found in the USEPA Membrane Filtration Guidance Manual (EPA 815-R-06-009). Based on our review of the challenge study data for the SMT 600-P50 UF membrane modules, we have determined that the challenge study is compliant with LT2ESWTR requirements. Please review the conditions in the following pages regarding the approved log removal value demonstrated during challenge testing ( $LRV_{C-Test}$ ) and the approved NDPT for production membrane modules that did not undergo challenge testing.

**TCEQ-APPROVED  $LRV_{C-Test}$**

For the BSMT SMT 600-P50 UF module and the other modules identified in the 2<sup>nd</sup> paragraph of this letter, the TCEQ approves a  $LRV_{C-Test}$  of **6.19** for the removal of *Cryptosporidium* for systems operated in deposition mode. The  $LRV_{C-Test}$  approval by the TCEQ does not apply to systems operated in cross flow mode, as this hydraulic configuration was not demonstrated in this challenge test study. The following are the parameters of the approved challenge study:

Full-scale module tested	BSMT SMT 600-P50 UF Modules
Number of Independent Modules Tested	5
Criterion of Selected Modules	None*
Model Number / Part Number / Serial Numbers of Tested Modules	GC2011001620, GC2011001475, GC2011001400, GC2011001545 and GC2011001340
Nondestructive Performance Testing (NDPT) Process	Pressure Decay Test
Quality Control Release Value (QCRV)	0.060 pounds per square inch (psi) per minute (min.)
Challenge Particulate	<i>Bacillus atrophaeus</i> endospores (as a surrogate for <i>Cryptosporidium</i> ) with an average diameter of 0.8 µm and an average length of 1.8 µm
Detection Limit	1 colony forming unit (CFU) per 100 milliliters (mL)
Feed Concentration Range	$1.97 \times 10^6$ to $2.44 \times 10^6$ CFU per 100 mL**
Max Filtrate Flux Rate	120 gallons per square-foot per day (gfd) @ 20° C
Mode of Operation / Flow Configuration	Deposition mode / Outside In

\* Regarding the selection of modules for testing, there was no consideration of manufacturing variability. However, the challenge study established a quality control release value (QCRV) of 0.060 psi/min. based on the pressure decay test results of the modules used to establish the  $LRV_{C-Test}$  (as required by 40 CFR 141.719(b)(2)(vii)). Any membrane module that does not meet the QCRV established in the challenge study is not eligible for the approved  $LRV_{C-Test}$  of 6.19-log.

\*\*As allowed by 40 CFR 141.719(b)(2)(iii), the maximum allowable feed concentration is  $3.16 \times 10^6$  x Filtrate Detection Limit. All feed concentrations during this challenge study were in compliance with this requirement.

**LIMITS OF TCEQ-APPROVED  $LRV_{C-Test}$**

The TCEQ-approved  $LRV_{C-Test}$  is valid for only the BSMT SMT600-P50, SMT600-P51, SMT600-P52, SMT600-P53, SMT600-P55, SMT600-P56, SMT600-P57, SMT600-P60, SMT600-P72, SMT600-P80, and SMT600-P81 UF modules operated under the hydraulic conditions used for the challenge testing and only for modules that have passed the NDPT. From our review of the challenge study, an acceptable module must comply with the following specifications to receive the TCEQ-approved  $LRV_{C-Test}$ :

- 1) Specifications of the challenge tested Beijing Scinor Membrane Technologies SMT 600-P50 UF module:
  - Polyvinylidene fluoride (PVDF) hollow fiber membranes;
  - Nominal membrane pore size of 0.1  $\mu\text{m}$  (0.1 microns);
  - Fiber inner diameter - 0.7 millimeters (mm)
  - Fiber wall thickness - 0.3 mm
  - Module diameter - 160 mm (diameter of SMT 600-P50 UF module only)
  - Nominal membrane surface area of 538.2-ft<sup>2</sup> (SMT 600-P50 UF module only);
  - An outside-to-inside flow path;
  - Operational mode: deposition (no cross-flow);
  - Maximum filtrate flux at 20 °C: 120 gallons per square-foot per day (gfd);
  - Maximum operating temperature of 40°C (104°F);
  - Maximum trans-membrane pressure (TMP) of 43.5 psi;
  - Operating pH range: 1 - 11; and
  - Maximum chlorine tolerance: 5,000 mg/L.
- 2) For use by public water systems in Texas for microbial contaminant removal credit, only the BSMT SMT 600-P50 (and the other BSMT modules listed in this letter) that have been certified for performance by NSF International are allowed. As defined in the NSF Report (pages 35 and 36), this means that only modules that have passed a Non-Destructive Performance Test (NDPT) with a Quality Control Release Value (QCRV) of 0.060 psi/min.

In accordance with the QCRV established by the challenge study, the NDPT is a pressure decay test as outlined below:

- Open filtrate port to atmosphere, close feed and concentrate ports
  - Apply 20 psi of air pressure to the feed port
  - Allow pressure to stabilize for 1 minute
  - Close the air inlet valve to the feed port
  - Record the change in feed port air pressure over 5 minutes
  - The decay rate should be no greater than the QCRV of 0.060 psi/min
- 3) BSMT must record the results of each BSMT membrane module's NDPT with the module's assigned unique serial number. The NDPT result for each the BSMT SMT 600-P50 membrane module (or other BSMT module listed in this letter) delivered to a Texas PWS must be provided upon delivery of the membrane modules to a PWS.
  - 4) BSMT must notify the TCEQ in writing if the SMT 600-P50 membrane modules or other BSMT modules listed in this letter are modified, or if the NDPT method is modified in any manner. After receiving written notification, the TCEQ shall determine if the modified BSMT membrane module shall be required to undergo challenge testing or if the modified NDPT method is acceptable.
  - 5) The TCEQ shall grant log removal credits to Texas PWSs using membrane filtration for *Giardia* and *Cryptosporidium*. The log removal credits shall not exceed the lower of:
    - a) The TCEQ-approved  $\text{LRV}_{\text{C-Test}}$ ; or
    - b) The maximum removal efficiency that can be verified through a membrane unit's site-specific direct integrity test ( $\text{LRV}_{\text{DIR}}$ ).
  - 6) Each BSMT SMT 600-P50 UF membrane module and the other BSMT modules listed in this letter must conform to ANSI/NSF Standard 61 and must be certified by a testing organization accredited by ANSI.
  - 7) Please note that the approved  $\text{LRV}_{\text{C-Test}}$  is for the current Federal and Texas statutes, and the EPA and TCEQ rules. If any of these statutes or rules are revised, the TCEQ-approved  $\text{LRV}_{\text{C-Test}}$  in this letter may also be revised.

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Please provide a copy of this letter to each of your Texas PWS customers. This letter is **not** to be construed as:


- A granted TCEQ exception for any Texas PWS to use the BSMT SMT 600-P50 UF membrane modules or other BSMT modules listed in this letter. Each Texas PWS must request and receive site-specific approval to use membrane filtration in accordance with 30 TAC §290.42(g) and §290.39(l);
- TCEQ approval for a Texas PWS to install a BSMT SMT 600-P50 UF membrane module or other BSMT modules listed in this letter; or
- TCEQ approval for the Texas public water system's required concentration time (CT) study.

If you have questions concerning this letter, or if we can be of additional assistance, please contact David Williams, P.E. at [david.williams@tceq.texas.gov](mailto:david.williams@tceq.texas.gov) or (512) 239-4674, or any member of the Technical Review and Oversight Team at [PTRS@tceq.texas.gov](mailto:PTRS@tceq.texas.gov).

Sincerely,



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