

State Water Resources Control Board

July 24, 2020

Jack E. Barker/President
Innovative Water Technologies, Inc.
29625 Industrial Park Road
Rocky Ford, CO 81067

Conditional Acceptance of the Innovative Water Technologies, Inc., ZeeWeed 1500-275 (IWT-275) membrane module

Dear Mr. Barker:

On behalf of the Water Treatment Committee (WTC) of the California State Water Resources Control Board (SWRCB), Division of Drinking Water, we have found the ZeeWeed 1500-275 (IWT-275) membrane module is of the same materials, components and manufactured on the same assembly lines as the California approved GE ZeeWeed 1500-600 membrane module. The primary difference is the IWT-275 module length is 54 percent shorter which should have no adverse impact on filter performance.

Based on the findings, the WTC has determined that the ZeeWeed 1500-275 (IWT-275) membrane can be used as an alternative filtration technology to meet the physical removal requirements of the California Surface Water Treatment Rule (SWTR) (California Code of Regulations, Title 22, Division 4, Environmental Health Chapter 17, Article 2, Section 64653(f)), as well as the Federal Long Term 1 and Long Term 2 Enhanced Surface Water Treatment Rules (LT1ESWTR, LT2ESWTR), for use on any approved surface source water when used as the core of a complete and well designed, constructed and operated filtration system.

The WTC hereby accepts the ZeeWeed 1500-275 (IWT-275) as an alternative filtration technology for compliance under the California SWTR, LT1ESWTR and the LT2ESWTR.

Table 1 provides the pathogen removal credit assigned by SWRCB to the to the IWT-275 membrane module. Tables 2 and 3 depict design and operating values that the membrane system cannot exceed as a condition of this acceptance.

Table 1 – ZW1500-275 (IWT-275) Pathogen Removal Credit

<i>Giardia lamblia</i>	4.0-log
<i>Cryptosporidium</i> oocysts	4.0-log
Virus	1.0-log ¹

1. Regardless of removal credit, each plant is required to provide a minimum of 0.5 log *Giardia* and 4.0 log virus inactivation through disinfection.

Table 2 – ZW1500-275 (IWT-275) System Online Operations

Operating Parameters	Maximum Value
Flow per module (IWT-275)	9.5 gpm
Flux	50 gal/(day·ft ²)
Transmembrane Pressure (TMP)	40 psig
Turbidity Performance Standards	0.1 NTU based on 95% of monthly measurements; Not to exceed 0.5 NTU at any time

Table 3 – ZW1500-275 (IWT-275) Design and Operating Specifications

Specifications	Metric	Imperial
Dimensions		
Maximum height	1,074.4 mm	42.3 inch
Housing OD	180.0 mm	7.1 inch
Maximum width	224.0 mm	8.8 inch
Weights		
Module shipping weight	22.8 Kg	50.2 lb.
Max. sludge accumulation per module	5.5 Kg	12.1 lb.
Amount of 100% Glycerin in Shipped Module	2.4 Kg	5.28 lb.
Fiber Properties		
Membrane material	Polyvinylidene Fluoride (PVDF)	
Nominal pore size	0.02 micron	
Absolute pore size	0.1 micron	
Membrane surface properties	Non-ionic & hydrophilic	
Fiber ID	0.66 mm	0.026 in
Fiber OD	1.10 mm	0.043 mm
Fiber Bundle Properties		
Nominal membrane surface area	25.5 m ²	275 ft ²
Fiber length exposed	720 mm	28.35 in
Maximum number of fibers per module	10,323	
Operating Specifications		
Flow Path	Outside-In	
TMP Range	0 to 276 kPa	0 to 40 psig
Maximum flow	36 L/min	9.5 gpm
Flux	84 L/(hr·m ²)	50 gal/(day·ft ²)
Maximum shell inlet pressure	379 kPa	55 psig
Maximum operating temperature	40 °C	104 °F
Operating pH range	5.0 – 10.0	
MIT Specifications		
MIT minimum starting pressure	89.6 kPa, 896 mbar	13 psig
MIT hold-up volume (inside-out)	4.6 L	1.2 gal
MIT pressure resolution	68.9 Pa, 0.689 mbar	0.01 psig

Potting Depth	80 mm	3.15 in
Back pressure	762 mm	30 in
Liquid-membrane contact wetting angle (θ)	53°	
Volumetric Concentration Factor (VCF)	1 (dead-end-mode of operations)	
Capillary constant that describes pore shape	1 (most conservative)	
Maximum pressure decay rate allowed to achieve 4 log reduction (based on max flux, max TMP, temperature at 25°C)	13.79 mbar/min 1.38 Kpa/min	0.2 psig/min



IWT-275 Wall Spring Membrane
(pre-filter, IWT-275 membrane, backwash controller,
backwash bladder tank)

Conditional Acceptance

Approval for the design and use of your technology in any drinking water application will be handled on a case-by-case basis by the Division of Drinking Water (DDW) district offices or by local primacy agencies (LPA) and is granted through the domestic water supply permitting process. Information such as shop drawings and specifications may be requested to aid in the development of the water supply permit. A commissioning period to assess performance on start-up may be required in an effort to ensure that the final system functions as expected. The DDW district office or LPA is responsible for evaluating the source water quality to be treated, and they will set the overall removal and inactivation requirements that must be met for a given source water.

Membrane integrity testing (MIT) must be conducted at least once every 24 hours of operation. The specified test frequency may be modified based on actual system design and membrane performance by the local DDW district office or LPA. The MIT shall have a resolution of at least 0.02 psig. The start and ending pressure, and decay rate (psig/min) shall be recorded for each MIT.

Any changes to any feature, formulation, part or product used in the IWT-275 membrane module filter should be reported (in writing) to SWRCB in advance of making the changes to any production version sold in California. The detail of your written notification will be reviewed to determine if additional performance testing will be required. Consequently, the letter and its appendices should provide sufficient detail for the SWRCB WTC to render such a decision. Should additional testing be required, the SWRCB WTC will review all study protocols proposed to be used as a condition of accepting the final report. Upon reviewing the final report, the WTC will make a recommendation regarding acceptance of the identified changes to the design and/or operating criteria.

Should you have any questions, please feel free to contact Mr. Guy Schott at guy.schott@waterboards.ca.gov or by phone at (707) 576-2732 or Mr. Eugene Leung at eugene.leung@waterboards.ca.gov or by phone at (510) 620-3460.

Sincerely,

Guy J. Schott, P.E.
Associate Sanitary Engineer
Technical Operations Section

Eugene H. Leung, P.E.
Senior Sanitary Engineer
Technical Operations Section

cc: Water Treatment Committee