

Client: SPECTRUM
Samples: PPG-0.45-10EGS Filter Cartridge BCS 1306062 and 1306065
Analysis Parameter: 1.0 µM Fluorescent Polystyrene Microspheres
Performed and Analyzed by: George Lukasik, Ph.D. and A. Stargel, MPH; July 30- August 01, 2013.
Test Standard: NSF 53-2011 section 7. Mechanical Filtration using General Test Water (GTW) Challenge (< 1.0 NTU water)

Water Sample	1.0 µM Fluorescent Microspheres ¹			
	Units / milliliter			Average Percent Removal
	Filter Influent	Filter Effluent A BCS 1306062	Filter Effluent B BCS 1306065	
Initial filter performance (following 163 liters GTW)	4.8 x 10 ⁴	0.221	0.243	99.9995%
Following 3 Cycles (following of 486 liters GTW)		0.258	0.234	99.9995%
Following 8 Cycles (following 1513 liters GTW)		0.357	0.352	99.9993%

¹ One micron green fluorescent polystyrene microspheres (Fluoro-Max Dyed Green Aqueous 1.00µm, ThermoFisher, USA) were used. The microspheres were enumerated by fixing onto SingleSpot Slides (IDEXX, USA) and viewing by UV fluorescence microscopy.

*Provided filters were placed in a 10" cartridge holder. The fluorescent microspheres were added to 3,000 liters of City of Gainesville (Florida) tap water (pH 7.7, hardness: 123, TDS: 378, temperature 23.7°C, and NTU: 0.2). The water was thoroughly homogenized and was then passed through each of two filters using a centrifugal pump generating 59 PSI of water pressure. The flow through each filter was adjusted to 8.0 liters/min and remained relatively unchanged throughout the study. The filters were operated on a 20 minute "ON" cycle followed by a 20 minute "OFF" cycle for a total of 9 cycles. The filter effluents' were collected in a clean 1.5 liter container at the beginning of the study, at the beginning of the 4th "ON" cycle and upon start up following the 9th "OFF" cycle. The effluent samples were concentrated by membrane filtration and assayed for the microspheres as per laboratory protocol. The challenge influent water was sampled prior to the filter challenge study and at the end. The number of microspheres (units/ml) was determined and is reported as the "Filter Influent Water" and "Filter Effluent". All analysis was conducted in duplicates. The flow rate was calculated using a NIST traceable timer and a traceable meter/totalizer.



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Study data are summarized in the provided table(s). The results presented pertain only to the study conducted on the test articles/samples provided by the client (or client representative). The study was authorized and commissioned by the client. The results presented pertain only to the samples analyzed and identifier number(s) indicated. The data provided is strictly representative of the study conducted using the material/samples/articles provided by the client (or client's representative) and its (their) condition at the time of test. The study and data are obtained under laboratory conditions and may not be representative or indicative of a real-life process and/or application. Positive, negative, and neutralization controls were performed as outlined in the method and as per Good Laboratory Practices. All analyses were performed in accordance to laboratory practices and procedures set forth by our NELAP/TNI accreditation standards (ISO 17025) unless otherwise noted. BCS makes no claims with regards to the express or implied warranty regarding the ownership, merchantability, safety or fitness for a particular purpose of any such property or product.



August 02, 2013

Signature of Laboratory Director/Authorized Rep. _____ Date: _____

