COMMONWEALTH of VIRGINIA

Department of Health

Cynthia C. Romero, MD, FAAFP
TTY 7-1-1 OR
State Health Commissioner
1-800-828-1120

P O BOX 2448
Richmond, VA 23218

August 28, 2013

Mr. Jens Gartner
WLS-USA LLC
gartner@wrs-usa.com

Dear Mr. Gartner:

You requested that the Virginia Department of Health (VDH) consider the EN-12566-3 as equivalent to the NSF 40 test protocol and to extend General Approval for Treatment Level 2 to the Solido aerobic treatment unit (ATU). Treatment Level 2, or TL-2, is equivalent to a 30 mg/l BOD_5 and 30 mg/l TSS effluent standard.

VDH has reviewed the EN-12566-3 protocol and a detailed analysis is included in the attached memo. Based on our review of the protocol, VDH accepts the EN-12566-3 as equivalent to the NSF 40 and sufficient for determining general approval for TL-2. However, there are some caveats to how the data will be interpreted as noted on the attached memo.

VDH has taken the position that the design flow of a NSF Standard 40 Class I ATU is the flow that was tested and certified by NSF and is listed on their website. That rated capacity from NSF 40 is carried over to the Virginia General Approval for TL-2. The rated flow capacity is then divided by the Virginia regulatory flow value of 150 gpd/bedroom in order to determine the number of bedrooms for which a unit is rated. Other non-tested models of that certified ATU may then be included under that NSF certification by evaluating them against the certified model in light of appropriate "scale-up" factors.

In the case of the Solido ATUs, it appears that the E35 unit was tested per EN 12566-3 protocol by PIA GmbH and certified as follows:

Nominal Organic Load:	0.25 kg/d (0.55 lb/d)
Nominal Hydraulic Load:	0.75 m^3/d (198 gpd)
BOD5 Removal Efficiency:	98.1%
TSS Removal Efficiency:	96.2%
NH4-N Removal Efficiency:	94.2%

In keeping with VDH's position regarding NSF certified ATUs, we would accept the Solido E35 as a secondary (TL-2) treatment device with the design flow of 198 gpd. The other, untested units can also be accepted as secondary treatment devices by evaluating them against that E35 unit adjusted by appropriate scale-up factors. Peak flows from the test protocol cannot be readily accepted as design flows since the EN 12566-3 testing was only briefly performed at those peak flows; therefore, long term treatment performance at those higher flows is unknown.

The equivalent flows and loadings for the untested units were developed from the tested unit. It is noted that you provided ratings for the unit that do not agree with the test conditions. The E35 unit was tested at 83% of the manufacturer listed hydraulic flow ((198/238) x 100)) and 70% of the manufacturer listed organic loading ((0.55 lb/0.79 lb) x 100)). The capacity of the untested units was reduced by the same amount to reflect the conditions of the test. The European population equivalent does not equate to the Virginia population equivalent for flow and loadings of 75 gpd/person and 0.2 lbs BOD_5/day. **As a result the use of the treatment units as Generally Approved TL-2 units is limited as follows**:

Model	Flow, gpd	BOD_5 Load Rating, lb/day	Number of Bedrooms under VA Regulations and General Approval TL2
One Tank Options			
Solido E-35 with LA-45	198	0.55	1
Solido E-45 with LA-80	263	0.74	1
Solido E-60 with LA-80	329	0.92	2
2-4 Tank Options			
Solido E-35/35 with LA 120 in control kiosk	394	1.11	2
Solido E-50/50 with LA-120 in control kiosk	526	1.48	3
Solido E-60/60 with 2 x LA-80 and control kiosk	657	1.85	4
Solido E-50+50/50+50 with 2 x LA-120 in control kiosk	1052	2.95	6*
Monolith Tank Options			
Solido 4 E-30 (mit LA-45)	131	0.37	0**
Solido 9 E-30/30 (mit LA-80)	296	0.83	2***
Solido 16 E-60/60 (mit 2 x LA-80)	526	1.48	3

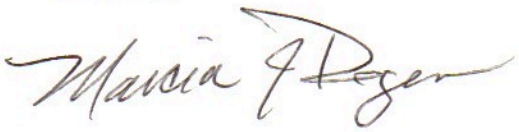
*General Approval only extends to systems ≤ 1,000 gpd. The E50+50/50+50 is limited to 6 bedrooms under this General Approval.
**The flow of this unit is below the regulatory minimum of 150 gpd per bedroom therefore no bedroom count is assigned. It could be used in a single resident situation as a Generally Approved unit.
***The flow of this system at 296 gpd is considered substantially compliant with 300 gpd treatment capacity required for a two bedroom home.

VDH recognizes that the regulatory design flows for small systems in Virginia are higher than most states and that there are other states that do use an average and peak design concept. VDH will be exploring this topic with the Sewage Handling and Disposal Regulation Advisory Committee in the future. However, today VDH must consider assigning General Approval to a treatment unit in a manner equivalent to the NSF 40 methodology which uses the evaluated flow rate as the rated capacity with peaks above that rated capacity.

You may appeal this decision by requesting an informal fact-finding conference (IFFC) before VDH pursuant to §2.2-4019 of the *Code of Virginia*. To obtain an IFFC before VDH, you must submit a written request to Mr. Dwayne Roadcap, Acting Director, Division of Onsite Sewage, Water Supplies, Environmental Engineering, and Marina Programs within 30 days of your receipt of this letter. Mr. Roadcap can be reached at (804) 864-7462, Dwayne.Roadcap@vdh.virginia.gov or at 109 Governor Street, Madison Building 5th Floor, Richmond, Virginia 23219.

If I can be of more help, please feel free to call me at (804) 387-1883.

Sincerely,



Marcia J. Degen, Ph.D., P.E.
Technical Services Administrator
Division of Onsite Sewage, Water Services,
Environmental Engineering & Marina Programs

Cc: Dwayne Roadcap, Acting Division Director
Kemper Loyd, Technical Services Engineer

Virginia Department of Health

Office of Environmental Health Services

Division of Onsite Sewage and Water Services, Environmental Engineering and Marina Programs

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To: File

From: John Aulbach, P.E.

Date: October 25, 2012 Amended August 23, 2013 by M. Degen

RE: Solido ***Review Summary – Data Submission for TL-2 Compliance***

Cc: Marcia Degen, P.E. – Technical Services Manager

Background:

VDH has been requested to accept the **Solido** ATUs as "generally approved" for secondary (TL-2) treatment in Virginia. The Solido ATUs are not certified under NSF/ANSI Standard 40, Class I, but they are certified under the European Union standard EN 12566-3. At least one other state (Minnesota) accepts certification under EN 12566-3 for "general approval" as a secondary treatment device.

The EN 12566-3 certification protocol consists of the following:

Sequence	Description	Duration (weeks)	Sampling Events
1	Biomass Establishment	As recommended	0
2	Nominal Loading	6	≥ 4
3	Underloading	2	≥ 2
4	Nominal Loading w/ Power Interruption	6	≥ 5
5	Low Occupation Stress (No flow)	2	0
6	Nominal Loading	6	≥ 3
7	Overloading	2	≥ 2
8	Nominal Loading w/ Power Interruption	6	≥ 5
9	Underloading	2	≥ 2
10	Nominal Loading	6	≥ 3

The results of the 20(+) samples collected during Nominal Loading sequences (with and without power interruptions) are used to calculate removal efficiencies for COD, BOD_5, TSS, and (usually) one or more N species. Those removal efficiencies are stated on the unit's EN 12566-3 Certification. Removal efficiencies are also calculated for the 6(+) samples collected during periods of Underloading and Overloading; those efficiencies are reported separately.

The EN 12566-3 protocol specifies influent BOD_5 and TSS concentrations of 150-500 mg/L and 200-700 mg/L, respectively. The upper ends of both ranges exceed the 30-day average influent concentrations specified by the NSF/ANSI Standard 40, Class I protocol (BOD_5 = 100-300 mg/L and TSS = 100-350 mg/L). Therefore, EN 12566-3 certification may represent treatment efficiency with a higher-strength influent.

VDH Determination:

VDH has decided that EN 12566-3 certification testing may serve as the basis for "general approval" as a secondary (TL2) treatment device in accordance with the following:

1. Average BOD_5 and TSS treatment efficiencies will be calculated using the results from all (26+) samples collected during the EN 12566-3 certification test period – including all Nominal Loading, Underloading and Overloading sequences.

2. BOD_5 and TSS treatment efficiencies determined in #1 will be applied to maximum NSF/ANSI Standard 40, Class I BOD_5 and TSS influent concentrations (300 mg/L BOD_5 and 350 mg/L TSS) to calculate resultant effluent concentrations.
3. If both the BOD_5 and TSS effluent concentrations calculated in #3 meet secondary requirements (≤ 30 mg/L), VDH will proceed to have the unit recognized as "generally approved" for secondary (TL-2) treatment.

The Solido E35 ATU was tested per EN 12566-3 protocol by PIA GmbH and certified as follows:

Nominal Organic Load:	0.25 kg/d (0.55 lb/d)
Nominal Hydraulic Load:	0.75m^3/d (198 gpd)
BOD_5 Removal Efficiency:	98.1%
TSS Removal Efficiency:	96.2%
NH_4-N Removal Efficiency:	94.2%

The following characteristics were determined from the results of all samples collected during the certification test period:

Influent BOD_5:	328 mg/L	(n=26)
BOD5 Removal Efficiency:	97.9%	(n=26)
Calculated Effluent BOD_5:	6.09 mg/L	(300*(1-0.979))
Influent TSS:	363 mg/L	(n=26)
TSS Removal Efficiency:	95.6%	(n=26)
Calculated Effluent TSS:	15.2 mg/L	(350*(1-0.956))

The above calculated effluent BOD_5 and TSS concentrations both meet secondary effluent criteria.

Solido ATU sizes are as follows and are based on a population equivalent (PE). Solido design information indicates that 1 PE = 0.15 m^3/day (39.6 gpd) and 0.04 to 0.06 kg/day (0.09 to 0.13 lb/day) and that the E35 unit is rated at 238 gpd and 0.79 lb/day BOD_5. However, the E35 unit was tested at only 198 gallons per day and 0.55 lb/day BOD_5. Therefore, the unit was not tested at the desired flow and load. It was tested at 83% of the stated flow capacity (198/238 x 100) and 70% of the stated organic load (0.55/0.79 x 100). VDH accepts the test flow and load so the ratings for the other units have been adjusted accordingly (reduced to reflect 83% of the stated flow and 70% of the stated organic capacity). Using these conversions, the columns to the right were calculated to reflect the flows and loads supported by the tested unit. The number of bedrooms allowed under Virginia regulation is identified in the last column. The Sewage Handling and Disposal Regulations are based on 150 gpd/bedroom (2 people/bedroom occupancy) and 0.2 lb BOD_5 per person per day.

Model Number	European PE	Solido Assigned Flow Rating, gpd	Solido Assigned BOD, lb/day	VDH Assigned Flow Rating, gpd	VDH Assigned BOD_5 Rating, lb/d	VDH Assigned, Number of Bedrooms
E35	3-6	238	0.79	198 (tested)	0.55 (tested)	1
E45	4-8	317	1.06	263	0.74	1
E60	4-10	396	1.32	329	0.92	2
E35/35	6-12	475	1.58	394	1.11	2
E50/50	8-16	634	2.11	526	1.48	3
E60/60	10-20	792	2.64	657	1.85	4
E-50+50/50+50	16-32	1267	4.22	1052	2.95	6*
4E-30	2-4	158	0.53	131	0.37	0**
9E-30/30	4-9	356	1.18	296	0.83	2***
16E-60/60	6-16	634	2.11	526	1.48	3

*General Approval only extends to systems ≤ 1,000 gpd. The E50+50/50+50 is limited to 6 bedrooms under this General Approval.
**The flow of this unit is below the regulatory minimum of 150 gpd per bedroom therefore no bedroom count is assigned. It could be used in a single resident situation as a Generally Approved unit.
***The flow of this system at 296 gpd is considered substantially compliant with 300 gpd treatment capacity required for a two bedroom home.

Recommendation: Accept the Solido units as TL 2 with the VDH assigned flows, BOD_5, and bedroom ratings noted above.