



Norweco Singulair 960 Series Advanced Wastewater Treatment Plants PSS Designer and Inspector Handbook

Overview

Tanks-A-Lot Ltd. has been distributing Norweco Singulair NSF 40 Class 1 secondary treatment plants in Alberta for over 15 years. The Alberta Private Sewage System Standard of Practice 2009 (the "ABSOP-09") took effect in December 2009. Designers and inspectors of private sewage systems in Alberta need to be aware of the alignment between Norweco Singulair 960 Series Advanced Wastewater Treatment Plants ("Singulairs") manufactured by Tanks-A-Lot Ltd. ("TAL") and certain requirements of ABSOP-09. The key points are:

1. Optional lift stations to move sewage from the home sewer connection to a Singulair plant are outside the scope of ABSOP-09 and fall under other plumbing codes.
2. Singulair has an inherent method of "instantaneous flow attenuation" by way of staged inlet ports in its Biokinetic Filter and headroom within the tank. Most residential applications in the range of 2 to 6 bedrooms will not require additional capacity or facilities to handle instantaneous flow attenuation.
3. Concrete Singulair tanks manufactured by Tanks-A-Lot are approved under province wide variance VAR-PS23.10 respecting CSA listing for secondary treatment plant tanks, a copy of which is included in the Singulair delivery kit.
4. Singulair delivery kit includes insulated lids and an installation-ready bundle of insulation for the tank top and coverage of 3 feet down the sidewalls.
5. A lift station behind a Singulair treatment plant is not an "effluent tank".
6. Singulair delivery kit includes a TAL Pump Cycle Counter, unless the design calls for a pump control panel that includes flow measurement, and a free coupon for a 2 year Norweco MCD subscription service for accumulating fault and maintenance events.
7. Systems including an at-grade distribution system require a variance application citing Standata PST2009-002. The variance application should also cite Singulair's inherent "control system to equally spread dosing of the daily wastewater volume over a 24 hour period" in lieu of the time-dosing referenced in Standata PST2009-002.

Singulair Plant Sizing

Singulair 960 Series plants are available in 5 sizes. The following table shows the alignment of Singulair models to home size before considering other sizing impacts as required in Part 2 of ABSOP-09.

Singulair Model	Daily Treatment Capacity	Bedrooms and Additional Volume	Instantaneous Flow Attenuation
960-500	500 imp gpd 1.9 cu meters per day	3 bedrooms plus 135 gallons or 4 bedrooms plus 41 gallons	138 imp gallons
960-750	625 imp gpd 2.8 cu meters per day	4 bedrooms plus 250 gallons or 5 bedrooms plus 156 gallons	138 imp gallons
960-1000	833 imp gpd 3.8 cu meters per day	5 bedrooms plus 364 gallons or 6 bedrooms plus 270 gallons	222 imp gallons
960-1250	1041 imp gpd 4.7 cu meters per day	cluster or commercial applications	222 imp gallons
960-1500	1249 imp gpd 5.67 cu meters per day	cluster or commercial applications	246 imp gallons

The column labeled "Instantaneous Flow Attenuation" are values available for consideration of SOP requirements under s. 2.2.1.5 and 2.2.2.3. For example, a soaker tub having 100 gallon volume requires $(100-75) \times 2 = 50$ gallons of addition to design Peak Flow (per table 2.2.2.3) and requires "a method to manage the additional volume and instantaneous flow rate" (per s. 2.2.1.5).

System Components

Optional Sewage Lift Station – cylindrical (30" i.d) catch basin, sewage handling pump, float switch and high level alarm. TAL specification for lift station includes insulated lid, effluent pump, float switch, and high level alarm. The optional sewage lift station is typically outside the scope of the ABSOP-09 as it is normally located more than 1.8 meters upstream of the first treatment component (see s. 1.1.2.1 (1) (a)).

TAL Concrete Singulair Castings – all Singulair models have one N9600B bottom casting and one top casting with access openings varying by model. Some models have a one foot or two foot tall middle ring casting. These castings are the subject of variance VAR-PS23.10 granted by the Provincial Administrator, Private Sewage Systems respecting ABSOP-09 sentence 5.2.3.1 (2) (a). A copy of variance VAR-PS23.10 is attached hereto. Joints between the castings are a reliable tongue-and-groove configuration, with Conseal acid resistant sealant provided for placement in the joints by the Installer.

Pretreatment Components – pretreatment is accomplished within an integral compartment in models 960-500 and 960-750. An additional pretreatment tank is included with 960-1000 and larger models. Where a pretreatment tank is included, it is a CAN/CSA-B66 listed products and labeled accordingly.

Norweco Components – all Singulair models include one ServicePro TNT MCD control panel, one to three biokinetic filter(s), and one or two aerators. This equipment is all covered by NSF40 Class 1 certification of these plants.

Treated Effluent Lift Station – cylindrical (30" i.d.) concrete catch basin, effluent pump, float switch, and TAL pump cycle counter are included. The sole purpose of the lift station is to accumulate a specified pump dose. It does not manage the flow rate to downstream components and is not an "Effluent Tank" per Part 6 of the SOP. Effluent flow rate is managed by the Biokinetic filter ports.

Insulation – R8 insulation is included for the roof and 34" of side walls of the top casting of the Singulair castings, and for the access covers. Standard burial depth for Singulair treatment plants is 18", therefore insulation is provided to a depth of 52". Where an additional pretreatment tank is included, so is insulation for the roof of that tank and for the first 34" of the side walls. The working zone of the Treated Effluent Lift Station is more than 4 ft below grade in normal installation so no portion of the lift station requires insulation, comparable to not providing insulation for tank risers. Also no insulation is required or supplied for the Optional Sewage Lift Station. The supplied insulation for Singulair tanks is not pre-installed as that would interfere with the functioning of lifting slings used in installation and handling of the tank castings. The insulation may be bonded using PL Premium or comparable adhesive, or it may be fit into place during backfilling.

Control Systems – the control system for basic installation of Singulairs in a single unit residential application consists of foam sensors on the aerators (to detect high level conditions), the Service Pro TND MCD control panel, the Norweco MCD monitoring service (2 year subscription included), the flow control ports in the Biokinetic filter, and the TAL pump cycle counter (accumulates time stamps for up to 8000 pump cycles). A high level alarm is not located in the treated effluent lift station because high level conditions originating there are captured by the foam sensors on the aerator. This control system is included in the standard TAL Singulair delivery kit and, when installed following supplied instructions, it fully complies with Section 2.3 of the SOP.

Installation Guidelines

All aspects of installation and other-supplied material must conform to the requirements of ABSOP-09 and to TAL Tank Installation Guidelines – a reference manual which is available upon request. Singulair installations should only be completed by installers who have completed a Norweco Authorized Training Course offered by TAL as a factory certified training agent. Norweco and TAL terms of sale include a provision that the Installer provides a contractual commitment to two years of site servicing (4 visits at approximately 6 month intervals) as part of the installation. The installer may sublet this servicing requirement to third parties who have completed the Norweco Authorized Training Course and who possess a factory authorized service kit.

Equal Spreading of Dose Times

Many Singulair installations are followed by at-grade dispersal systems, generally following Standata PST2009-002. All Singulair units are integrally "equipped with control systems needed to equally spread the dosing of the daily wastewater volume over a 24 hour period". The method of staged ports in the Biokinetic filter provides an equivalent level of safety compared to electronic time dosing. The language of Standata PST2009-002 in referring to "24 hour, electronically controlled timed dosing" is inadvertently respective compared to the most comparable sentence in ABSOP-09. An analysis of pump cycles in the Treated Effluent Lift Station following the standard loading pattern in NSF40 Class 1 certification and the minimum and maximum dose requirements of ABSOP-09 demonstrates that the mean pump cycle would be 4.8 hours, median pump cycle would be 4.0 hours, and standard deviation of pump cycle would be 1.9 hours. This standard deviation at less than 40% of the mean pump cycle demonstrates equal spreading of effluent doses over a 24 hour period.

Where Singulair plants are being used for residential developments in front of at-grades, a variance application should be made citing Standata PST2009-002 and making the following further variance application:

The Singulair Model 960-??? is integrally equipped with a control system to equally spread the dosing of the daily wastewater volume over a 24 hour period. Based on analysis of NSF 40 standard dosing patterns for residential applications, this system provides an equivalent level of public safety compared to an electronically controlled time dosing system and it is consistent with the control systems contemplated by Alberta Private Sewage Systems Standard of Practices 2009 sentence 2.2.2.5 (1)(b).

Flow Equalization

Where flow equalization is required (e.g. certain commercial applications, see ABSOP-09 sentence 2.2.1.7 and 2.2.2.5), the tank providing flow equalization may be placed either upstream or downstream of the Singulair. If the flow equalization tank is placed downstream of the Singulair, the normally supplied Treated Effluent Lift Station is not required. Irrespective of location, the tank providing flow equalization no longer relies on the flow equalization method integral to the Singulair and the flow equalization tank should be equipped with its own control system (typically an electronic time dosing system) for equally spreading the dosing of the daily wastewater over a 24 hour period.

Larger Systems

Single unit Singulair models are available for flow rates up to 5.7 cubic meters per day. Flow requirements up to 17 cubic meters per day can be handled by arranging up to 3 Singulairs in parallel, along with appropriate flow equalization components and control systems. Norweco and TAL also supply Modulair advanced wastewater treatment plants for flow rates between 15 and 400 cubic meters per day. This Handbook does not address SOP compliance for treatment systems consisting of more than one Singulair or handling flow rates greater than 5.7 cubic meters per day.

Additional Information

Additional information about Singulair 960 Series Advanced Wastewater Treatment Plants can be obtained by contacting Tanks-A-Lot at ph: (780) 472-8265, e-mail: sales@tanks-a-lot.com, or online: www.tanks-a-lot.com. Technical resources are also available from Norweco at: <http://www.norweco.com/html/products/singulair.htm>.