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BMEC Application	A2001-04
BMEC Application	A2005-04
Date of Amendment	May 26, 2005

**AUTHORIZATION REPORT- NORWECO Singulair® Alternate  
Tertiary Discharge Area Bed System**

**1. Applicant**

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Norwalk, Ohio  
USA  
44857-1196

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**2. Manufacturing Facilities**

Norweco Equipment Company  
220 Republic Street  
Norwalk, Ohio  
USA  
44857-1196

**3. Description**

The Norweco Singulair® Alternate Tertiary Discharge Area Bed System (the “ Norweco Area Bed”) is primarily comprised of a tertiary treatment unit, an effluent filter and an area bed.

The tertiary treatment units permitted for use with this system are referenced in the Supplementary Guidelines to the Building Code, as amended, as meeting tertiary quality effluent criteria and include models 960-500-2000, 960-750-3000, 960-1000-4000, 960-1250-4750, and 960-1500-5700.

An effluent filter is required downstream of the treatment unit. The specification of the effluent filter may vary depending on the Area Bed System design, and the filter models specified for use with the Norweco Area Bed may be located in section 6.A.4. of this authorization.

An area bed is comprised of two parts; the stone layer and the sand layer.

The sand layer of an area bed is sized in consideration of the soil it rests on, and under certain conditions, it may be required to be laterally extended. This lateral sand layer extension is known as the mantle. The effluent is sent to the stone layer, either by gravity or pressure from a pump, via a pipe. This pipe leads from the treatment unit and terminates at the distribution box or header. From the distribution box or header, the effluent is sent to a series of perforated distribution pipes that run through the stone layer.

#### **4. Authorization requested**

The applicant sought an Authorization for an Norweco Area Bed System as an equivalent to a other Class 4 sewage systems as referenced in Section 8.7. "Leaching Beds" of the Building Code.

#### **5. Assessment**

Reports and assessments provided by the applicant show that if the Norweco Area Bed is designed, performance tested and installed in accordance with the manufacturer's instructions and limitations, the Building Code and the specific terms and conditions stated in this authorization, the level of performance required by the Building Code will be provided.

Reports submitted and reviewed:

1. NORWECO Singulair® Systems Owners Manual, Models 960-500, 960-750, 960-1000, 960-1250 or 960-1500 Treatment Unit, which incorporates a schedule of required maintenance to be conducted on the system every six (6) months.
2. Technical Background Information Memo relating to NORWECO Singulair® Systems dated February 19, 2001 and February 27, 2001.
3. CAN/CSA-B66-00 - Prefabricated Septic Tanks and Sewage Holding Tanks, Plumbing Products and Materials - a National Standard of Canada.
4. State of Washington Singulair® Model 960 Performance Evaluation Summary Report.
5. NSF Wastewater Technology Report, Singulair® Model 960, dated April 1996.
6. NSF Wastewater Technology Report, Singulair® Model 960 Supplemental Report, dated March 1997.
7. CSA International Certificates of Compliance.
8. NSF International Official Listing.

9. Singulair® Model 960 Installation Manual.
10. Singulair® Model 960 Service Manual.
11. Application A2005-05: Amendment to Norweco, January 31, 2005 to the Building Materials Evaluation Commission.
12. Van Harten Surveying Inc.'s Report, April 27, 2005, ref.16220-05.

## 6. Authorization

The Norweco Area Bed System is authorized as an equivalent to other Class 4 sewage systems as referenced to in Section 8.7. "Leaching Beds" of the Building Code; all other requirements pertaining to the design, installation and construction are subject to the regulations of the Building Code, and to the following terms and conditions:

### A. Specific Terms & Conditions

#### 1.0. Definitions

A word or phrase used in this Authorization has the following meaning for the purposes of this Authorization:

**Area Bed** means the part of a leaching bed comprised of a stone layer and the underlying unsaturated sand layer intended to further treat and distribute the effluent, and does not include the area referred to as the mantle.

**Contact Area** means the area of infiltrative surface, directly below the area bed, required to absorb the treated effluent into the underlying native soil, but does not include the area where the mantle, if required, comes into contact with the native soil.

**Extended Contact Area** means the area of the sand bed, as extended, and mantle, where required, to meet the necessary lateral extension such that the effluent is absorbed into the underlying soil

**Infiltrative Surface** means the area of interface where effluent migrates downward from the sand layer of the area bed and, if necessary, the mantle and passes into the native soil or leaching bed fill.

**Mantle** means the lateral extension of the area bed using imported leaching bed fill having a T time of 15 min/cm or less, but does not include the area referred to as the area bed, necessary to provide an area of hydraulic catchment in any direction in which the effluent entering the leaching bed fill will move horizontally such that effluent is treated and absorbed.

**Raised or Partially Raised Area Bed** means a sewage system in which any part of the leaching bed is above the natural ground elevation.

**Uniform Distribution** means the even dispersal of effluent throughout all areas of an area bed and adjoining mantle, if required, as it migrates down from the stone layer to the underlying sand layer to either the native soil or mantle comprised of imported soil.

**Vertical Separation** means the depth of unsaturated soil below a leaching bed as measured from the bottom of the absorption trench or the bottom of the stone layer to a limiting surface such as high ground water table, rock or soil with a percolation time greater than 50 min/cm.

## **2.0 Installation Requirements**

- 2.1. This Authorization is valid only for Norweco Inc.
- 2.2. Only Norweco manufacturer trained and authorized agents or employees shall install, maintain and service the Area Bed System.
- 2.3. The Norweco Area Bed System shall be installed as per the manufacturer's installation instructions.
- 2.4. The Service and Maintenance Agreement prescribed by Sentence 8.9.2.3.(2) of the Building Code requires that the persons authorized by the manufacturer to service and maintain Area Bed System and who have entered into the agreement with the person operating the treatment unit, and shall:
  - 2.4.1. conduct and record at least once during every six month period, an inspection and servicing as specified by the manufacturer of the Norweco treatment unit in the "Continuing Maintenance Manual"; and provide a copy to the person operating the Area Bed System;
  - 2.4.2. provide a copy of the "Continuing Maintenance Manual" to the person operating the Area Bed System and to the authority having jurisdiction at the time of the permit application;
  - 2.4.3. conduct sampling and testing in accordance with the requirements of Clauses 8.9.2.4.(1)(a) and (b) of the Building Code;
    - 2.4.3.1. once during the first 12 months after the Area Bed is put into use, and
    - 2.4.3.2. thereafter, once during every 48 month period after the previous sampling has been completed,

- 2.4.4. promptly submit the sampling test results to the person operating the system and Norweco treatment unit, and
- 2.5. Norweco Inc. shall retain records of the sampling test results for each Area Bed System received pursuant to the terms and conditions set out in 2.4. above, for a period of 10 years and shall promptly forward copies of those records to a chief building official upon request.

**3.0 System Requirements**

- 3.1. All pipe connections in the system (i.e. pretreatment chamber, treatment units, accessory treatment units, tanks, pumps and filters) where incorporated, shall be flexible and watertight.
- 3.2. The Norweco treatment units used in the system shall use the daily design sewage flows as referenced in Table 3.2.1. "Daily Design Flow":

Table 3.2.1.  
Daily Design Flow

<b>Treatment Unit Models</b>	<b>Flow Range</b> <b>measured in Litres</b>
960-500-1000	1100 to 2000
960-750-3000	2000 to 3000
960-1000-4000	3000 to 4000
960-1250-4750	4000 to 4750
960-1500-5700	4750 to 5700
Column 1	Column 2

**4.0. Design**

- 4.1. The Norweco treatment unit shall be fitted with a bottomless sand filter, or a Singulair® Bio-Kinetic Filter.
- 4.2. An absorption system comprised of a stone layer overlying a sand layer and having a total minimum depth of 500 mm, and:
  - 4.2.1. the stone layer shall be a minimum depth of 200 mm, and
  - 4.2.2. the sand layer shall be a minimum depth of 250 mm and have a percolation time of 6 to 10 min/cm.

- 4.3. The stone layer required by 4.2. above, shall have a minimum area as specified by the manufacturer but not less than:
- 4.3.1. where the total daily design sanitary sewage flow does not exceed 3000 L, the area shall be such that the loading on the surface of the stone layer does not exceed 75 L/m<sup>2</sup> per day, or
  - 4.3.2. where the total daily design sanitary sewage flow exceeds 3000 L, the area shall be such that the loading on the surface of the stone layer does not exceed 50 L/m<sup>2</sup> per day.
- 4.4. The stone layer required by the terms and conditions set out in 4.2. above, shall be protected with a permeable geo-textile fabric in such a manner so as to prevent soil or leaching bed fill from entering the stone.
- 4.5. The bottom of the stone layer shall be at all points vertically separated at least 600 mm from the high ground water table, rock or soil with a T time of 6 or less, or greater than 50 min/cm; except:
- 4.5.1. where the underlying soil has a T time of between 6 and 50 min/cm, the bottom of the stone layer at all points may be reduced to 450 mm to rock, high water table, and soil having a T time of 50 min/cm.
- 4.6. The effluent shall be evenly distributed over the stone layer to within 600 mm of the perimeter edge of the stone layer using distribution pipes in accordance with the Building Code Appendix A-8.7.5.3.(2); or other means that achieve even distribution to within 600 mm of the perimeter edge of the stone layer.
- 4.7. The sand layer shall have a minimum area that is the greater of;
- 4.7.1. the area of the stone layer required by the terms and conditions set out in 4.3. above,
  - 4.7.2. where the sand layer is installed in soil having a T time of 15 min/cm or less, the loading rate at the base of the area bed, shall be calculated using the formula  $A = QT/850$  (L/m<sup>2</sup>/day), or
  - 4.7.3. where the sand layer is installed in or on soil having a T time of greater than 15 min/cm, that the sand layer be extended using imported leaching bed fill having a T time of not more than 15 min/cm; the construction of the extended sand layer, including the area bed and mantle shall:
    - 4.7.3.1. be to a depth of at least 250 mm,
    - 4.7.3.2. extend at least 15 m beyond the distribution pipes in any direction that the effluent entering the soil will move horizontally, and

4.7.3.3. be calculated using the formula  $A = QT/400$  or by using the example calculations as they are provided, in Table 4.7.3.3. "Combined Area Bed and Mantle Loading Rates"

Where:

A is the area of contact in  $m^2$  between the base of the sand layer and the underlying native soil,

Q is the total daily design sanitary sewage flow in litres, and

T is the percolation time of the underlying native soil in min/cm to a maximum of 50.

Table 4.7.3.3.  
Combined Area Bed and Mantle Loading Rates Example Calculations

Loading Rate $A = QT/400$	
T of the native soil.	Loading rate (L/m <sup>2</sup> /day)
≤ 15	27
20	20
30	13
40	10
≥ 50	8
Column 1	Column 2

4.8. Any Area Bed System that must be raised to meet the vertical separation distances required by the terms and conditions set out in 4.5. of this Authorization, shall meet the mantle requirements of the terms and conditions set out in 4.7., regardless of the T time of the native soil.

**B. General Conditions**

1. The use of the Norweco Area Bed System, and as described in the specific terms and conditions set out in 6.A. must comply with the *Building Code Act, 1992* (the "Act") as amended or re-enacted from time to time and except as specifically authorized herein, with the Building Code.
2. A copy of this Authorization shall accompany each application for a building permit and shall be maintained on the site of the construction with the building permit.

3. The Applicant named in Part 1 hereof shall promptly notify the BMEC of:
  - (a) the failure of the Applicant, or of the material, system or building design that is the subject matter of this Authorization, to comply with any of the terms and conditions set out in 6.A. above; or
  - (b) the occurrence of any of the events described in conditions 6.B.4.(a) and (b)(ii) below.
  
4. The BMEC may amend or revoke this Authorization where it determines that:
  - (a) any change has been made to:
    - (i) the material, system or building design that is the subject matter of this Authorization;
    - (ii) the address of the applicant specified in Part 1 of this Authorization; or,
    - (iii) the ownership of the applicant specified in Part 1 of this Authorization.
  - (b) the use of the material, system or building design authorized herein;
    - (i) does not comply with the Act any relevant legislation as they may be amended or re-enacted from time to time; or
    - (ii) provides an unsatisfactory level of performance, in situ.
  - (c) the Applicant, or the material, system or building design that is the subject matter of this Authorization, has failed to comply with any of the terms and conditions set out in this Authorization; or
  - (d) any Building Code provision relevant to this Authorization has been amended or remade.
  
5. Where the BMEC receives additional information concerning the material, system or building design authorized herein, the BMEC may review this Authorization and the BMEC may after the review amend or revoke this Authorization as in the opinion of the BMEC may be necessary.

Dated at Toronto this 26 day of May 2005.

## **BUILDING MATERIALS EVALUATION COMMISSION**

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Edward Link, Vice-Chair