

Approval

PURSUANT TO
SECTION 53M(7) OF THE
ENVIRONMENT PROTECTION ACT 1970
CERTIFICATE OF APPROVAL

An approval is hereby issued by Environment Protection Authority ('EPA') under Section 53M(7) of the *Environment Protection Act 1970* ('the Act')

TO: ORENCO SYSTEMS INC.

**FOR: ORENCO ADVANTEX AX20
Mode 1B and Mode 3B (nutrient reduction)**

Treatment type: Aerobic Recirculating Textile Filter with UV Disinfection

Supplied by: Innoflow Australia Pty Ltd

This is to certify that the above system ('the system') is a type of septic tank system approved by EPA for the purposes of Part IXB of the Act, subject to the attached conditions.

A separate permit ('the permit') is required from the relevant municipal council before installation, pursuant to Section 53M(5)(b) of the Act. The permit shall govern the dispersal method and maintenance requirements.

Approval Number: CA 117/10

Date of Issue: 5 May 2010



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**ANTHONY CRAIG ROBINSON
DELEGATE
ENVIRONMENT PROTECTION AUTHORITY**

**This Certificate of Approval is valid until 5 May 2015,
unless withdrawn earlier by EPA.**



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SYSTEM DESCRIPTION

The Orenco AdvanTex AX20 Modes 1B and 3B ('the system') collect, treat, disinfect and irrigate domestic wastewater.

- I. Treatment system components (see Attachment A – *Schematic drawing*):
 - a) A 6,000L injection-moulded fibreglass tank in the shape of a horizontal cylinder (the Processing Tank) with two 1 metre high watertight PVC access risers containing:
 - i. a 4000L Primary Treatment Chamber (i.e. a septic tank);
 - ii. a 2000L Effluent Recirculation Chamber containing:
 - a 160L Biotube Pump Vault with Orenco effluent filter, Orenco PF300552 submersible pump and float valve system;
 - Recirculation Splitter Valve (RSV) (Mode 1B in the pump vault, Mode 3B in the tank).
 - b) A 1,000L rectangle fibreglass AdvanTex 'pod' sits on top of the 6,000L processing tank in-between the access risers and contains:
 - i. engineered polyester textile sheets which hang from horizontal rods, occupy 60% of the space in the pod;
 - ii. five rows of distribution pipes with 68 spray valves located above the textile sheets;
 - iii. the 100 mm deep space below the textile sheets is the treated effluent collection well.
 - c) A final Effluent Storage Tank with UV disinfection unit and Orenco PF100552 irrigation pump.
 - d) Control Panel with a digital programmable logic controller or the VeriComm Remote Monitoring System.
- II. Treatment process:
 - a) Wastewater enters the first chamber of the Processing Tank through an inlet tee. The constituents in the sewage separate into three zones: a floating scum layer, a clarified liquid layer in the middle and a sludge layer on the bottom of the chamber. Liquid in the clarified layer flows through an opening in the internal baffle wall into the second chamber.
 - b) The second chamber receives both the primary treated effluent from the first chamber in the Processing Tank and secondary treated effluent from the base of the AdvanTex pod.
 - c) From the second chamber the combined treated effluent flows into the base of the Biotube Vault and up through the Biotube effluent filter into the compartment above. The volume discharged when the high water alarm/override timer float is raised is a function of the flow rate of the recirculation pump, the minimum number of override cycles, and the override pump on time.
 - d) The recirculation ratio is 4:1 i.e. liquid is recirculated through the textile filter pod four times and on the fifth cycle liquid is discharge to the external Effluent Storage Tank. The timing of the distribution of effluent over the textiles can be programmed to spread the treatment evenly through-out the day and night and therefore control surge and high flows.
 - e) When the liquid is pumped through the five distribution pipes, it is forced up through the 68 effluent emitters located on top of the pipes, hits the orifice shields and is projected back down over the top of the textiles as a circular spray. The liquid trickles down through the 12.5 mm thick textile sheets which have a high moisture holding capacity. The textile fibres, which have a high surface area per unit volume, physically treat the liquid by trapping particles and the aerobic microbes, which grow on the fibres, biologically treat the liquid by consuming the organic matter.
 - f) After the treated liquid has trickled down and collected in the base of the AdvanTex pod, it flows through the Filtrate Return Pipe into the Recirculating Splitter Valve, which diverts the treated liquid either back into the second chamber of the Processing Tank or out to the Effluent Storage Tank.
 - g) During extended periods of no flow from the house (several days or more), all the treated effluent is recirculated from the AdvanTex pod to the second chamber in the Processing Tank

via the Biotube Vault to keep the microbes alive. If a power failure occurs the microbes will continue to live in the moist air in the AdvanTex pod for up to 21 days.

- h) The programmable Control Panel can detect excessive inflows, can modulate flows, control surges and improve treatment through frequent micro-dosing. In addition, the telemetry VeriComm control panel (where fitted) will automatically notify the service provider when the system is operating outside of normal conditions.

CONDITIONS OF APPROVAL

General

1. This approval is valid until 5 May 2015 unless withdrawn earlier by EPA.
2. No modifications or variations to the system may be made unless the manufacturer has prior approval from the EPA in writing.
3. On expiry of this Certificate of Approval, systems installed in Victoria must comply with Renewal of Approval testing as outlined in the latest version of EPA Publication 760 *Guidelines for aerated on-site wastewater treatment systems* or other methods approved by EPA in writing.
4. The system is approved subject to the following activities meeting the requirements outlined in the most recent version of EPA Publication 891.2 *Code of Practice - Onsite Wastewater Management* (see EPA website www.epa.vic.gov.au) and the most recent version of Australian/New Zealand Standards AS/NZS 1546.1 *On-site Domestic Wastewater Units: Septic Tanks*, AS/NZS 1546.3 *On-site Domestic Wastewater Treatment Units: Aerated Wastewater Treatment Systems*, and AS/NZS 1547 *On-site Domestic Wastewater Management*.
 - a) the design, manufacture, installation and maintenance of the treatment system; and
 - b) the design, installation and maintenance of the irrigation system.
5. All persons involved in the activities in condition 4 must be aware of and fulfil their responsibilities as outlined in the most recent version of EPA Publication 891.2 *Code of Practice - Onsite Wastewater Management*. In addition to system designers, manufacturers, installers and accredited service agents, other responsible persons include:
 - a) municipal council officers that assess applications for permits to install and to use on-site wastewater treatment systems;
 - b) land capability assessors;
 - c) owners and occupiers of the site where the system is installed.

Performance

6. Hydraulic and Organic Loading:

The system is approved for treatment of wastewater from residential and commercial premises with the following MAXIMUM hydraulic and organic loads:

Model	Hydraulic load (L/day)	Biochemical Oxygen Demand (g/day)
AdvanTex AX20	2000	725

7. Nutrient Reduction:

Advantex AX20 Mode 3B achieved the following nutrient reduction during the accreditation process:

Model	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
AX20 Mode 3B	65% reduction (influent av. 40 mg/L to effluent av. 14.4 mg/L)	26% reduction (influent average 10.8 mg/L to effluent average 7.9 mg/L)

8. Treated effluent from the system must not exceed the following limits (90% of samples):

For sub-surface irrigation:	
5-day Biochemical Oxygen Demand (BOD ₅)	20 mg/L (max. 30 mg/L)
Total Suspended Solids (TSS)	30 mg/L (max. 45 mg/L)
For surface irrigation:	
5-day Biochemical Oxygen Demand (BOD ₅)	20 mg/L (max. 30 mg/L)
Suspended Solids (SS)	30 mg/L (max. 45 mg/L)
<i>E.coli</i>	10 cfu/100 mL (max. 20 cfu/100 mL)

9. Estimated Electricity Usage for a 4 person household with average wastewater flows and loads:

The system must be continuously connected to a 240V/50Hz AC power supply. A weather-proof isolating switch must be provided at the power outlet. The power supply must have its own clearly marked designated circuit breaker in the fuse box and no other appliances connected.

Electrical Equipment	Watts	Daily operation (hours)	kWh/year	~Annual Cost @ ~\$0.15/kWh
Orengo PF300552 120L/min, 1/2 Hp, single-phase 50Hz, 240V Recirculation Pump	920	0.44	147	\$22
Orengo PF100552 40L/min, 1/2hp, single-phase, 50Hz, 240V Irrigation Pump	920	0.11	37	\$6
Salcor 3G UV lamp	69	24	604	\$90

Permitted Uses

10. End Uses for the treated effluent:

- Dispersal to land via sub-surface irrigation;
- Dispersal to land via surface irrigation;
- Disposal to land via infiltration trenches, evapo-transpiration beds/trenches or a mound.

Installation

11. When a treatment system is purchased, the manufacturer must provide the homeowner with a copy of the following documents:

- Statement of warranty and of service life;
- Schematic drawing and detailed specifications (Attachment A);
- Owner or occupier's operation instruction manual (Attachment B);
- Installation manual;
- Minimum A4 size installation plans;
- Service agreement contract;
- Sample service report form;
- A full description of the treatment train and mechanical and electrical component parts; and
- Approval documentation obtained from EPA i.e. this Certificate of Approval CA 117/10.

The premises owner must supply a copy of any of the above documents as required by the local council, as part of the application for a permit to install or to use this on-site wastewater treatment system.

12. Installation of the treatment system must be carried out in accordance with the manufacturer's specifications by an accredited service installer. An accredited installer is a person who has been suitably trained by Innoflow Australia Pty Ltd regarding the installation, operation and service requirements of the system and is accredited by the system supplier in writing.

13. The irrigation system and the pipework connecting the treatment system to the house and to the irrigation area must be installed by a person licensed or registered with the Victorian Plumbing Industry Commission (PIC) in Plumbing (Drainage) work or working under the direct supervision of a person licensed with the PIC, in accordance with the most recent versions of:
 - a) Australian Standard AS/NZS 1546.1 *On-site domestic wastewater treatment units: Part 1 Septic tanks*;
 - b) Australian Standard AS/NZS 1546.3: *On-site domestic wastewater treatment units: Aerated wastewater treatment systems*;
 - c) Australian Standard AS/NZS 1547 *On-site domestic wastewater management*; and
 - d) *Victorian Plumbing Regulations 2008*.
14. The electrical components of each treatment system and the associated irrigation area must be installed by a licensed electrician and in accordance with the manufacturer's specifications set out in the Installation Manual.
15. Each system must be fitted with an effective effluent collection point so that samples of treated wastewater can be easily taken without compromising the sample.
16. The system must be installed so that easy and ongoing access to relevant components of the system is ensured for the purpose of inspection and maintenance. Access openings over all chambers must be watertight and located at finished ground surface level or above.
17. A permanent, clear and indelible notice listing the manufacturer's name and contact details, the model name and number and the date of installation of the treatment system, must be attached to the system in a prominent position.

Maintenance and Monitoring

18. An audio-visual alarm system with mute (maximum 24 hours) facilities or an Orenco VeriComm remote monitoring system must be installed in an appropriate location to indicate any failure or fault in the system.
19. The maximum permissible noise level from the treatment system (except the alarm) shall be 40 dB L_{Aeq} at a distance of 1 m.
20. The relevant local Council shall require the owner/user of the system to enter into an on-going service contact with an accredited service agent to service and maintain the treatment and irrigation system every 6 months where the system is connected to an audio-visual alarm or annually when connected to the Orenco VeriComm remote monitoring system. The maintenance and servicing must be carried out in accordance with the manufacturer's specifications. An accredited service agent is a person who:
 - a) has been suitably trained by the system manufacturer regarding the installation, operation and service requirements of the system; and
 - b) is accredited by the system manufacturer in writing to undertake the service.
21. The system must be desludged once every 5 to 7 years or as deemed necessary, based upon sludge and scum depths, after inspection and maintenance.
22. Where treated wastewater from the system is recycled via surface irrigation onto land, the service agent must ensure the effluent is sampled and analysed annually. The sample must be tested for '5-day Biochemical Oxygen Demand' (BOD₅), 'Total Suspended Solids' (TSS) and E.coli. Where effluent from the system is recycled via sub-surface irrigation, annual effluent sampling is not required unless deemed necessary by the local council.
23. All sampling and analysis referred to in Condition 21 must be undertaken in accordance with the most recent version of EPA Publication IWRG701 *Industrial Waste Resource Guidelines: Sampling and Analysis of Waters, Wastewaters, Soils and Wastes*, or other methods approved by EPA in writing.

24. All treated effluent samples must be taken by an appropriately trained person and analysed by a laboratory that is accredited by the National Association of Testing Authorities (NATA) to undertake the required tests.

Reporting

25. The service agent of a system must submit an annual report to the local council containing copies of all the following reports from the previous 12 months:
 - a) treatment and irrigation system inspection and maintenance reports; and
 - b) laboratory analytical test reports on NATA laboratory letterhead (where applicable).