CHIEF EXECUTIVE APPROVAL 14/2016
Plumbing and Drainage Act 2002, part 5.

Approval

1. The Oxyfix C-90 10PE – UV Model ("the system") described in the Specifications and Drawings in the attached Schedule and manufactured by Eloy Water Australia ("the manufacturer") (ABN 47 161 058 471) has been assessed in accordance with the Queensland Plumbing and Wastewater Code (QPW Code) dated 15 January 2013.

2. Approval is granted for the advanced secondary quality wastewater treatment system, subject to compliance by the manufacturer with the requirements of the Plumbing and Drainage Act 2002, part 5 and the conditions of approval detailed below.

3. This approval, the conditions of approval and the Schedule comprise the entire Chief Executive Approval document.

4. Any modification by the manufacturer to the design, drawings or specifications scheduled to this approval must be approved by the Chief Executive.

Conditions of approval

5. The manufacture, installation, operation, service and maintenance of the systems must be in conformity with the conditions of this Chief Executive Approval.

6. The advanced secondary quality wastewater treatment system may only be used on premises that generate per day:

(a) a maximum hydraulic loading of 1500L; and

(b) a maximum organic loading of 700g BOD₅

7. For the system to meet the requirements of an advanced secondary quality wastewater treatment system, the system must produce the following effluent quality —

(a) 90% of the samples taken must have a BOD₅ less than or equal 10g/m³ with no sample greater than 20g/m³; and

(b) 90% of the samples taken must have total suspended solids less than or equal 10g/m³ with no sample greater than 20g/m³; and

(c) 90% of the samples taken must have thermotolerant coliform count not exceeding 10 organisms per 100 mL with no sample exceeding 200 organisms per 100mL.
8. Each system must be serviced in accordance with the manufacturers details supplied in the owner’s service and maintenance manuals.

9. Each system must be supplied with —
   
   (a) a copy of this Chief Executive Approval document;  
   (b) details of the system and ancillary equipment;  
   (c) instructions for authorised persons for its installation;  
   (d) a copy of the owner’s manual to be given to the owner at the time of installation; and  
   (e) detailed instructions for authorised service personal for its operation and maintenance.

10. This approval does not extend, apply to, or include the land application system used in conjunction with an approved system installed on premises.

11. At each anniversary of the Chief Executive Approval date, the manufacturer must submit to the Chief Executive a list of all systems installed in Queensland that they have received an installation and commissioning certificate for during the previous 12 months.

12. Where the Chief Executive is notified of any system failures that are believed to be the result of poor design or faulty manufacture, the Chief Executive may randomly select a number of installed systems for audit. The Chief Executive will notify the National Association of Testing Agencies (NATA) accredited laboratory nominated by the manufacturer, which systems are to be audited for Biochemical Oxygen Demand (BOD5) and Total Suspended Solids (TSS). The sampling and testing of the selected systems, if required, is to be done at the manufacturer’s expense. The following results must be reported to the Chief Executive;
   
   (a) Address of premises.  
   (b) Date inspected and sampled.  
   (c) Sample identification number.  
   (d) Biochemical Oxygen Demand (BOD5).  
   (e) Total Suspended Solids (TSS).

13. The Chief Executive may, by written notice, cancel this approval if the manufacturer fails —to comply with one or more of the conditions of approval; or within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

14. This approval may only be assigned with the prior written consent of the Chief Executive.

15. This approval expires on 17 November 2021 unless cancelled earlier in accordance with paragraph 13 above.

Lindsay Walker  
Director  
Strategic Policy (Plumbing, Drainage, Committees and Special Projects)  

Date approved: 17 November 2016  

Chief Executive Approval  

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SCHEDULE

Attachment 1

Specifications for the

Oxyfix C-90 10PE – UV Model
The Eloy Water Oxyfix 10 EP aerated wastewater treatment plant was tested in accordance with the Australian Standard AS/NZS 1546.3:2008 On-site domestic wastewater treatment units - Aerated wastewater treatment systems.

How does Oxyfix work?

Once the wastewater enters the Oxyfix system, the cleaning process takes place under gravity in three stages: the initial separation of solids, the biological reaction and clarification. After those three stages, the effluent is disinfected (when required) and then pumped out to the irrigation zone.

1 - Primary separator

Wastewater is pre-treated as the solid matter is separated and partially digested by anaerobic bacteria (i.e. bacteria that survive without oxygen). A layer of cellulose and grease forms on the surface, which is liquefied and digested.

2 - Biological reactor

The Oxybee® media inside the reactor promotes the rapid establishment of bacteria in order to create a «bio-film». Oxygen is introduced at the base of reactor by a blower and air diffusers to increase the activity of the aerobic bacteria (i.e. bacteria that feed on oxygen). This second category of bacteria is essential for ammonium to be nitrified.

The Oxyfix® waste water treatment system draws inspiration from a biological phenomenon found in Nature and recreates this using Oxybee® (media) produced in the form of a honeycomb shape.
Oxybee® is constructed from lightweight and durable recycled plastic (polypropylene and polyethylene) to create a platform to support the continual growth of bacteria. To further optimize the quality of bio-film without risk of clogging, Elroy Water engineers developed Oxybee® to provide a large surface area of 200m²/m³ with a specific 90% of open area. This unique and innovative design has produced a consistent and reliable platform that will never need to be replaced.

3 - Clarifier
The third and last stage is to separate any residual suspended matter present in the treated effluent and to encourage denitrification. The suspended matter collects at the base of the Clarifier as sludge and is returned to the primary separator through a recirculation system (using a pump or airlift, depending on the model). Thanks to the sampling chamber inside the reactor, the quality of the clarified water is easy to control.

4 - Disinfection and Irrigation tank
If no disinfection:
Not applicable

If chlorine disinfection:
After pre-filtering at the output of the treatment tank, the treated wastewater arrives in the “effluent storage tank” passing through a chlorine disinfection system. The objective of the disinfection treatment is to eliminate pathogenic microorganisms from the treated wastewater. The treated water is then stored in the “Disinfection and Irrigation Tank” until the water level is sufficiently high that it engages the pump and the effluent is drained to the irrigation surface.

If UV Disinfection
The treated wastewater arrives in the “Disinfection and Irrigation tank” where it is stored for a short period. When the water reaches a sufficient level, the pump engages and the effluent is drained away to the irrigation surface passing through a disc filter that retains particles of up to 80 microns and an ultraviolet disinfection system. The objective of the disinfection treatment is to eliminate pathogenic microorganisms from the treated wastewater. After the disinfection the water can be pumped out of the chamber to the disposal system.
### Design parameters

<table>
<thead>
<tr>
<th>Design parameters</th>
<th>Flow (m³/day)</th>
<th>1.500</th>
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</thead>
<tbody>
<tr>
<td>BOD5</td>
<td>(g O₂ / day)</td>
<td>700</td>
</tr>
<tr>
<td>TSS</td>
<td>(g / day)</td>
<td>700</td>
</tr>
<tr>
<td>Nt</td>
<td>(g / day)</td>
<td>150</td>
</tr>
<tr>
<td>P</td>
<td>(g / day)</td>
<td>25</td>
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### Performance criteria

<table>
<thead>
<tr>
<th>Performance criteria</th>
<th>Oxyfix C-90 10 PE - UV Model</th>
<th>Oxyfix C-90 10 PE - Chlorine Model</th>
<th>Oxyfix C-90 10 PE - No disinfection</th>
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</thead>
<tbody>
<tr>
<td>BOD5</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
</tr>
<tr>
<td>TSS</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
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<tr>
<td>E.coli</td>
<td>γ</td>
<td>γ</td>
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Advanced Secondary Treatment
Peak flow = $3Q_{18} = 250$ l/hour

**Dimensions and volumes:**

<table>
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<tr>
<th>Primary</th>
<th>Volume</th>
<th>(m$^3$)</th>
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<tbody>
<tr>
<td>Sludge storage</td>
<td>(m$^3$)</td>
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<tr>
<td>Water level</td>
<td>(m)</td>
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<td><strong>Biological reactor</strong></td>
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<tr>
<td>Volume</td>
<td>(m$^3$)</td>
<td></td>
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<tr>
<td>Water level</td>
<td>(m)</td>
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<td>1.90</td>
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<tr>
<td>Oxybee (biocarrier)</td>
<td>(m$^3$)</td>
<td></td>
<td>1.240</td>
</tr>
<tr>
<td>Diffusors</td>
<td>(pcs)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Clarifier</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>(m$^3$)</td>
<td></td>
<td>1.057</td>
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<tr>
<td>Water level</td>
<td>(m)</td>
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<td>1.90</td>
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<tr>
<td>Recirculation type</td>
<td></td>
<td></td>
<td>Airlift (venturi effect)</td>
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<tr>
<td>Recirculation flow</td>
<td>(m$^3$/day)</td>
<td></td>
<td>6 to 9</td>
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<tr>
<td><strong>Pumping station</strong></td>
<td>Min. volume</td>
<td>(m$^3$)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**d) detailed description of the components including construction material**

Tank(s): High performance fiber reinforced concrete

Biocarrier (Oxybee): Recycled polypropylene

Air feed pipes: PVC PN16

Filter: polypropylene

**Proposed method of disinfection where applicable**

Chlorination: tablet dispenser cassette

UV disinfection: 80μm filter & 40W UV lamp

**Details of pumps and associated controls, electrical panel, alarm system and aerators and controls where applicable**

Air blower:

Model: JDV-5-80 or similar

Energy consumption: $0.055 \text{ kW/h} \times 24/24 = 481.80 \text{ kWh / year}$

**Irrigation pump:**

Model: Pedrollo or DAB or Davey or similar (HMT 9 as the standard pump)

Energy consumption: $0.800 \text{ kW/h} \times 0.19 \text{ h / day} = 55.48 \text{ kWh / year}$
UV lamp:
Model: 40W UV lamp
Energy consumption: 0.040 kW/h x 24/24 = 350.40 kWh/ year

Alarms system:
Sound and visual alarms pre-installed in the control board
Indicators lights for high water and blower failure

- required servicing intervals
- required intervals for wastage of sludge

Maintenance: once every 3 months

Sludge pump-out is required if accumulation exceeds 70% of the total volume of the primary chamber
Drawing:

Oxyfix C-90 10 PE – No disinfection

Diagram of a wastewater treatment system with labels for Electrical Junction Box, Access Covers, Inlet, Sludge Return, Primary Sewage Chamber, Aeration Chamber, Clarification Chamber, and Concrete Tank.
Oxyfix C-90 10 PE – Chlorine model

Diagram showing the layout of the Oxyfix C-90 10 PE Chlorine model, including
inlet, sludge return, aeration chamber, primary sewage chamber, compacting chamber,
PESU tank, pumpout chamber, electrical junction box, and access covers.

Concrete tank.
CHIEF EXECUTIVE APPROVAL No. 14/2016

Plumbing and Drainage Act 2002, part 5, division 1, section 93

SCHEDULE

Attachment 2

Drawings for the

Oxyfix C-90 10PE – UV Model

[Stamp: Chief Executive Approval]

Department of Housing and Public Works

Chief Executive Approval

Approval No: 14/10016

Date of Issue: 18/11/16

Delegate Signature: [Signature]

Building Codes Queensland
OXYFIX C-90 10 PE - UV MODEL

IRRIGATION

ELECTRICAL JUNCTION BOX

INLET

SLUDGE RETURN

ACCES COVERS

PRIMARY SEWAGE CHAMBER

AERATION CHAMBER

CLARIFICATION CHANNEL

FILTER

PE ELOY TANK

PUMP OUT CHAMBER

EFFLUENT PUMP

CONCRETE TANK