Queensland Government

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 47 161 068 471) 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 BOD_5

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 BOD_5 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.

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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 (BOD_5) 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 (BOD_5).

   (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: 18 November 2016

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SCHEDULE

Attachment 1

Specifications for the

Oxyfix C-90 10PE – UV Model

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Eloy Water: Oxyfix 10 PE models

a) Brief description of the item

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

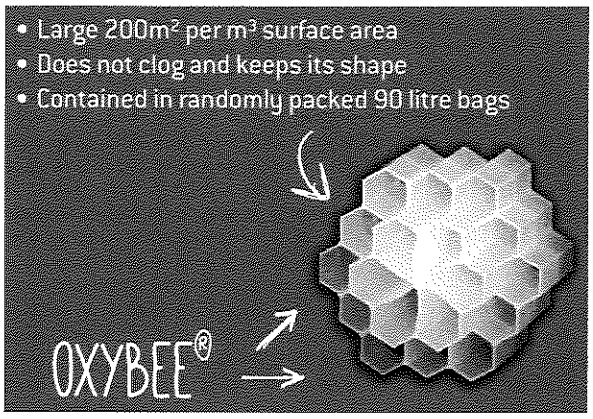
Wastewater is pre-treated as the solid matter is separated and partially digested by anaerobic bacteria (i.e. bacteria that survive without oxygen). A layer of cellulose and grease forms on the surface, which is liquefied and digested.

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, Eloy 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.

b) design parameters which include hydraulic, organic and nutrient loading

Design parameters	Flow	(m^3/day)		1.500
	BOD5	(g O2 / day)		700
	TSS	(g / day)		700
	Nt	(g / day)		150
	P	(g / day)		25

Performance criteria				**Oxyfix C-90 10 PE - UV Model**	**Oxyfix C-90 10 PE - Chlorine Model**		**Oxyfix C-90 10 PE - No disinfection**
	Advanced Secondary Treatment						
	BOD5	< 10 mg O2 / L		✓	✓		✓
	TSS	< 10 mg / L		✓	✓		✓
	E.coli	< 10 CFU / 100 ml		✓	✓		✗

c) operating capacity and peak design capacity

Peak flow = $3Q_{18}$ = 250 l/hour

Dimensions and volumes:

Primary	Volume	(m^3)		2.899
	Sludge storage	(m^3)		1.516
	Water level	(m)		1.90
Biological reactor	Volume	(m^3)		1.244
	Water level	(m)		1.90
	Oxybee (biocarrier)	(m^3)		1.240
	Diffusors	(pcs)		3
Clarifier	Volume	(m^3)		1.057
	Water level	(m)		1.90
	Recirculation type			Airlift (venturi effect)
	Recirculation flow	(m^3/day)		6 to 9
Pumping station	Min. volume	(m^3)		1.000

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

e) Proposed method of disinfection where applicable

Chlorination: tablet dispenser cassette

UV disinfection: 80µm filter & 40W UV lamp

f) details of pumps and associated controls, electrical panel, alarm system and aerators and controls where applicable

<u>Air blower:</u>

Model: JDK-S-80 or similar

Energy consumption : 0,055 kW/h x 24/24 = 481,80 kWh / year

<u>Irrigation pump :</u>

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

Energy consumption : 0,800 kW/h x 0,19 h / day = 55,48 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

g) required servicing intervals

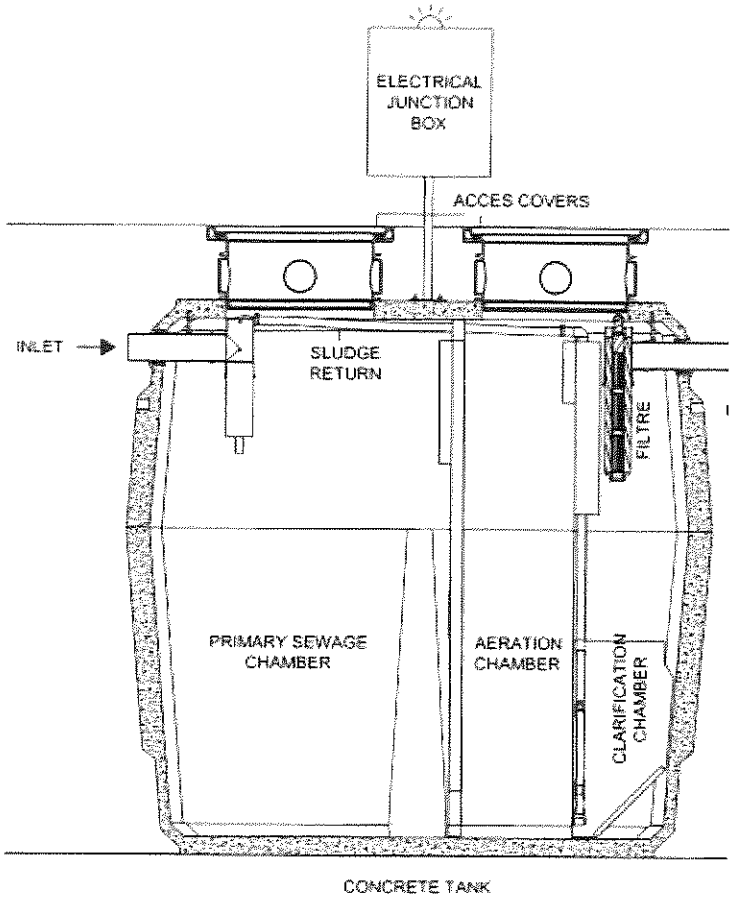
Maintenance: once every 3 months

h) required intervals for wastage of sludge

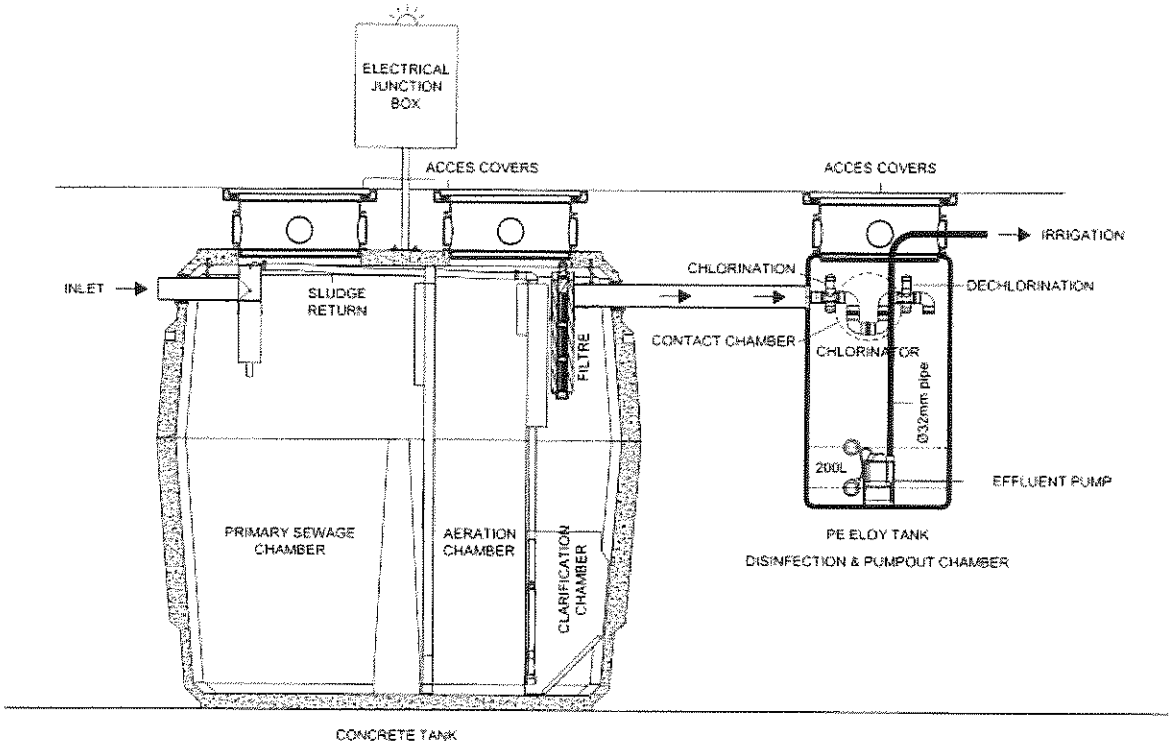
Sludge pump-out is required if accumulation exceeds 70% of the total volume of the primary chamber

Drawing :

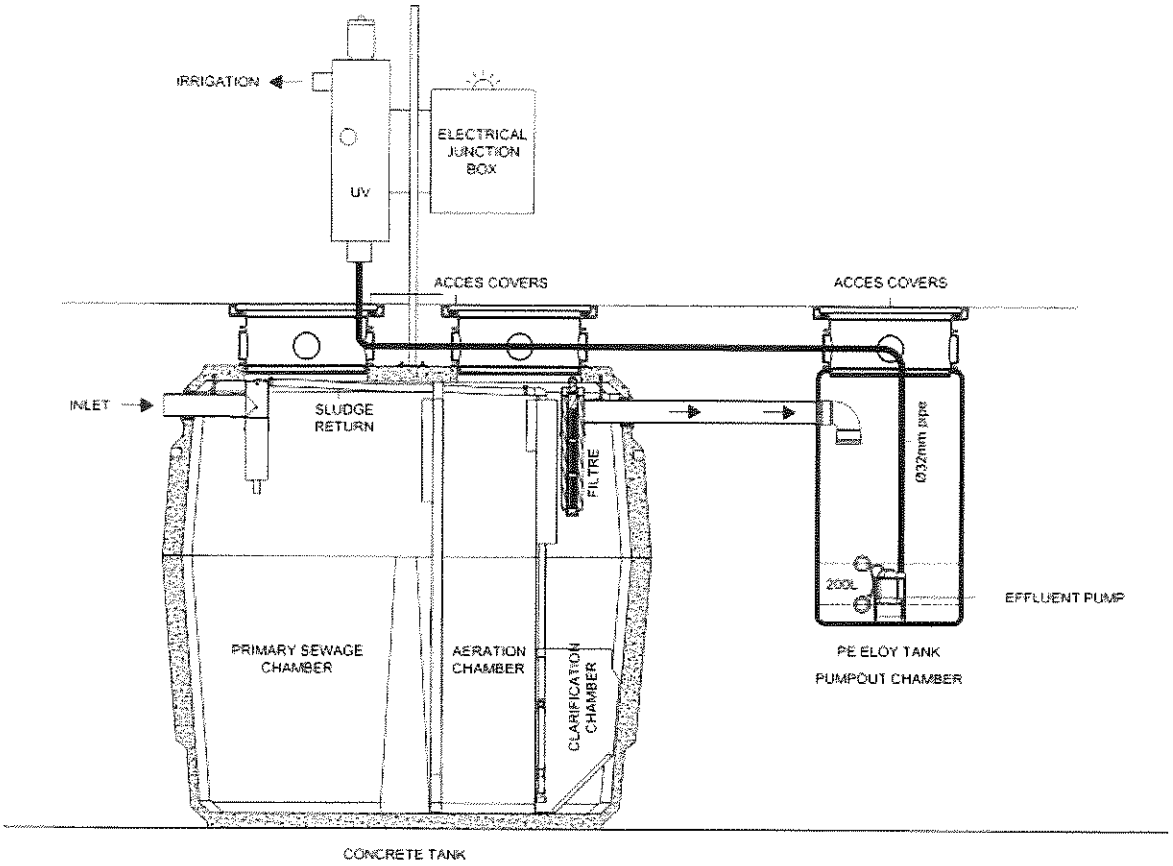
Oxyfix C-90 10 PE – No disinfection



Oxyfix C-90 10 PE – Chlorine model



Oxyfix C-90 10 PE – Chlorine model



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SCHEDULE

Attachment 2

Drawings for the

Oxyfix C-90 10PE – UV Model

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Building Codes Queensland

OXYFIX C-90 10 PE - UV MODEL

Department of Housing and Public Works
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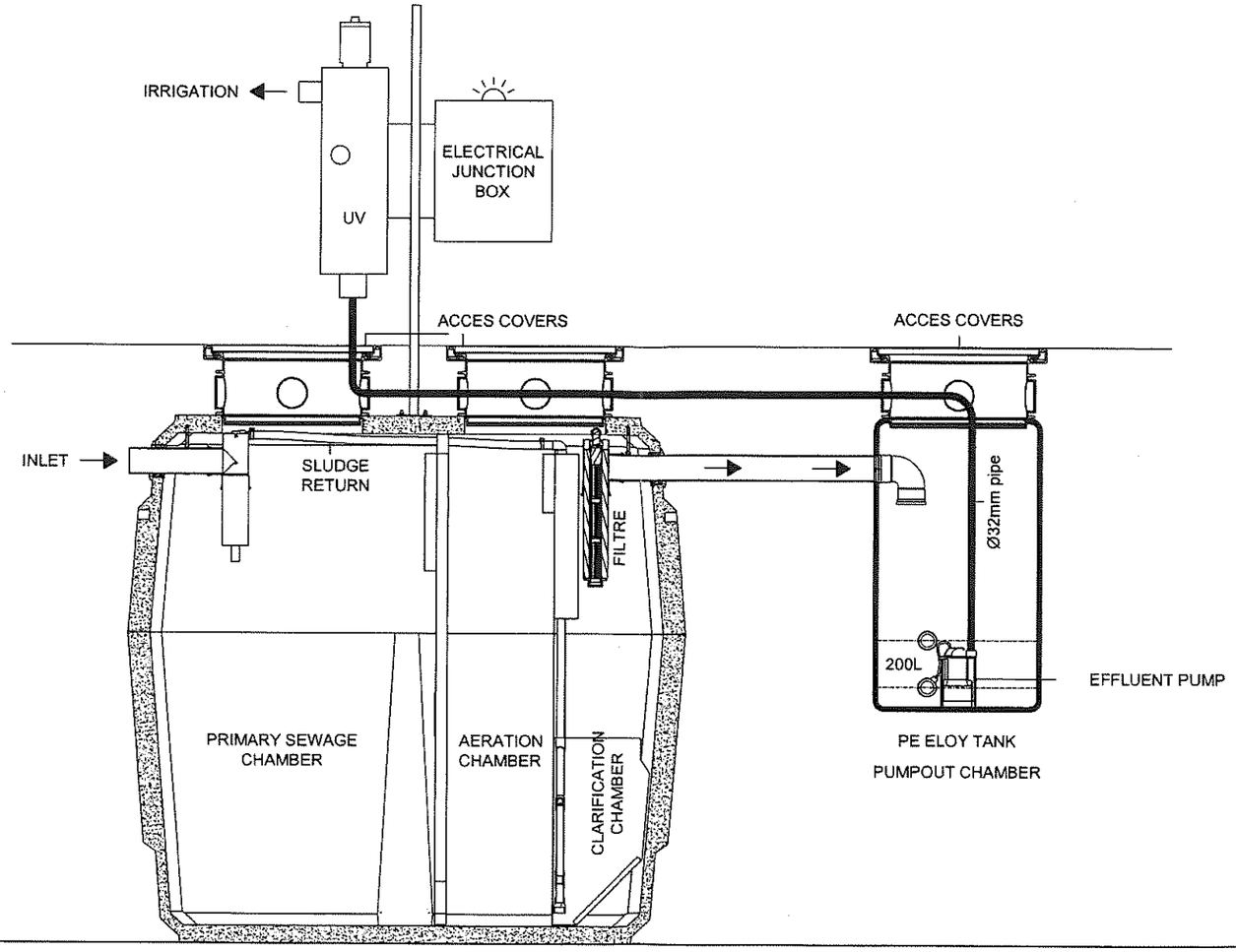
Building Codes Queensland



DATE	REVISION	MODIFICATIONS	VALIDATION		
			Designed by: P.Hick	Verified by:	Validé par: X.Maertens

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OXYFIX C-90 1-10 EP (3)
Unique tank
Schematic diagram

ELOY STANDARD PRODUCT RANGE
OXYFIX AUSTRALIE

Scale	Date	Sheet
1/25	10/05/2016	A3

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