TREATMENT PLANT APPROVAL 03/2026

Plumbing and Drainage Regulation 2019, Part 4

Queensland Government

Approval

1. The **WWR MARK IV** ("the system") described in the Specifications and Drawings in the attached Schedule, manufactured and supplied by **Houston Utility Service Pty Ltd** (ABN 44 163 768 652) ("the manufacturer"), has been assessed in accordance with:
   (a) the Plumbing and Drainage Regulation 2019, section 19
   (b) the Queensland Plumbing and Wastewater Code published on 26 June 2025.
2. A Treatment Plant Approval (TPA) is granted for a **Secondary quality** with **nutrient reduction** wastewater treatment system subject to compliance by the manufacturer with the requirements of the *Plumbing and Drainage Act 2018* and the conditions of approval detailed below.
3. This approval, the conditions of approval, and the Schedule comprise the entire TPA document.
4. Any modification by the manufacturer/supplier 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 system must conform with the conditions of this TPA.
6. The system, when tested against Australian Standard AS 1546.3:2017 – *On-site domestic wastewater treatment units, Part 3: Secondary treatment systems* (AS1546.3) and assessed by a certification accreditation body, was found to comply with the **Secondary quality,** 4000 L/day level. The system was also assessed on its ability to reduce **nutrients**. The system must continue to meet the following effluent criteria:
   (a) Secondary quality treatment

Table 2.1 (Abrev) AS1546.3:2017 Secondary effluent compliance criteria for an STS

Parameter	Secondary effluent	
	90% of Samples	**Maximum**
Five-day Biological Oxygen Demand (BOD_5)	≤ 20 mg/L	30 mg/L
Total Suspended Solids (TSS)	≤ 30 mg/L	45 mg/L
*Escherichia coli (E. coli)**	≤ 10 cfu/100 mL	30 cfu/100 mL
Free Available Chlorine (FAC)Þ	Minimum 0.5 mg/L†	N/A
Turbidity §	N/A	10 NTU

* Where disinfection is required
Þ Where chlorine disinfection is required
† Minimum level, not 90% of samples
§ Where UV light is used for disinfection

(b) Nutrient reduction capacity

During the testing of the system, the treated effluent was tested for Total Nitrogen (TN) and Total Phosphorus (TP) concentrations. The system has the capacity to reduce the TN and TP concentrations as follows:

- TN an average of 66.28 mg/L to 27.84 mg/L which represents a reduction of **57.99%**
- TP an average of 12.14 mg/L to 2.62 mg/L which represents a reduction of **78.42%**

Treatment Plant Approval
Approved by: Michael Essery
Delegated Authority
Department of Housing & Public Works

7. For the first three months after installation and commissioning, TSS must be monitored in accordance with AS1546.3. TSS monitoring results are to be verified by a Certified Assessment Body and the subsequent report/s forwarded to the Chief Executive.
8. Each system installed must be serviced in accordance with the Certificate of Conformance, certificate number 7704-3293-02 issued by Global Certification Pty Ltd on 3 February 2026, and details supplied in the owner's operation and maintenance manual.
9. The system is designed for use above ground.
10. Each system must be supplied with —
    a. a copy of this TPA document
    b. details of the system
    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
    e. detailed instructions for authorised service personnel for its operation and maintenance.
11. At each anniversary of the TPA issue date, the manufacturer/supplier must submit to the Chief Executive, a list of all systems installed in Queensland during the previous 12 months. Where the Chief Executive is notified of any system failures, the Chief Executive may randomly select several installed systems for audit. The Chief Executive will notify the supplier's nominated NATA accredited laboratory which systems are to be audited for BOD5 and TSS. The sampling and testing of the selected systems are to be done at the supplier'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. BOD_5 for influent and effluent
    e. TSS for influent and effluent.
12. The Chief Executive may, by written notice, cancel this TPA if the manufacturer/supplier fails:
    a. to comply with one or more of the conditions of approval, or
    b. within 30 days, to remedy a breach for which a written notice been given by the Chief Executive.
13. This approval may only be assigned with the prior written consent of the Chief Executive.
14. This approval expires on **22 April 2031** unless cancelled earlier in accordance with clause 10 above.

Michael Essery

Treatment Plant Approval
Approved by: Michael Essery
Delegated Authority
Department of Housing & Public Works

Director
Strategic Policy (Plumbing, Drainage and Special Projects)

Date approved: 23 April 2026

Level 15,
53 Albert Street Brisbane
GPO Box 2457, Brisbane Qld 4001
Website www.hpw.qld.gov.au
ABN 61 331 950 314

Treatment Plant Approval
Approved by: Michael Essery
Delegated Authority
Department of Housing & Public Works

TREATMENT PLANT APPROVAL 03/2026

Plumbing and Drainage Regulation 2019, Part 4

SCHEDULE

WWR MARK IV

Attachment 1: Global Certification Certificate 7704-3293-02
Attachment 2: WWR MARK IV – Owner's manual
Attachment 3: WWR MARK IV – Schematic diagrams
Attachment 4: WWR MARK IV – Flow diagram

Treatment Plant Approval
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Delegated Authority
Department of Housing & Public Works

Attachment 1: Global Certification Certificate 7704-3293-02

PRODUCT CERTIFICATE OF REGISTRATION

Houston Utility Service Pty Ltd

Head Office: 1427 Ipswich Road, Rocklea, QLD 4106, Australia

Product Performance Testing

Secondary 4000 L/day or 26.6EP level with a reduction of 57.99% for Nitrogen and 78.43% for Phosphorus

AS 1546.3:2017

Model	Disinfection	Average Results over the Test Period	Servicing Frequency	Discharge	Manufactured and assembled
WWR MARK IV	Yes	TSS: 24.02mg/l BOD_5: 2.13mg/l E Coli: 2.20 CFU/100mL Nitrogen: 27.84 mg/L Phosphorous: 2.62 mg/L	3 Month Service 2.18 yearly sedimentation pump out or as required	Pumped via Disinfection / UV light via discharge pump	1427 Ipswich Road, Rocklea, QLD 4106, Australia
The system took 1 week to meet the secondary standard. The system may be installed above ground, partially-buried or buried.					

This Certificate of Conformance to the Product Certificate Scheme for "Domestic Wastewater Treatment Units (AWTS)" remains the property of Global Certification Pty. Ltd. and is granted subject to the terms and conditions of the Contract Application, in respect of the Product certified on this page and the attached schedule to the Certification of Conformance, bearing the same number as this certificate.

Evan Miller - General Manager
Global Certification Pty Ltd

JAS-ANZ
WWW.JASANZ.ORG/REGISTER

CERTIFICATION DATE:	DATE OF ISSUE:	EXPIRY DATE:	CERTIFICATE #:
27 August 2025	3 February 2026	27 August 2030	7704-3293-02

GLOBAL CERTIFICATION

Global Certification Pty Ltd
1C, 60 Enterprise Place, Tingalpa, QLD 4173, Australia
1300 495 855 | www.globalcertification.com.au

Global Certification Pty Ltd is accredited by The Joint Accreditation System of Australia and New Zealand (www.jas-anz.org/register) – accreditation number: Z4480410AC

Treatment Plant Approval
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Delegated Authority
Department of Housing & Public Works

Attachment 2: WWR MARK IV – Owner's manual

Mobile Wastewater Recycle Unit
WWR MARK IV
Maintenance and Operators Manual

Version released: 30/04/2025

Ph: 1300 134 991 | www.houstonutility.com | info@houstonutility.com

Houston Utility Service Pty Ltd | ABN: 44 163 768 652 | houstonutility.com
1427 Ipswich Rd, Rocklea QLD 4106, Australia info@houstonutility.com +61 7 3277 1630

Initial:
Date:

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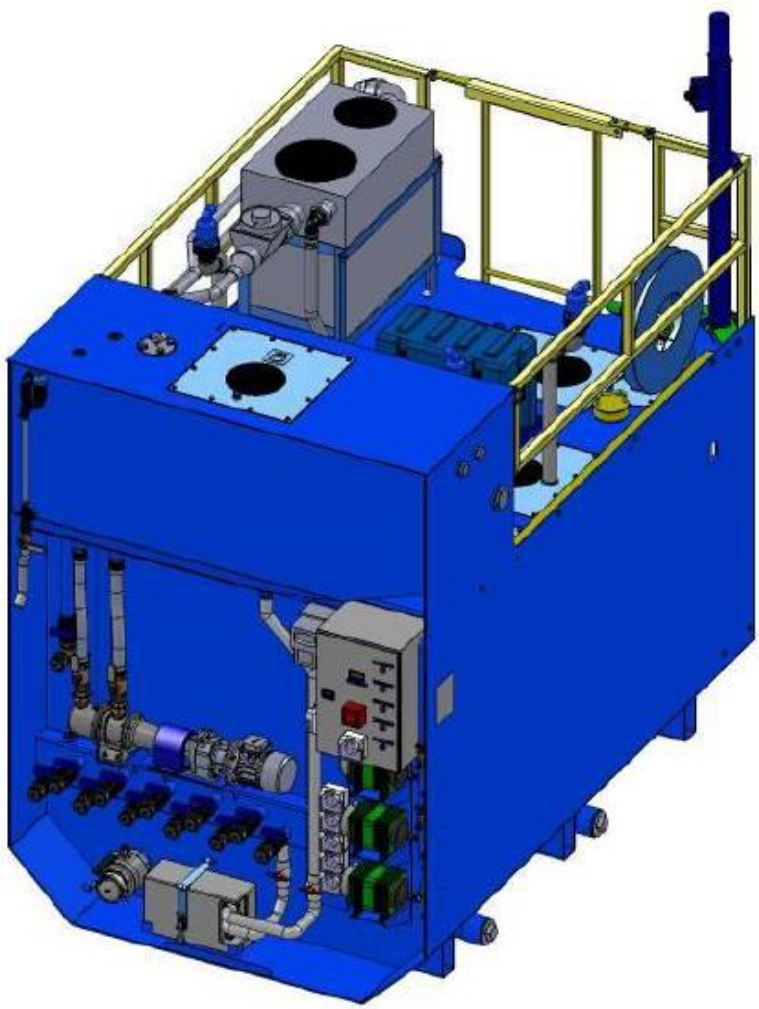

SPU 3 PICTURE 01

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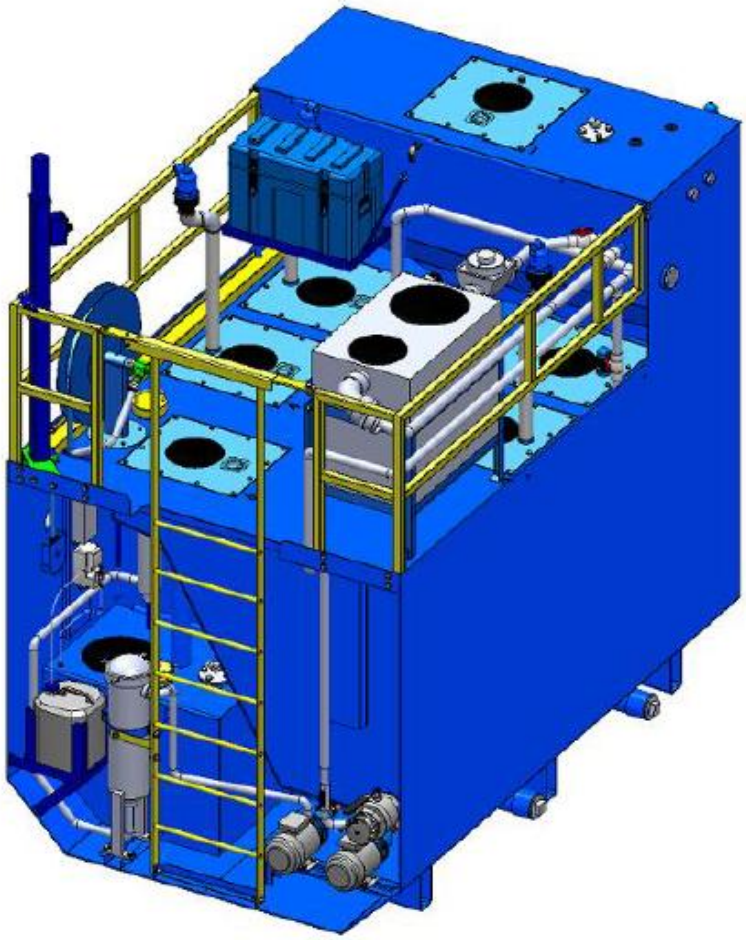

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Mobile Wastewater Recycle Unit – Maintenance and Operators Manual

WWR-MARK IV PROCESS OUTLINE

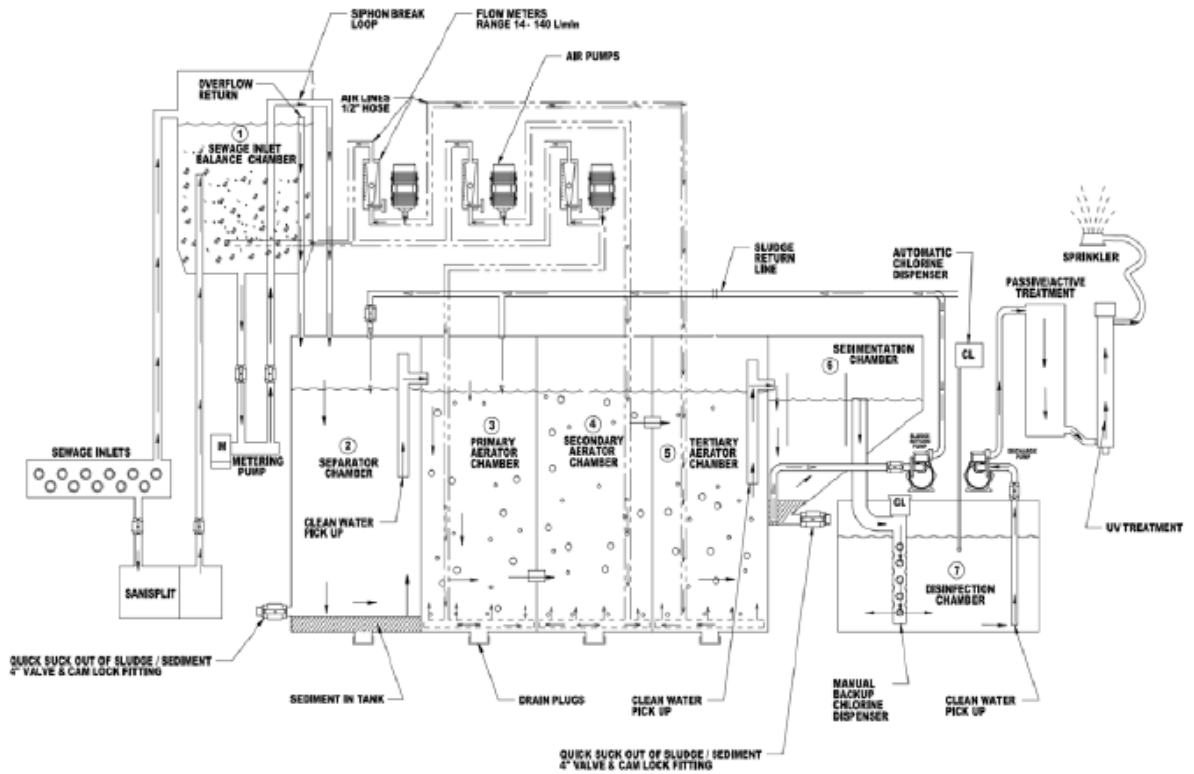


Fig. 1

(a) Waste (from toilets, showers, etc) are pumped and macerated into the sewage inlet manifold.

(b) A Sanisplit pump is connected to the inlet manifold and is only used when emptying hoses as per operations manual.

(c) From the balance chamber the sewage is metered by the metering pump at a rate of 5000 – 10,000 litres or 1320 – 2640 gallons/day into the separation chamber 2. The balance chamber ensures a steady throughput of waste though the machine regardless of the variability of the input. If, however, the input is too great for the WWR-MARK IV to process, an alarm will sound if high level is kept for more than 60 minutes.

(d) In the separation chamber, any heavy solids settle and light solids float. "Clean" water is taken from the middle of the water column and flows through aeration chambers 3, 4 and 5.

(e) The three aeration chambers are of equal volume and are supplied with air by the three air pumps. The aeration chambers help aerobic bacteria to decompose organic material.

(f) Fluid then gravity feeds to the sedimentation chamber 6 where the sediment is collected and returned through the sludge return system. The sludge return system is on a timer setup.

(g) Clean fluid is collected from the top of the sedimentation chamber and flows down to the disinfection chamber 7.

(i) Automatic – A dosing pump controlled by a timer delivers a controlled dose of liquid chlorine at regular intervals.

(h) A water level indicator activates the discharge pump, pumping the water from the disinfection chamber through a basket pod, UV treatment system and then through the pump-out hose to either spray field or holding tank.

2 WWR-MARK IV System Identification

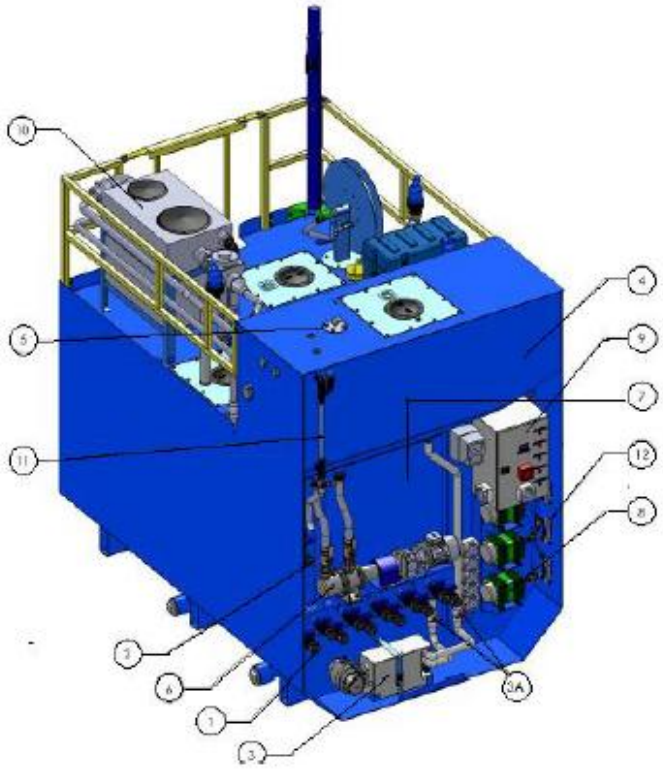


Fig. 2

(1) Sewage inlet manifold

(2) Kitchen waste inlet

(3) Hose clean out pump

(3A) Hose clean out pump shut off valves

(4) Balance tank (tank 1)

(5) Float sensor – balance tank

(6) Metering Pump (CP800)

(7) Identification plate and serial number

The serial number is stamped on the identification plate attached to the unit. If the identification plate is missing or damaged, contact Houston Utility Service and quote the serial number to obtain a new plate.

(8) Air Pumps

Thomas LPH150

(9) Switch board

(10) Optional Grease Separator for commercial application

(11) Balance Tank sight glass (removed)

(12) Air flow control between balance tank and tank 5

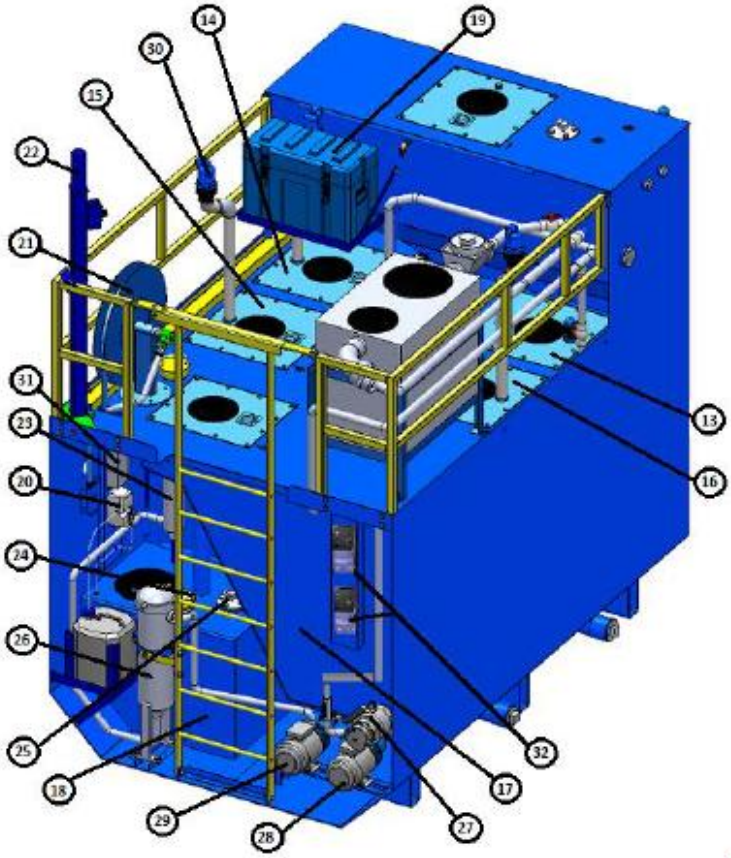


Fig. 3

(13) Separation chamber (Tank 2)

(14) Tank 3, (15) Tank 4, (16) Tank 5 Aerator chambers

(17) Sedimentation chamber (Tank 6)

(18) Disinfection chamber

(19) PPE storage box

(20) Automatic chlorine dispenser

(21) Hose Reel & Sprinkler (removed) and replaced with camlock and 25mm purple hose

(22) Satellite dish mount (removed)

(23) UV filter

(24) Manual chlorine filling point (removed)

(25) Float sensor – pump-out tank

(26) Basket Pod

(27) Sedimentation chamber dump valve

(28) Sludge return pump

(29) Discharge pump

(30) Breather

(31) DO Metre (removed)

(32) Variable frequency drives *(US Version only)*

Switchboard

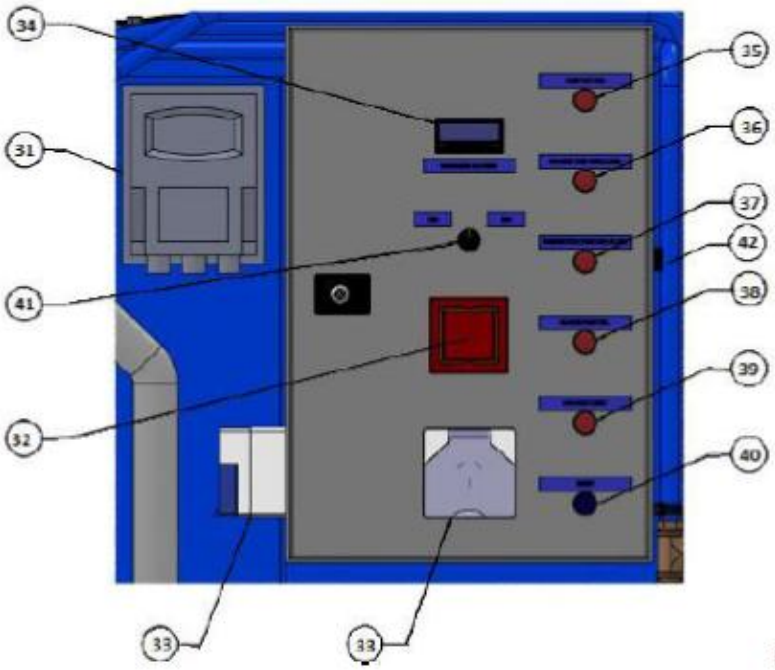


Fig. 4

(31) Variable frequency drive controller

(32) Audible alarm

(33) Power Input

The unit must be plugged in to 240V 50Hz power 15 Amp *(US Version: 220-240V 60Hz)*

(34) Counter Module

Counter module counts and displays total volume of fluid processed in litres. Use "RST" button to zero count.

(35) Pump out fail

(36) Balance tank hire alarm

(37) Disinfection tank hire alarm

(38) Sludge pump fail

(39) VFD fault

(40) Oxygen System Failure Button (removed)

(41) Alarm Reset Button

Only to be pushed to temporarily silence alarm. Repairs required as per warning light failure. Immediate action to be taken by maintenance personnel.

(42) Manual Pump out Button

Sewage inlets

Sewage inlets

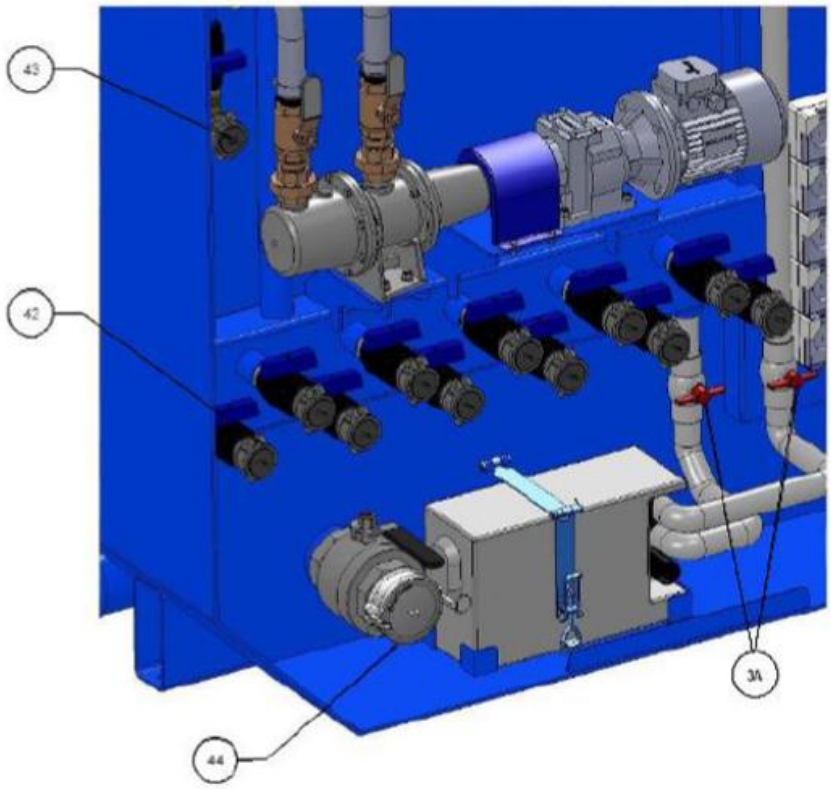


Fig. 5

(42) General waste input

11 x 1 ½" *(US version: 11 x 2")* female Camlock fittings for general waste (toilets and showers, etc).

(43) Kitchen waste input

1 x 1 ½" female Camlock fitting for kitchen waste.

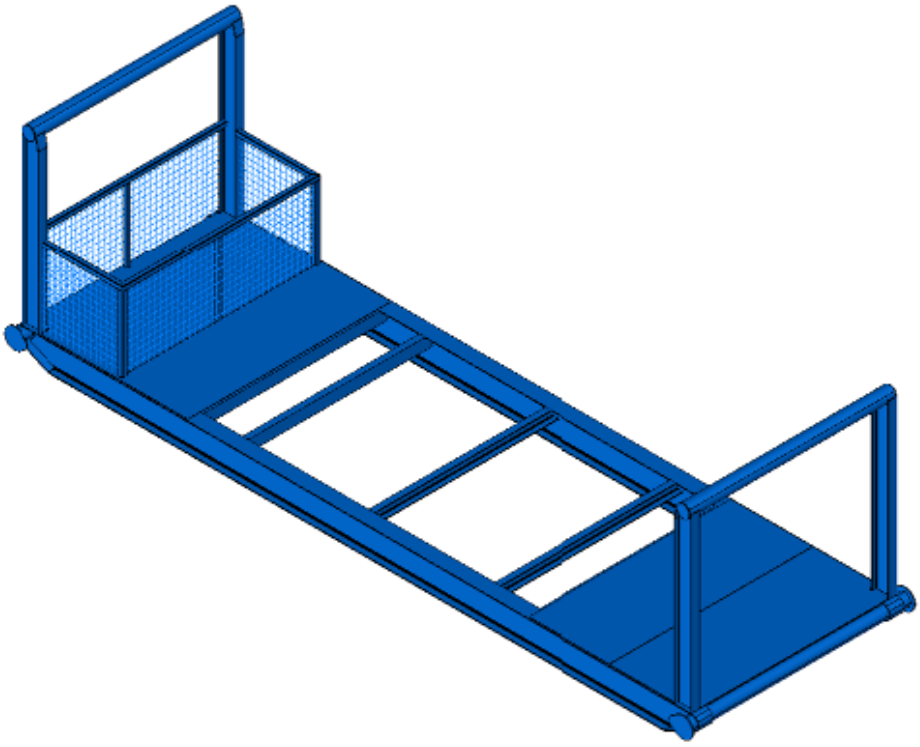
(44) Separation chamber dump valve

1 x 4" male Camlock fitting for auxiliary output as required.

(3A) Hose clean out pump shut off valves

3 Optional Extras

3.1 20' Oilfield Skid



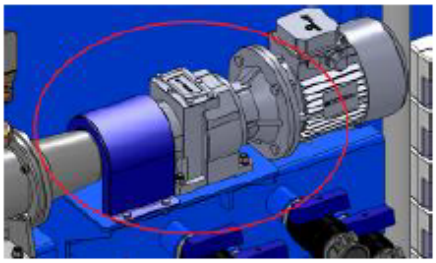
To ensure that the WWR-MARK IV may be transported when full, it must be fastened to a skid or trailer which is designed to carry the full weight of the WWR-MARK IV and its contents. Houston Utility Service can supply a 20' oilfield skid designed to carry the WWR-MARK IV and has a storage area for hose and personal protective equipment.

4 Safe use of WWR-Mark IV

WARNING

Read this manual completely before operating the machine.
Leave this manual or a copy with the WWR-MARK IV.
Always use correct personal protective equipment (PPE).

DANGER



WARNING: MACHINERY STARTS AUTOMATICALLY

ISOLATE Power supply before working on any mechanical or electrical equipment

Do not put your head inside any compartment under any circumstances.

Do not enter any compartment under any circumstances.

No naked lights or smoking in the vicinity of the WWR-MARK IV.

Do not look at the UV light (only exposed during service operations)

CAUTION

Always setup the unit on level ground.

Ensure the WWR-MARK IV is not parked in a cause way or hollow. In the event of flooding the unit may shut down due to power issues and will leak untreated wastewater if totally submersed.

Do not plug the unit in until you have finished setting it up.

Do not use any of the following items in the WWR-MARK IV:

- Bleach or disinfectants.
- Oil and fats.
- Acids.
- Paints, fuel or any oil-based products.
- Food scraps.
- Sanitising wipes
- Any solid objects such as chalk, pens, bolts, syringes etc.

Only biodegradable chemicals may be put through this system.

Discharged water is only intended for irrigation purposes.

Do not drink the discharged water.

Do not use the discharged water for cleaning purposes.

Sprinkler must be set up as far away as possible from any dwellings or thorough fares.
Do not let the discharged water pool.
Continuously move the sprinkler to avoid pooling water from discharge.

5 Personal Protective Equipment (PPE)

5.1 PPE for Daily Checks

The following list for PPE must be worn at all times when performing daily checks.

5.2 PPE for All Other

The following list for PPE must be worn at all times when performing all other operations to unit other daily checks.

5.3 PPE Site Specific

The WWR-MARK IV is designed for use in industrial applications the following PPE may be required at work sights.

6 Safety signs

6.1 Danger Signs

6.2 Notice Signs

6.3 Warning Signs

6.4 Prohibition Signs

7 Commissioning

7.1 Commissioning the Wastewater Recycle Unit

When a WWR-MARK IV unit is initially sent to site empty, whether it is new or a clean unit, a start-up procedure must be performed by either of the below:

1. Houston Utility Service personnel; or
2. Written consent by Houston Utility Service

The following steps are to take place to ensure the unit operates to its full potential.

PPE must be worn at all times

Before connecting power to the unit:

1. Remove the lid on the balance tank (tank 1); fill with water up to the float sensor level (approx. 920 litres=243 gallons) and dose with 1 x 500mls (.13 gallons) container of **Ecozyme B+ or US alternative** and 200 grams or 7 ounces of **Compost accelerator (Actizyme or US alternative)** before replacing the lid. (see Fig.6)

2. Remove the lids on the 3 aeration chambers (tanks 3, 4 and 5) filling all 3 tanks to (approximately 200mm or 8" from the top of the tanks). Replace the lids back onto the 3 aeration chambers (tanks 3, 4 and 5). (see Fig.6)

3. Remove the lid on the separation chamber (tank 2), filling the tank (approximately 200mm or 8" from the top of the tank). Dose with 1 x 500mls (.13 gallons) container of **Ecozyme B+ or US alternative** and 200 grams or 7 ounces of **Compost accelerator (Actizyme or US alternative)** before replacing the lid. (see Fig.6)

4. Add water to the sedimentation chamber (tank 6) level to the top of the weir. (see Fig.6)

5. Add water to the disinfectant tank (tank 7) (see Fig.6)

6. Remove lid on the Basket Pod and clean basket

The WWR-MARK IV unit is now ready to complete the normal start up procedure.

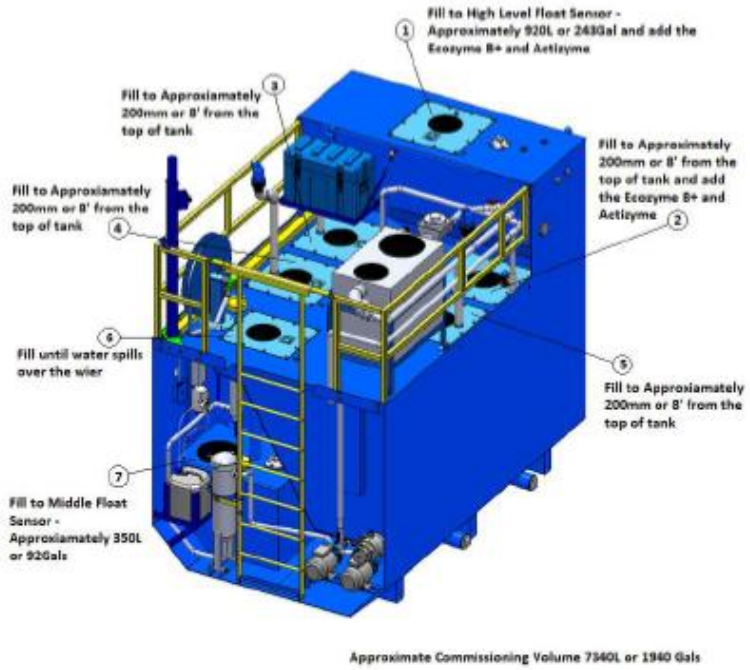


Fig. 6

8 Start-up Procedure WWR-MARK IV

WARNING: THIS WASTEWATER RECYCLE UNIT HAS FACTORY SETTINGS. ONLY AUTHORIZED PERSONNEL TO CHANGE SETTINGS

1. Connect all external macerator pump camp building hoses to the unit. (All raw sewage must be macerated prior to inlet) Ensure kitchen waste is connecting to Camlock 43 and all others to Camlock 42. (See Fig 5 on page 11 for locations)

2. Unroll purple sprinkler hose to full extension ensuring no kinks. If irrigating, set up the sprinklers in a designated irrigation area. The designated irrigation area is to be cordoned off with the appropriate WARNING signs attached to the bunting. This area is to be 15Mx15M (49'x49') or 225m² (2421 ft²) (for each unit) and be a minimum of 60M (196') from a habitable building. Move the sprinkler regularly to minimise pooling of water wearing appropriate PPE.

3. Ensure the transport isolation valve between the Sedimentation chamber and the disinfectant tank is in an open position before connecting unit to the main power.

4. Refill the Chlorine drum to maximum level before start-up. Liquid Chlorine is added when performing the daily inspections.

   WARNING: The WWR-Mark IV has a factory setting and the chlorine dosing pump should not be tampered with.

5. Reset the counter module (see Fig. 4) at the front of the PLC box to zero before starting up the unit. This must be done daily as part of the maintenance, recording all liquid flow.

6. Ensure all ball valves are open between pumps, tanks, basket pod and the UV light before starting up the unit (the handle is to run parallel to the pipework).

The unit is now ready to plug into power for operation

9 Inspections and Maintenance Intervals

9.1 Daily Inspection and Maintenance

1. Check alarm system is not signalling a malfunction.
2. Check the air pump system is operational. (Run time is 40 mins on and 40 mins off)
3. Ensure the chlorine Drum has adequate daily supply and no signs of hose leaking
4. Perform a visual inspection of all hose connection from buildings to WWR Unit for leakage
5. Perform visual inspection of sprinkler and hose for kinks to ensure fluid is exiting the sprinkler properly.
6. Check treated water is not pooling at the sprinkler. Move sprinkler if necessary.
7. Check bunting and signs are in place around the irrigation area.
8. If an optional grease separator is fitted, check the fat levels

9.2 Weekly Inspection and Maintenance (or on every move)

1. Perform daily inspection as per 11.1, then
2. Refill the Chlorine drum with liquid Chlorine to maximum level.
3. Check UV filter is operational. There are 2 LED lights located on the control panel of the UV filter. One LED is an alarm, check this is not lit. An audible alarm will also sound if the UV light is not functioning properly. Digital display count downs lamp replacement (A3 replace lamp).
4. If an optional grease separator is fitted, check the fat levels

9.3 Six Monthly Inspection and Maintenance

1. Perform weekly inspection as per 11.2, then
2. Remove sludge from the sediment chamber (tank 6), the contents of the Separator Chamber (tank 2). This is to be done by a licenced sewage collection contractor. Pump-out is via the top of tank numbers 2, 6. Replace tanks 2 and 6 with clean fresh water.
3. On skid mounted models check tension of 6 x ¾" bolts, torque bolts to 326ftlb. Replace grade 8 bolts if required.
4. Remove UV lamp and sleeve (Do not touch lamp with bare hands). Clean sleeve with vinegar as per clause 21.3 – UV Filter Manual.
5. Clean air filters on LP150-HN linear air pump.

10 Critical Spares List (per unit)

PARTS REQUIRED	PART NUMBER	MIN - MAX
THOMAS AIR PUMP	HUS000138	1
CP 25 COMPLETE WITH MOTOR	HUS000134	1
CP 25 O-RING	HUS000130	1-2
CP 25 STATOR	HUS000131	1-2
CP 25 ROTOR	HUS000132	1-2
CP 25 MECH SEAL	HUS000133	1-2
250MM DIA LID AND RING	HUS000121	2-3
350MM DIA LID AND RING	HUS000123	1-2
CP 800 STATOR	HUS000125	1-2
CP 800 ROTOR	HUS000126	1-2
CP 800 MECH SEAL	HUS000127	1-2
STERILIGHT O RING	HUS000152	1
STERILIGHT UV SLEEVE	HUS000153	1
STERILIGHT UV LAMP	HUS000154	2
O,RING BUNA GASKET FOR FILTER	HUS000030	1
X100 FILTER STRAINER BASKET	HUS000176	1-2

11 Consumables List (per unit)

PARTS REQUIRED	PART NUMBER	MIN - MAX
LIQUID CHLORINE – 20 LTR		4-6
ECOZYME B+ (COMMISSIONING ONLY)		1 X 5LTR
ACTIZYME (COMMISSIONING ONLY)		300 GRAMS

12 Packing up and moving WWR-MARK IV

1. Before moving, ensure that all toilets are flushed twice with fresh water, then isolate all water feeds in the camp.
2. Close all valves on sewage inlet manifold
3. Open red ball valves and pug in pump out macerator
4. Disconnect all hoses from each camp building one at a time and roll hosed up towards the unit emptying fluid back into the unit through the macerator. Replace all camlock caps and store ready for transport.
5. Close red ball valves and unplug the macerator.
6. Activate the manual disinfectant pump out button located on the right-hand side of the Switchboard labelled **"Press to Empty Pump out Tank** "The button will flash **GREEN** while the chamber is emptying its contents. When the button becomes solid **GREEN** the chamber is empty and ready for transport.
7. Turn off the power to the unit at the main camp switchboard and roll up lead for storage.
8. Roll up purple hose and store with sprinkler.
9. Close the 80mm (3") Sedimentation tank transport isolation ball valve located on the pipe between the Sedimentation and disinfectant tanks
10. Ensure all loose items on unit are fastened down ready for transport

The WWR-MARK IV is now ready to move

13 WWR Series IV Troubleshooting Guide

- IF ALARM IS SOUNDING PUSH RESET TO SILENCE
- ONCE SOLUTION IS VERIFIED PRESS RESET TO CLEAR LIGHT
- IF LIGHT REMAINS ON, SOLUTION IS NOT VERIFIED

SYMPTOM	LIKELY CAUSE	SOLUTIONS
PUMP OUT FAIL ALARM OR LIGHT	***PUSH GREEN PUMP OUT BUTTON ON SIDE OF SWITCHBOARD TO INITIALISE MANUAL PUMP OUT AND FOLLOW BELOW TROUBLESHOOTING***	
	BLOCKED BASKET	CLEAN BASKET
	CP 25 PUMP IS WEAK	REBUILD CP 25 PUMP WITH ROTOR, STATOR AND MECHANICAL SEAL.
	PUMP OUT HOSE HAS A KINK OR BLOCKAGE	CHECK FOR ANY KINKS IN HOSE OR FLATTENING OF HOSE EITHER REPAIR OR REPLACE IF REQUIRED.
	PUMP OUT FLOW SWITCH FAILED	IF PUMP IS PUMPING FLUID AND LIGHT OR ALARM ARE ON, SWITCH IS EITHER STUCK IN CLOSE MODE AND NEEDS CLEANING OR REQUIRES REPLACING.
	BALL VALVE AFTER THE BASKET POD (UNDER THE CHLORINE BOTTLE) IS IN THE OFF POSITION	TURN RED HANDLE SO IT POINTS THE SAME DIRECTION AS THE PIPE.
	BALL VALVE ON THE SUCTION LINE OF THE DISCHARGE PUMP (COMING OUT OF THE DISINFECTION TANK) IS IN THE OFF POSITION	TURN GREEN HANDLE SO IT POINTS THE SAME DIRECTION AS THE PIPE.
	AIR LOCK IN SYSTEM (PUMP IS RUNNING)	UNPLUG PUMP AND ALLOW TO STOP AND TRY PLUGGING IN AGAIN TO ACTIVATE PUMP.
	RELAY #2 IN SWITCHBOARD FAULTY	LOOK FOR BURN MARKS IN RELAY, TRY SWAPPING OUT TO CHECK, IF PUMP STARTS PUMPING REPLACE RELAY.
	PUMP MAY SEIZE AFTER NOT RUNNING FOR SOME TIME	REMOVE FAN COVER OFF BACK OF ELECTRICAL MOTOR CHECK TO SEE IF MOVES FREELY IF NOT MAYBE POSSIBLE TO PUT WRENCH ON FLATS AND FREE PUMP. IF DOES NOT FREE UP REPLACE ELECTRICAL MOTOR.
	DISCHARGE PUMP HAS FAILED	CONTACT ELECTRICIAN OR REPLACE ELECTRICAL MOTOR.

SYMPTOM	LIKELY CAUSE	SOLUTIONS
PUMP OUT FAIL ALARM OR LIGHT (CONTINUED)	DISCHARGE PUMP UNPLUGGED/PLUGGED INTO WRONG POINT	PLUG PUMP INTO TOP POWER POINT
	DISCHARGE PUMP HAS GONE OUT ON OVERLOAD	PRESS SMALL RED BUTTON LOCATED AT THE TOP OF THE PUMP
BALANCE TANK HIGH ALARM OR LIGHT	CP 800 PUMP IS RUNNING BUT NOT PUMPING	SLOWLY CLOSE OUTLET SIDE OF PUMP AND FEEL HOSE FOR PULSE, IF BALL VALVE GETS TO FULLY CLOSED POSITION AND HOSE IS NOT PULSING, THIS VERIFIES THAT NO FLUIDS ARE BEING PUMPED (POSSIBLE BLOCKAGE) 1ST STEP HOOK UP FRESH WATER SUPPLY TO CLEANOUT ON CP 800 ALTERNATE THE CLOSING OF BOTH VALVES WHILST CP 800 IS RUNNING TO PUSH FRESH WATER EITHER INTO TANK 1 OR THROUGH PUMP AND OUTLET. REDO THE CLOSING OF OUTLET VALVE TO CHECK FOR PULSE. IF STILL NO PULSE CP 800 PUMP REQUIRES REBUILD ROTOR, STATOR AND MECHANICAL SEAL.
	WASTE IS COMING IN FASTER THAN THE UNIT IS ABLE TO PROCESS IT	IT IS DETRIMENTAL TO THE SYSTEM TO OVERLOAD IT. REGULATE INPUT.
	CP 800 PUMP IS NOT RUNNING, VFD SHOWS STOP ON SCREEN AND IS NOT BEING ACTIVATED BY FLOAT ASSEMBLY TO START METERING PUMP	FLOAT ASSEMBLY LOWER BALL FLOAT NEEDS TO BE EITHER FLUSHED WITH FRESH WATER OR RAISED TO SEND SIGNAL TO VFD, IF WHEN RAISED DOES STILL NOT ACTIVATE METERING PUMP SWITCH ALL BREAKERS IN SWITCHBOARD TO OFF POSITION, WAIT 30 SECONDS AND TURN ALL BREAKERS ON STARTING FROM RIGHT HAND SIDE TO LEFT.
	PUMP OUT FAIL	ISOLATE ALL INCOMING FLOW. FOLLOW PUMP OUT FAIL TROUBLESHOOTING

SYMPTOM	LIKELY CAUSE	SOLUTIONS
SLUDGE PUMP FAIL ALARM OR LIGHT	***SLUDGE PUMP PROGRAMMED TO 10 MINS OFF 10 MINS ON***	
	CP 25 PUMP IS WEAK	REBUILD CP 25 PUMP WITH ROTOR, STATOR AND MECHANICAL SEAL.
	BALL VALVE FROM TANK CLOSED	OPEN BALL VALVE
	AIR LOCK IN SYSTEM (PUMP IS RUNNING)	UNPLUG PUMP AND ALLOW TO STOP AND TRY PLUGGING IN AGAIN TO ACTIVATE PUMP.
	SLUDGE PUMP FLOW SWITCH FAILED	IF PUMP IS PUMPING FLUID AND LIGHT OR ALARM ARE ON, SWITCH IS EITHER STUCK IN CLOSE MODE AND NEEDS CLEANING OR REQUIRES REPLACING.
	SLUDGE PUMP UNPLUGGED/ PLUGGED INTO WRONG POWER POINT	PLUG PUMP INTO BOTTOM POWER POINT
	SLUDGE PUMP HAS GONE OUT ON OVERLOAD	PRESS SMALL RED BUTTON LOCATED AT THE TOP OF THE PUMP
	RELAY #1 IN SWITCHBOARD FAULTY	LOOK FOR BURN MARKS IN RELAY, TRY SWAPPING OUT TO CHECK, IF PUMP STARTS PUMPING REPLACE RELAY.
	PUMP MAY SEIZE AFTER NOT RUNNING FOR SOME TIME.	REMOVE FAN COVER OFF BACK OF ELECTRICAL MOTOR CHECK TO SEE IF MOVES FREELY IF NOT MAYBE POSSIBLE TO PUT WRENCH ON FLATS AND FREE PUMP. IF DOES NOT FREE UP REPLACE ELECTRICAL MOTOR.
	SLUDGE PUMP HAS FAILED	CONTACT ELECTRICIAN OR REPLACE ELECTRICAL MOTOR.
VFD FAULT ALARM	VFD OR INLET PUMP IS NOT WORKING	OPEN SWITCH BOARD, SWITCH ALL BREAKERS TO OFF POSITION WAIT 30 SECONDS AND TURN ALL BREAKERS ON STARTING FROM RIGHT HAND SIDE TO LEFT.

SYMPTOM	LIKELY CAUSE	SOLUTIONS
CHLORINE LEVEL NOT DROPPING ON DAILY INSPECTION	AIR LOCK IN SYSTEM	PRESS AND KEEP PRESSED THE RIGHT KEY TO ENTER INTO PRIMING MODE PUMP WILL GO FOR 30 SECS, VISUALLY INSPECT IN TANK TO ENSURE CHLORINE IS BEING ADDED.
	FOOT VALVE BLOCKED	RINSE WITH FRESH CLEAN WATER AND REPRIME
	NO POWER TO DOSING PUMP	CHECK OUTLET IS PLUGGED IN, CHECK BREAKER IS ON IN SWITCHBOARD. IF STILL NOT WORKING REPLACE WITH PRE-PROGRAMMED CHLORINE DOSER FROM HOUSTON UTILITY OR HAVE HOUSTON UTILITY INSTALL.
	CHLORINATOR NOT PUMPING	CONTACT HOUSTON UTILITY FOR REPLACEMENT PRE-PROGRAMMED PART OR FOR HOUSTON INSTALL.
UV LIGHT CONTROLLER HAS NO NUMBERS ON DISPLAY	BREAKER IS OFF	CHECK BREAKER IN SWITCHBOARD AND POWER SOCKET
UV CONTROLLER HAS BLANK SCREEN AND ALARM	BROKEN OR CRACKED UV SLEEVE AND OR LAMPS	SEE ICE CONTROLLER MANUAL FOR REPLACING LAMP
UV LIGHT LEAKING WATER	ORINGS SPLIT ON SLEAVE OR SLEAVE IS CRACKED OR BROKEN	REPLACE ORINGS AND OR SLEEVE
UV CONTROLLER BEEPING AND SHOWING A3 FAULT	UV LAMP HAS REACHED EXPIRATION DATE BEYOND 365 DAYS COUNTS DOWN TO 0.	SEE ICE CONTROLLER MANUAL FOR REPLACING LAMP.

16 Specifications: Influent, Effluent, Volumes and Weights

16.1 Influent Criteria	20 Person Accommodation	50 Person Work Site
BOD_5	50g (1.7oz) per person /day	20g (.7oz) per person /day
Sludge Scum	80L (21gal) per person /year	25L (6.6gal) per person /year
Maximum Daily Flow Rate	200L per person /day	80L per person /day

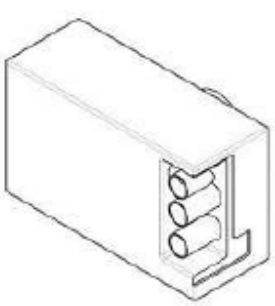
16.2 WWR-MARK IV Approximate Volumes

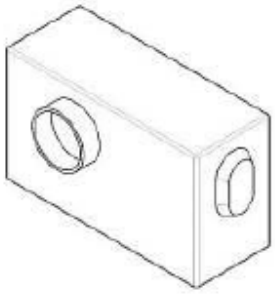
	Working Volume	Total Volume
Balance tank	940L (248gal)	1150L (304gal)
Settling tank	1310L (346gal)	1450L (383gal)
Aeration Chambers (Total)	3930L (1038gal)	4350L (1149gal)
Sedimentation Chamber	810L (214gal)	1000L (264gal)
Chlorine/pump-out tank	350L (92gal)	370L (98gal)
Total	7340L (1940gal)	8320L (2198gal)

16.3 WWR-MARK IV Approximate Weight

	Stand Alone	Skid Mounted
Empty	3800kg (8377 lb)	4700kg (10361 lb)
Full (Working volumes)	11140kg (24559 lb)	12040kg (26544 lb)

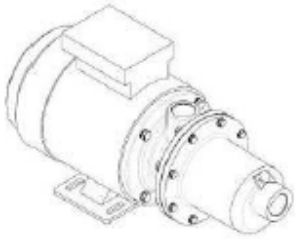
17 Specifications: System and Equipment





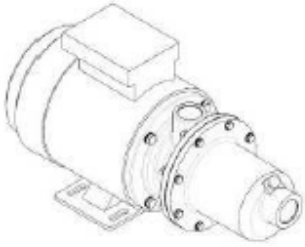
17.1 Hose Clean Out Pump

Make	Techma
Model	Sanisplit 3 Combi
Flow Rate	210L/min (55gal/min) @ 5M (16.4') head



17.2 Sludge Return Pump

Make	Mono Progressing Cavity Pump
Model	CP25
Flow Rate	25L/min (6.6gal/min) @ 5M (16.4') head

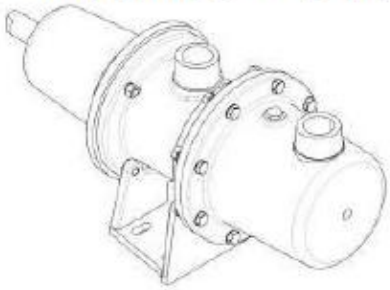


17.3 Pump-out Pump

Make	Mono Progressing Cavity Pump
Model	CP25
Flow Rate	25L/min (6.6gal/min) @ 5M (16.4') head

17.4 Air Pump

Make	Thomas
Model	LP150 HN
Flow Rate	255L/min (67gal/min) @ 0.3 bar (4.3psi)



17.5 Metering Pump

Make	Mono Progressing Cavity Pump
Model	CP800
Flow Rate	60L/min (15.8gal/min) @ 1450rpm and 5M (16.4') head

17.6 Gear Motor

Make Sew Euro	Helical Gear Motor
Model	R37 DRN90S4

17.7 UV Filter

Make	Sterilight Silver-UV Disinfection
Model	S12Q-PA
Maximum Operating Pressure	8.26 bar (119psi)

18 Risk Assessment – SAMPLE ONLY

Rev No	Prepared By	Date	Approved By	Date
0				

18.1 Purpose

The purpose of this Standard Operating Procedure is to identify the process steps, hazards involved with each process step and the control measures implemented for WWR-MARK IV (Waste Water Recycle Unit) Operating Procedure. Hazards that are identified not included in this SOP must be documented and a formal Job Hazard Analysis (JHA) carried out. The JHA can form part of this SOP as an attachment. Employees / subcontractors involved in the work activity must be instructed in this SOP prior to beginning any work activity and must also be involved in any further JHA process of identifying further hazards and identifying control measures.

18.2 Safety Equipment and PPE

The following safety equipment and PPE are to be utilized at all times while carrying out the work activity.

- Safety Boots
- Long Sleeved cotton Shirts and Trousers
- Disposable Coveralls (Full Body)
- Safety Glasses
- Face Shield
- PVC Impervious Gloves (Long-full sleeve)
- Hard Hat when on site
- Antibacterial Hand wash Gel

18.3 Process Table

The process table on the following pages contains the Process steps, potential hazards and control measures for WWR-MARK IV (Waste Water Recycle) Operating Procedure. All personnel involved in the activity must be instructed on the contents process table prior to the commencement of the activity. All personnel and subcontractors are required to acknowledge in writing that they have received process/safety instruction in the activity by signing the attached crew sign off sheet

Process Step	Potential Hazards	Control Measures	Responsible Person/s
▪ Operation Guide ▪ Rig up unit ▪ Processing ▪ Rig down unit	▪ Biological-Exposure to infectious substances	▪ Engineering/isolation-Maintain WWR-MARK IV as per the operations manual. Cap all unconnected inlet fittings (Camlock cap) ▪ Administration-Compliance with SOP. Train personnel in the safe management of the WWR-MARK IV. Warning signage to be posted on the WWR-MARK IV unit including exposure to biological agents. ▪ PPE-PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Disposable coveralls. Portable eyewash available. Antibacterial hand wash. Safe disposal of contaminated PPE (containment bag)	
	▪ Chemical-Exposure to hazardous substances (chlorine and Noxious gasses)	▪ Engineering/isolation-Chemical to be stored from non-compatible substances in labelled appropriate containment ▪ Administration-Training in handling hazardous substances specific to the WWR-MARK IV (Chlorine) MSDS to be available on the WWR-MARK IV Warning signage to be posted on the WWR-MARK IV Unit including exposure to biological agents and noxious gases released when opening hatches for inspection. ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Portable eyewash available. Refer to the MSDS for minimum PPE requirements for handling chlorine.	
	▪ Physical-Working at height, ▪ trip hazards (hoses), ▪ pinch points (lids, hinges, fittings) ▪ Electrical (Electrocution) ▪ Manual Handling (Lifting and connecting hoses)	▪ Engineering/isolation-Fall prevention to be installed (handrails). Electrical system tested appropriate for wet system and tagged by a competent person (HUS Electrician) Equipment hoses and fittings to be of light weight construction. ▪ Administration-Periodic camp audits to include inspection of equipment for hazards including trips, slips & falls, pinch points ▪ **If the UV light alarm sounds and flashes, turn machine off and contact HUS for handling procedure (Do not remove the bulb or look at the bulb)** ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Portable eyewash available.	
	▪ Environmental-unplanned release of untreated effluent	▪ Administration-Inspect all valves and fittings for serviceability and condition ▪ Report spill to Santos and HUS Management. ▪ WWR-MARK IV to be placed on flat level ground. (Do not place in a depression) ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Disposable coveralls. Portable eyewash available.	
	▪ Hydraulic shock (caused by excessive water input)	▪ Engineering/isolation-Facility to bypass grey water from washing machines and showers if unit is affected by hydraulic shock (Refer to the Operation Manual) ▪ Administration- Each operating unit to have access to operation manual for instruction reference. Train personnel in the management of the WWR-MARK IV which	

Process Step	Potential Hazards	Control Measures	Responsible Person/s
		includes trouble shooting and unit diagnostics. ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Disposable coveralls. Portable eyewash available.	
▪ Transportation	▪ Biological- Exposure to infectious substances	▪ Engineering/isolation- Cap all inlet fittings. ▪ Administration-Competent Operator to load and unload WWR-MARK IV on location. ▪ Sign to be placed displaying "caps to be placed on fittings during transportation" ▪ PPE-Standard on-lease PPE.	
	▪ Physical-Working at heights (tying down load onto trailer) ▪ Damage to equipment and fittings during loading.	▪ Engineering/isolation-Unit to be chained to trailer for adequate security. ▪ Administration-Truck driver is to sign off on the pre mobilisation Transportation for as having secured the WWR-MARK IV skid. ▪ PPE- Standard on-lease PPE.	
	▪ Environmental- unplanned release of untreated effluent (accidental release from damage or open valves) ▪ Leaks from unsecured lids	▪ Engineering/isolation- Cap all inlet fittings. ▪ Administration-The WWR-MARK IV hatches must be secured prior to loading and unloading on and off the winch truck. ▪ Report spill to Santos and HUS Management. ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Disposable coveralls. Portable eyewash available.	
▪ Chemical Handling	▪ Chemical-Exposure to hazardous substances (chlorine and Noxious gasses) ▪ Containment and transportation of hazardous substances	▪ Engineering/isolation-Chlorine to be stored in appropriate containment. Chlorine (class 8) is not to be stored with flammable liquids (Class 3). ▪ Chlorine is not to be stored with food stuffs and container must be opened in a well ventilated area and avoid inhalation of fumes. ▪ The most suitable storage is the Camp Laundry ▪ Administration- ▪ Containers must be appropriately labelled ▪ MSDS to be available in the operation manual. ▪ PPE-Handling Kit to include the following: 1. Disposable coveralls x 5 2. PVC Impervious Gloves (Long-full sleeve) x5 3. Eye Protection –minimum safety glasses and (Face Shield when required) x1 4. MSDS for Chlorine Tablets 5. A copy of this SOP 6. Portable eye wash station x3 7. Antibacterial hand wash jell x3 8. Operations Manual ▪ The PPE Handling Kit is to be stored in a weather proof container, fixed to the WWR-MARK IV. ▪ NB: All items in the Handling Kit are to be restocked as required. Field Safety Advisors are to conduct a monthly inspection to reconcile and reorder the kit contents	
▪ Plant Maintenance	▪ Equipment failure ▪ Pump failure ▪ Electrical System failure ▪ Warning device failure ▪ Hoses and fittings failure ▪ Filter failure ▪ Chlorination process failure	▪ Items Listed-Refer to Trouble Shooting Guide in Operation Manual ▪ Do not enter any compartment of the unit	
	▪ Environmental-release of partially treated product	▪ Engineering/isolation- Facility to bypass grey water from washing machines and showers if	

Process Step	Potential Hazards	Control Measures	Responsible Person/s
	(due to complete or partial system failure)	unit is affected by hydraulic shock (the use of biodegradable products) ▪ Administration- Report spill to HUS Management. ▪ Items Listed-Refer to Trouble Shooting in the Operation Manual. ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses. Disposable coveralls. Portable eyewash available.	
▪ Portable Macerator maintenance	▪ Environmental-release of partially treated product (due to complete or partial system failure)	▪ Engineering - Site managers to consider fitting ball valve to portable macerator inlet lines, alternatively keep a bung that can be fitted to the end of portable macerator inlet lines. ▪ Inlet lines fitted must allow the portable macerator to be raised to a height that is no less than 300mm higher than the highest point of the septic system it services ▪ Isolation/Administrative- Maintenance personnel to flush lines prior to commencing work ▪ All systems (Toilets, basins, washing machines, etc) to be tagged out of service. ▪ Power to portable macerator to be isolated and tagged out of service ▪ Portable macerator to be elevated to a suitable platform at least 300mm higher than the highest point of the septic system it services – allow time for waste to drain away from the macerator ▪ 2 people to be used to disconnect inlet line - 1 to hold line the other to remove jubilee clip. The outlet lines between macerator and WWR-MARK IV are held on by Camlock fittings these should be disconnected as well. ▪ Bung put in or valve turned to off to prevent fluid leakage out of inlet line - keep macerator end of line elevated. Camlock caps fitted over outlet lines and lines also kept elevated ▪ Repairs or replacement of Macerator can be made; re-assembly is reverse order of these instructions. ▪ PPE- PVC impervious long sleeve chemical handling gloves. Minimum safety glasses, goggles preferred. Mouth and nose mask.. Disposable coveralls. Portable eyewash available.	

19 Crew sign off sheet – SAMPLE ONLY

This Standard Operating Procedure and Operation Manual has been reviewed by all employees/subcontractors involved in the work activity and has been approved for use by the Manager.

Approved by	
Position	
Date	
Company	

NAME	POSITION	SIGNATURE
COMMENTS RAISED BY CREW		

20 Appendix A – MSDS

20.1 MSDS – Liquid Chlorine

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name:	**CHLORINE**
Other name(s):	Liquefied chlorine, Liquid chlorine, Diatomic chlorine, Chlorine cylinder (used)
Recommended Use:	Disinfection, water treatment, bleaching, metal recovery, neutralising agent, oxidant.
Supplier:	Orica Australia Pty Ltd
ABN:	99 004 117 828
Street Address:	1 Nicholson Street, Melbourne 3000 Australia
Telephone Number:	+61 3 9665 7111
Facsimile:	+61 3 9665 7937
Emergency Telephone:	**1 800 033 111 (ALL HOURS)**

2. HAZARDS IDENTIFICATION

This material is hazardous according to criteria of Safe Work Australia; HAZARDOUS SUBSTANCE.

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Risk Phrases:	Toxic by inhalation, irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms.
Safety Phrases:	Keep container tightly closed and in a well ventilated place. Do not breathe vapour/mist. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible). Avoid release to the environment. Refer to special instructions safety data sheets.
Poisons Schedule:	S7 Dangerous Poison.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Risk Phrases
Chlorine	7782-50-5	>=99.8%	R23, R36/37/38, R50

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor at once.

Inhalation:
Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:
If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water. If swelling, redness, blistering or irritation occurs seek medical assistance. For skin burns, cover with a clean, dry dressing until medical help is available. Launder contaminated clothing before reuse.

Eye Contact:
If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes.

Ingestion:
Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

Medical attention and special treatment:
Treat symptomatically. Effects may be delayed. Delayed pulmonary oedema may result.

5. FIRE FIGHTING MEASURES

Hazards from combustion products:
Non combustible, but will support combustion of other materials. Oxidizing substance.

Precautions for fire fighters and special protective equipment:
Not combustible, however will support the combustion of other materials. Keep containers cool with water spray. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire. Only move cool cylinders. Do not approach cylinders suspected to be hot. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure. If unable to keep cylinders cool, evacuate area.

Suitable Extinguishing Media:
Not combustible, however, if material is involved in a fire use: Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem Code: 2XE

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures:
Clear area of all unprotected personnel. Evacuate personnel from downwind areas. Wear protective equipment to prevent skin and eye contact and inhalation of vapours/dusts. Avoid breathing in vapours. Work up wind or increase ventilation. Wear self contained breathing apparatus. Shut off leak if possible without risk. Work up wind. Use water spray to disperse vapour. DO NOT spray water directly on the leak, liquid chlorine or chlorine container. If safe to do so, rotate container so that gas and not liquid escapes. SMALL SPILLS: Allow liquid to evaporate.

Seek specialist advice. For large spills notify the Emergency Services.

Chlorine gas only becomes visible at high concentrations.

Methods and materials for containment and clean up:
Clear area of all unprotected personnel. Wear protective equipment to prevent skin and eye contact and breathing in vapours. Avoid breathing in vapours. Work up wind or increase ventilation. Air-supplied masks are recommended to avoid inhalation of toxic material. For gas leak, DO NOT spray water directly on the leak or chlorine container. Use fire hoses equipped with fog nozzles to disperse gas downwind. For liquid: Contain - prevent run off into drains and waterways. Use fog nozzles as before. Do NOT allow any water to fall onto a pool of liquid chlorine as this will increase gas cloud. If safe to do so, cover with large plastic sheet. Where possible vapour knock down water should be contained.

7. HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Conditions for safe storage:
Store in a cool, dry, well ventilated place and out of direct sunlight. Store away from foodstuffs. Store away from combustible materials. Keep dry - reacts with water. Keep container standing upright. Use chains or clamps to prevent cylinders being knocked over. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for leaks.

Precautions for safe handling:
Avoid skin and eye contact and breathing in vapour. Avoid all contact.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chlorine: Peak Limitation = 3 mg/m³ (1 ppm)

As published by the National Occupational Health and Safety Commission.

Peak Limitation - a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Engineering controls:
Ensure ventilation is adequate to maintain air concentrations below Exposure Standards. If inhalation risk exists: Use with local exhaust ventilation or while wearing air supplied mask. Vapour heavier than air - prevent concentration in hollows or sumps. DO NOT enter confined spaces where vapour may have collected.

Personal Protective Equipment:
The selection of PPE is dependant on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Orica Personal Protection Guide No. 1, 1998: I - OVERALLS, CHEMICAL GOGGLES, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).
* Not required if wearing air supplied mask.

Wear overalls, chemical goggles, full face shield, elbow-length impervious gloves. Use with adequate ventilation. If inhalation risk exists, wear air-supplied mask meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Gas / Liquid
Colour:	Greenish - Yellow (high concentrations) ; Clear/invisible (low concentrations)
Odour:	Pungent , Irritating
Odour Threshold:	1 ppm (approx)
Molecular Formula:	Cl2
Specific Gravity:	1.468 (liquid). 1.56 (@ -35°C).
Relative Vapour Density (air=1):	2.4
Vapour Pressure (20 °C):	666 kPa
Flash Point (°C):	Not applicable
% Volatile by Volume:	ca. 100
Solubility in water (g/L):	7300 mg/L
Boiling Point/Range (°C):	-34
Freezing Point/Range (°C):	-101

10. STABILITY AND REACTIVITY

Chemical stability:	Reactive chemical. Reacts violently with many organic chemicals (eg. mineral oils, greases) , hydrocarbons , silicones , and finely divided metals . Forms explosive mixtures with alcohols , glycols , ammonia and its compounds , and hydrogen over a wide range of concentrations . Corrosive in the presence of moisture.
Conditions to avoid:	Avoid exposure to heat, sources of ignition, and open flame. Avoid contact with combustible substances. Do not allow water to come into contact with liquid chlorine.
Incompatible materials:	Incompatible with combustible materials. Incompatible with heat and hot surfaces. Incompatible with reducing agents.
Hazardous decomposition products:	Oxides of chlorine. Chlorine compounds.
Hazardous reactions:	Oxidising agent. Supports combustion of other materials and increases intensity of a fire. Corrosive to some metals in the presence of moisture. (brass, copper, lead, nickel, steel and stainless steel) Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. Can react with acids and some nitrogen or phosphorous compounds. Hazardous polymerisation will not occur.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion:	Not a likely route of exposure, however, swallowing liquid will result in freeze burns of the mouth, throat and stomach. Swallowing can result in chemical burns to the mouth, throat and abdomen; perforation of the gastrointestinal tract and vomiting of blood and eroded tissue.
Eye contact:	A severe eye irritant. Corrosive to eyes; contact can cause corneal burns. Contamination of eyes can result in permanent injury. Liquid splashes or spray may cause freeze burns to the eye.
Skin contact:	Liquid chlorine is corrosive to skin. Contact with skin will result in irritation. Liquid splashes or spray may cause freeze burns.

Inhalation: Material is irritant to the mucous membranes of the respiratory tract (airways). May cause coughing and shortness of breath. May cause adverse lung effects if high concentrations are inhaled. Inhalation of vapours may cause severe breathing difficulties and lung oedema. Delayed (up to 48 hours) fluid build up in the lungs may occur. Severe exposure may cause lung damage. Overexposure may result in death.

Long Term Effects:
No information available for the product.

Toxicological Data:
Inhalation LC50 (rat): 293 ppm/1hr. (1)
Inhalation LC50 (mice): 137 ppm/1hr. (1)
SKIN: Corrosive (rabbit).
EYES: Severe irritant (rabbit).

12. ECOLOGICAL INFORMATION

Ecotoxicity	Avoid contaminating waterways.
Persistence/degradability and mobility	Does not accumulate in organisms. The material is not expected to bioconcentrate.
Aquatic toxicity:	Very toxic to aquatic organisms.
96hr LC50 (fish):	0.014 mg/L
Terrestrial toxicity:	Very ecotoxic in the soil environment.

13. DISPOSAL CONSIDERATIONS

Disposal methods:
Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Contact supplier for advice.
For all Orica labelled chlorine packages, return directly to Orica.

14. TRANSPORT INFORMATION

Road and Rail Transport
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail: DANGEROUS GOODS.

UN No:	1017
Class-primary	2.3 Toxic Gas
Subrisk 1:	5.1 Oxidising Agent
Subrisk 2:	8 Corrosive
Proper Shipping Name:	CHLORINE
Hazchem Code:	2XE

Marine Transport
Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea: DANGEROUS GOODS.
This material is classified as a Marine Pollutant (P) according to the International Maritime Dangerous Goods Code.

UN No:	1017
Class-primary:	2.3 Toxic Gas
Subrisk 1:	5.1 Oxidising Agent
Subrisk 2:	8 Corrosive
Proper Shipping Name:	CHLORINE
IMDG EMS Fire:	F-C
IMDG EMS Spill:	S-U

Air Transport
TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in passenger aircraft and cargo aircraft.

15. REGULATORY INFORMATION

Classification: This material is hazardous according to criteria of Safe Work Australia; HAZARDOUS SUBSTANCE.

Hazard Category:
T : Toxic
Xi: Irritant
N: Dangerous for the Environment

Risk Phrase(s):
R23: Toxic by inhalation.
R36/37/38: Irritating to eyes, respiratory system and skin.
R50: Very toxic to aquatic organisms.

Safety Phrase(s):
S7/9: Keep container tightly closed and in a well ventilated place.
S23: Do not breathe vapour/mist/aerosol.
S24/25: Avoid contact with skin and eyes.
S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible)
S61: Avoid release to the environment. Refer to special instructions Safety Data Sheets.

Poisons Schedule: S7 Dangerous Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

(1) 'Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet. US Dept. of Health & Human Services: Cincinatti, 2006.

This safety data sheet has been prepared by SH&E Shared Services, Orica.

Maximum use rate for potable water treatment is 30 mg/L (as per NSF certification)

20.2 MSDS – Ecozyme B+

ECOZYME B+ Liquid Drain Cleaner

1. Identification of the material and supplier

Names

Product name	: Ecozyme B+ Liquid Drain Cleaner
ADG	: Not regulated
Supplier	: Austech Products P/L. 44 Kitchen Rd Dandenong, VIC, 3175
Emergency telephone Number	:1800 061 801

Uses

Material uses	: Drain Cleaning product
Date of issue	:1st March 2010

2. Hazards identification

Statement of hazardous/ Dangerous nature : **Not classified as hazardous** according to the criteria of NOHSC **nor classified as dangerous goods** according to the ADG code.

3. Composition/information on ingredients

Ingredients, determined not to be hazardous according to NOHSC criteria, and not dangerous according to the ADG Code, make up the product concentration to 100%.

4. First-Aid measures

Eye contact	: Rinse with plenty of running water. Get medical attention if symptoms Occur.
Skin contact	: In case of contact, immediately flush skin with plenty of water. Wash clothing before reuse. Get medical attention if symptoms occur.
Inhalation	: Remove to fresh air. Obtain medical attention if symptoms occur.
Indigestion	: Do not induce vomiting. Rinse mouth; then drink one or two large glasses of water. Contact a doctor or Poisons Information Centre (phone 13 11 26).
Notes to physician	: No specific treatment. Treat symptomatically.

5. Fire-fighting measures

Extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Fire/explosion hazard	: No specific hazard.
Special protective equipment for firefighters.	: Fire-fighters should wear appropriate protective equipment and self - Contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Hazardous decomposition Products	: No specific data

6. Accidental release measures

Personal precautions	:Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
Environmental precautions	:Avoid dispersal of spilled material and runoff and contact with soil and waterways. Inform the relevant authorities if the product has caused environmental pollution (waterways, soil or air).
Methods for cleaning up	:Stop leak if without risk. Move containers from spill area. Prevent entry into watercourse, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Note: see section 8 for personal protective equipment and section 13 for waste disposal.

7. Handling and storage

Handling	:Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking.
Storage	:Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep away from incompatibles, such as strong oxidising material.

8. Exposure controls/personal protection

Occupational exposure Limits	**: No exposure standard allocated.**
Engineering measures	: No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the work station location.
Personal protection	
Eyes	: Recommended: Safety glasses.
Hands	: Recommended: PVC gloves.
Respiratory	: A respirator is not needed under normal and intended conditions of product use.
Skin	: No special protective clothing is required.

9. Physical and chemical properties

Physical state	: Liquid.
Colour	: Green. [light]
Odour	: Citrus.
Boiling point	: >100°C(>212°F)
Melting point	: Not available.
Vapour pressure	: Not available.
Specific gravity	: 0.984 to 1.024.
Flash point	: Product does not support combustion.
Vapour density	: Not available
pH	: 7 to 8 [Conc. (%w/w): 100%]
Solubility	: Easily soluble in cold water, hot water.

10. Stability and reactivity

Stability	: The product is stable under normal ambient conditions of temperature an pressure.
Conditions to avoid	: None identified.
Materials to avoid	: Strong oxidising material.
Hazardous decomposition Products	: No specific data.
Hazardous Reactions	: No hazardous reactions expected.

11. Toxicological information

Potential acute health effects

Inhalation	: No known significant effects or critical hazards.
Indigestion	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Eye contact	: Slightly irritating to the eyes.

Potential chronic health effects

Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Reproductive toxicity	: No known significant effects or critical hazards.

12. Ecological information

Ecotoxicity data	: Not available.
Persistence/degradability	: Not available.
Mobility	: Not available.
Other adverse effects	: No known significant effects or critical hazards.

13. Disposal considerations

Methods of disposal	: Do not reuse product containers. The generation of waste should be avoided or minimised wherever possible. Avoid dispersal of spilled material and runoff and contact with soil and waterways. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

14. Transport information

Regulation	UN number	Proper shippin name	Class	Packing group	Additional information
ADG	-	Not regulated	-	-	-
IMDG	-	Not regulated	-	-	-

15. Regulatory information

Australia Inventory (AICS) : All substances are listed on AICS or exempt.
AU Classification : Not classified as hazardous according to the criteria of NOHSC.

Standard for the Uniform Scheduling of Drugs and Poisons.

Not scheduled.

Control of scheduled Carcinogenic Substances

Ingredient name	Schedule

No listed substance.

16. Other information

Prepared by : Regulatory affairs.
Date of previous issue : 12-july-2002
Change made : Minor formulation change.
Next Review Date : 1/3/2015
References : -ADG Code-Australian Transport of Dangerous goods
-Adopted National Exposure Standard for Atmospheric Contaminants in the Occupational Environment
-Approved Criteria for Classifying Hazardous Substances.
- List of Designated Hazardous Substances.
- National Code of Practice for the Labelling of Workplace Substances.
- National Code of Practice for the Preparation of Material Safety Data Sheets.
- National Model Regulations for the Control of Scheduled Carcinogenic Substances.
- National Model Regulations for the Control of Workplace Hazardous Substances.
- Standard for the Uniform Scheduling of Drugs and Poisons.

Disclaimer

The above information is believed to be correct with respect to the formula used to manufacture the product in the country of origin. As, data, standards, and regulations change, and conditions of use and handling are beyond our control. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION.

20.3 Actizyme Compost Accelerator

1. Identification of the material and supplier

Names

Product name	: ACTIZYME COMPOST ACCELERATOR
ADG	: Not regulated
Supplier	: Austech Products P/L, 44 Kitchen Rd Dandenong, VIC, 3175
Emergency telephone Number	:1800 061 801

Uses

Material uses	: Water Treatment
Date of issue	: 1st March 2010

2. Hazards identification

Statement of hazardous/ Dangerous nature	: Not classified as hazardous according to the criteria of NOHSC nor classified as dangerous goods according to the ADG code.

3. Composition/information on ingredients

Ingredients, determined not to be hazardous according to NOHSC criteria, and not dangerous according to the ADG Code, make up the product concentration to 100%.

4. First-Aid measures

First-aid measures

Eye contact	: Rinse with plenty of running water. Get medical attention if symptoms occur.
Skin contact	: Flush contaminated skin with plenty of water. Obtain medical attention if symptoms occur.
Inhalation	: Remove to fresh air. Obtain medical attention if symptoms occur.
Ingestion	: Do not induce vomiting. Rinse mouth; then drink one or two large glasses of water. Contact a doctor or Poisons Information Centre (phone 13 11 26).
Notes to physician	: No specific treatment. Treat symptomatically.

5. Fire-fighting measures

Extinguishing media	: Use an extinguishing agent suitable for the surrounding fire.
Fire/explosion hazard	: No specific hazard.
Special protective equipment for firefighters	: Fire-fighters should wear appropriate protective equipment and self - Contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Hazardous Decomposition Products	: These products are carbon oxides (CO, CO2).

6. Accidental release measures

Personal precautions	: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
Environmental precautions	: Avoid dispersal of spilt material and runoff and contact with soil waterways, drains and sewers.
Methods for cleaning up	: If emergency personnel are unavailable vacuum or carefully scoop up spilt material and place in an appropriate container for disposal by incineration. Avoid creating dusty conditions and prevent wind dispersal.

Note: see section 8 for personal protective equipment and section 13 for waste disposal.

7. Handling and storage

Handling	: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
Storage	: Store in a well-ventilated dry place. Protect from moisture. Keep away from incompatibles, such as strong oxidizing material.

8. Exposure controls/personal protection

Occupational exposure Limits	: No exposure standard allocated.
Engineering measures	: None required. However, use of adequate ventilation is good industrial practice.
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Personal protection	
Eyes	: Recommended: Safety glasses.
Hands	: Recommended: PVC gloves.
Respiratory	: A respirator is not needed under normal and intended conditions of product use.
Skin	: No special protective clothing is required.

9. Physical and chemical properties

Physical state	: Solid. (Extruded solid)
Colour	: Brown. (Light)
Odour	: Faint Odour
Boiling point	: >100°C
Melting point	: Not available.
Vapour pressure	: Not available.
Flash point	: Product does not support combustion.
Vapour density	: Not available
pH	: 7 (1%)
Solubility	: Very slightly soluble in cold water, hot water.

10. Stability and reactivity

Stability	: The product is stable under normal ambient conditions of temperature and pressure.
Conditions to avoid	: None identified.
Materials to avoid	: Strong oxidizing material.
Hazardous decomposition Products	: These products are carbon oxides (CO,CO2).
Hazardous Reactions	: No hazardous reactions expected.

11. Toxicological information

Potential acute health effects	
Inhalation	: No known significant effects or critical hazards.
Ingestion	: Exposure can cause nausea, headache and vomiting.
Skin contact	: No known significant effects or critical hazards.
Eye contact	: Slightly irritating to the eyes.
Potential chronic health effects	
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Reproductive toxicity	: No known significant effects or critical hazards.

12. Ecological information

Ecotoxicity data	: Not available.
Persistence/degradability	: Not available.
Mobility	: Not available.
Other adverse effects	: No known significant effects or critical hazards.

13. Disposal considerations

Methods of disposal	: Do not reuse product containers. The generation of waste should be avoided or minimised wherever possible. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

14. Transport information

Regulation	UN number	Proper shipping name	Class	Packing group	Additional information
ADG	-	Not regulated	- (-)	-	-
IMDG	-	Not regulated	- (-)	-	-

15. Regulatory information

Australian Inventory Status : All substances are listed on AICS or exempt.
AU Classification : Not classified as hazardous according to the criteria of NOHSC

Standard for the Uniform Scheduling of Drugs and Poisons.
Not scheduled.

Control of scheduled Carcinogenic Substances
Ingredient name Schedule
No listed substance.

16. Other information

Prepared by : Regulatory affairs.
Date of previous issue : 18-February-2002
Change made : New format. 1/3/2011
Next Review Date : 1/3/2015
References : -ADG Code-Australian Transport of Dangerous goods
-Adopted National Exposure Standard for Atmospheric Contaminants in the Occupational Environment
-Approved Criteria for Classifying Hazardous Substances.
- List of Designated Hazardous Substances.
- National Code of Practice for the Labelling of Workplace Substances.
- National Code of Practice for the Preparation of Material Safety Data Sheets.
- National Model Regulations for the Control of Scheduled Carcinogenic Substances.
- National Model Regulations for the Control of Workplace Hazardous Substances.
- Standard for the Uniform Scheduling of Drugs and Poisons.

Disclaimer

The above information is believed to be correct with respect to the formula used to manufacture the product in the country of origin. As data, standards, and regulations change, and conditions of use and handling are beyond our control. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION.

21 Appendix B – Electrical Equipment Technical Information

21.1 TECMA Sanisplit 3 Combi

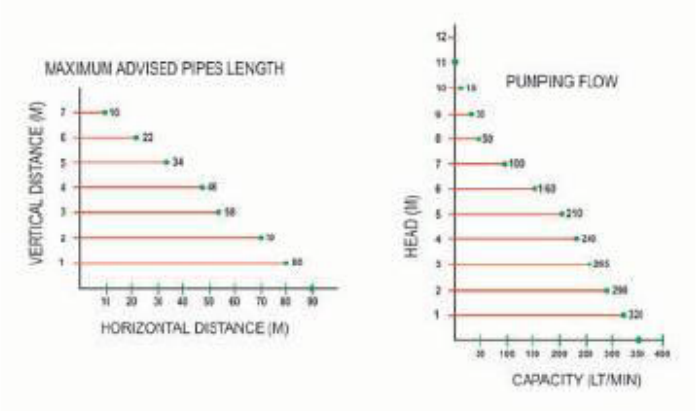
Electrical

Your Sanisplit must be wired into a fused; unswitched fixed wiring connector (5 Amp Fuse). Disconnect from the electricity supply before attempting to service the unit.

Specifications	
Power Supply	230 V AC
Power	600W
Electrical Absorption	3A
Frequency	50 Hz
Protection Class	IP 55
Max Elevation Head	11mm
Max Capacity	350 L/min
Service	Intermittent
Sewage Water Temperature	< 100°C
Condenser	10 F/450V
Electrical Cable Length	1.2m
Pipe Discharge Size	32mm or 40mm

Flow Rates

Maximum head is 11 metres vertically, or 80 metres horizontally. If both vertical and horizontal pipes are used many factors will affect performance such as number of bends and length of horizontal and vertical pipe work. For this reason no accurate performance calculation formula is possible. Use the charted flow rates at various heights as a guide.



TECMA

Sanisplit - the world of toilet

Tecma automated toilet and wastewater package pump stations.

Installation and use instructions

1.0 Before installation

- A permit may be required for the installation of the Sanisplit system, please check with your local plumbing/drainage inspector and electrical inspectors before you proceed with installation
- Determine the correct model to use, a Sanisplit 3 for example will be required if a bath or shower is to be installed in conjunction with a toilet.
- All models come standard with an internal vent system.
- If a long length of pipe is used on the main inlet to the Sanisplit please ensure you have an externally vented unit.

ART.								
TYPE	1	•						
TYPE	2	•	•				•	•	•
TYPE	3	•	•	•	•	•	•	•	•
TYPE	K2		•				•	•	•
TYPE	K3		•	•	•	•	•	•	•

- All models come standard with an internal non-return valve fitted into the discharge line.
- The Sanisplit consists of a box that incorporates a pump that can automatically chop and expel mild acids, fatty hot water (up to 100°C), faeces and toilet paper through a 32 uPVC class D pressure pipe to the nearest sewer. Sanisplit are not intended to pump sanitary products such as tampons, condoms as they may cause a blockage. Blockages can also be caused by coffee grinds as they are heavy and settle in pipes and tanks.
- The Sanisplit can be used to collect wastewater and pump up to a maximum height of 11 meters (refer to the performance curve on page 7). It is suitable for all the discharges of the sanitary fittings located in both the bathroom and the kitchen, including washing machine, dishwasher, and any other device that needs to discharge waste water.
- When connecting the Sanisplit to a toilet, a P-Pan style toilet is the norm. If you wish to use an S-pan this is possible but you will require fall to the Sanisplit location.

TECMA
Sanisplit - the world of toilet

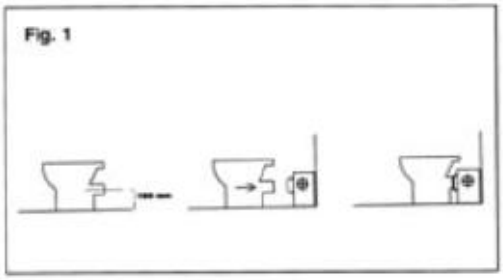
2.0 Installation of Sanisplit Type 1-2-3

The Sanisplit is made up of 2 parts – the tank component which has connections for WC, discharge pipe and up to 2 x 40mm DWV inlet pipes. Multiple bathroom components can be connected to the Sanisplit by using standard T connectors into the waste pipe lines as per standard plumbing practice.

2.1 P-Pan Connection

The Sanisplit can be connected to any standard P-pan toilet. The P-pan is connected by inserting the WC discharge into the rubber coupling on the tank; lube may be required and fix P-pan in place with the jubilee clip supplied (Fig. 1).

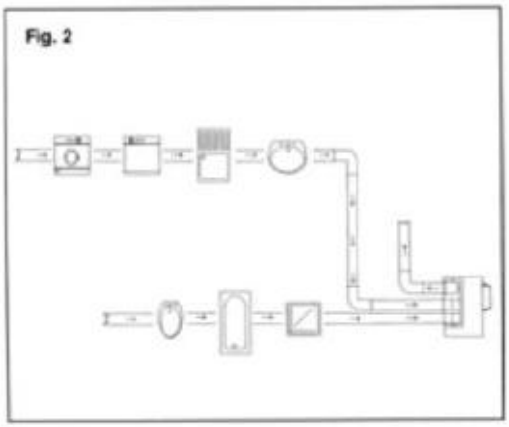
Fig. 1



2.2 Waste Pipe Connections

The discharge from the Sanisplit and other pieces of bathroom and kitchen equipment are connected to the back of the Sanisplit (Fig. 2), this allows all pipes, connectors, valves etc. that spoil the appearance of a bathroom to be hidden, please remember however that the Sanisplit and all valves must be accessible.

Fig. 2



Discharge pipe, - should be in 32 uPVC class D pressure pipe securely fixed to reduce noise and vibration, the discharge line should always rise to the discharge point.

Jubilee clips have been supplied for all pipe connections to tank.

Bathroom and kitchen items must be connected as shown in Fig. 2. For dishwashers and washing machines only, one can select either of the two inlet connections.

However the possibility of connecting pipes externally exists, this allows pipes to be run external to the wall cavity (Fig.3, Fig.4 and Fig.5).

Fig. 3

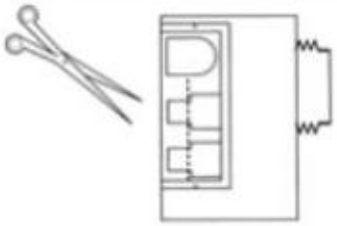


Fig. 4

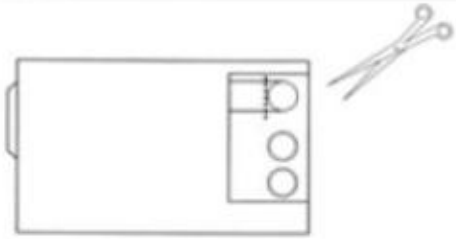
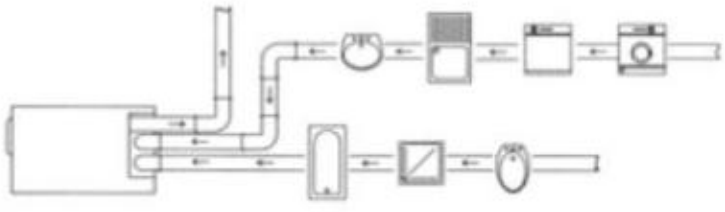


Fig. 5

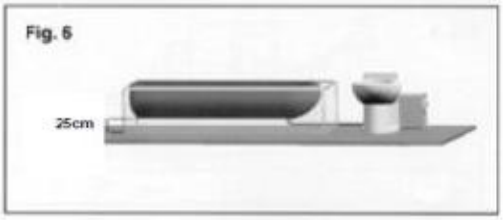


TECMA
Sanisplit - the world of toilet

2.3 Connection of Shower, Baths and Laundry SuperTubs

The shower tray and floor of the bathtub must be at least 25cm (250mm) above floor level (Fig. 6) with either a 40mm HEPvO 40mm waste valve or a 40mm FLOcheck (Swing Check) valve. This allows the Sanisplit to switch on and off with out wastewater backing up into the shower tray or the bathtub.

Fig. 6



2.4 Venting

Sanisplit are available with two vent options, one being the internal atmosphere vent which requires no attention by the installer, the other being the external atmosphere vent – the external vent option connects to the top of the Sanisplit through a 32mm PVC waste/vent socket, and requires 32mm pipe to be run to a suitable termination point as per the NZ Building and Plumbing code of practice.

External venting is required if remote installation of the Sanisplit is intended.

2.5 Venting to Atmosphere

1. Drain the unit, split and disconnect from toilet pan.
2. Remove the four screws from the tank unit.
3. Push the pan collar inside the white plastic outer and slide the butyl tank out of the unit.
4. Remove the white internal vent fitting located on the top of the tank.
5. Remove the rubber skirt and ping-pong ball.
6. Cut the bottom from the rubber skirt that covered the ping-pong ball.
7. Re-insert rubber skirt into butyl tank.
8. Push a 112-32 PVC female thread adaptor into the old vent position.
9. Mark the centre position on the white plastic outer for the hole to fit a 113-32 PVC male thread adaptor.
10. Drill the hole to ensure a tight fit for the 32mm male fitting.
11. Re-assemble the unit, checking all pipes are properly connected.
12. Re-install the pump and connect the 32mm DWV vent pipe.

Note: Warranty is void if an air admittance valve is used in conjunction with Sanisplit.

2.6 Labelling

Labels have been supplied with the Sanisplit, please affix in an appropriate position. They are intended to warn users against the disposal of sanitary and non-biological items through the Sanisplit system

3.0 Sanisplit Types

3.1 Standard Sanisplit type 1-2-3

This unit discharges wastewater from all bathroom and kitchen fixtures and appliances including the WC toilet pan.

3.2 Sanisplit K series pump stations

This discharges water from all bathroom and kitchen items except the WC toilet pan.
There is an inspection plug, fixed by a clip, on the front of the appliance.
Connection of the outlet and of the bathroom and kitchen items is the same
as for the Type 2-3.

4.0 Operation and Precautions

- If the electricity supply fails, do not use the devices connected to the appliance.
- It is recommended that the appliance should have its own RCD protected power socket.
- The appliance can discharge only faeces, toilet paper and acid fatty and hot water (up to 100oC). Do not throw unsuitable objects that might damage the pump into the WC. For this reason, fix the label supplied to the underside of the toilet lid or in some other position where it is visible.
- Check that the items connected to the appliance are not leaking, since if they are, the pump will operate uselessly. Furthermore, in the event of a failure in the power supply, water leaking from some device could flow back up and might then overflow.
- In the event that the bathroom or house are not to be used for a long period, it is recommended that the mains water supply be closed.
- Detergents do not damage the pump.

5.0 Servicing Sanisplit

The Split-system macerator-box comprises an initial water-collecting unit fixed in a permanent manner onto the water closet and the other appliances, and a second extractable unit including the mechanisms needed for its operation.

The extractable part can be removed in a very simple operation as follows:

a. Disconnect the power supply plug from the pump unit.
b. Remove the side cover as shown in Fig. 7.

Fig. 7

c. Remove the plug provided for emptying the collection unit, collecting the water as shown in Fig. 8. or if you have the drain bag model just puncture it through the plug fitting a replacement plug once drained.

Fig. 8

d. Unscrew the knob on the opposite side of the appliances as shown in Fig. 9.

Fig. 9

e. Remove the extractable unit as shown in Fig. 10 and free the macerator from any unsuitable object as shown in Fig. 11.

Fig. 10

Fig. 11

f. Once blockage removed reinsert the extractable unit and screw back the knob until the extractable unit is firmly connected to the water collection unit.

g. Reinsert the plug removed in step 3

h. Reconnect power supply,

i. Test run the unit by flushing toilet or running sink, and check for leaks.

j. Replace the pipe cover removed in step 1.

21.2 Linear Diaphragm Pumps – LP 150HN

THOMAS by Gardner Denver

OPERATION MANUAL
Linear Diaphragm Pumps

Models:				
	AP-30	LP-150HN	LW-240	YP-6A
	AP-40	LP-200HN		YP-15A
	AP-60N			YP-20A
	AP-60/80			YP-6V
	AP-80H			YP-15V
	AP-100			YP-20V
	AP-120			YP-30VC
				YP-40VC
				YP-50VC
				YP-60VC
				YP-70VC

Thank you for purchasing a Gardner Denver Thomas linear pump.
See page 6 for native language translation table of contents.
Save these original instructions.

Art. Nr. 17000820 07/2016

1

THOMAS by Gardner Denver

Safety Instruction

Symbols Used

Warning Instruction
Failure to comply can endanger the pump, the system or even the life and health of persons.

Caution – High Voltage
This symbol warns of dangerous high voltages.

Please read this manual before operation of the pump, taking note of all instructions. Compliance with these instructions will ensure safe and reliable operation. Failure to comply with all the safety precautions can result in malfunction, risk of fire and endanger the health of people.

Any constructional change or misuse by an end-user invalidates the product warranty and/or liabilities.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children should not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

All AP, LP, LW, YP 30VC, YP 40VC, YP 60VC, YP 60VC and YP 70VC models are equipped with an integrated thermal protective switch that activates (pump will not run) when overheated and deactivates (normal operation mode) after the pump has cooled. (The YP-6A, YP-15A, YP-20A, YP6V, YP-15V and YP-20V models have a thermal fuse.)

Do not place anything on the electrical cable. Damaged cables can cause short circuits or electrical shock and must be repaired by trained service personnel.

Do not spill water or other liquids over the pump.

Work on electrical devices may only be carried out by skilled personnel in accordance with the applicable engineering regulations.

Installation Instruction

- The pump is suitable only for operation in dry rooms.
- The pump location should be well ventilated, positioned horizontally on its mounting feet and should not come in contact with other objects or installed in an area that is subject to explosion hazard.
- Ensure the pump is placed on a firm base with a suitable slip-free surface.
- Kinks or bends in hose can affect pump performance. Inside hose diameter should be a minimum equal to pump outlet outer diameter and its length should not exceed 10m.
- Ensure that the supply voltage and frequency corresponds to the pump label.
- Ensure that the pump socket is earthed.
- Ensure that the operating air temperature is within the range -10°C to +40°C and the air humidity does not rise above 90%.
- The diaphragm linear pump is designed for pumping air only. The following media must not be allowed to enter the air intake: dangerous gas mixtures (e.g. combustible gases, explosive gases or vapours), water vapour, any liquids, aggressive gases, or traces of oil or oil mist and grease.
- Pumps should be operated within specified pressure range only. Performance range specification may be found on series datasheet on gd-thomas.com. Do not operate pump at zero pressure.

2

THOMAS by Gardner Denver

Installation Instruction (Continued)

For pumps used to aerate water in aquariums, ponds or similar, avoid water entering the pump by ensuring that the pump is installed above the water level.

For proper grounding, do not defeat the ground pin.

If the supply cord is damaged, it must be replaced by trained service personnel in order to avoid a hazard.

Maintenance Instruction

Any maintenance work to linear pump other than what is described within the table below must be undertaken by trained service personnel.

Recommended Filter Maintenance Schedule

Make sure the main power cord is disconnected before performing maintenance.

	AP Series	LP Series	LW Series	YP Series
Filter Cleaning/ Replacement	The air filter element should be cleaned every three months and replaced every twelve months.			Customer integrated

AP Series Filter Element Replacement Instructions:
Disconnect power. Remove filter cover & screw. Replace filter element, reassemble cover & screw.

LP or LW Series Filter Element Replacement Instructions:
Disconnect power. Remove filter cover & screw. Replace filter element, reassemble cover & screw.

YP Series Filter Element Replacement Instructions:
It is the responsibility of the end-user to integrate a suitable filtration method.

For replacement filter element part numbers, see pertinent series datasheet on gd-thomas.com.

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THOMAS by Gardner Denver

Integrated Diaphragm Protection Switch Information

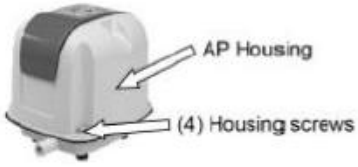
Models AP-60N, AP-60/80, AP-80H, AP-100, AP-120, LP-150HN, LP-200HN, LW-240 and YP-70VC are equipped with an integrated diaphragm protection switch that activates or turns off the pump in case of a diaphragm failure or external impact. This switch may be deactivated by performing the following instructions:

Make sure the main power cord is disconnected before performing switch deactivation.

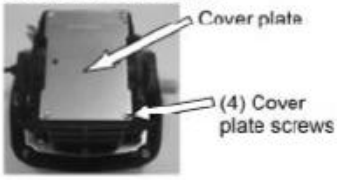
If the diaphragm is damaged, have the pump serviced by trained service personnel. (Damage may be detected by little or no air flow or higher than normal sound level.)

Applicable AP Series Diaphragm Switch Deactivation Instruction:

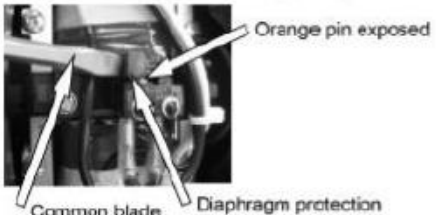
Disconnect power and remove four housing screws and housing.



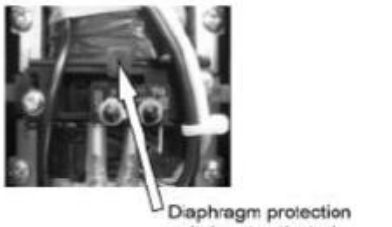
Remove four cover plate screws and cover plate.



Use a common blade screwdriver to push lower portion of black switch lever over orange pin so that the orange pin is no longer exposed.



After positioning diaphragm protection switch to proper position to deactivate switch, reassemble unit.



Applicable LP & LW Series Diaphragm Switch Deactivation Instruction:

Note: The LP & LW Series models contain different switches. Identify what type switch your pump has by comparing the various photos and instructions below:

Disconnect power and remove housing screws and housing.

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21.3 UV Filter Manual

Sterilight silver uv disinfection

Installation, Operation and Maintenance

Owner's Manual

SQ-PA, S1Q-PA, S2Q-PA, S5Q-PA, S8Q-PA, S12Q-PA, SSM-14, SSM-17, SSM-24, SSM-37, SSM-39

Manufactured in Canada by:

R-can

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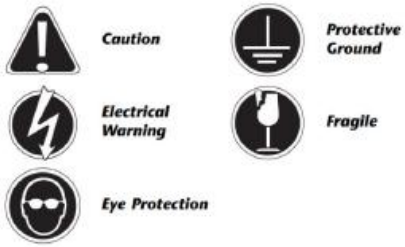
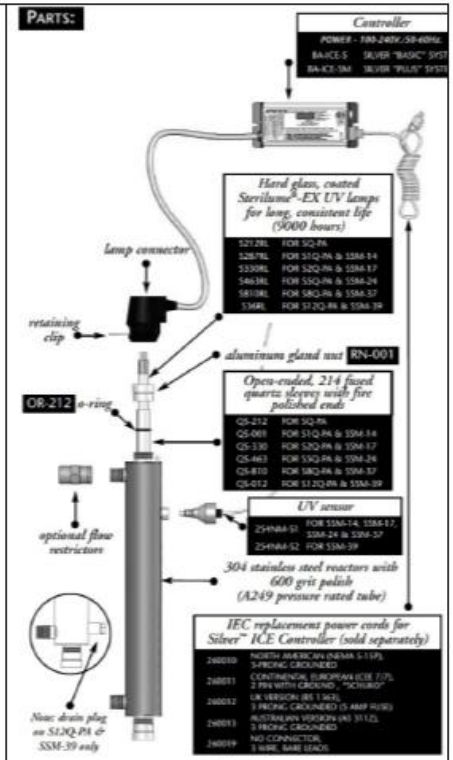
EPA# 57987-CN-001
October 2006
P/N S20104

TABLE OF CONTENTS:

SYMBOLS:



PARTS:



SAFETY INSTRUCTIONS:

WARNING - to guard against injury, basic safety precautions should be observed, including the following:

1. ***READ AND FOLLOW ALL SAFETY INSTRUCTIONS.***
2. **CAUTION** - Disconnect power before servicing.
3. **DANGER** - To avoid possible electric shock, special care should be taken since water is present near electrical equipment. Unless a situation is encountered that is explicitly addressed by the provided maintenance and troubleshooting sections, do not attempt repairs yourself, refer to an authorized service facility.
4. Carefully examine the disinfection system after installation. It should not be plugged in if there is water on parts not intended to be wet.
5. Do not operate the disinfection system if it has a damaged cord or plug, if it is malfunctioning or if it has been dropped or damaged in any manner.
6. Always disconnect water flow and unplug the disinfection system before performing any cleaning or maintenance activities. Never yank the cord to remove from an outlet; grasp the wall plug and pull to disconnect.
7. Do not use this disinfection system for other than intended use (potable water applications). The use of attachments not recommended or sold by the manufacturer / distributor may cause an unsafe condition.
8. Intended for indoor use only. Do not install this disinfection system where it will be exposed to the weather or to temperatures below freezing. Do not store this disinfection system where it will be exposed to the weather. Do not store this disinfection system where it will be exposed to temperatures below freezing unless all water has been drained from it and the water supply has been disconnected.
9. Read and observe all the important notices and warnings on the water disinfection system.
10. If an extension cord is necessary, a cord with a proper rating should be used. A cord rated for less Amperes or Watts than the disinfection system rating may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
11. **SAVE THESE INSTRUCTIONS.**

Warning: The UV light given off by this unit can cause serious burns to unprotected eyes and skin. Never look directly at an illuminated UV lamp. When performing any work on the UV disinfection system always unplug the unit first. Never operate the UV system while the UV lamp is outside of the UV chamber.

Note: The UV lamp inside of the disinfection system is rated at an effective life of approximately 9000 hours. To ensure continuous protection, replace the UV lamp annually.

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WATER CHEMISTRY:

Water quality is extremely important for the optimum performance of your UV system. The following levels are recommended for installation:

- **Iron: < 0.3 ppm (0.3 mg/L)**
- **Hardness*: < 7 gpg (120 mg/L)**
- **Turbidity: < 1 NTU**
- **Manganese: < 0.05 ppm (0.05 mg/L)**
- **Tannins: < 0.1 ppm (0.1 mg/L)**
- **UV Transmittance: > 75% (call factory for recommendations on applications where UVT < 75%)**

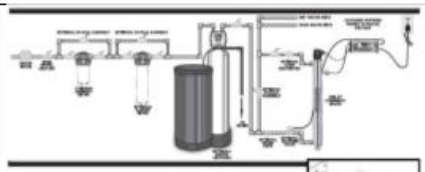
** Where total hardness is less than 7 gpg, the UV unit should operate efficiently provided the quartz sleeve is cleaned periodically. If total hardness exceeds 7 gpg, the water should be softened.*

If your water chemistry contains levels in excess of those mentioned above, proper pre-treatment is recommended to correct these water problems prior to the installation of your UV disinfection system. These water quality parameters can be tested by your local dealer, or by most private analytical laboratories. **Proper pre-treatment is essential for the UV disinfection system to operate as intended.**

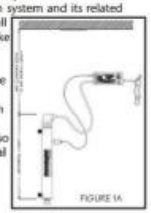
INSTALLING YOUR UV DISINFECTION SYSTEM:

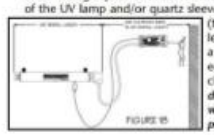
- CAUTION, electronic ballast must be connected to a grounded receptacle and the lamp connector ground wire connected to the stainless steel reactor chamber.
- The disinfection system is designed to be mounted either horizontally or vertically at the point-of-use or point-of-entry depending on the specific flow rate of the unit.
  Note: The ideal installation is vertical with the lamp connector on top. This is to prevent water damage from occurring on the lamp pins and lamp connector.
- The ballast should be mounted either above or beside the reactor chamber. This will prevent moisture caused by condensation from entering the ballast enclosure, causing a potential for ballast failure.
- The complete water system, including any pressure or hot water tanks, must be sterilized before start up by flushing with chlorine (household bleach) to destroy any residual contamination.
- For safety purposes, the disinfection system should be connected to a ground fault interrupt circuit.
- The disinfection system is intended for indoor use only, do not install disinfection system where it may be exposed to the weather.
- Install the disinfection system on cold water line only.
- If treating the entire house, install the disinfection system before any branch lines.
- A 5 micron sediment filter must precede the disinfection system. Ideally, the disinfection system should be the last treatment the water receives before it reaches the faucet.

3



1. The above picture shows the installation of a typical disinfection system and the related components that may be used for the installation. The use of a by-pass assembly is recommended in case the system requires "off-line" maintenance. If this is the case, it must be noted that the system will require supplementary disinfection of the distribution system if any water is used during this by-pass condition. In addition, during by-pass, the water will NOT be disinfected and the attached "DO NOT CONSUME THE WATER" tag (included with the system), should be physically installed on the by-pass assembly until such time as the system is sanitized and returned to service. Please refer to the complete disinfection procedure as outlined on page 6 of this document. If the water is to be consumed while the system is off-line, the water must be boiled for twenty minutes prior to consumption.
2. Select a suitable location for the disinfection system and its related components. As it is recommended to install a ground fault protected circuit (GFCI), make sure that this is taken into consideration prior to any installation. The system can either be installed vertically (inlet port at the bottom) (Figure 1A), or horizontally (Figure 1B), however the vertical installation is the most preferred method. When selecting a mounting location, you must also leave enough space to allow for the removal of the UV lamp and/or quartz sleeve (typically leave a space equal to the size of the reactor chamber itself). ***(Note: Installation drawings show Silver "PLUS" system with UV sensor for representation purpose only)***





4

3. Mount the system to the wall using the supplied clamps. Various connection methods can be used to connect the water source to the system, however union type connectors are recommended. The use of a flow restrictor device is strongly recommended when installing your system in order to maintain the manufacturers rated flow rate. The flow restrictor should be installed on the outlet port and is designed to be installed in one direction only. Ensure that the flow of the water matches the flow direction as indicated on the flow restrictor (Figure 1C). DO NOT SOLDER CONNECTIONS WHILE ATTACHED TO THE SYSTEM AS THIS COULD DAMAGE THE O-RING SEALS.
4. Mount the Silver ICE controller horizontally to the wall, near the reactor chamber. Ideally place the controller above the reactor and away from any water connection point, to prevent any water from potentially leaking onto the controller by means of a leak at a connection point or a "sweating" system. Make sure you allow for a "drip-loop" (Figure 1D) on the lamp, sensor and power cord, again, to prevent any water from potentially entering the controller. Affix the green ground wire to the grounding lug at the top of the reactor vessel and securely fasten with the lugnut provided (Figure 1E).
5. Install the UV lamp and UV sensor as outlined on pages 7-9.
6. Install the over-molded lamp connector as outlined on page 7.
7. When all plumbing connections are made, slowly turn on the water supply and check for leaks. The most likely cause for leaks is from the o-ring seal. In case of a leak, shut water off, drain cell, remove the retaining nut, wipe the o-ring and threads clean and re-install.
8. Once it is determined that there are no leaks, plug the system into the ground fault interrupter, and check controller to ensure the system is operating properly. The controller is designed to detect both power to the system and lamp illumination. It is important to NEVER LOOK DIRECTLY AT THE BURNING UV LAMP.
9. Allow the water to run for a few minutes to clear any air or dust that may be in the reactor.

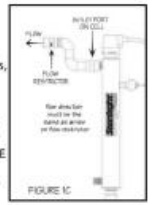


FIGURE 1C

PLEASE NOTE: When there is no flow, the water in the cell will become warm, as the UV lamp is always on. To remedy this, run a cold water tap anywhere in the house for a minute to flush out the warm water.

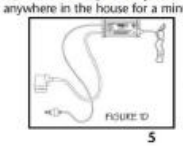


FIGURE 1D

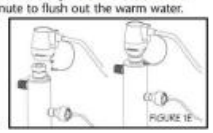


FIGURE 1E

5

Disinfection Procedure:

UV disinfection is a physical disinfection process and does not add any potentially harmful chemicals to the water. As UV does not provide a disinfection residual, it is imperative that the entire distribution system located after the UV be chemically disinfected to ensure that the water is free from any bacteriological contaminants. The disinfection process must be performed immediately after the UV unit is installed and repeated thereafter whenever the UV is shut down for service, without power, or inoperative for any reason. The procedure for sanitizing the plumbing system is readily accomplished as follows:

1. Remove the pre-filter cartridge and fill the sump with 1-2 cups of household (5.25%) bleach (chlorine) – Do ***NOT*** use hydrogen peroxide. At all times during this process, make sure the UV unit (and lamp) is turned on and operational!
2. Open every faucet and allow cold water to run until the chlorine is detected. When you smell chlorine, shut the faucet off and then repeat the process on the hot water side. You must ensure that all taps, including outside faucets, dishwashers, showerheads, washing machines, connections to refrigerators, toilets, etc., pass chlorinated water.
3. Once all the locations have passed the chlorine disinfection solution, you will need to leave the solution sit for a period of 20 – 30 minutes. Reinstall the pre-filter cartridge into the filter and then flush the chlorine solution from the system. Make sure that each fixture that was disinfected in step two is completely flushed of the chlorine solution as the consumption of this water is not advised due to the extremely high concentrations of chlorine. It is important to remember that in the event that a UV is briefly shut down for routine cleaning or during power interruptions where water could have passed through the system, the aforementioned procedure must also be followed.
4. The addition of chlorine (bleach) to a hot water tank that has in the past been fed with untreated raw water with high levels of other contaminants (iron, manganese, hydrogen sulphide, organics, etc.) will result in oxidation of these contaminants and may require repeated flushing of the hot water tank. This contingency must be dealt with independently under the start-up procedure for any other conditioners that may form a part of the pre-treatment for the UV unit.
5. The above procedure (Steps 1 to 3) will result in a massive chlorine residual far in excess of the 0.5 to 1.0 mg/L typically present in municipally chlorinated water and of a magnitude consistent with the minimum 50 mg/L chlorine solution recommended for the disinfection of distribution systems known to be contaminated.

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PLEASE NOTE: As the Silver "PLUS" systems include a 254nm UV intensity monitor, it should be noted that the introduction of the bleach solution required for disinfection ***WILL*** trigger a temporary low UV condition. This is due to the fact that the bleach physically "clouds" the raw water. Once the bleach runs through the system, the alarm condition will return to normal. During this sanitization process, the audible alarm condition on the Silver "PLUS" controller can be temporarily deferred by pressing the "RESET" switch for 5 seconds. By doing this, the audible alarm will be silenced and the solenoid relay will close (AC power will be provided to the normally closed (NC) solenoid, allowing water to pass through the system). The system will display R2 on the controller LED. This condition will remain for 12 hours unless the system is manually reset as outlined on page 10 of this manual.

OPERATION

- Always disconnect power before performing any work on the disinfection system.
- Regularly inspect your disinfection system to ensure that the system is operational.
- Replace the UV lamp annually (or biennially if seasonal home use) to ensure maximum disinfection.
- Always drain the reactor chamber when closing a seasonal home or leaving the unit in an area subject to freezing temperatures.

Operating & Maintenance Instructions:

Caution: PRIOR TO PERFORMING ANY WORK ON THE DISINFECTION SYSTEM, ALWAYS DISCONNECT THE POWER SUPPLY FIRST.

UV Lamp Replacement / Cleaning:

1. To replace the lamp, there is NO need to disconnect the system from the water supply, nor to drain the water from the reactor chamber. Lamp replacement is a quick and simple procedure requiring no special tools. The UV lamp must be replaced after 9,000 hours of continuous operation (approximately one year) in order to ensure adequate disinfection.

FIGURE 2A

2. Disconnect main power source and allow the unit to power down. Remove the lamp connector by sliding the metal retaining ring (Figure 2A) away from the body of the connector. Remove connector and lamp from the reactor chamber. Separate the lamp from the connector (Figure 2B). Do not twist the lamp from the connector; simply slide the two apart. Avoid touching the lamp on the glass portion. Handling the lamp at the ceramic ends is acceptable, however if you must touch the lamp glass, please use gloves, or a soft cloth. Fully remove the lamp from the reactor chamber being careful not to angle the lamp as it is removed from the chamber. If the lamp is removed on an angle, pressure will be applied on the inside of the quartz sleeve, causing the sleeve to fracture

FIGURE 2B

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3. To install a new lamp, first remove the lamp from its protective packaging, again being careful not to touch the lamp glass itself. Carefully insert the lamp into the reactor vessel (actually inside the quartz sleeve) (Figure 2C). Insert the lamp fully into the chamber leaving about two inches of the lamp protruding from the chamber. Next, attach the connector to the UV lamp (Figure 2B). The connector is "keyed" and will only allow correct installation in one position. Ensure the connector is fully seated onto the UV lamp (Figure 2D).


FIGURE 2C

4. Once the lamp is fully seated on the connector, slide the connector over the aluminum retaining nut. Make sure the metal retaining ring on the connector is pulled away from the body of the connector in order that the connector may slide fully over the retaining nut. Once the connector is located fully over the retaining nut, slide the metal ring back in to lock the connector in place (Figure 2E). As this connector is keyed to the reactor chamber, make sure the notch on the connector (Figure 2A) is located over the ground luglocated on the reactor chamber.

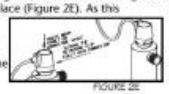


FIGURE 2E


FIGURE 2D

Quartz Sleeve Replacement / Cleaning:

1. If the water contains any hardness minerals (calcium or magnesium), iron or manganese, the quartz sleeve will require periodic cleaning. To remove the quartz sleeve, first remove the UV lamp as outlined in step 1-4 then perform the following steps:
   a) Shut off water supply and drain all lines.
   b) Remove the lowest connection on the disinfection system to drain the UV chamber (use a small bucket under the connection to prevent a spill). Note: On S12Q-PA & SSM-39 systems the UV chamber is provided with a 1/4" drain port. On this system, remove the drain plug and allow water to drain into a bucket.
   c) Remove aluminum gland nuts from chamber (Figure 3A). Locate for the free floating spring inside sleeve at the opposite end of the lamp connection (do not allow quartz sleeve to fall).
   d) Carefully remove o-rings from the quartz sleeve (Figure 3B). Note: the o-ring may tend to adhere to the quartz sleeve, it is recommended to replace the o-rings annually.
   e) Clean the outside of the quartz sleeve with a cloth soaked in CLR, vinegar or some other mild acid and then rinse.
   f) Re-assemble the quartz sleeve with spring in the UV chamber allowing the sleeve to protrude an equal distance from both ends of the UV chamber (Figure 3C).
   g) Wet the o-rings and slide onto each end of the quartz sleeve and reassemble the gland nuts (hand tight is sufficient).
   h) Re-tighten all connections, turn on water and check for leaks.
   i) Re-install the UV lamp and lamp connector as per prior instructions.
   j) Plug in ballast and verify the POWER-ON LED is illuminated and ballast power-up sequence operates.

Note: If the system is put on a temporary by-pass or if it becomes contaminated after the disinfection system, it will be necessary to shock the system with household bleach for a full 20 minutes before resuming the use of the water.


FIGURE 3B


FIGURE 3C

UV Sensor Replacement / Cleaning:

The UV sensor is an extremely sensitive and fragile instrument. Extreme care is required when handling and cleaning. The sensor window itself is constructed from quartz which is extremely fragile, be careful you do not chip or break this quartz window. Manufacturer's warranty does not cover damage due to neglect or misuse.

1. Mineral deposits and sediment may accumulate on the sensor window decreasing the UV energy detected. Good maintenance of pre-treatment equipment will reduce the accumulation of residues. If the system indicates that the UV intensity is low, one cause may be a stained quartz sleeve and/or sensor window (Figure 4A). If necessary, remove the sensor assembly and proceed with cleaning process. Repeat the process as often as necessary to keep the sensor window and quartz sleeve clean.

2. Before removing the sensor assembly, follow the steps as outlined in the "Quartz Sleeve Replacement And/Or Cleaning" section. The quartz sleeve should be cleaned at the same time as the UV sensor. Disconnect the UV sensor from the Silver "PLUS" (BA-ICE-SM) controller by disconnecting the sensor cable (Figure 4B). To remove the sensor, grasp the stainless portion of the sensor and rotate counter-clockwise (Figure 4C) until the sensor is free of the threaded sensor port.

3. Once the sensor is free from the reactor chamber, clean the quartz window with a commercial scale remover (CLR or Lime-A-Way) and a lint free cotton swab (Figure 4D). Follow all manufacturer's instructions regarding the cleaning fluid used. Do not use an abrasive cleaner on the sensor window. Scratching of the sensor window will void any manufacturer's warranty on this item.

4. Carefully reassemble the sensor assembly into the sensor boss by first inserting the sensor o-ring (Figure 4E) and then the sensor itself. Screw the sensor into the [illegible] tighten to achieve a water-tight seal. DO NOT OVER TIGHTEN. Attach [illegible] cable to the Controller and return to service (Figure 4F).

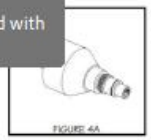


FIGURE 4A

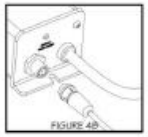


FIGURE 4B


FIGURE 4C


FIGURE 4D

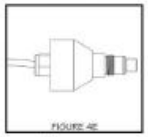


FIGURE 4E


FIGURE 4F

OPERATION:

Basic Systems incorporating BA-ICE-S controller:

365 1. *Lamp life remaining (days):*

The controller tracks the number of days of operation of the lamp and the controller. The default screen will display the total lamp life remaining (in days). The controller will count down the number of days remaining until the lamp requires changing (365 days to 1 day). At "0" days, the controller will display A3 on the display and supply an intermittent audible chirp (1 second on, 5 seconds off), indicating the need to change the lamp.

DEFERRAL - Once the "A3" or end of lamp life message is shown on the LED screen, the audible alarm can be deferred up to 4 separate times. This can be done by simply depressing the push-button "RESET" switch, which is located on the left side of the controller. Each time the reset switch is pressed the controller alarm is deferred seven days. Once the final 7 day deferral has been reached the alarm can only be silenced by changing the UV lamp and manually resetting the controller timer. To do this please follow the step by step instructions below:

1. disconnect power supply from controller
2. remove expired lamp from the reactor chamber
3. install new UV lamp and connect it to lamp connector
4. replace lamp connector
5. hold down the "RESET" switch while reapplying power to the controller
6. 5 second delay will occur until you hear an audible tone & LED display will read 365 once again

Once you hear the tone, let go of the switch and the counter will be reset. The delay switch is designed to allow you time to address the alarm while you obtain a new UV lamp. Even though the alarm on the system can be deferred for a period of time, it is important to address each and every alarm condition as they are indicating that there is a potential problem with the system and should be remedied.

1680 2. *Total days of operation:*

The controller also displays the total running time of the controller. To obtain this reading, press the push-button SWITCH once. The total running time of the controller will be numerically displayed in days. This information will remain displayed for ten seconds and will then revert back to the lamp life remaining default screen. It should be noted that this value cannot be reset.

3. *Lamp failure (blank screen):*

When the system recognizes LAMP FAILURE (no current running through the lamp), the 4-segment display will be blank (no default LAMP LIFE REMAINING screen) and the system will supply an intermittent audible tone (1 second on, 1 second off). The system will remain in this state, until this condition is remedied.

"PLUS" Systems incorporating BA-ICE-SM controller:

99 1. *UV intensity (%):*

The Silver "PLUS" series of products incorporate a UV sensor which detects the discrete 254 nm wavelength of the UV lamp. This information is relayed to the Silver "PLUS" controller and is the default display shown in "% UV output". The system will display the UV output between 50 to 99 percent. When the system drops below 50%, a low UV warning is displayed as A2 and alternately flashes (at 2 second intervals) back to the actual UV level. → Eg. 49
Additionally, the system will supply an intermittent audible tone (2 seconds on, 2 seconds off), during low UV conditions.
Note: UV levels of ...

65 to 99 Indicates the system is functioning within normal a normal operating range.

56 to 64 Indicates the UV level is still within a safe level, however at this level the system should be examined to determine why the UV level is this low.

50 to 55 Indicates the UV level is nearing the point of unsafe UV intensity, at this level the system should be CLOSELY examined to determine why the UV level is this low.

< 49 Indicates the UV level has now reached a level that is unsafe. At this level the water should not be consumed. The system/water supply should be examined to determine the reason for the low UV level of the UV intensity. At this level, the solenoid output has been activated and if a solenoid is installed, water will cease to flow.

DEFERRAL - To temporarily defer the audible alarm during a low UV alarm, press the push-button "RESET" switch and hold for five seconds. This will mute the audible alarm condition for 12 hours.

This advanced warning system has been installed to provide you with the optimum protection against microbiological contamination in your water.
DO NOT DISREGARD THE WARNING SIGNALS.
The best way to ensure optimum UV performance is to have the water microbiologically tested by a recognized testing agency on a regular basis.

11

Possible causes for low uv alarm conditions:

i) The UV lamp has perhaps reached a level whereby it can no longer adequately provide a sufficient level of disinfection due to age (> 9000 hours). The lamp should be replaced with a new lamp from the manufacturer of the same size and type.
ii) The quartz sleeve and/or the sensor window have become stained or dirty. Mineral deposits or sediment in the water that was not detected during the original water analysis may be the cause for this.
iii) Intermittent voltage drop in the household power supply reducing the lamp output. The lamp will return to normal when the power is restored to full voltage. *Note: the monitoring system will not operate during power failures.*
iv) The quality of the influent water has changed and is no longer within the acceptable operational range of the UV system. Perform a water analysis to determine the exact constituents and concentration levels.

365 2. ***Lamp life remaining (days):***

To obtain this reading, press the push-button SWITCH a single time and follow the steps as outlined on page 10, regarding the operation of this feature.

1680 3. ***Total days of operation:***

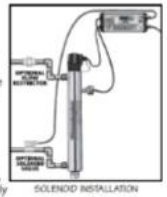
To obtain this reading, press the push-button SWITCH two times in succession and follow steps as outline on page 10, regarding the operation of this feature.

4. ***Lamp failure (blank screen):***

Please refer to page 10 for explanation of this feature.
Note: On the Silver "PLUS" systems, the audible tone provided for lamp failure is a continuous alarm, rather than the intermittent (1 second on, 1 seconds off) condition on the basic Silver systems.

5. ***Solenoid Output:***

Working in conjunction with the UV intensity monitor, the Silver "PLUS" controller provides a powered, male IEC, solenoid (line voltage) connection (note: this is NOT a dry contact). In addition, this solenoid connection is protected with a replaceable 2 amp isolated fuse. When the UV intensity monitor senses that the water is not adequately being treated and drops to 49% UV intensity or below , the internal relay is opened thereby stopping AC power flowing to the normally closed solenoid valve. The valve will remain closed (no power) until the UV level rises above 49%, at which time the solenoid will open, allowing for water to pass through. To temporarily defer the operation of this solenoid output for up to 12 hours, please refer to the instructions outlined on page 11 of this manual.



SOLENOID INSTALLATION

NOTE: **DURING BYPASS, THE *"DO NOT CONSUME THE WATER"*** tag included with this manual should be placed in a prominent location and the water should NOT be consumed until the system has returned to a safe condition.

12

6. ***4-20mA output (optional):***

For those looking for the capability to transmit the UV intensity data to a remote location via a 4-20 mA signal, an optional "Y" cable is available from your dealer (Figure 5A). Please order PN 260134. This "Y" cable comes with 20 meters (65') of cable for the 4-20 mA signal. To install, first remove the existing sensor cable from the Silver "Plus" controller (Figure 5B) and affix the new "Y" cable (Figure 5C). Next, attach the "male" end of the existing sensor cable to the "female" end of the new "Y" cable. Appropriately attach the 4-20 mA cable to the applicable equipment and ensure all connections are hand-tight.

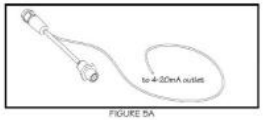


FIGURE 5A

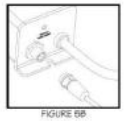


FIGURE 5B

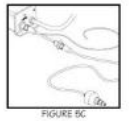


FIGURE 5C

13

TROUBLESHOOTING:

TROUBLESHOOTING GUIDE

Symptom	Possible Causes	Solutions
Pressure Drop	• sediment pre-filter clogged	• replace filter cartridge with appropriate 5 micron cartridge Note: check source water supply as fluctuations may occur in source pressure
	• flow regulator	• flow regulator will result in pressure drop when approaching full flow
High Bacteria Counts	• Quartz sleeve is stained or dirty	• clean sleeve with scale cleaner and eliminate source of staining problem (ie. soften hard water)
	• change in feedwater quality	• have source water tested to ensure that water quality is still within allowable limits for this system
	• contamination in water lines after UV system	• it is imperative that effluent water stream be shocked with chlorine (bleach) before water leaves UV system - disinfection system must have a bacterial free distribution system to work effectively
	• possible break-through of sediment through pre-filter	• have source water tested for turbidity - may need stepped filtration in order to catch all sediment entering water system (20 micron filter followed by a 5 micron filter followed by UV system)
Heated Product Water	• common problem caused by infrequent use of water	• run water until it return to ambient temperature
Water Appears Milky	• caused by air in the water lines	• run water until air is purged
Unit Leaking Water	• problem with o-ring seal (on gland nut and/or UV sensor)	• ensure o-ring is in place, check for cuts or abrasions, clean o-ring, moisten with water and re-install, replace if necessary (OR-212)
	• condensation on reactor chamber caused by excessive humidity & cold water	• c c
	• inadequate inlet/outlet port connections	• c ta
System Shutting Down Intermittently	• interrupted power supply	• ensure system has been installed on its own circuit, as other equipment may be drawing power away from UV (ie. pump or fridge) • UV system should not be installed on a circuit which is incorporated into a light switch
Lamp Failure Alarm on - New Lamp	• loose connection between lamp and connector	• disconnect lamp from connector and reconnect, ensuring that a tight fit is accomplished
	• moisture build up in connector may keep lamp and connector form making a solid connection	• eliminate chance of any moisture getting to the connector and/or lamp pins

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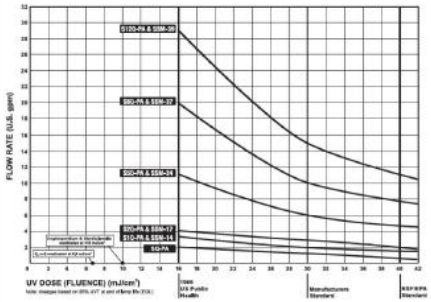
DISPLAY FAULT MODES

LED display reads "A3"	• lamp life expired - countdown is at "0" days • press reset button for a deferred alarm, replace UV lamp
LED display is blank	• controller is in lamp failure mode • power system down, allowing it to reset itself; apply power in order to confirm that the controller is able to power lamp • check to see if there is sufficient power to the UV system
Low UV level displayed on screen	• test water supply to see if water quality meets recommended parameter limits • clean quartz sleeve and sensor eye
LED flashing "A2" and then back to UV level	• low UV alarm deferral has been activated • UV level has dropped below 50% and the audible alarm has been muted by pressing the reset switch and holding it for 5 seconds • this audible alarm deferral will only last 12 hours

SILVER SERIES DOSE FLOW CHART:



15

SPECIFICATIONS SILVER "BASIC":

	MODEL	SQ-PA	S1Q-PA	S2Q-PA	S5Q-PA	S8Q-PA	S12Q-PA
Flow Rate[1]	US Public Health 16 mJ/cm²	7.5 lpm (2 gpm) (0.5 m³/Hr.)	12.3 lpm (3.3 gpm) (0.7 m³/Hr.)	15 lpm (4 gpm) (0.9 m³/Hr.)	41.6 lpm (11 gpm) (2.5 m³/Hr.)	75.7 lpm (20 gpm) (4.5 m³/Hr.)	110 lpm (29 gpm) (6.6 m³/Hr.)
	R-Can Standard 30 mJ/cm²	5.7 lpm (1.5 gpm) (0.3 m³/Hr.)	7.5 lpm (2 gpm) (0.5 m³/Hr.)	11 lpm (3 gpm) (0.7 m³/Hr.)	22.7 lpm (6 gpm) (1.4 m³/Hr.)	37.9 lpm (10 gpm) (2.3 m³/Hr.)	57 lpm (15 gpm) (3.4 m³/Hr.)
	NSF/EPA 40 mJ/cm²	2 lpm (0.5 gpm) (0.1 m³/Hr.)	5.5 lpm (1.5 gpm) (0.3 m³/Hr.)	7.5 lpm (2 gpm) (0.5 m³/Hr.)	17 lpm (4.5 gpm) (1.0 m³/Hr.)	29.3 lpm (7.8 gpm) (1.8 m³/Hr.)	42 lpm (11 gpm) (2.5 m³/Hr.)
Dimensions	Length	30.5 cm (12")	38.1 cm (15")	43.2 cm (17")	56 cm (22")	90 cm (35")	94 cm (37")
	Width	5.2 cm (2")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
	Height	5.2 cm (2")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
	Diameter	5.2 cm (2 ")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
Inlet/Outlet Port Size		1/4" MNPT	1/4" MNPT	1/2" MNPT	3/4" MNPT	3/4" MNPT	Combo 3/4" FNPT/ 1" MNPT
Shipping Weight		2.3 kg (5 lbs.)	2.3 kg (5 lbs.)	2.7 kg (6 lbs.)	3.2 kg (7 lbs.)	4.5 kg (10 lbs.)	5.4 kg (12 lbs.)
Electrical	Voltage[2]	100-240V, 50-60Hz	100-240V, 50-60Hz	100-240V, 50-60Hz	100-240V, 50-60Hz	100-240V, 50-60Hz	100-240V, 50-60Hz
	Power Consumption	15 W	19 W	22 W	30 W	46 W	48 W
	Lamp Watts	10 W	14 W	17 W	25 W	37 W	39 W
Maximum Operating Pressure		8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)
Ambient Water Temperature		2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)
Lamp Type		Sterilume™-EX (standard-output)					
Visual "Power On"		Yes	Yes	Yes	Yes	Yes	Yes
Audible Lamp Failure		Yes	Yes	Yes	Yes	Yes	Yes
Lamp Replacement Reminder		Yes	Yes	Yes	Yes	Yes	Yes
Visual Lamp Life Remaining		Yes	Yes	Yes	Yes	Yes	Yes
Total Running Time		Yes	Yes	Yes	Yes	Yes	Yes
254nm UV Monitor		No	No	No	No	No	No
Powered Solenoid Output		No	No	No	No	No	No
4-20 mA Output		No	No	No	No	No	No
Chamber Material[3]		304 S.S.[1]	304 S.S.[1]	304 S.S.[1]	304 S.S.[1]	304 S.S.[1]	304 S.S.[1]

[1] Flow rates stated @ 95% UVT EOL
[2] 12VDC available on request
[3] 316L stainless steel available on request

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SPECIFICATIONS SILVER "PLUS":

MODEL		SSM-14	SSM-17	SSM-24	SSM-37	SSM-39
Flow Rate[1]	US Public Health 16 mJ/cm²	12.3 lpm (3.3 gpm) (0.7 m³/Hr.)	15 lpm (4 gpm) (0.9 m³/Hr.)	41.6 lpm (11 gpm) (2.5 m³/Hr.)	75.7 lpm (20 gpm) (4.5 m³/Hr.)	110 lpm (29 gpm) (6.6 m³/Hr.)
	R-Can Standard 30 mJ/cm²	7.5 lpm (2 gpm) (0.5 m³/Hr.)	11 lpm (3 gpm) (0.7 m³/Hr.)	22.7 lpm (6 gpm) (1.4 m³/Hr.)	37.9 lpm (10 gpm) (2.3 m³/Hr.)	57 lpm (15 gpm) (3.4 m³/Hr.)
	NSF/EPA 40 mJ/cm²	5.3 lpm (1.5 gpm) (0.3 m³/Hr.)	7.5 lpm (2 gpm) (0.5 m³/Hr.)	17 lpm (4.5 gpm) (1.0 m³/Hr.)	29.3 lpm (7.8 gpm) (1.8 m³/Hr.)	42 lpm (11 gpm) (2.5 m³/Hr.)
Dimensions	Length	38.1 cm (15.5")	43.2 cm (17")	56 cm (22")	90 cm (35.6")	94 cm (37.5")
	Width	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
	Height	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
	Diameter	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	6.5 cm (2.5")	8.9 cm (3.5")
Inlet/Outlet Port Size		1/4" MNPT	1/2" MNPT	3/4" MNPT	3/4" MNPT	Combo 3/4" FNPT/ 1"MNPT
Shipping Weight		2.7 kg (6 lbs.)	3.2 kg (7 lbs.)	3.6 kg (8 lbs.)	5.0 kg (11 lbs.)	5.9 kg (13 lbs.)
Electrical	Voltage	100-240V./ 50-60Hz	100-240V./ 50-60Hz	100-240V./ 50-60Hz	100-240V./ 50-60Hz	100-240V./ 50-60Hz
	Power Consumption	19 W	22 W	30 W	46 W	48 W
	Lamp Watts	14 W	17 W	25 W	37 W	39 W
Maximum Operating Pressure		8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)	8.62 bar (125 psi)
Ambient Water Temperature		2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)	2-40°C (36-104°F)
Lamp Type		Sterilume™-EX (standard-output)				
Visual "Power-On"		Yes	Yes	Yes	Yes	Yes
Audible Lamp Failure		Yes	Yes	Yes	Yes	Yes
Lamp Replacement Reminder		Yes	Yes	Yes	Yes	Yes
Visual Lamp Life Remaining		Yes	Yes	Yes	Yes	Yes
Total Running Time		Yes	Yes	Yes	Yes	Yes
254nm UV Monitor		Yes	Yes	Yes	Yes	Yes
Powered Solenoid Output		Yes	Yes	Yes	Yes	Yes
4-20 mA Output		Yes (optional 260134)	Yes (optional 260134)	Yes (optional 260134)	Yes (optional 260134)	Yes (optional 260134)
Chamber Material[2]		304 S.S.[2]	304 S.S.[2]	304 S.S.[2]	304 S.S.[2]	304 S.S.[2]

[1] Flow rates stated @ 95% UVT EOL
[2] 316L stainless steel available on request

17

MANUFACTURER'S WARRANTY:

Manufacturer warrants the ultraviolet disinfection system hardware and electrical systems to be free from defects in material and workmanship for a period of five (5) years from the date of purchase by the original owner (consumer) on a pro-rated basis. Manufacturer warrants the ultraviolet lamps to be free from defects in material and workmanship for a period of one (1) year and the reactor chamber for a period of seven (7) years. The warrantor will at its option and expense, either repair or replace such units subject to the following conditions, exceptions, and exclusions.

CONDITIONS, EXCEPTIONS, AND EXCLUSIONS

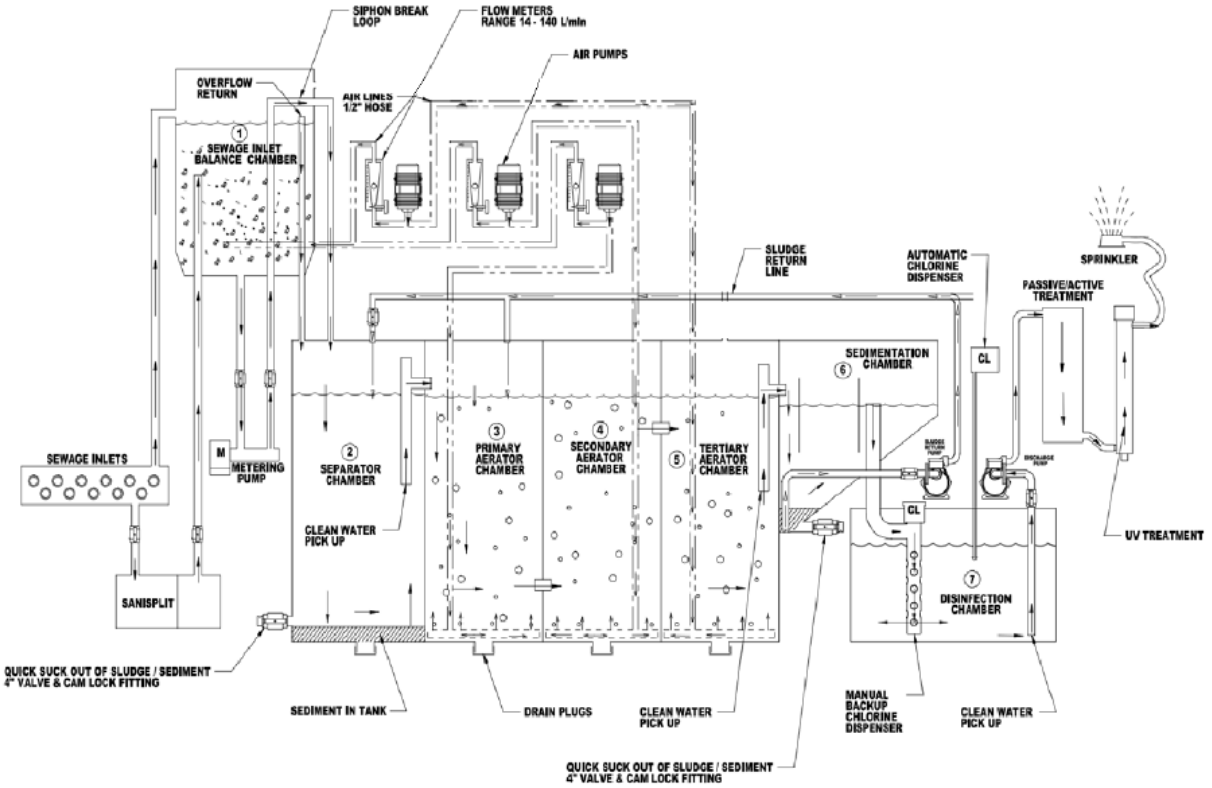
The foregoing limited Warranty is subject to the following terms and conditions:

1. Water passed through the unit must fall within the following parameters:
   a) Iron: < 0.3 ppm (0.3 mg/L)
   b) Hardness*: < 7 gpg (120 mg/L)
   c) Turbidity: < 1 NTU
   d) Manganese: < 0.05 ppm (0.05 mg/L)
   e) Tannins: < 0.1 ppm (0.1 mg/L)
   f) UV Transmittance: > 75% (call factory for recommendations on applications where UVT < 75%)

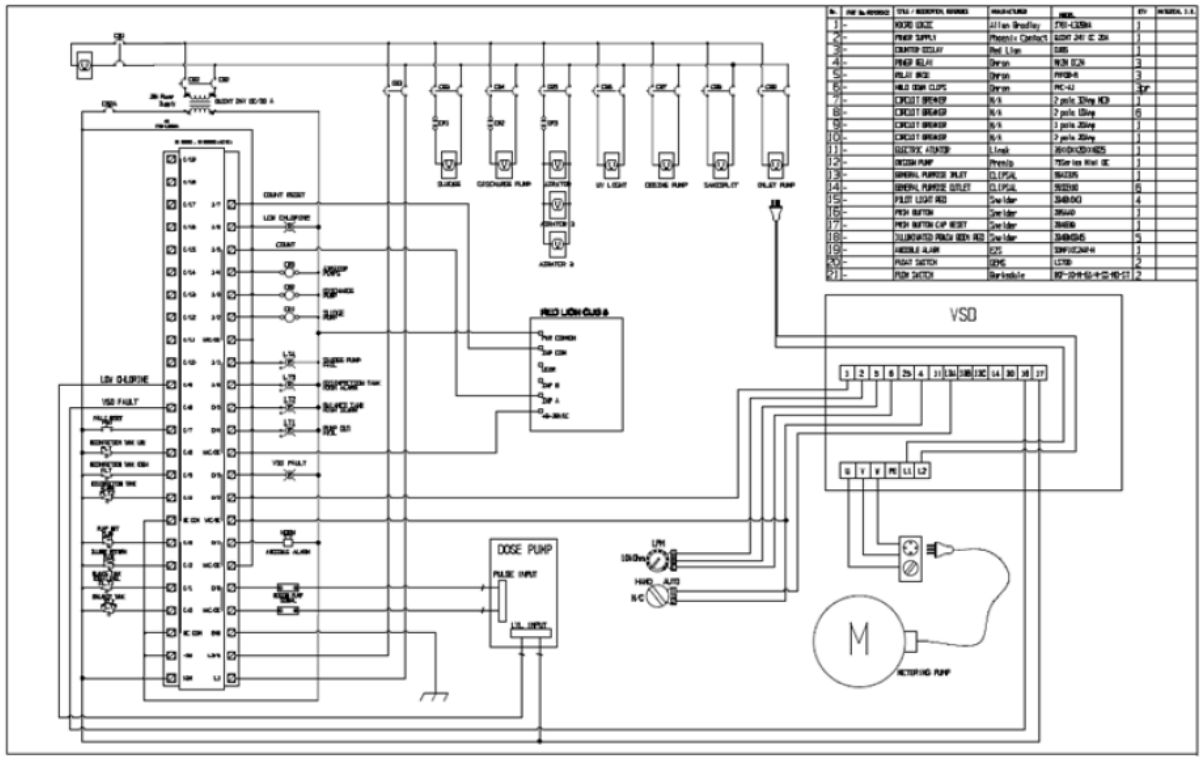
   ** Where total hardness is less than 7 gpg, the UV unit should operate efficiently provided the quartz sleeve is cleaned periodically. If total hardness is over 7 gpg, the water should be softened.* ***Warranty will be void, if the proper steps are not taken to ensure that these impurities are not present.***
2. This limited Warranty shall not apply to any unit which has been repaired or altered by anyone other than the Warrantor or by a person authorized by the Warrantor, nor to any units which have been subject to misuse, neglect, or accident.
3. This limited Warranty runs exclusively to the original Consumer and with respect to the original installation only.
4. WARRANTOR SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.
5. This limited Warranty excludes the cost of labour in removing any defective unit or installing any replacement unit. This limited Warranty applies only to a unit when returned to the Warrantor at the owner's expense and in accordance with shipping instructions received from the Warrantor.

18

22 Appendix D – Hydraulic Schematic



23 Appendix E – Electrical Schematic



24 WWR-MARK IV – Emergency Contact

24.1 Emergency and Maintenance number

Ph: 1300 134 991

24.2 Email

info@houstonutility.com

24.3 Website

www.houstonutility.com

25 References

25.1 Related documents

(a) BMS-1006-OPS-DOC-001 Daily & Weekly SPU Inspection and Maintenance Checklist

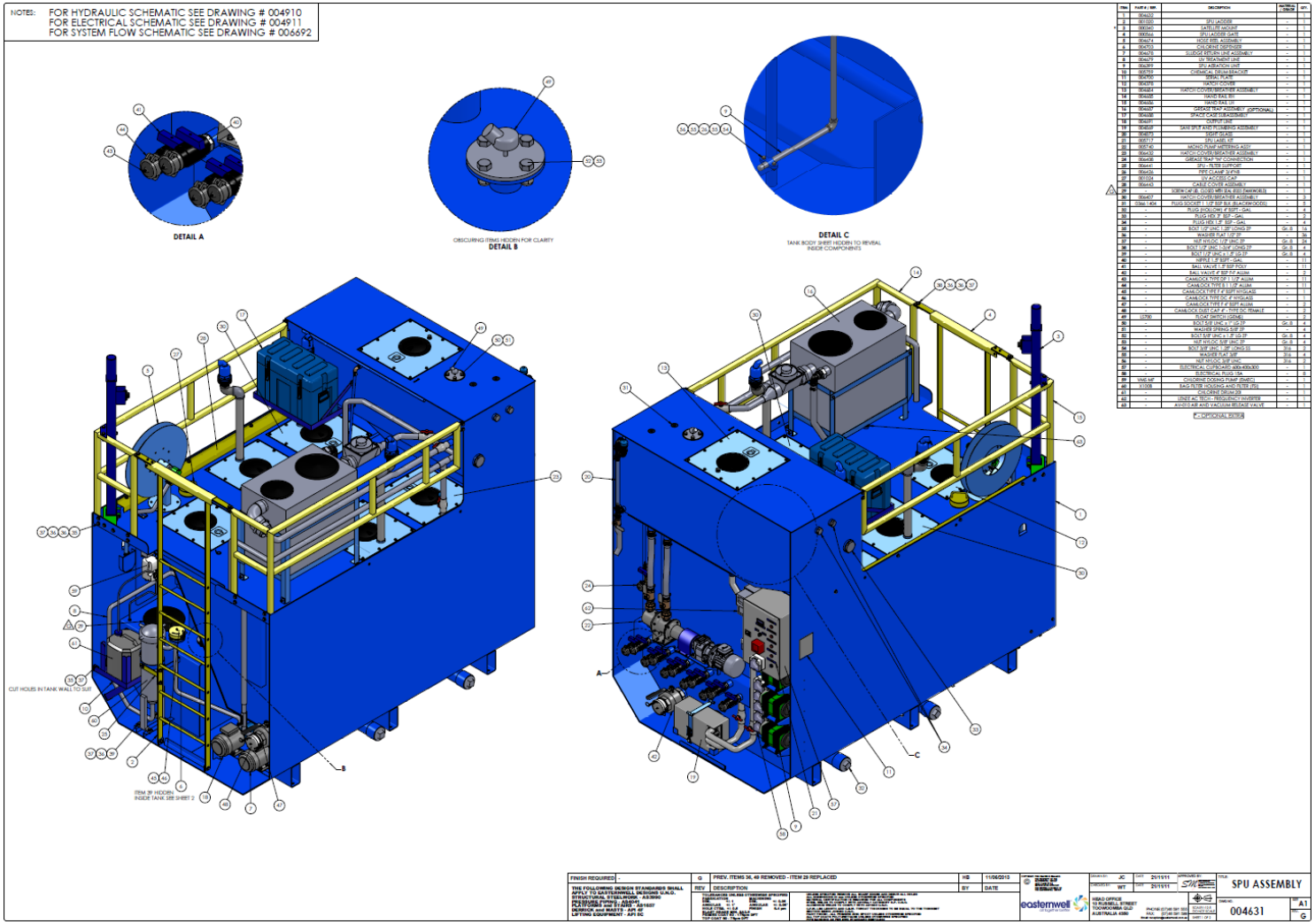
(b) BMS-1006-OPS-DOC-002 Monthly SPU Inspection Checklist

(c) BMS-1006-OPS-DOC-003 Six Monthly SPU Inspection Checklist

26 Document control

Revision #	Release date	Revision description	Owner(s)	Approver
1.0	01 Aug 2014	Original release (version 4 from prior branding update)	GM – Business Development	GM – Business Development
2.0	10 April 2019	Version 5 Created. Incorporates US conversions and updated requirements	GM-Operations	GM-Operations
3.0	03/05/2019	Final updates with wording and formatting (version 6)	GM-Operations	GM-Operations
4.0	14/10/2021	Adding BMS reference 1006-OPS-MAN-001 (version 7)	GM-Operations	GM-Operations
5.0	30/04/2025	Formatting update, removal of optidrive 2.4	Operations Coordinator	Operations Coordinator

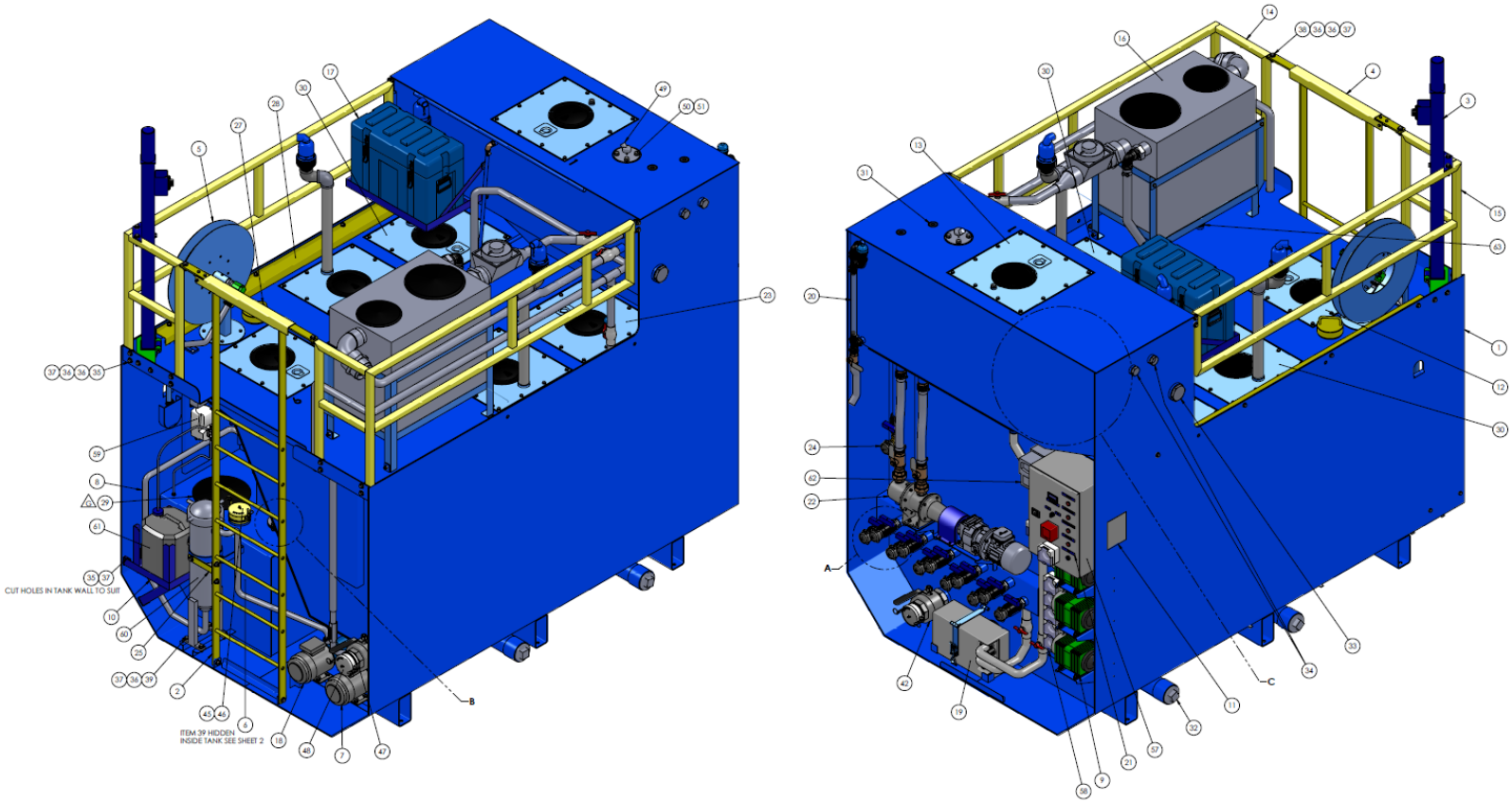
Attachment 3: WWR MARK IV – Schematic diagrams



TREATMENT PLANT APPROVAL 03/2026

Plumbing and Drainage Regulation 2019, Part 4

Queensland Government



FINISH REQUIRED -	G	PREV. ITEMS 36, 49 REMOVED - ITEM 29 REPLACED	HB	11/06/2013	© COPYRIGHT THIS DRAWING REMAINS THE PROPERTY OF THE EASTERNWELL GROUP AND CANNOT BE REPRODUCED WITHOUT THE WRITTEN CONSENT OF THE EASTERNWELL GROUP	DRAWN BY: JC DATE 21/11/11	APPROVED BY: SM	TITLE: SPU ASSEMBLY
THE FOLLOWING DESIGN STANDARDS SHALL APPLY TO EASTERNWELL DESIGNS U.N.O. STRUCTURAL STEELWORK - AS3990 PRESSURE PIPING - AS4041 PLATFORMS and STAIRS - AS1657 DERRICK and MASTS - API 4F LIFTING EQUIPMENT - API 8C	REV	DESCRIPTION	BY	DATE	easternwell all together better	CHECKED BY: WT DATE 21/11/11		
TOLERANCES UNLESS OTHERWISE SPECIFIED FABRICATION: DIM. +/- 1, ANGULAR +/- 1°, HOLE CTRS. +/- 0.5 MACHINING: DIM. +/- 0.05, ANGULAR +/- 0.05°, FINISH 6.4 µm BLAST GRADE MIN. SA2.5 PRIMER COAT 60 - 175µm DFT TOP COAT 60 - 75µm DFT		UNLESS SPECIFIED REMOVE ALL SHARP EDGES AND DEBUR ALL HOLES ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED MATERIAL CERTIFICATION IS REQUIRED FOR ALL COMPONENTS STEEL WELDS TO COMPLY WITH AS1554.1 CATEGORY S.P. U.N.O. ALUMINIUM WELDS TO COMPLY WITH AS1665 U.N.O. C.P.W. LEG LENGTH AND C.B.W. THROAT THICKNESS TO BE EQUAL TO THE THINNEST SECTION BEING JOINED U.N.O. PAINT FINISH - ALL PRIMERS ZINC EPOXY UNLESS OTHERWISE SPECIFIED ALL TOP COATS POLYURETHANE UNLESS OTHERWISE SPECIFIED PIPE BANDING AS PER DWG STANDARD EMS12-502			HEAD OFFICE 10 RUSSELL STREET TOOWOOMBA QLD AUSTRALIA 4350 PHONE:(07)46 591 555 FAX: (07)46 591 595 Email: reception@easternwell.com.au	SCALE:1:12.5 DO NOT SCALE SHEET 1 OF 2	DWG NO. 004631 SIZE A1 REV. G

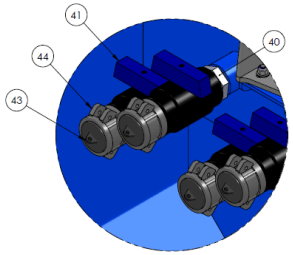
Treatment Plant Approval
Approved by: Michael Essery
Delegated Authority
Department of Housing & Public Works

TREATMENT PLANT APPROVAL 03/2026

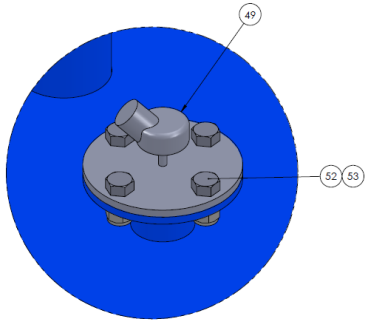
Plumbing and Drainage Regulation 2019, Part 4

Queensland Government

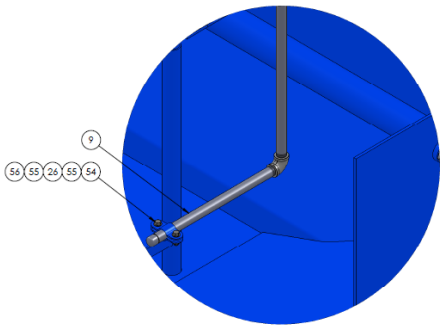
NOTES: FOR HYDRAULIC SCHEMATIC SEE DRAWING # 004910
FOR ELECTRICAL SCHEMATIC SEE DRAWING # 004911
FOR SYSTEM FLOW SCHEMATIC SEE DRAWING # 006692



DETAIL A



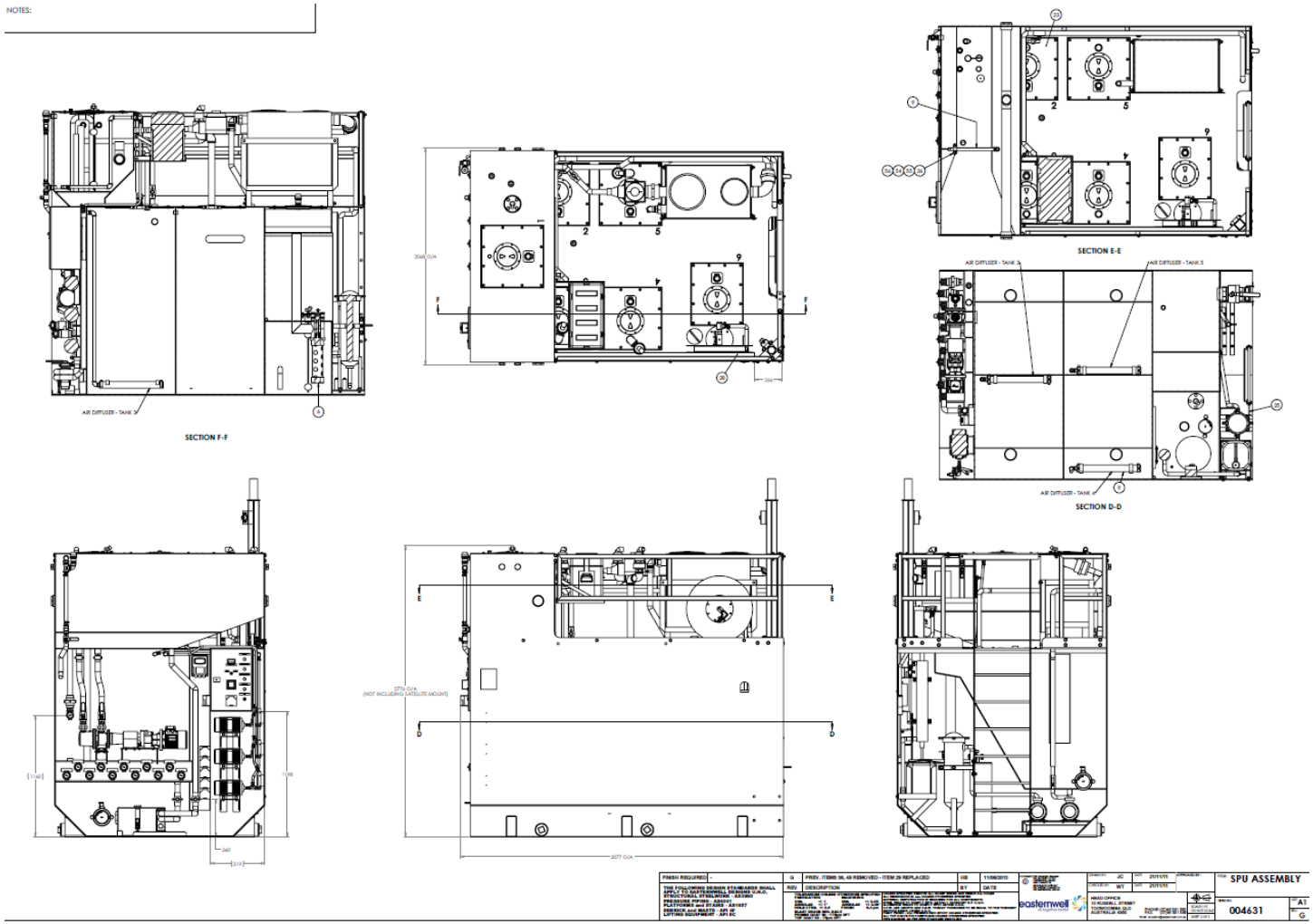
OBSCURING ITEMS HIDDEN FOR CLARITY
DETAIL B

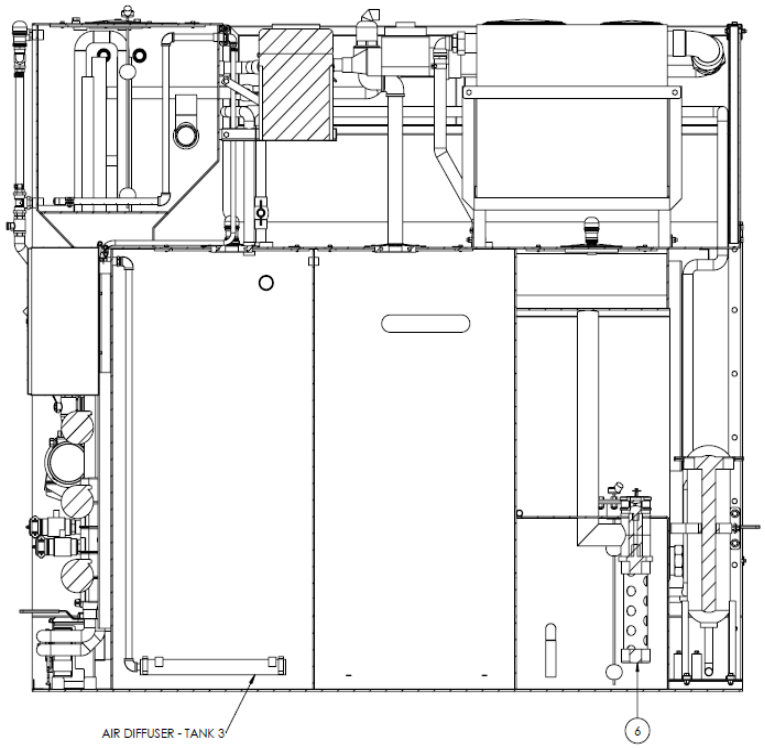


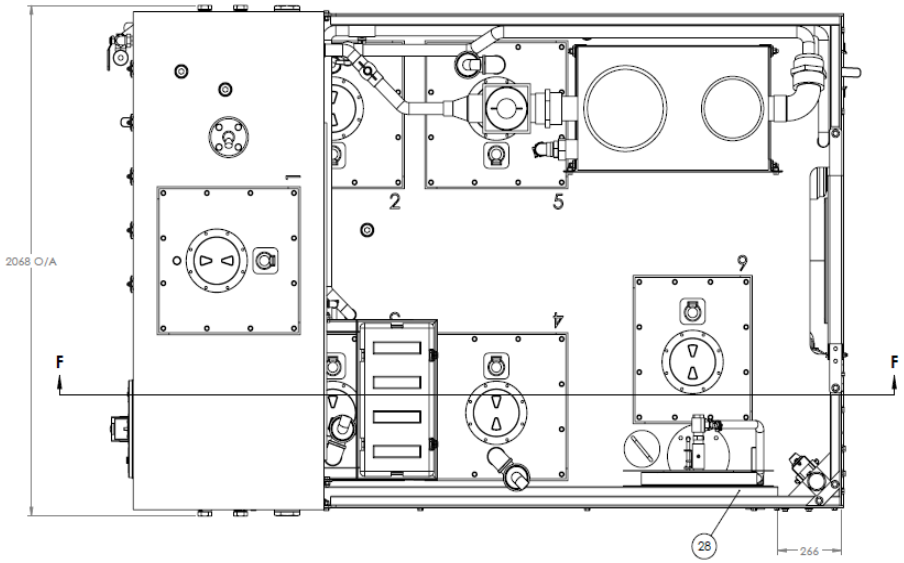
DETAIL C
TANK BODY SHEET HIDDEN TO REVEAL INSIDE COMPONENTS

ITEM	PART # / REF.	DESCRIPTION	MATERIAL / GRADE	QTY.
1	004632			1
2	001020	SPU LADDER	-	1
3	000340	SATELLITE MOUNT	-	1
4	000566	SPU LADDER GATE	-	1
5	004674	HOSE REEL ASSEMBLY	-	1
6	004703	CHLORINE DISPENSER	-	1
7	004678	SLUDGE RETURN LINE ASSEMBLY	-	1
8	004679	UV TREATMENT LINE	-	1
9	006399	SPU AERATION UNIT	-	1
10	005759	CHEMICAL DRUM BRACKET	-	1
11	004700	SERIAL PLATE	-	1
12	004378	HATCH COVER	-	1
13	004684	HATCH COVER/BREATHER ASSEMBLY	-	1
14	004685	HAND RAIL RH	-	1
15	004686	HAND RAIL LH	-	1
16	004687	GREASE TRAP ASSEMBLY (OPTIONAL)	-	1
17	004688	SPACE CASE SUBASSEMBLY	-	1
18	004691	OUTPUT LINE	-	1
19	004869	SANI SPLIT AND PLUMBING ASSEMBLY	-	1
20	004873	SIGHT GLASS	-	1
21	005717	SPU LABEL KIT	-	1
22	005740	MONO PUMP METERING ASSY	-	1
23	006432	HATCH COVER/BREATHER ASSEMBLY	-	1
24	006408	GREASE TRAP "IN" CONNECTION	-	1
25	006441	SPU - FILTER SUPPORT	-	1
26	006426	PIPE CLAMP 3/4"NB	-	1
27	001024	UV ACCESS CAP	-	1
28	006443	CABLE COVER ASSEMBLY	-	1
29	-	SCREW CAP LID, CLOSED WITH SEAL Ø355 [TANKWORLD]	-	1
30	006407	HATCH COVER/BREATHER ASSEMBLY	-	3
31	0366 1404	PLUG SOCKET 1 1/2" BSP BLK [BLACKWOODS]	-	5
32	-	PLUG (HOLLOW) 4" BSPT - GAL	-	4
33	-	PLUG HEX 3" BSP - GAL	-	2
34	-	PLUG HEX 1.5" BSP - GAL	-	4
35	-	BOLT 1/2" UNC 1.25" LONG ZP	Gr. 8	16
36	-	WASHER FLAT 1/2" ZP	-	36
37	-	NUT NYLOC 1/2" UNC ZP	Gr. 8	24
38	-	BOLT 1/2" UNC 1-3/4" LONG ZP	Gr. 8	4
39	-	BOLT 1/2" UNC x 1.5" LG ZP	Gr. 8	4
40	-	NIPPLE 1.5" BSPT - GAL	-	11
41	-	BALL VALVE 1.5" BSP POLY	-	11
42	-	BALL VALVE 4" BSP F-F ALUM	-	2
43	-	CAMLOCK TYPE DP 1 1/2" ALUM	-	11
44	-	CAMLOCK TYPE B 1 1/2" ALUM	-	11
45	-	CAMLOCK TYPE F 4" BSPT NYGLASS	-	1
46	-	CAMLOCK TYPE DC 4" NYGLASS	-	1
47	-	CAMLOCK TYPE F 4" BSPT ALUM	-	2
48	-	CAMLOCK DUST CAP 4" - TYPE DC FEMALE	-	2
49	LS700	FLOAT SWITCH (GEMS)	-	2
50	-	BOLT 5/8" UNC x 1" LG ZP	Gr. 8	4
51	-	WASHER SPRING 5/8" ZP	-	4
52	-	BOLT 5/8" UNC x 1.5" LG ZP	Gr. 8	4
53	-	NUT NYLOC 5/8" UNC ZP	Gr. 8	4
54	-	BOLT 3/8" UNC 1.25" LONG SS	316	2
55	-	WASHER FLAT 3/8"	316	4
56	-	NUT NYLOC 3/8" UNC	316	2
57	-	ELECTRICAL CUPBOARD 600x400x300	-	1
58	-	ELECTRICAL PLUG 15A	-	8
59	VMS MF	CHLORINE DOSING PUMP (EMEC)	-	1
60	X100B	BAG FILTER HOUSING AND FILTER (FSI)	-	1
61	-	CHLORINE DRUM 20l	-	1
62	-	LENZE AC TECH - FREQUENCY INVERTER	-	1
63	-	AV-010 AIR AND VACUUM RELEASE VALVE	-	1

Treatment Plant Approval
Approved by: Michael Essery
Delegated Authority
Department of Housing & Public Works







SECTION F-F

FINISH REQUIRED -	G	PREV. ITEMS 36, 49 REMOVED - ITEM 29 REPLACED	HB	11/06/2013	
THE FOLLOWING DESIGN STANDARDS SHALL APPLY TO EASTERNWELL DESIGNS U.N.O. STRUCTURAL STEELWORK - AS3990 PRESSURE PIPING - AS4041 PLATFORMS and STAIRS - AS1657 DERRICK and MASTS - API 4F LIFTING EQUIPMENT - API 8C	REV	DESCRIPTION	BY	DATE	

TOLERANCES UNLESS OTHERWISE SPECIFIED
FABRICATION: DIM. +/- 1; ANGULAR +/- 1°; HOLE CTRS. +/- 0.5
MACHINING: DIM. +/- 0.05; ANGULAR +/- 0.05°; FINISH 6.4 µm
BLAST GRADE MIN. SA2.5
PRIMER COAT 60 - 175µm DFT
TOP COAT 60 - 75µm DFT

UNLESS SPECIFIED REMOVE ALL SHARP EDGES AND DEBUR ALL HOLES
ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
MATERIAL CERTIFICATION IS REQUIRED FOR ALL COMPONENTS
STEEL WELDS TO COMPLY WITH AS1554.1 CATEGORY G.P. U.N.O.
ALUMINIUM WELDS TO COMPLY WITH AS1665 U.N.O.
C.F.W. LEG LENGTH AND C.B.W. THROAT THICKNESS TO BE EQUAL TO THE THINNEST SECTION BEING JOINED U.N.O.
PAINT FINISH - ALL PRIMERS ZINC EPOXY UNLESS OTHERWISE SPECIFIED
ALL TOP COATS POLYURETHANE UNLESS OTHERWISE SPECIFIED
PIPE BANDING AS PER EWG STANDARD EM912-502

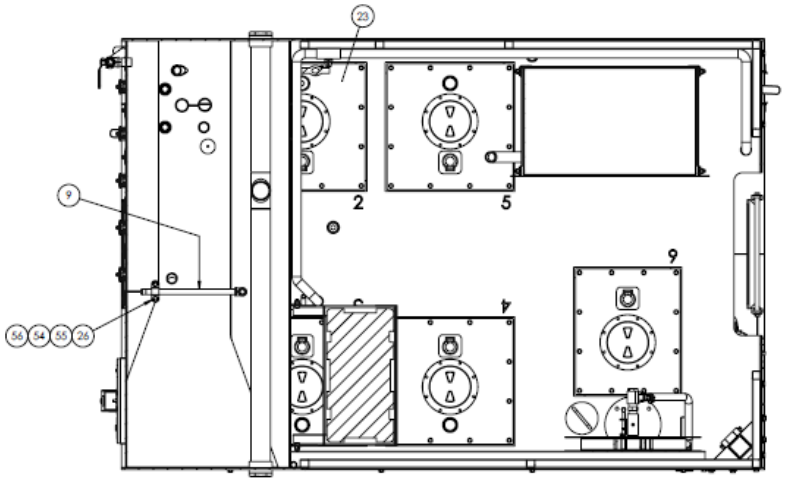
easternwell
all together better

DRAWN BY: JC	DATE 21/11/11	APPROVED BY:	TITLE: SPU ASSEMBLY
CHECKED BY: WT	DATE 21/11/11		

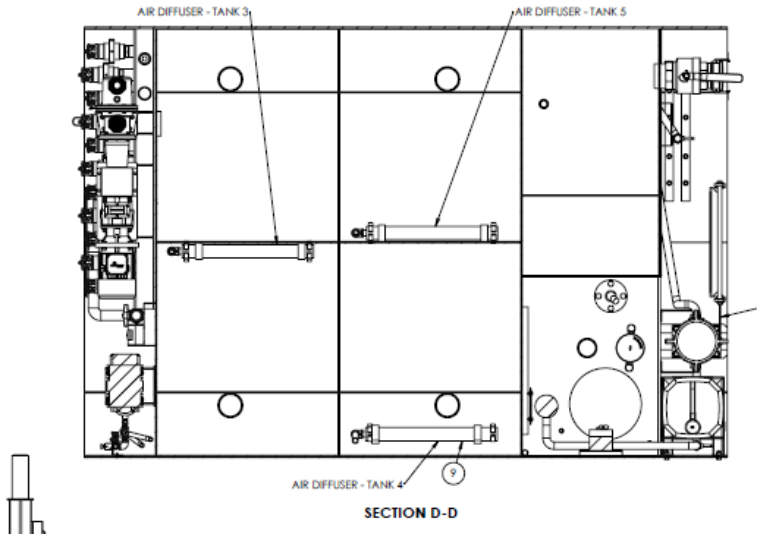
HEAD OFFICE
10 RUSSELL STREET
TOOWOOMBA QLD
AUSTRALIA 4350
PHONE:(07)46 591 555
FAX: (07)46 591 599
Email: reception@easternwell.com.au

SCALE:1:15
DO NOT SCALE
SHEET 2 OF 2

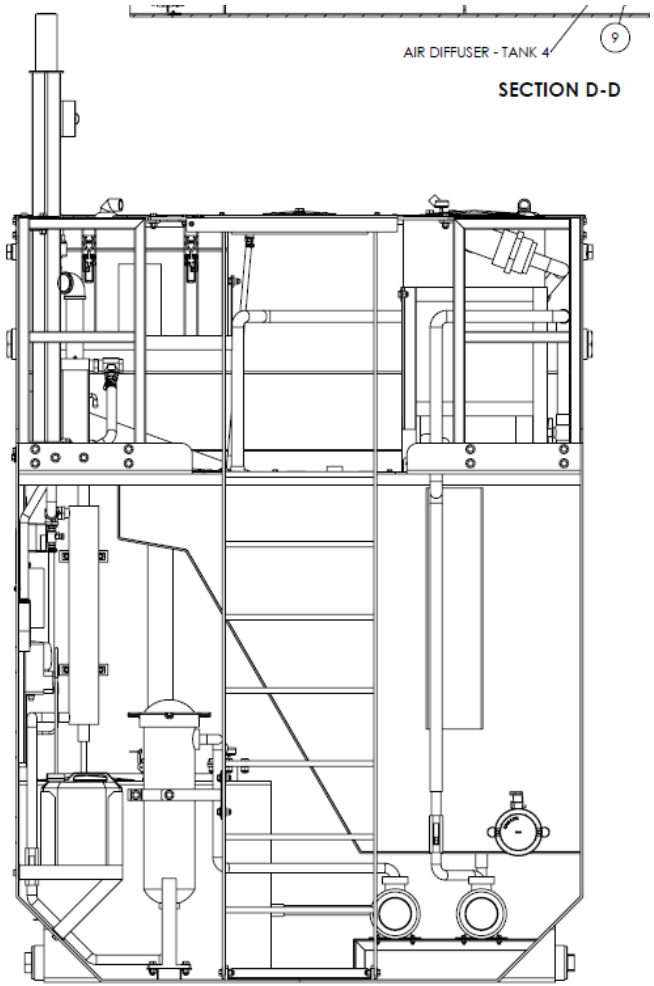
DWG NO. 004631
SIZE A1
REV. G



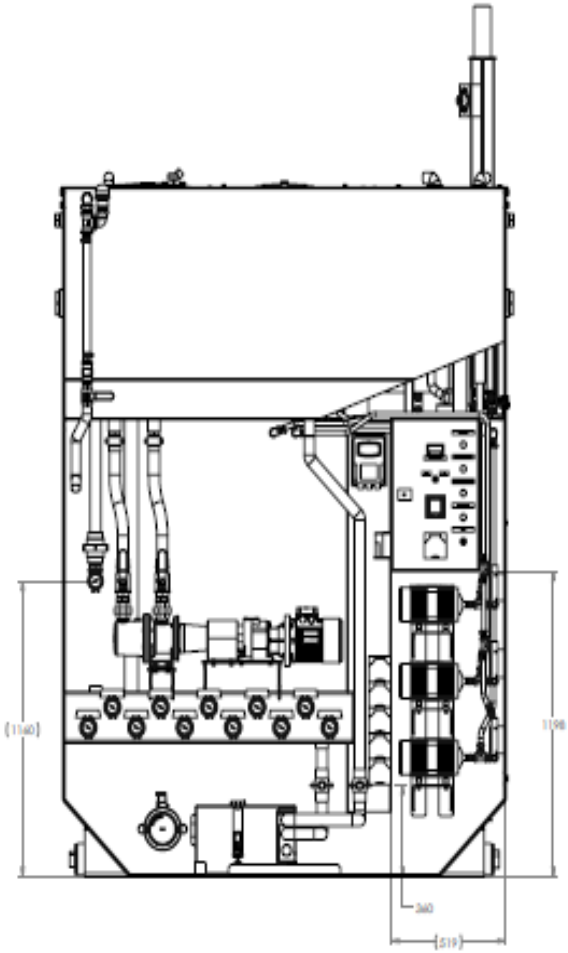
SECTION E-E

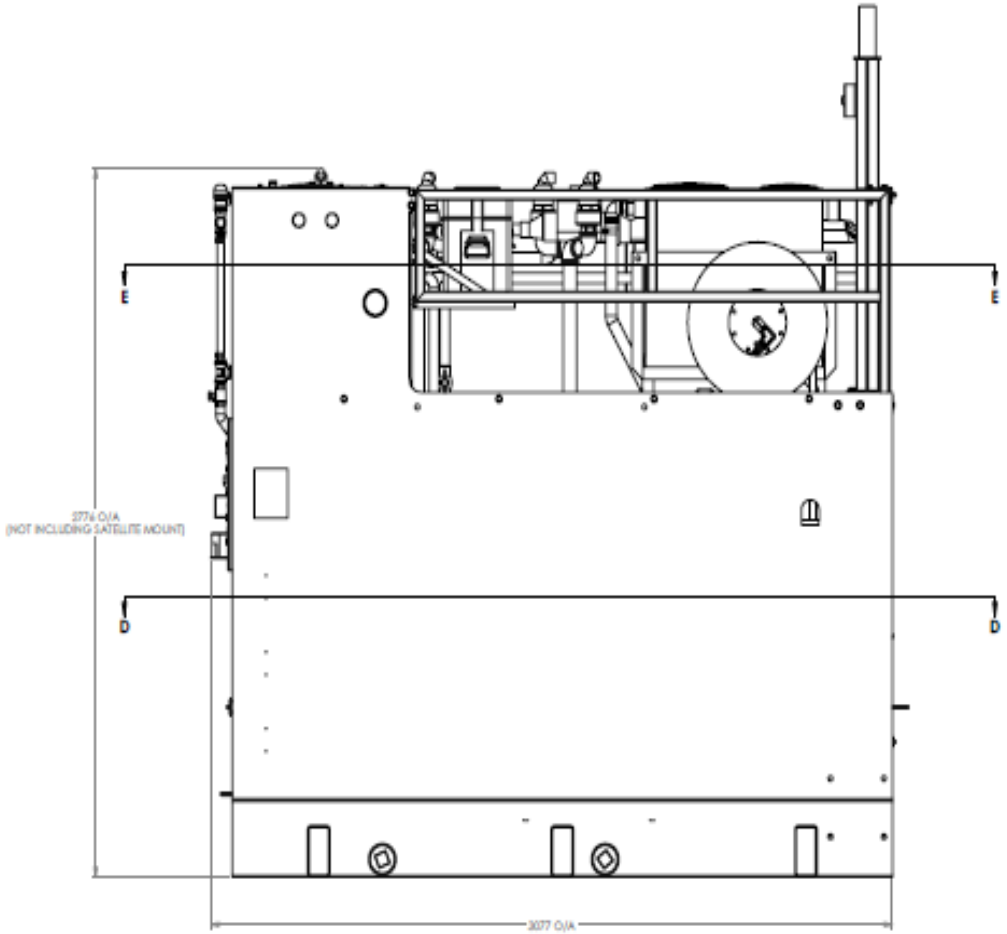


SECTION D-D

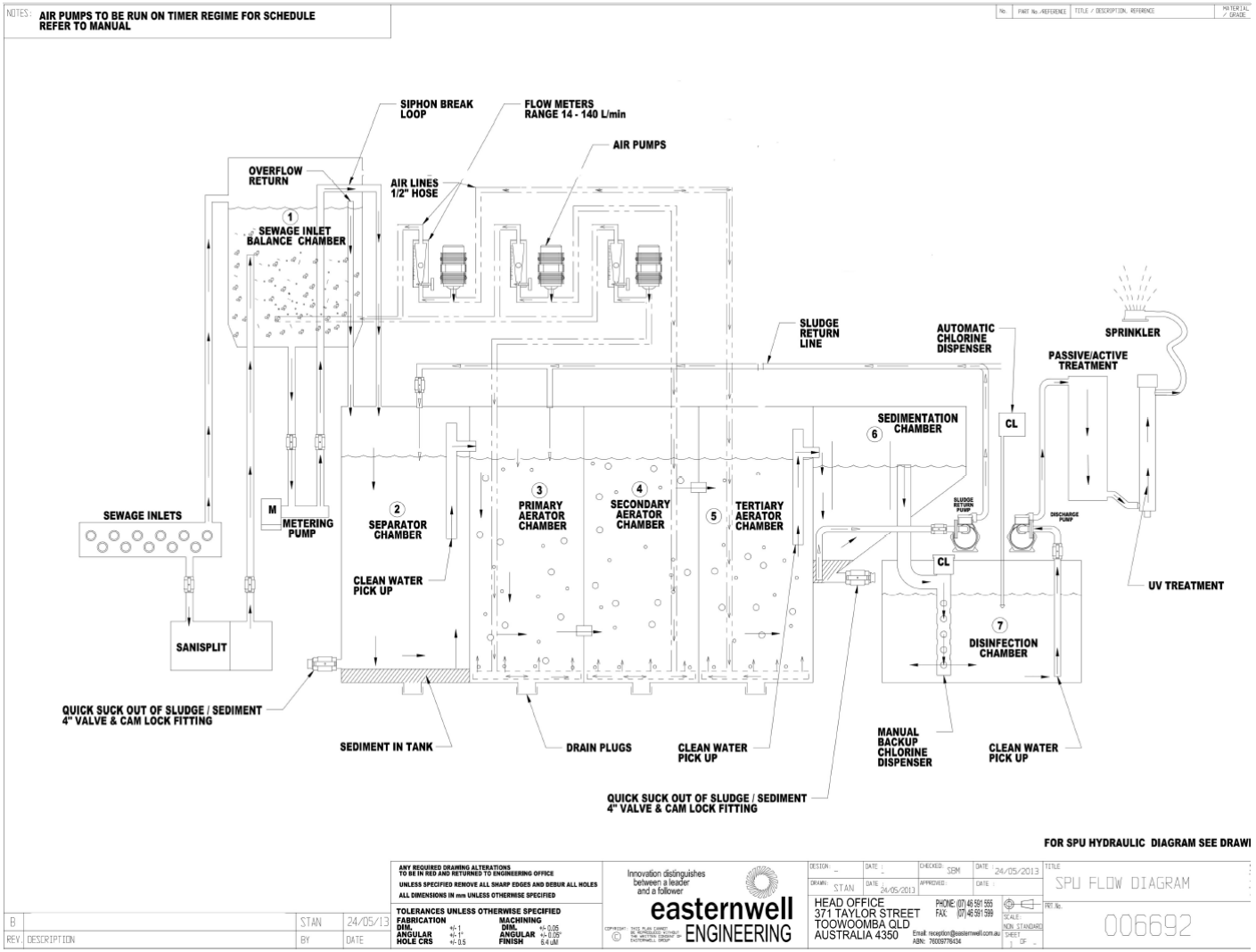


SECTION D-D





Attachment 4: WWR MARK IV Flow diagram



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