

Tasmanian Plumbing Code 1994

PART C2 – INTERIM SYSTEM ACCREDITATION REPORT

No. BSR0396/2004

TYPE OF SYSTEM: Aerated Waste Water Treatment System (Rotating Biological Contactor)

TITLE: KELAIR-BLIVET™ Packaged Sewerage Treatment Plant
Models: BL300; BL500; BL1000; BL1500; BL2000; BL3000; BL3500; and BL4000

APPLICANT: Kelair Pumps Australia Pty Ltd
1/12 South Street Invermay Launceston Tas 7245

MANUFACTURER: Kelair Pumps Australia Pty Ltd

SYSTEM DESCRIPTION: Packaged aerated wastewater sewerage treatment plant which works in a similar operation to a rotating biological contactor (RBC) but by using a plug flow system. A plug flow system means all effluent comes in contact with the biomass, which is grown within the reactor on a rotor(s) while aerating with external air.

SPECIFICATION:	Tank size No.	Unit average flow m ³ /day	BOD Applied Level Kg/day	Average population EP
	BL300	4.6	1.1	20
	BL500	11.5	2.75	50
	BL1000	23	5.5	100
	BL1500	34.5	8.25	150
	BL2000	46	11	200
	BL3000	57.5	13.75	250
	BL3500	74.75	17.875	325
	BL4000	92	22	400

SUPPORTING DOCUMENTS:

- Letter dated 28/2/96
- Pamphlet of KELAIR-BLIVET™ features
- Product Bulletin dated June 1995
- Table of different Models (See Schedule 3 attached)
- Letter dated 20/3/96 plus attachments and Test results.

CONDITIONS OF ACCREDITATION: Refer to Schedules 1 and 2 attached

NOTE: The applicant is to make themselves aware of their responsibilities under the *Environmental Management and Pollution Control Act 1994*, the *State Policy on Water Quality Management 1997* and the *Emission Limit Guidelines for sewerage treatment plants that discharge pollutants into fresh and marine waters*.

SCHEDULE 1 - CONDITIONS OF INTERIM ACCREDITATION FOR KELAIR-BLIVET™ PACKAGED SEWERAGE TREATMENT PLANT MODELS: BL300; BL500; BL1000; BL1500; BL2000; BL3000; BL3500; AND BL4000

1. Definitions

ADWF means, "Average Dry-Weather Flow";

AS/NZS 1547 means, the Joint Australian/New Zealand Standard "AS/NZS 1547:2000 On-site domestic-wastewater management";

BOD₅ means, "5-day Biochemical Oxygen Demand";

designer means, the designer who is responsible for the design, documentation or certification of the design or inspection of the installation;

DIER means, "the Department of Infrastructure, Energy and Resources";

EP means, "Equivalent persons";

NATA means, "National Association of Testing Authorities";

permit means, "a Special Plumbing Permit issued by a permit authority pursuant to the *Building Act 2000*";

Permit Authority means, "a person or body authorised by the Municipal Council, in which the system is to be located, under *Building Act 2000*";

SS means, "Suspended Solids";

TPC means, the "Tasmanian Plumbing Code";

WWTP means, "Waste Water Treatment Plant".

2. General

2.1. The installation and operation of the KELAIR-BLIVET™ WWTP must satisfy the following conditions, the conditions of the permit, the manufacturers operation and maintenance and installation manuals.

2.2. The KELAIR-BLIVET™ WWTP's are granted **interim accreditation** to enable the installation and testing of a number of systems to facilitate verification of their compliance, with the performance requirements of Part B2 of the TPC, Section 2.4 of AS/NZS 1547 and the conditions of interim accreditation, under normal operating conditions.

2.3. This interim accreditation replaces previous Certificate of Accreditation number 23 issued 1/8/1996.

2.4. This interim accreditation permits the installation of up to nine (9) systems from a range of four (4) of the models listed above.

Note: When calculating the maximum number of installations, the systems installed under the Certificate of Accreditation No. 23 issued 1/8/1996 are to be included but does not take into account Council owned systems.

2.5. At least three systems must undergo a minimum of six months of testing and evaluation by an independent third party quality auditor or certifier authorised by DIER. The test period is to include a three-month full operational period during the winter months after commissioning. The testing and monitoring is to be arranged for and paid for by Kelair Pumps Australia Pty Ltd (the manufacturer).

2.6. The Certificate of Interim Accreditation will be without effect except where an independent third party quality auditor or certifier authorised by DIER has advised in

writing its agreement to facilitate the testing and evaluation of the KELAIR-BLIVET™ WWTP's at an identified site or sites and to the preparation of an evaluation report to DIER in accordance with the conditions of interim accreditation.

2.7. Where any installations of the KELAIR-BLIVET™ WWTP's have been found not to operate satisfactorily during the test period or serviceable life and as a result require modification(s) to achieve the required water quality limits and operational performance, the installed systems are to be modified accordingly.

2.8. *Mechanical equipment*

Mechanical equipment is to be:

- (a) Durable, require minimal maintenance and must be adequately protected from the aggressive environment;
- (b) Readily accessible for maintenance or replacement; and
- (c) Suitable for continuous and intermittent operation.

2.9. *Electrical equipment*

All electrical equipment must comply with the requirements of Electrical Standards and Safety Tasmania and must be suitable for continuous and intermittent operation.

Where there is any possibility of an explosive gas mixture developing near a motor, the motor is to be intrinsically safe.

All electrical components for and incidental to the KELAIR-BLIVET™ WWTP's must be in accordance with AS/NZS 3000.

All electrical equipment must be readily accessible for maintenance or replacement.

2.10. All effluent pumps are to have performance characteristics that match the hydraulic requirements of the irrigation system to be installed in the land application area.

2.11. The anticipated life of any elements of a wastewater system that have a serviceable life of less than 15 years must be nominated in the manufacturer's manual.

Note: Mechanical and electrical components are exempt from this requirement provided the design meets the requirements of conditions 2.8 and 2.9.

2.12. Any proposed modifications/alterations made to the wastewater treatment systems or manuals must be authorised by DIER.

Note: Modifications may be subject to additional verification and/or testing.

2.13. The systems are accredited for use only where domestic and or commercial wastewater flows do not exceed the organic loading specified in the Part C2 – Interim System Accreditation Report No. BSR0396.

2.14. Each application to a Permit Authority to install a KELAIR-BLIVET™ WWTP must be accompanied by a site-and-soil evaluation report and design report in accordance with AS/NZS 1547. Refer to the '*Permits – Reports*' section of this schedule.

2.15. The manufacturer must supply the owner and the occupier (if the occupier is not the owner) with comprehensive manuals, setting out the care, use, operation and maintenance requirements of each system to be installed. The manuals must also include procedures to be followed in the event of a system malfunction.

2.16. A risk management plan is to be developed, specific to each installation, to reduce the frequency of unforeseen overflows due to system malfunctions e.g. power supply

- problems, operator error, equipment failure and the like. Each plan is to contain contingencies to ensure that spills, which occur, are appropriately dealt with to minimise risks to the environment and public health. Copies of the plan are to be provided to the owner and occupier (if the occupier is not the owner), the operator and the Permit Authority.
- 2.17. The owner of the system must enter into and maintain a maintenance contract with the relevant council, the manufacturer of the system, or other council approved person in accordance with the conditions of permit.
- 2.18. The owner must enter into an agreement with the Permit Authority to maintain a maintenance contract where that contract is with the manufacturer of the system or other approved person in accordance with the permit.
- 2.19. The owner must also enter into an agreement with the Permit Authority to the effect that the test system is to be removed and replaced with an accredited system should the test system fail to be granted accreditation on completion of testing.
- 2.20. Each unit must be provided with a permanent, clear indelible notice in a prominent position that is readily visible after installation. The notice must include the following information:
- (a) The manufacturer's name or registered mark;
 - (b) The model number or designation;
 - (c) The month and year of manufacture;
 - (d) The capacity in litres/week;
 - (e) The top load limitations; and
 - (f) The weight of the unit.
- 2.21. At each anniversary of the accreditation date, the manufacturer is to provide a list of all their installed accredited systems by anniversary year of installation to DIER.
- 2.22. A copy of the following information is to be made available by the manufacturer to each Permit Authority where it is intended to install a KELAIR-BLIVET™ WWTP in their jurisdiction once full accreditation has been obtained:
- (a) Statement of warranty;
 - (b) Statement of service life;
 - (c) Quality Assurance Certification (w/a);
 - (d) Installation Manual;
 - (e) Service Manual;
 - (f) Operators Manual;
 - (g) Service Report Form;
 - (h) Engineering Drawings in A3 format;
 - (i) Detailed Specifications;
 - (j) A4 Plans; and
 - (k) Accreditation documentation from DIER.
- 2.23. The Certificate of Interim Accreditation may become void should the applicant fail to meet the conditions set out in this schedule.
- 2.24. The Certificate of Interim Accreditation is valid for two (2) years from the date of accreditation or until withdrawn by the authority having jurisdiction.

3. Permits and Reports

- 3.1. When issuing a permit the Permit Authority is to satisfy itself that, the designer's choice of the KELAIR-BLIVET™ WWTP's configuration is optimal for the proposed site conditions. (Refer to Design Report)
- 3.2. Prior to the issue of a permit to install a KELAIR-BLIVET™ WWTP the following reports must be submitted with an application to the Permit Authority:

3.2.1. *Site-and-soil evaluation report*

This report is to detail results of an assessment of the individual lot(s) for the public health, environmental, legal and economic factors which are likely to impinge on the siting and design of a land-application system and an evaluation of the site and soil characteristics to determine feasible options for designing and sizing a land-application system. (Refer to AS/NZS 1547 Clause 4.1.5 and associated appendices to 4.1).

3.2.2. *Design report*

The Design Report is to include the following:

- (a) Relevant aspects of the Site-and-soil Evaluation Report.
- (b) A report on the selection of the land-application system. (Refer to AS/NZS 1547, Clause 4.2.4 and associated appendices to Clause 4.2 for further information).
- (c) A report on the selection of the wastewater-treatment unit. (Refer to AS/NZS 1547, Clause 4.3.6 and associated appendix to Clause 4.3 for further information).

Note: In order to ensure overall system performance against the manufacturers design criteria and to maintain optimum operating conditions it is strongly recommended that the entire system design, including up-to and beyond the Blivet™ WWTP, should be discussed with the manufacturer prior to making an application for a permit.

- (d) The Design Report is to provide sufficient information to show that the performance objectives of Part 2 of AS/NZS 1547 have been met.

- 3.3. The following reports must be submitted to the Permit Authority and made available to DIER upon request after commissioning of the system:

3.3.1. *Installation and commissioning report*

The Installation and Commissioning Report is to cover the 'as-constructed' records of the system together with the results of commissioning tests to demonstrate correct construction and installation and is to be provided to the Permit Authority on completion of the work. (Refer to and AS/NZS 1547 Clause 4.5.6.3 and associated appendices to Clause 4.5 for further information).

3.3.2. *Inspection and Maintenance Report*

Maintenance reports cover ongoing inspection and maintenance operations in order to monitor the operation of the wastewater system. (Refer to AS/NZS 1547 Clause 3.7.4 and associated Appendix 3A for further information).

4. Installation

- 4.1. The KELAIR-BLIVET™ WWTP's must not be installed in plumbing installations other than in accordance with the conditions of a permit issued by a Permit Authority.

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- 4.2. The testing sites for the KELAIR-BLIVET™ WWTP's must be representative of the climatic, geological, or geographic variations expected to be encountered in the deployment of the systems within Tasmania.
- 4.3. The systems must not be installed in situations where the wastewater temperature in the biological reactor will fall below 10⁰ C.
- 4.4. The systems must be supplied, constructed and installed in accordance with the design and specifications submitted with Kelair Pumps Australia Pty Ltd's application to DIER for accreditation for the KELAIR-BLIVET™ WWTP's.
- 4.5. Each test installation must be inspected and checked by the designer or the designer's agent. The designer, on completion, is to certify that the installation has been constructed, installed and commissioned in accordance with its design, the conditions of accreditation and conditions of permit.
- 4.6. All plumbing work installed in connection with the system must comply with the Tasmanian Plumbing Code and Tasmanian *Plumbing Regulations*.
- 4.7. The installation of the KELAIR-BLIVET™ WWTP's must satisfy the installation requirements for 'flushing sanitary fixtures not connected to a sewer' as specified in the TPC.
- 4.8. All electrical work and connections must be carried out by an appropriately licensed electrician and in and accordance with relevant provisions of AS/NZS 3000:2000 Wiring rules.
- 4.9. Where discharging treated effluent to a land application system by surface or shallow subsurface drip irrigation a lockable sampling tap or gate valve is to be provided on the outlet pipe leading to the irrigation system.
- 4.10. The designer is to certify the construction, installation and commissioning of each system prior to a Permit Authority issuing a completion certificate (plumbing work).
- 4.11. *Alarm Systems*

All installations must be provided with an alarm to indicate an electrical or mechanical malfunction. The alarm must comprise audible and visual components, with muting facilities for the audible component. The muting facility must reset to audible after no greater than 24 hours.
- 4.12. For multiple occupancies located on a single title, an indicator light and audible alarm, with muting facilities for the audible component, must be located in the kitchen or laundry of each residence, with an external flashing visual alarm in a readily visible location to signify a system malfunction.
- 4.13. For commercial premises, an indicator light and audible alarm, with muting facilities for the audible component, must be provided in a prominent location, with an external flashing visual alarm in a readily visible location to signify a system malfunction.
- 4.14. Where the transfer of influent or effluent to or within the treatment facility via collection wells is provided for by pumping, each collection well must be equipped with a permanently installed high-level alarm.

5. System testing and Performance and Evaluation

- 5.1. To obtain full accreditation of the KELAIR-BLIVET™ WWTP's the manufacturer is to appoint an independent third party quality management certification body or person acceptable to DIER to test and evaluate the WWTP's *in-situ*.
- 5.2. Effluent testing and monitoring must be carried out on all trial systems in accordance with the provisions of Table 1 in Schedule 2 of this report.
- 5.3. The independent third party quality management certification body or person authorised to conduct the evaluation is to prepare an evaluation report based on the manufacturers design criteria, construction requirements and test criteria with particular reference to:
- (a) Identification of the type and model being tested, compliance with drawings, rated capacity, loadings and testing methods;
 - (b) A log of tests, compliance calculations, maintenance, equipment or component failures and other factors pertinent to the test evaluation;
 - (c) Temperature regime;
 - (d) Address of premises,
 - (e) Date sampled,
 - (f) Analytical test methods and results;
 - (g) Sample identification number,
 - (h) Sample parameters specified in Table one of Schedule 2,
 - (i) Service history,
 - (j) Graphs of accumulative data for parameters specified in Table one of Schedule 2 results for each test system; and
 - (k) Reference to the relevant conditions of accreditation.
- 5.4. Intensive monitoring is required during and immediately following commissioning of each installation in order to assess the systems performance against the manufacturers design criteria and to establish optimum operating conditions. Intensive monitoring is to continue until the plants performance has been evaluated over a range of operating conditions, e.g. seasonal variations, in influent loading, climatic, geological, or geographic variations etc...

Note: Initially more frequent monitoring may be required by the relevant Permit Authority subject to local conditions. Intensive monitoring will also assist with the refining of plant maintenance schedules.

- 5.5. A sampling and analysis program satisfying the relevant requirements of AS/NZS 5667 must be developed and be accepted by DIER prior to commencing any trials.
- 5.6. All required testing and reporting of parameters must be carried out in a laboratory registered by NATA at the manufacturers expense (Refer to Table one of Schedule 2).
- 5.7. In addition to the independent third party quality management certification body or persons' evaluation report, copies of the installation and commissioning and inspection and maintenance reports referred to in the 'Permits – Reports' section of this schedule must be provided to DIER.

6. Commissioning, Performance Monitoring and Reporting (Serviceable life)

- 6.1. All installations of the KELAIR-BLIVET™ WWTP's must be used, operated, maintained and monitored to ensure they perform continuously and without intervention between inspections carried out by approved person(s).

- 6.2. Intensive monitoring is required during and immediately following commissioning of each installation in order to assess the systems performance against the manufacturers design criteria and to establish optimum operating conditions. Intensive monitoring is to continue until the plants performance has been evaluated over a range of operating conditions, e.g. seasonal variations in influent loading, climatic, geological, or geographic variations etc...

Note: Permit Authorities may require more frequent monitoring due to local conditions. Intensive monitoring will assist with the refining of plant maintenance schedules.

- 6.3. Effluent monitoring must be carried out for all disposal methods in accordance with Table 2 of Schedule 2, for the operational life of the system.
- 6.4. Performance monitoring of each installation is to commence after commissioning and must be carried out at not less than three (3) monthly intervals in accordance with the conditions of accreditation, the conditions of permit and the manufacturers requirements, by an approved person(s).
- 6.5. For all systems, the following effluent monitoring must be carried out:
- (a) For discharges by way of surface irrigation using UV disinfection **only**, the permit is to require the owner to cause a sample of the effluent to be taken and analysed by an appropriately qualified person for BOD₅, SS and Thermotolerant Coliforms on a quarterly basis;
 - (b) For discharges by way of surface irrigation incorporating Chlorine as a disinfectant, the permit is to require the owner to cause a sample of the effluent to be taken and analysed by an appropriately qualified person for BOD₅, SS and Thermotolerant Coliforms annually and for Residual Chlorine, quarterly;
 - (c) For discharges to land by way of subsurface absorption/transpiration trenches, the permit is to require the owner to cause a sample of the effluent to be taken and analysed by an appropriately qualified person for BOD₅ and SS annually;
 - (d) For discharges to fresh and marine waters, the permit is to require sampling and monitoring in accordance with the ELG's; and
 - (e) Any other tests for the parameters set out in Table 1 of Schedule 2 required by a Permit Authority, to establish the ongoing proper performance of the system and the protection of public and environmental health, at no less than quarterly intervals.
 - (f) For other disinfection processes, alternative testing methods and frequencies must be authorised by DIER.
- 6.6. Copies of the following reports and certificates must be submitted to the Permit Authority and the owner as soon as practicable after the commissioning of the system and after each scheduled or unscheduled service for the period specified in the permit:
- (a) the initial plant installation and commissioning report and certification;
 - (b) all laboratory analytical test reports; and
 - (c) all inspection and maintenance and monitoring reports.
- 6.7. In addition to the criteria set out in the manufacturer's quarterly servicing report sheets the following matters are to be reported on:
- (a) Weather conditions;
 - (b) Ambient temperature and Effluent temperature;

- (c) Odour;
- (d) Water meter reading (where applicable);
- (e) Trench operation (where applicable);
- (f) Irrigation area operation and performance (where applicable);
- (g) Alarm system operation;
- (h) Air pump operation and filter;
- (i) Irrigation pump operation;
- (j) Irrigation filters; and
- (k) Contain a statement warning the user of the system of which items and products must not be used in the system.

6.8. *Ultra Violet lamps and ballasts*

Where UV disinfection is permitted to be used and effluent is distributed above ground, all Ultra Violet lamps and ballasts must:

- (a) Be accessible;
- (b) Be monitored daily;
- (c) Be cleaned at least every two (2) months; and
- (d) Have records kept of the lamps use, lamp life and replacement cycles for both lamps and ballasts.

6.9. All samples are to be determined by a NATA registered laboratory and samples for disinfectant concentration, pH, DO, flow rates, may be determined on-site.

6.10. Effluent from the KELAIR-BLIVET™ WWTP's taken in any random grab sample shall comply with the parameters set out in Table 2 of schedule 2.

6.11. Copies of any report or certificate are to be made available to DIER upon request.

7. **Wastewater Discharges**

7.1. All waste water discharges must satisfy the relevant parameters set in Table 2 of Schedule 2.

7.2. Where disposing of treated effluent from a system to land by subsurface absorption trenches the length of those trenches used must not be less than 50% of that required for septic tank effluent, sized accordance with AS/NZS 1547.

7.3. Other applications of effluent to the land must be in accordance with AS/NZS 1547 so far as reasonably practicable.

7.4. Where it is not practicable for effluent from the system to be disposed of in accordance with AS/NZS 1547 the method of disposal must satisfy contemporary relevant regulatory requirements to the satisfaction of the Permit Authority.

7.5. Disposal by surface or shallow subsurface irrigation may be permitted where the Permit Authority is satisfied that the applicant has demonstrated that:

- (a) The effluent can be retained on-site;
- (b) The location of the disposal field(s) satisfies the requirements of the State Policy on Water Quality Management 1997 and AS/NZS 1547 as appropriate;
- (c) The land application area restricts casual access by unauthorised persons and animals and be appropriately signed;
- (d) The discharge quality will satisfy the relevant requirements set in Table 2 of Schedule 2.

8. Desludging

- 8.1. The system is to be desludged strictly in accordance with the manufacturer's recommendations and the sludge is to be disposed of in accordance with the conditions of permit.
- 8.2. Only persons with a waste transport business Environment Protection Notice issued by DPIWE are to be engaged for the removal, transporting and disposal of accumulated sludge removed from the system.
- 8.3. Any waste material removed from the KELAIR-BLIVET™ WWTP's during monitoring or servicing must be disposed of and/or utilised by an approved facility or agency.
- 8.4. Measures are to be put in place during servicing that will protect the environment, personnel and any other persons who could be affected by the activity.

SCHEDULE 2 – EFFLUENT AND SAMPLING PARAMETERS

TABLE 1: PARAMETER & SAMPLING POINT	FREQUENCY
Flow (As agreed)	Weekly
BOD5 (mg/l) (Raw and treated wastewater samples prior to disinfection)	Monthly
Suspended solids (SS) (mg/l) (Raw and treated wastewater samples prior to disinfection)	Monthly
Thermotolerant Coliforms (orgs/100mL) (Samples to be taken at outlet)	Monthly
Total Nitrogen (mg/l) (Raw and treated wastewater samples prior to disinfection)	Monthly
Total Phosphorous (mg/l) (Raw and treated wastewater samples prior to disinfection)	Monthly
Oil and Grease (Raw and treated wastewater samples prior to disinfection)	Monthly
pH (Raw and treated wastewater samples prior to disinfection)	Weekly
Ambient and raw and wastewater temperatures	Weekly
Dissolved Oxygen (DO) (To be taken at aeration chamber)	Weekly
Disinfectant levels (To be taken from pumpout chamber)	Weekly

Notes:

1. All sampling of effluent is to be carried out in accordance with AS/NZS 5667.
2. Recording of ambient and raw wastewater temperatures is to verify the minimum temperature range of the systems successful operation.
3. Samples of raw and wastewater are taken to identify the plants ability to perform as designed.
4. COD can be used where the relationship between COD and BOD has previously been established. This would involve a more intensive monitoring period involving both parameters.
5. The influent only requires testing during commissioning phase.
6. On each testing occasion, two samples are to be collected over a minimum interval of 30 minutes for BOD₅ and SS.
7. Once the plant has been fully commissioned and shown to produce the required effluent parameters the frequencies may be changed expanded to quarterly.
8. In the case of plant malfunctions, more frequent sampling may be necessary (i.e. weekly initially and then monthly until optimal performance objectives are achieved.

TABLE 2: EFFLUENT PARAMETERS
For discharges to other than piped irrigation systems:
Biochemical Oxygen Demand (BOD ₅) 20 mg/L
Suspended Solids (SS) 30 mg/L
For surface irrigation:
Thermotolerant Coliform count 10 organisms/100 mL
Free Residual Chlorine 0.5 mg/L (min.) and 2.0 mg/L (max.)
Biochemical Oxygen Demand (BOD ₅) 20 mg/L
Suspended Solids (SS) 30 mg/L
For shallow subsurface irrigation:
Biochemical Oxygen Demand (BOD ₅) 15 mg/L
Suspended Solids (SS) 15 mg/L
For discharge to fresh and marine waters:
Where permitted, all discharges must satisfy the Department of Primary Industries Water and Environment, <i>Emission Limit Guidelines for sewerage treatment plants that discharge to fresh and marine waters.</i>

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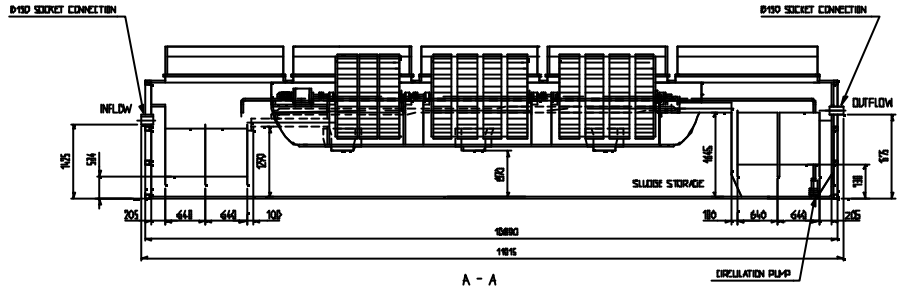
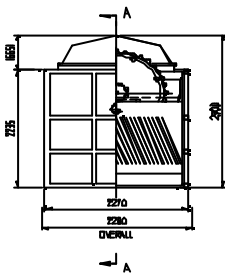
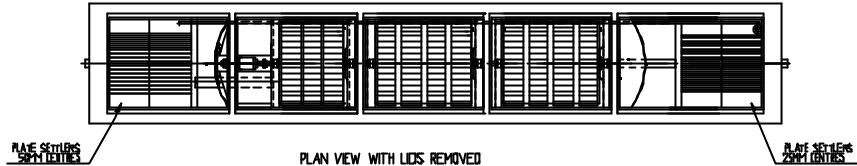


KelairPumps

KELAIR-BLIVET™

PACKAGED SEWAGE TREATMENT PLANT

BL4000



KELAIR-BLIVET DIMENSIONS

Tank Size	Unit Average Flow	BOD Applied Level	Average (People)	Approx. Weight Empty	Approx. Weight Operating	Drive Unit	Connection (mm)	Unit Sizes in Metres		
								Length	Width	Height
BL 300	4.6	1.1	20	1.5	9.5	0.37	100	2.1	2.02	2.2
BL 500	11.5	2.75	50	3	17.5	0.55	150	4.9	2.27	2.9
BL1000	23	5.5	100	3.35	19.25			5.375		
BL1500	34.5	8.25	150	4	23.75	6.4				
BL2000	46	11	200	4.7	28.25	7.5				
BL3000	57.5	13.75	250	5.85	35.25	9.275				
BL3500	74.75	17.875	325	6.3	38.25	10.1				
BL4000	92	22	400	6.8	41.5	10.9				