



INSTALLATION, OPERATION AND MAINTENANCE MANUAL

OIL WATER SOLID SEPARATOR CL10 | CL15 | CL20 | CL30



Version 1.0

25th May 2015



AMENDMENTS

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IMPORTANT INFORMATION

ON RECEIPT OF EQUIPMENT

1. Register the separator at makwater.com.au
2. Review parts list in the next section.
3. Thoroughly read the Installation Instructions on page 14.

IF YOU DISCOVER ANY DISCREPANCIES

Please report any discrepancies to MAK Water on 1300 669 032 immediately. MAK Water cannot accept responsibility for missing items if not reported within 24 hrs of receipt.

REGULATORY COMPLIANCE & SYSTEM RELIABILITY

To ensure regulatory compliance and maximum reliability the following steps must be undertaken:

- The system must be correctly installed as described in this manual.
- The system must be regularly maintained as described in this manual. Call 1300 669 032 for more information or to arrange system servicing.
- Clearmake Quickbreak detergents and degreasers must be used in any cleaning activities which produce waste water to be treated by this separator.
- Mixing Quickbreak chemicals with other detergents or chemicals may impede the quick break action provided.
- Using other chemicals may cause the oil in the incoming water to emulsify, resist separation and may result in failure to reach trade waste quality discharge water.



PARTS LIST

Table 1 below lists all the parts included with the system. Figure 1 on the next page shows the separator internals for easy identification.

Description	Separator Model Number			
	CL10	CL15	CL20	CL30
Stainless Steel Tank & Lid	1	1	1	1
Galvanised Separator Stand	1	1	1	1
Black Spiral Wound VTC Pack ¹	6	8	8	10
VTC Pack Stainless Steel Brace & Tie Down ¹	4	4	4	4
Sludge Hopper Gate Valve ¹	2	2	2	2
Internal Skimmer Tube (PVC)	2	2	2	2
IOM Manual ¹	1	1	1	1
Helical Rotor Pump, C15AC31JMA, 3 phase ²	0	0	1	0
Helical Rotor Pump, C16AC13JMA, 3 phase ²	0	0	0	1
Diaphragm Pump, DS50 or DT50 ^{2,3}	1	0	0	0
Diaphragm Pump, DS76 or DT76 ^{2,3}	0	1	1	0
Waste Oil Tank, 500L, Stainless Steel ⁴	1	1	1	1
Pump Controller	1	1	1	1
Float Switch ⁵	1 or 2	1 or 2	1 or 2	1 or 2

Table 1 Separator Part Checklist

Notes:

1. Item within stainless steel tank.
2. Each separator can have different pumps. One pump is supplied per separator.
3. "S" represents single phase. "T" represents three phase.
4. Optional purchase.
5. Either one or two float switches are supplied. Two float switches if a high level alarm is required. One float switch when there is no high level alarm.

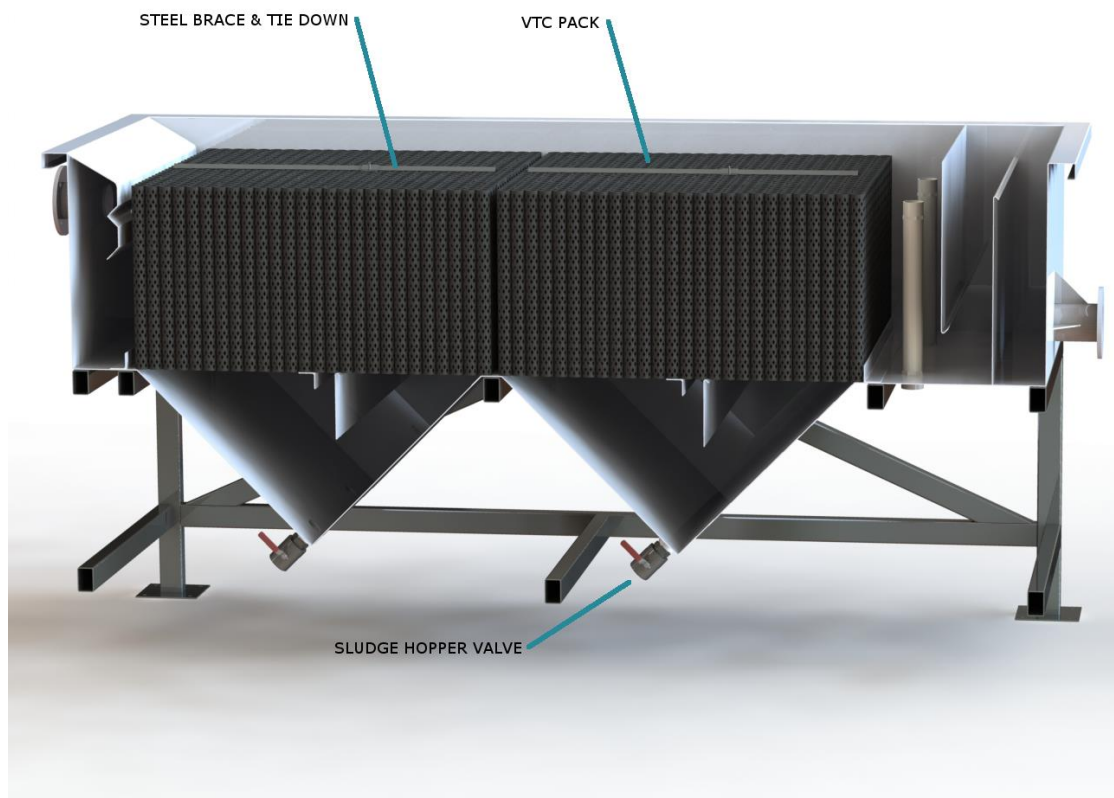


Figure 1 Separator Internal Parts



PRODUCT INTRODUCTION

This Clearmake Oil/Water/Solids (OWS) separator is specifically designed to receive and treat a polluted waste water stream prior to discharge to sewer. The Clearmake OWS separator is approved by the Water Services Association of Australia (WSAA) to treat *influent water streams containing non-compliant levels of free-floating hydrocarbons and solids **only***.

The Clearmake OWS Separator is appropriate for pre-treatment of waste water streams from any wash down or clean up area where mixtures of water, hydrocarbons and solids occur.

Suitable installation locations include, but are not limited to, wash bays in the following commercial and industrial locations:

- Mining equipment wash bays
- Transformer bund surface water treatment
- Mechanical repair and maintenance workshops
- Motor wreckers
- Motor vehicle dealerships
- Hire Companies
- Marinas

The system will continue to maintain the required compliance levels provided it is installed, operated and maintained in accordance with the documented instructions contained within this manual.

SEPARATOR OVERVIEW

The separator tank is manufactured from 304 stainless steel and is supported by a 304 stainless steel frame. 316 stainless steel tanks and frames are available as an option for installations in harsh or corrosive environments.

A low-shear feed pump (helical rotor or diaphragm-type), is specifically designed for transfer of waste water from the collection tank to the OWS separator. The low shear nature of this pump helps to reduce the emulsification of the oil in the water.

The Vertical Tube Coalescing (VTC) pack is constructed from oleophilic polyethylene, which provides increased efficiency and performance via its enhanced flow and phase separation characteristics and longevity.

The concentrated solids collected in the hopper are removed by a readily accessible manual gate valve at the base of the unit. Waste oil is drained into a separate reservoir.

Clearmake OWS separators have an enhanced gravity coalescing medium to separate non emulsified oils from water. This unique and proven method to separate these components is



easy to maintain and use. Oils with a rise velocity greater than 0.7 m/h and solids with a settling velocity greater than 0.7 m/h will generally be separated by these units.

The enhanced gravity coalescing medium differentiates these separators from the typical coalescing plate interceptor (CPI) style.



PROCESS DESCRIPTION

SEPARATOR SYSTEM PROCESS

The Clearmake OWS separator is supplied with a pump, float switch(es) and pump controller. These items combine (with other client supplied items) to provide a system which can reduce free floating effluent oil concentrations to less than 5mg/L. The installation layout on page 14 shows the separator system process in detail.

SEPARATOR PROCESS

Clearmake OWS separators use vertical tube coalescing (VTC) packs to achieve the enhanced gravity coalescing action. Each pack consists of a block of vertically-oriented 40 mm tubes. Each tube comprises of bonded strands of polyethylene in an open, helical pattern.

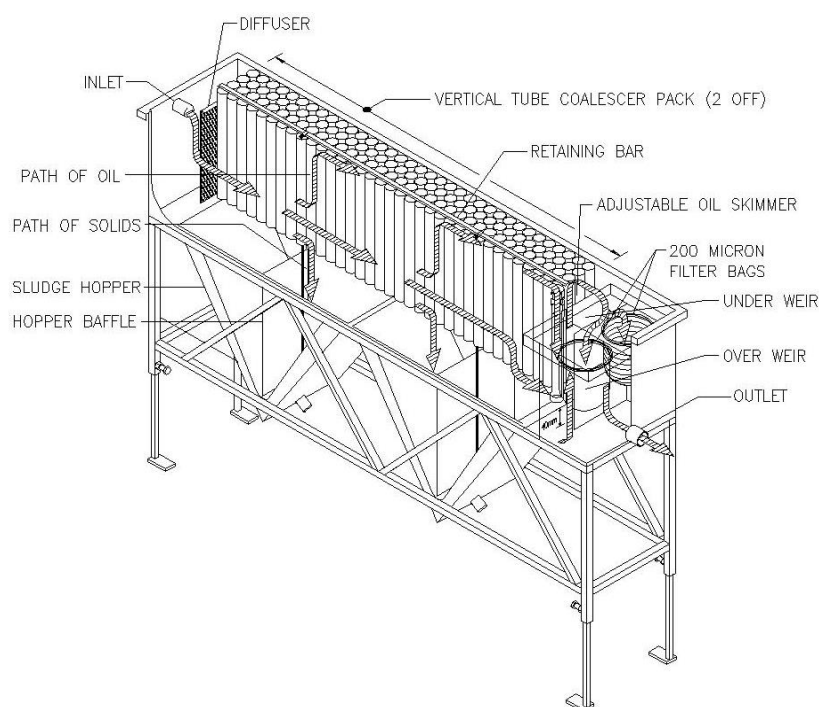


Figure 2 - Cross Section of Typical Clearmake Oil Water Solid Separator

The incoming water enters the separator chamber and is forced through the open structure of the tubes. The solids fall, by gravity, to the sludge hopper below and the incoming stream continues a circuitous passage through the tubes. The oil droplets coalesce on the surface of the tubes and then rise to the surface. The resultant build-up of oil on the surface is automatically skimmed off to the waste oil reservoir. The treated water then flows under the



first weir (to prevent the progress of hydrocarbons) and over a final weir (to arrest the progress of silt/solids) before exiting through the outlet port to sewer.

MAJOR COMPONENTS

The Clearmake OWS separator requires the following components.

Collection Tank

Supplied by others, this tank or pit is where the waste water collects prior to being treated.

The suction line for the separator pump and the float switches are situated in this collection tank. MAK Water recommends this tank is sized to be at least twice the hourly flow rate of the separator.

Float Switches

In the collection tank a float switch is used to turn the pump on and off. The float is set up with counterweight and a reasonable length of lead (between the counter weight and the float).

This length of lead allows the pump to turn on at the low point and off at the high point. The exact length of lead between the counterweight and the float is dependent on the tank dimensions. Refer to item 8 in the installation instructions for float switch setup details.

Controller

This relay driven controller takes inputs from the float switches and controls the pump operation.

Pump

The pump is supplied with the separator and is integral to the operation of the system. The pump is operated by controller in this system.



SEPARATOR DATA

The two tables below present specific data regarding each separator. Table 2 below shows specific separator data. Table 3 overleaf shows specific pump data.

Description	Separator Model Number			
	CL10	CL15	CL20	CL30
Nominal Flow Rate (L/hr)	10,000	15,000	20,000	30,000
Treatment Flow Rate (L/hr) ¹	7,200	11,000	15,000	25,000
Empty Weight (kg)	189	470	571	705
Full Weight (kg)	1,157	3,210	4,311	6,015
Volume (L)	927	2,740	3,740	5,310
Inlet Connection	DN65 ²	DN100 ³	DN100 ³	DN150 ³
Outlet Connection	DN80 ²	DN100 ³	DN100 ³	DN150 ³
Oil Skimmer Outlet Connection Size, BSPF (mm)	DN50	DN50	DN50	DN50
Sludge Outlet Connection Size, BSPF (mm)	DN50	DN50	DN50	DN50

Table 2 Separator Data

Notes:

1. Use the treatment flow rate when selecting the correct separator for the application.
2. BSPF connections.
3. Table D Flanges.



Description	Pump Model			
	DS50 / DT50	DS76 / DT76	C15AC31JMA	C16AC13JM
Pump Type	Diaphragm	Diaphragm	Helical Rotor	Helical Rotor
Maximum Flow Rate (L/hr) ^{1,2}	7,200	11,000 ³	15,000	25,000
Motor Speed (rpm)	1,430	1,430	1,400	1,400
Voltage (V)	240 / 415	240 / 415	240 / 415	240 / 415
Kilowatt Rating (kW)	1.1	1.5	2.2	3.0
Full Load Current (A)	8.8 / 2.37	10.4 / 3.16	11.5 ⁶ / 4.7	13 ⁶ / 6.5
Inlet Connection Size	DN50 ⁴	DN80 ⁴	DN80 ⁵	DN100 ⁵
Outlet Connection Size ^{4,5}	DN50 ⁴	DN80 ⁴	DN80 ⁵	DN100 ⁵

Table 3 Separator Pump Data

Notes:

1. Maximum flow rate is dependent on pipe diameter, length of inlet pipe, height change from suction point to separator inlet. Contact MAK Water to confirm appropriate pump sizing.
2. Recommended maximum suction head is 4m.
3. Factory set flowrate.
4. BSPF connections.
5. Table D Flanges.
6. Estimated current.



INSTALLATION INSTRUCTIONS

Please consult your local tradewaste/plumbing inspector before installing this equipment to ensure that these instructions meet local requirements.

ALWAYS USE LICENSED ELECTRICAL AND PLUMBING CONTRACTORS

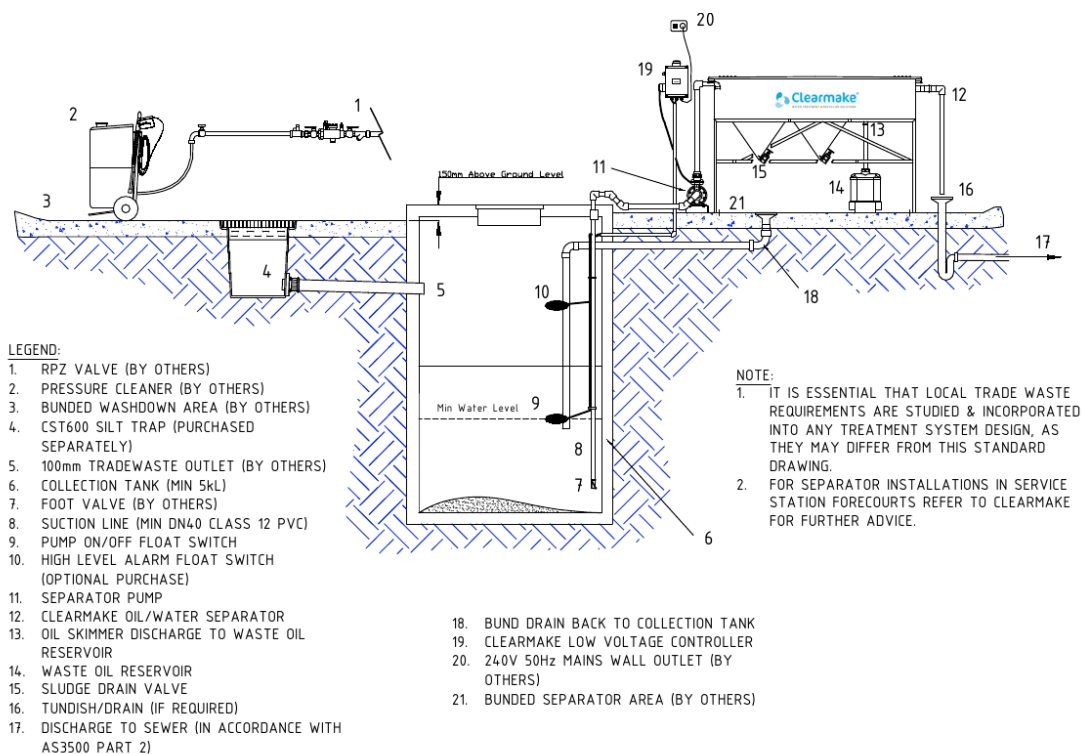


Figure 3 Separator System Layout

Read all instructions provided for this equipment and refer to all diagrams in this manual for assistance with installation. A larger version of the above separator system layout is provided in Appendix B.

1. Place the separator into position and bolt the stand down. Ensure that the concrete base is suitable to hold the weight of the equipment (when full of water). Make sure the unit is level in both planes. MAK Water recommends to install separator feet on a 20mm shrink free grout base.
2. Connect the outlet pipe to sewer as per the Separator System Layout above.
3. Connect the suction line to the pump using the correct diameter pipe as per Table 2 above. **Note:** It is a requirement in some areas to provide sampling taps on the inlet and outlet pipes of the separator and a non-resettable flow meter on the discharge pipe prior to sewer entry. MAK Water can supply a flow meter if required.
4. The suction line must be terminated approximately 200 mm from the bottom of the collection tank. If a helical-rotor pump has been supplied a foot valve must be fitted (not supplied). Provide a barrel union in the suction line to permit the suction line to be withdrawn and serviced/inspected. For the helical rotor pump, it is recommended



to install a gooseneck in the suction line to ensure the pump's internal components remain filled with water at all times.

5. Install a waste oil pipe from the oil skimmer outlet on the bottom of the tank to the waste oil reservoir.
6. Fit the supplied gate valve (two for the CL3 and CL5) to the sludge hoppers. Make sure they are closed before filling the separator.
7. Fasten the pump to the concrete slab as shown in the Separator System Layout. Connect the pump to the separator. To aid servicing, include barrel unions and ball valves in the pipes either side of the pump. Plug the pump into the electrical controller (or to an appropriate wall power outlet for manual operation). **Note:** Ensure the water level in the collection tank never drops below the level of the suction line inlet. Maintaining this level will reduce the chance of damage to the helical rotor pump due to lose of prime. This is not a problem for the diaphragm pump.
8. Install the float switch to deactivate the pump approximately 25 mm above the suction line inlet level. Fasten the float switch lead to the suction line with plastic cable ties. Take care to ensure that the float travel is not impeded in any way. Set the pumping range to approximately 600-700 mm (this dimension may be increased or decreased to suit specific site applications and tank size). When nearly vertical the float switch will activate the pump. Ensure an appropriate minimum working volume in the pit per local guidelines. MAK Water recommends maximising the minimum working volume so the pump has the longest run time possible.
9. If supplied, install the high level float switch. It should be set to activate the alarm before water can back up to a point where the silt trap begins to flood.
10. The electrical controller has a gland provided at its base to introduce the float switch lead(s). Inside the controller housing low voltage terminals are provided to attach the float switch lead wires (as per the wiring instructions in the controller).
11. Fill the separator tank with clean water. For the helical-rotor pump, fill the pump priming chamber (which is capped with a blue plug on the top of the black plastic stator housing). **Note:** It is important that helical rotor pumps are never run dry (without water) as the rubber stator will be damaged by the heat created.
12. The controller typically has three settings "Off", "Manual" and "Auto". "Auto" mode switches the pump on and off based on the float switch position. The "Manual" mode turns the pump on (without regard for the float switch position). The "Off" mode keeps the pump off.
13. During install and commissioning, the pump can be manually run by switching to "Manual" mode. Once in operation, the switch should be set to "Auto". This will allow the controller to automatically control the pump. **Note:** Do not start the pump without enough water in the collection tank to cover the suction pipe inlet.
14. The oil skimmer inside the separator requires adjustment during commissioning. Run the pump until the water level in the tank has stabilized. Unscrew the oil skimmer until the top of the oil skimmer is to 3mm above the water level.

Note:

- The oil skimmer may require adjustment again after a film of oil has built up on the surface.



MAINTENANCE PROCEDURE

Maintenance intervals may need to be shortened depending on the amount of use and quality of the influent.

MAK Water recommends that Clearmake OWS separators be fully serviced at a minimum of three monthly intervals by accredited service personnel. Contact MAK Water on 1300 669 032 for assistance.

Note: The maximum period between major servicing that WSAA recommends is 3 months.

DAILY/WEEKLY MAINTENANCE

- Clean all collection pits and silt traps.
- Check waste oil reservoir level and arrange disposal of oil if necessary.
- Visually inspect separator and remove any floating solids that may block tubes.
- Visually inspect discharge effluent and check that it appears to be clean.
- Check the pump for normal operation and flow.
- Check the collection tank sludge level and ensure the float switch is operating correctly.
- Visually inspect all equipment for damage and correct operation.

MONTHLY/QUARTERLY MAINTENANCE

- Perform those tasks listed in Daily/Weekly Maintenance list.
- Lower the oil skimmer below the water level to remove all oil from the water surface.
- Drain the sludge hopper and dispose of appropriately.
- Remove the VTC packs and clean thoroughly – a pressure washer may be used.
- Clean out the separator thoroughly – best achieved with a pressure washer.
- Reinstall the VTC packs.
- Fill the system with clean water.
- Turn the power back on and check that the pump is primed and operating.

The following two pages are included as templates to record maintenance activities. MAK Water can provide PDF versions for your specific application. Contact 1300 669 032 for assistance.



CLEARMAKE OIL WATER SOLID SEPARATOR

DAILY/WEEKLY MAINTENANCE RECORD

ID	Task	Done	Date	Initials	Remarks
D1	Clean all collection pits and silt traps.				
D2	Check waste oil tank level and arrange disposal of oil if necessary.				
D3	Visually inspect separator and remove any floating solids that may block tubes.				
D4	Visually inspect discharge effluent and check that it appears to be clean.				
D5	Check the pump for normal operation and flow.				
D6	Check the collection tank sludge level and ensure the float switch is operating correctly.				
D7	Visually inspect all equipment for damage and correct operation.				
D8					



CLEARMAKE OIL WATER SOLID SEPARATOR

MONTHLY/QUARTERLY MAINTENANCE RECORD

ID	Task	Done	Date	Initials	Remarks
W1	Perform those tasks listed in Daily/Weekly Maintenance.				
W2	Lower the oil skimmer below the water level to remove all oil from the water surface.				
W3	Drain the sludge hopper and dispose of correctly.				
W4	Remove the VTC packs and clean thoroughly – a pressure washer may be used.				
W5	Clean out the separator thoroughly – best achieved with a pressure washer.				
W6	Reinstall the VTC packs.				
W7	Fill the system with clean water.				
W8	Turn the power back on and check that the pump is primed and operating.				



CONTROLLER ALARM

The controller indicates an alarm status by visual signal (audible signal is available as an option). When an alarm is signaled, the system requires attention. The alarm indicates that water in the collection tank has moved the high level float to a high level. If the controller is in “Auto” mode, the separator pump will continue to operate.

The reason for the alarm must be found. The alarm will continue to operate until the high level float switch is in the low position. Check the following section for troubleshooting advice.



TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	ACTION
High level alarm active.	Water level high in the collection tank	<p>Check the pump is operating when the lower float switch is high.</p> <p>Check whether the flow rate of the water coming into the collection tank is larger than the pump's flowrate.</p>
	High level float incorrectly detecting a high level.	<p>Check the float switch operation – it may be held up.</p> <p>Manually move the float switch through the vertical up and down positions to test the alarm's operation.</p>
No flow to separator.	Suction line obstructed.	<p>Check the suction line in the collection tank and remove any obstructions, including any sludge build up in the bottom of the collection tank.</p> <p>Check the foot valve on the suction line (if installed) for obstructions.</p>
	Prime lost on helical rotor pump.	<p>Prime the pump priming chamber, via the hole with the blue plug in place, provided for this purpose.</p> <p>Prime the helical rotor pump. Unscrew the blue priming plug on the pump casing. Pour water into this hole to prime the pump. Tighten the screw and re-start the pump.</p>
	Water level in collection tank below suction line.	<p>Check there is water in the collection tank and there are no blockages in the suction line prior to, or after, the pump.</p>
Pump inoperative.		<p>Use a licensed electrician to open the controller and check if the pump overload switch is tripped and reset if so. Check the power to the pump is switched on.</p>



SYMPTOM	PROBABLE CAUSE	ACTION
No flow to separator (continued).	Helical rotor pump stator damaged/worn.	Inspect the rotor and/or stator in the pump to determine if either is damaged or worn.
	Diaphragm pump flap valve failure.	Inspect the flap valves either side of the diaphragm. Replace if damaged or worn.
	Diaphragm failure.	For diaphragm pumps, inspect the diaphragm for leaks. Replace if damaged or worn.
Separator not discharging properly.	Discharge blockage.	Check the VTC for blockages and clean if necessary.
		Determine if there is build up of sludge in the hopper and clean out if needed.
System will not switch on/off.	Pump motor overload.	Use a licensed electrician to open the controller and check if the pump overload switch is tripped and reset if so. Check the power to the pump is switched on.
	No power to pump.	Use a licensed electrician to check the breaker in the controller's enclosure.
	Float switch failure/entanglement.	Check the float switch operation – it may be held down or up. Manually move the float switch through the vertical up and down positions to test if the pump is turning on and off.
Excess water in the waste oil tank.	Skimmer set too low	The oil skimmer may be set too low. If this is the case then adjust the skimmer up (wind the pipe fitting up/anticlockwise).
	Discharge blockage	Check the VTC for blockages and clean if necessary. Determine if there is build up of sludge in the hopper and clean out if needed.



SYMPTOM	PROBABLE CAUSE	ACTION
Oil in the discharge stream.	Skimmer set too high	Observe the oil skimmer in operation. If oil is not able to enter the top of the oil skimmer, then adjust the skimmer down (wind the pipe fitting down/clockwise).
	Heavy concentrations of emulsified oil in the incoming water.	Check the incoming water for unusual concentrations of oil.
	Incorrect cleaning chemicals being used.	Ensure Clearmake Quickbreak chemicals are used.
Pump overload switch is tripped or the motor runs.	Pump power supply	The power supply voltage may be too high or low – have this checked by an electrician.
	Pump motor defect	There may be a defect in the motor – check with MAK Water.
	Pump motor overheating	The motor may be exposed to excessive heat eg: proximity to an external heat source. Take measures to relocate or shield the pump if this is the case.
	Pump short-cycling	The motor may be stopping and starting too frequently due to incorrect float switch settings or inadequate collection tank operating volume.

Note: The motor normally runs too hot to hold.



PRODUCT WARRANTY

WARRANTY REGISTRATION

Log on to www.makwater.com.au to register this separator's warranty. MAKWater Pty Ltd makes the following warranties of its products:

PUMPS

Manufacturer's warranty of 12 months from date of sale.

The helical rotor pump operation and longevity are enhanced by the addition of a gooseneck in the pipework on the suction side of the pump to conserve a full reservoir of water within the pump cavity at all times.

The helical rotor pump is not self-priming. This pump requires a foot valve to be fitted to the base of the suction line to prevent it from losing prime when not running, if debris obstructs the foot valve or jams it open the pump will not prime itself, care should therefore be taken during installation and maintenance procedures that the foot valve is placed and preserved accordingly.

SEPARATOR TANK, STAND & VERTICAL TUBE COALESCER

5 year warranty from date of sale.

Note: The warranty on the separator tank is limited to "normal" applications where no corrosive elements are present. The tank is constructed of 304 stainless steel but is still susceptible to corrosion if exposed to certain substances. Check with MAK Water if in doubt as to your particular usage.

FLOAT SWITCH

1 Year manufacturer's warranty from date of sale.

OTHER COMPONENTS

1 Year manufacturer's warranty from date of sale.

For more details refer to the Terms and Conditions of sale at makwater.com.au.



SPARE/REPLACEMENT PARTS

MAK Water stocks a range of spare and replacement parts and consumables to suit Clearmake OWS systems. Below is a list of recommended spare parts and quantities:

Description	Part Number	Separator Model Number			
		CL10	CL15	CL20	CL30
Stator, C15, Helical rotor, Nitrile	PU-PUPT-C15ASTATOR	NA	NA	1	NA
Rotor, C15, Helical rotor, SS316	PU-PUPT-C15AROTOR	NA	NA	1	NA
Stator, C16, Helical rotor, Nitrile	PU-PUPT-C16ASTATOR	NA	NA	NA	1
Rotor, C16, Helical rotor, SS316	PU-PUPT-C16AROTOR	NA	NA	NA	1
Diaphragm, D50, Nitrile	PU-DIAP-D50	1 ¹	NA	NA	NA
Diaphragm, D76, Nitrile	P7100475	NA	1 ¹	NA	NA
Float Switch, 2 wire, 10m lead	FT-SJE-10M2W	1	1	1	1

Table 4 Separator Spare Parts

Note:

1. A helical rotor or diaphragm pump is supplied with the separator. Choose the stator and rotor for the helical rotor pump. Choose the diaphragm for the diaphragm pump.



QUICK BREAK PRODUCTS

To ensure the proper operation of Clearmake OWS separator the use of suitable Quick Break product is mandatory. The use of degreasers and cleaning chemicals that are biodegradable and possess 'Quick Break' properties are vital to the operational efficiency of your equipment and meeting trade waste standards.

Clearmake Quick Break products rapidly remove dirt and oil during the degreasing or wash down process by temporarily emulsifying them. After the 'Quick Break' is washed from the cleaned surface the 'breaking' action releases more than 90% of the oil within the first 30 minutes. This allows the oil to rise to the surface of the tank or separator from where it can be removed.

With no standards in place the terms 'Quick Break' and 'environmentally friendly' are often used to promote products that are inappropriate for use with water treatment systems.

Some Quick Breaks are effective cleaners but create an emulsion of oil, water and detergents that do not 'break'. These emulsions cannot be separated by the water treatment equipment. The result is this emulsified stream is discharged and will not comply with trade waste standards.

Some offer effective Quick Break action, but achieve their results with chemicals that can be hazardous to the environment and will not meet trade waste standards.

We strongly recommend the use of Clearmake Quick Break cleaning chemicals.

Please call 1300 669 032 or visit www.makwater.com.au/products/consumables/ for details of suitable cleaners and detergents.



REFERENCES

STANDARDS

Refer to the following standards and agreement guidelines to ensure that the installation is compliant with controlling authority requirements:

AS 3500	National Plumbing and Drainage Code
AS 3000	National Electrical Installation Code
AS 4494	General Performance Requirements for discharge of Commercial and Industrial liquid waste to sewer
AS 3966	Metal Access Covers, Road Grates and Frames



COMPLIANCE PLATES

Clearmake product authenticity is readily identified via reference to the compliance plate bearing the 'MAK Water' proprietary information. This information is attached to the separator at the inlet end below the top rim.

An example of the WSAA Compliance plate is shown below. The actual size is 85mm x 85mm.

 **Clearmake**[®]
WATER TREATMENT & RECYCLING SOLUTIONS

OIL/WATER/SOLIDS SEPARATOR

SERIAL NO

MODEL NO

FLOW RATE	<input type="text"/>	VOLUME	<input type="text"/>
PUMP TYPE	<input type="text"/>	PUMP NO	<input type="text"/>

WSAA APPRAISAL NO

Ph 1800 700 267 www.clearmake.com.au



APPENDIX B – SEPARATOR SYSTEM LAYOUT