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Reclaim Water system P&ID
Point Level Control Dye Low Level
RainEx 8000-D Water Reclaim System 1 of 2
RainEx 8000-D Water Reclaim System 2 of 2
1.0 Warnings

A QUALIFIED ELECTRICIAN MUST INSTALL POWER WIRING AND A DEDICATED GROUND.

RISK OF ELECTRIC SHOCK - SERVICE PANELS SHOULD BE OPENED ONLY BY QUALIFIED ELECTRICIAN PERSONNEL. REFER SERVICING TO THESE QUALIFIED AND TRAINED SERVICE PERSONNEL.
1.1 System Description

The supplied equipment is a flow-thru Water Reclamation system, which is able to accept continuous rainwater supply flow. The system is designed to treat rainwater for use in flushing. Water is supplied from the building rainwater collection network, and routed to the Water Reclaim Storage tank inlet. System operation is fully automated, as controlled by a PLC.

Raw water is pumped out of the tank through staged duplex bag filters and a UV light. It is then diverted to meet water supply requirements through a bladder expansion tank (customer supplied), or re-circulated back to the Water Reclaim Storage tank.

Water Reclaim Storage Tank
Rain water is stored in the 8,000 gallon Reclaim Storage tank. Water supply is provided from the building rainwater drainage system. The tank is supplied with city water via a mechanical float valve. This is provided to maintain a minimum tank water level in the event that usage exceeds rainwater supply. A clear plastic site gauge is provided to monitor the level in the tank.

The reclaim tank has a mechanical overflow drain, connected to an atmospheric drainage system, in the event that excess rainwater enters the tank.

The tank turnover is continuously maintained by circulating the contents of the reclaim tank through a sprayball on the circulation return line connection.

Coarse Basket Strainer
A duplex basket strainer is provided on the pump suction. The strainer provides coarse filtration of the raw water to prevent damage to the pumps.

Duplex Alternating Circulation/Supply Pumps
The pumps run continuously, and automatically alternate operation on the basis of time. Water from the interior storage tank will be boosted to as high as 80 psi via booster pump to supply water to the system(s). A pump discharge pressure gauge provides indication of outlet pressure at the skid.

Water Flow/Control System
A customer supplied bladder expansion tank installed at the reclaim system outlet will maintain water pressure for the system supply. If water is used, a loss of pressure will occur in the bladder expansion tank as volume is depleted. A pressure sensor in the expansion tank feed line detects that pressure has reached a low setpoint, which signals the PLC in the control panel to open the three-way motor-actuated valve into the supply position. The valve will maintain this position until pressure builds up to a high setpoint, after which the automated three-way valve returns to the recirculation position.

Bag Filters
The reclaim water is filtered to remove debris that enters the system. Bag filters are located in the reclaim system circulation line. Reclaim water is fed through duplex 50 micron bag filters. The water is then polished through duplex 10 micron bag filters, after which it is diverted to the UV light. In line pressure gauges are provided before and after each filter to monitor pressure drop/fouling of the bag filter elements. The pressure drop across the filters are monitored by a differential pressure switch that activates an alarm when the filters need changed.

**UV Light**
A 254nm UV Light is supplied in the circulation line to help disinfect the Reclaim system. The UV Light is supplied with an automated wiper assembly, which periodically cleans the surface of the UV quartz sleeves. Operation is controlled by the UV panel. Wiper frequency and cycle times are adjustable.

**Dye Storage and Injection**
A 55 gallon dye storage tank is included on the skid. Dye is injected into the supply line when there is an indication of flow to the bladder expansion tank. The dye identifies the reclaim water as non-potable. Dye is continuously injected when flow is detected via a metering pump.

**System Controls**
The reclaim system is controlled by a PLC installed in the main control panel, which is located on the assembly skid. The control panel door includes the following controls:
- Operator Interface (HMI)
- Fused disconnect switch
- Emergency stop button and reset pushbutton
- Flow Transmitter
- Alarm horn and silence/reset pushbutton

Reclaim system operating parameters status, indication and alarms are displayed on the HMI. The PLC is programmed to control the operation of the reclaim system Circulation and Supply modes, and the make-up of city water to the reclaim tank on high or low level call for water conditions.

Warning and shut-down alarms are programmed to protect the system and operators. Shut-down alarms are provided for pump faults. Warning alarms occur on reclaim system low pressure duration, dye tank low level, and on valve position alarms.

Refer to the Start-up, Operations and HMI Screens section for a complete description of the HMI screens and system operation.
1.2 Installation and Initial Start-Up Procedure

The system supplied is designed for automatic operation, with a minimal amount of operator interaction. Regular maintenance is required, and should be performed as outlined elsewhere in this manual. The following steps are typically required to bring the system on line.

The operator should read this entire manual prior to attempting installation and system start-up.

1. Locate the Reclaim Water System tank and Reclaim Assembly skid on a smooth, level surface that provides full support to the tank and skid bottom(s). Ensure that there is adequate space around the equipment for maintenance of the system.

2. Refer to Design Drawings and Documents for details on all plumbing and electrical requirements.

3. Plumb the rainwater supply line to the reclaim tank Rainwater Feed connection, which has a stand-pipe to direct supply streams toward the bottom of the tank.

4. Plumb the city water supply line to the reclaim tank City Water Make-up valve. Install an on/off isolation valve in this line.

5. Plumb the Recirculation Return connection from the reclaim assembly skid to the Sprayball/Return connection on the reclaim tank.

6. Plumb the Reclaim Tank Outlet connection to the Pump Suction Manifold at the assembly.

7. Plumb the Reclaim System Outlet connection to the building supply piping.

8. Plumb the Reclaim Tank Overflow connection to an open, atmospheric drain. Use a pipe size at least as large as the effluent fitting. Care must be taken to prevent the possibility of downstream flow restriction that could cause the reclaim tank to overflow.

9. Ensure that all piping connections and proper seals are made in order to prevent operator injury or system leaks.

10. Install the bulbs into the disinfection UV light on the skid (refer to the component manual in the O&M Section for details).
11. Install the bag filters into the bag filter housings on the skid, being sure to load the proper filter micron rating into the appropriate filter housing (refer to the component manual in the Component O&M Section, and also to the component list in the Design Document Section, for details).

12. Verify that the control panel power switch is in the OFF position, and wire the panel power to the required 460VAC / 3Ø power supply transformer, located on the skid (refer to the electrical schematic drawings in the Drawings Section for details).

13. The reclaim tank should be filled with water before introducing the rainwater supply so that the equipment can be checked for leaks, and system operation can be tested.

14. After all connections to the reclaim tank and assembly skid are made, and the tank is full of liquid, set all process manual valve operators to "OPEN" positions.

15. The power may be turned on at the panel.

16. Start the system and verify proper pump rotation.

17. Allow the pressure to build up in the system expansion tank. Once pressure has reached the Reclaim System High Pressure set-point, the system will circulate system flow back to the reclaim tank by automatically changing the position of the three-way Reclaim Water Divert valve.

18. Check the system for leaks. Should any leak occur, shut the system down, isolate the leak, make repairs, and restart the system.

19. Verify automatic operation of the UV Wiper assembly. Cycle time and frequency can be adjusted by accessing the UV panel.

20. Verify automatic operation of the three-way Reclaim Water Divert valve as it corresponds to reclaim system outlet pressure.


22. Allow the system to operate automatically. Follow routine maintenance and refer to the troubleshooting guide to maintain optimum performance.
1.3 Routine Maintenance

Routine Maintenance should include at minimum:

1. Refer to component operating manuals and follow recommended maintenance procedures.
2. Clean basket strainers as required to maintain unobstructed flow to the reclaim tank.
3. Replace bag filter elements as required to maintain circulation flow and pressure.
4. Periodically verify operation of the UV Light and UV Wiper. Replace UV Bulbs as required (at least once per year).
5. Inspection of piping connections for leaks.
6. Ensure unobstructed flow of drain and vent lines.
7. Verify bladder expansion tank pressure.
8. Verify normal operating position of manual valves.
## 1.4 Recommended Spare Parts

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Light</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Electrically Actuated Ball Valve</td>
<td>Actuator</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Valve Body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Valve</td>
<td>Diaphragm Assembly</td>
<td>Includes: Stem, Disc Guide, Disc, Disc Retainer, Spacer Washers, Diaphragm, Diaphragm Washer and Stem Nut</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repair Kit</td>
<td>Includes: Diaphragm, Disc/Disc Assembly and Spacer Washers</td>
<td></td>
</tr>
<tr>
<td>EVMUL18 Pump</td>
<td>Mechanical Seals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Transmitter</td>
<td>Rotor</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Rotor Pin</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>O-Rings</td>
<td></td>
<td></td>
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<tr>
<td>Basket Strainer</td>
<td>Replacement PVC Basket, 1/32&quot; Mesh</td>
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<td></td>
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<tr>
<td>Gauge/Guard</td>
<td>Diaphragm</td>
<td></td>
<td></td>
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<tr>
<td>Metering Pump</td>
<td>KOP Wet End Repair Kit</td>
<td></td>
<td></td>
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<tr>
<td>Bag Filter</td>
<td>#2 Bag Filter, 10 micron, glazed polypropylene, poly ring with handle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#2 Bag Filter, 50 micron, glazed polypropylene, poly ring with handle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Always include pump serial number when ordering spare parts.

**This is a Recommended Spare Parts List. Component O & M’s contain detailed parts lists for specific parts. Refer to Section 2 for complete lists.

The above parts should be kept on hand at all times to minimize down time and avoid difficulties. See each component’s O & M manual for installation instructions and additional spare parts.
## 1.5 Troubleshooting Guide

<table>
<thead>
<tr>
<th>Problem</th>
<th>Symptom</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water level too low</td>
<td>Inlet plumbing obstructed</td>
<td>Inspect/clean Basket strainers.</td>
</tr>
<tr>
<td></td>
<td>City water not making-up</td>
<td>Verify level setpoints and tank level transmitter operation.</td>
</tr>
<tr>
<td>Pumps not operating</td>
<td>Thermal overload tripped</td>
<td>Reset overload relay in control panel.</td>
</tr>
<tr>
<td></td>
<td>Blown fuse</td>
<td>Replace fuse in control panel.</td>
</tr>
<tr>
<td>Water level too high</td>
<td>Overflow plumbing obstructed</td>
<td>Inspect/clean blockage of overflow plumbing.</td>
</tr>
<tr>
<td>Reduced flow through spray-ball</td>
<td>Circulation line obstructed</td>
<td>Inspect/change bag filter cartridges.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verify valve operation/position.</td>
</tr>
</tbody>
</table>
1.6 BPE Product Warranty

**MINIMUM ORDER:**
The minimum order acceptable is $25.00 net billing.

**PRICES:**
Prices are based on standard domestic packaging and do not include special export packaging or other requirements. **ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

**CREDIT INFORMATION:**
Open account billing is extended to firms with established credit ratings. Please request a credit application. Any account not approved by our Credit Department may order C.O.D. or by credit card.

**TERMS:**
Net (30) days.

**DELIVERY:**
We are staffed to handle most orders promptly from our large inventory. **ALL SHIPMENTS WILL BE F.O.B. OUR PLANT UNLESS OTHERWISE SPECIFIED.**

**RETURNS AND CLAIMS:**
**CLAIMS FOR SHORTAGE MUST BE MADE WITHIN TEN (10) DAYS AFTER RECEIPT OF GOODS.** Claims for goods damaged or lost in transit should be filed with the carrier. **RETURNS WILL NOT BE ACCEPTED WITHOUT OUR WRITTEN PERMISSION.**

**TECHNICAL INFORMATION:**
Information on corrosion, pressures, and temperatures may be used as a guide and as a basis for recommendations and should not be interpreted as a guarantee. To be certain of results, materials should be tested under actual service conditions.

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**LIMITED PRODUCT WARRANTY**

All products not manufactured by Burt Process Equipment carry the original manufacturer's warranty. Copies are available on request. All products manufactured by Burt Process Equipment will be free of defects in material and workmanship for a period of (90) days from date of shipment from Burt Process Equipment. If found to be defective by us, we will repair or replace the nonconforming parts or goods at our option, or return the purchase price, at our option. Notice of a defective product must be given to Burt Process Equipment in writing immediately upon the discovery of such defect and include a copy showing proof of purchase. Burt Process Equipment will not be liable for special or consequential damages in any claim, suit or proceedings arising under this warranty, nor will Burt Process Equipment accept any liability for claims for labor, loss of profit, repairs or other expenses incidental to replacement. **The product warranty expressed above is our only warranty and may not be verbally changed or modified by any representative of Burt Process Equipment.** The offer to repair or replace nonconforming goods within warranty does not cover defects caused by shipping damages, damages caused by improper use or installation, or by the buyers attempt to use products beyond their mechanical, thermal or electrical capacity.

All freight costs incurred in shipping parts to or from Burt Process Equipment or to the manufacture if necessary, are at the expense of the customer.