

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

08 DEC 1993

Eliot I. Harrison, Agent for  
Baltimore Aircoil Company  
P.O. Box 7322  
Baltimore, MD 21227

Subject: IOBIO™  
EPA Registration No. 15118-1  
Your Amendment Dated July 30, 1993

Dear Mr. Harrison:

The amended labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable subject to the comment below. A stamped copy is enclosed for your records.

Submit five copies of the finished labeling before you release the product for shipment bearing the amended labeling.

For your records, an acute inhalation study is still required to be submitted by September 22, 1994, as indicated in our May 13, 1993 letter.

If you have any questions about these comments, you may call Wallace Powell at 703-305-6938.

Sincerely,



Ruth G. Douglas  
Product Manager 32  
Antimicrobial Program Branch  
Registration Division (7505C)

Enclosure

CONCURRENCES							
SYMBOL							
SURNAME							
DATE							

Baltimore Aircoil Company

# IOBIO™ Bacteria, Slime and Algae Control

IODINE CONTAINING CANISTER

KEEP OUT OF REACH OF CHILDREN

DANGER

**ACTIVE INGREDIENT**

Iodine ..... 99.5%

**INERT INGREDIENTS** ..... 0.5%

**TOTAL** ..... 100.0%

### STATEMENT OF PRACTICAL TREATMENT

**If in Eyes:** Flush with plenty of water. Call a physician.

**If on Skin:** Wash with plenty of soap and water. Get medical attention.

**If Swallowed:** Call a physician or poison control center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

**If Inhaled:** Remove from area to fresh air. If not breathing, clear airway and start mouth-to-mouth artificial respiration or use a bag-mask respirator. Call a physician immediately.

**Note to Physician:** Probable mucosal damage may contraindicate the use of gastric lavage.

EPA Reg. No. 15118-1  
EPA Est. No. 15118-MD-1

Net Contents:

Manufactured by:

Baltimore Aircoil Company  
PO Box 7322  
Baltimore, MD 21227

08 DEC 1993  
Under the Fungicide, Insecticide, and Plant Growth Regulator Act as amended, for the pesticide registered under EPA Reg. No. 15118-1

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## PRECAUTIONARY STATEMENTS

### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

**DANGER:** Corrosive. Causes irreversible eye damage and skin burns. May be fatal if swallowed or inhaled. Harmful if absorbed through the skin. Do not get in eyes, on skin or on clothing. Do not breath vapors. Wear goggles or face shield, protective clothing and chemical resistant gloves when handling. Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash before reuse.

### ENVIRONMENTAL HAZARDS

Iodine is toxic to fish. Do not discharge into lakes, streams, ponds or public waters unless in accordance with a NPDES permit. Do not contaminate water when disposing of equipment washwaters. For guidance, contact your State Water Board or Regional Office of the EPA.

### PHYSICAL OR CHEMICAL HAZARDS

Do not store or ship in the presence of ammonia. This product will form explosive nitrogen iodides when contacted with liquid ammonia, aqueous ammonia solutions (such as household ammonia) or alkaline solutions of ammonia salts.

**THIS CANISTER CONTAINS A COMMERCIAL GRADE OF PURE, ELEMENTAL IODINE. DO NOT DAMAGE OR IN ANY WAY ATTEMPT TO EMPTY CANISTER OF CONTENTS.**

REGISTERED  
08 DEC 1993  
Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended. Carcinogenic pesticide registered under EPA Reg. No. 15118-1



## DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

The IOBIO™ device aids in the control of bacteria, algae and slime in open recirculating cooling water systems that are used in conjunction with cooling towers, evaporative condensers and evaporative fluid coolers. The IOBIO™ device automatically controls and continuously dispenses a precise and very low concentration of elemental iodine into the recirculating water.

**DO NOT USE THIS PRODUCT WITH AIR WASHERS OR DIRECT EVAPORATIVE COOLERS USED FOR HUMAN COMFORT COOLING.**

IOBIO™ is not affected by pH values, dissolved mineral levels, or temperatures commonly found in open recirculating water systems which cool air-conditioning and industrial processes. When correctly selected and applied, the IOBIO™ canister requires replacement only once per year.

See the enclosed Installation, Operation and Maintenance manual for background information on the IOBIO™ device and instructions on installing and operating the product.

### STORAGE AND DISPOSAL

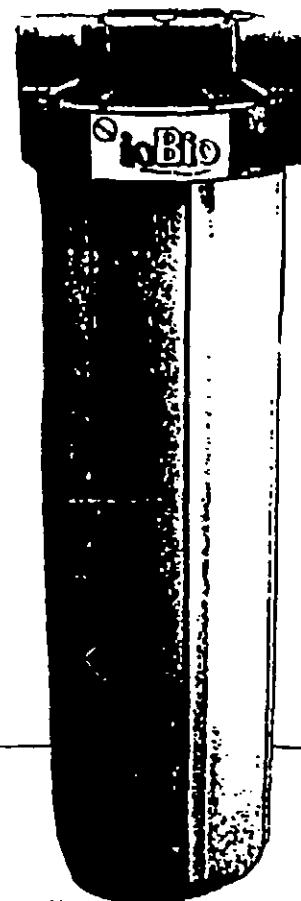
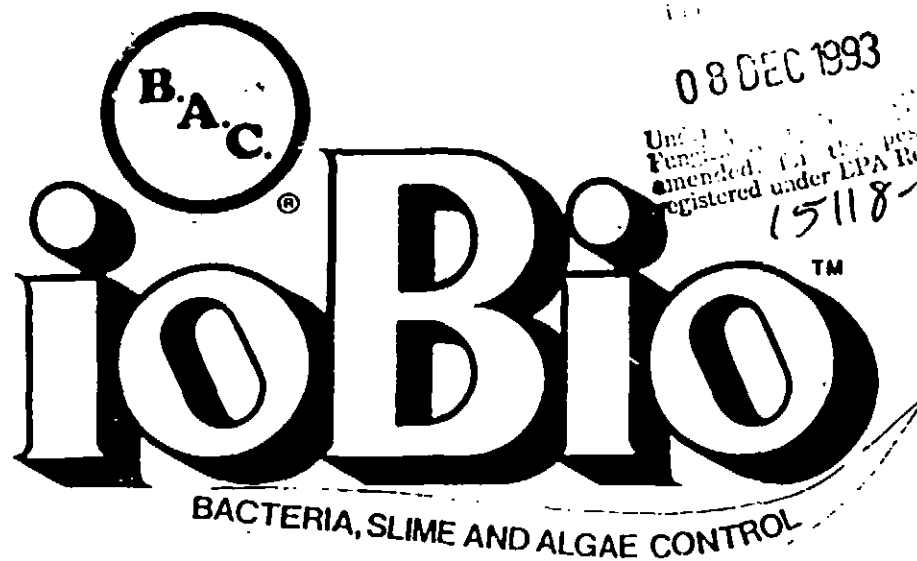
Do not contaminate water, food or feed by storage or disposal.

**Storage:** Keep canister tightly closed. Store in a dry place. Do not store in the presence of ammonia.

**Pesticide Disposal:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

**Canister Disposal:** DO NOT THROW EXPENDED IODINE CANISTERS IN THE TRASH. Ship the expended canister back to the manufacturer in the reusable carton that arrives with the replacement canister. See section on replacing canisters in Directions for Use booklet for instructions on changing canisters.

ACCEPTED  
08 DEC 1993  
Under Federal Insecticide, Fungicide, and Rodenticide Act as amended, this Pesticide registered under EPA Reg. No. 15118-1



# Installation, Operation and Maintenance Manual

## DESCRIPTION

The IOBIO™ Bacteria, Slime and Algae Control\* provides a simple and reliable means of controlling slime and algae often found in evaporative cooling systems. It is easy to use and requires little maintenance. By delivering very low concentrations of iodine, the IOBIO™ Control automatically controls unwanted microbiological contaminants in the open system. It is a simple, effective method of biological water treatment.

The information contained in this manual will enable the user to effectively install, operate, and maintain the IOBIO™ Control. It is important to follow these instructions to obtain the design performance from the device.

The IOBIO™ Control is installed in the make-up water piping to the cooling tower, evaporative condenser, or evaporative fluid cooler. The IOBIO™ Control is constructed of two primary components, a permanent upper housing and a replaceable lower iodine canister. When properly selected, the iodine canister contains a quantity of elemental iodine designed to last a full operating season. Since the exact duty cycle will vary on each application, it is suggested the IOBIO™ Control be monitored during the first season of use, and a replacement canister size be ordered that best matches the desired replacement interval.

The IOBIO™ Control is compatible with both alkalinity and acidity, and the dissolved mineral levels and temperatures commonly found in open recirculating water systems which cool air-conditioning and industrial processes.

Additional water treatment may be required if corrosive and/or scaling conditions exist. The services of a competent water treatment specialist should be obtained for specific water treatment recommendation in these instances. Any corrosion and scale inhibitors used must be compatible with halogen biocides.

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**NOTICE:** It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Do not use this product with air washers or direct evaporative coolers used for human comfort cooling.

# Installation Information

## PRECAUTIONARY STATEMENTS

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**IF INHALED:** Remove from area to fresh air. If not breathing, clear airway and start mouth-to-mouth artificial respiration or use bag-mask respirator. Call a physician immediately.

**NOTE TO PHYSICIAN:** Probable mucosal damage may contraindicate the use of gastric lavage.

## PARTS LIST

Package A: Installation Kit

- Upper housing.
- Housing mounting bracket and housing mounting screws.
- Sheet metal screws.
- PVC pipe and fittings.
- Installation, Operation and Maintenance Manual.

Package B: IOBIO™ Replacement Canister Package.  
Canister Wrench.

Package C: Anti-Syphon Valve (optional).

## TOOLS AND MATERIALS REQUIRED FOR INSTALLATION

- Drill and drill bits.
- Hand wrenches.
- Pipe thread dope or sealant.
- PVC solvent cleaner and pipe adhesive.
- Hack saw.

Additional tools and materials as necessary to re-route and modify existing make-up water supply piping (copper, steel, or PVC).

## PLUMBING CONSIDERATIONS

The table below indicates the recommended flows and pressures for the IOBIO™ Control.

The "maximum pressure" is the maximum allowable water pressure to which the IOBIO™ Control will be exposed when the cooling tower float valve (or electric level control solenoid valve) is closed and the make-up water flow is zero.

The "pressure drop" is the water pressure required to force the design water flow rate through the IOBIO™ Control. This value is over and above the pressure required to force the design water flow rate through the float valve. If the optional anti-syphon valve is used, additional pressure is required. See instructions and specifications enclosed in the optional anti-syphon valve package.

Canister Diameter (in)	Pressure Drop (psig)	Maximum Pressure (psig)	Maximum Flow (gpm)*
4	0.6	100	13
6	1.0	100	20

\*Maximum continuous make-up water flow rate.

It is recommended that the IOBIO™ Control be installed using the PVC pipe and fittings enclosed with this kit. It is recognized, however, that some local plumbing codes require the use of metallic piping.

**NOTE:** If metallic piping is used in lieu of PVC pipe, some corrosion of the metallic piping may occur near the IOBIO™ Control. Such metallic piping should be inspected annually and replaced as required.

ACCEPTED WITH COMMENTS in EPA Letter Dated:

08 DEC 1993

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended for the pesticide registered under EPA Reg. No. 15118-1

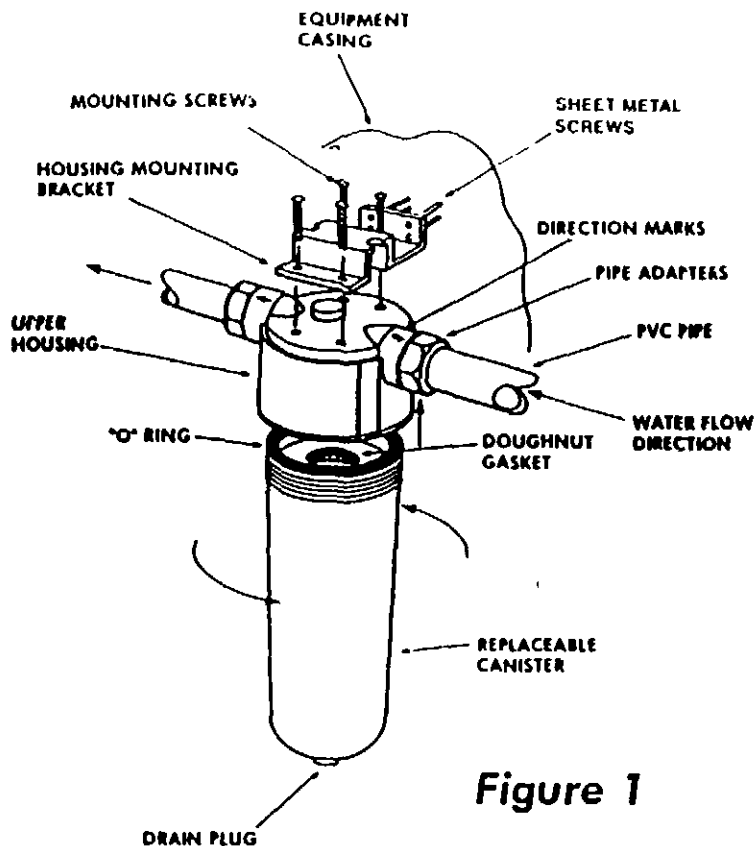


Figure 1

Plumbing codes require that potable water distribution systems be protected from contamination by non-potable water, such as evaporative cooling equipment water. The optional IOBIO™ anti-syphon valve is available for this purpose, if required.

Under most circumstances, B.A.C. evaporative cooling equipment requires no mechanical isolation from the potable water supply because the make-up water valve (float-operated valve) discharge connection has been positioned at a height above the basin overflow that is more than the minimum required by most codes for an "air break."

When the IOBIO™ Control is installed in the make-up water piping, it must be mechanically isolated from the potable water system. The optional IOBIO™ anti-syphon valve is a "Pressure Vacuum Breaker" which meets the American Society of Sanitary Engineers (ASSE)-1020 specification and is approved for "high hazard" application by Building Officials & Code Administrators Int'l. Inc. (BOCA), International Association of Plumbing & Mechanical Officials (IAPMO), International Conference of Building Officials (ICBO), Southern Building Code Congress International (SBCCI), and the Canadian Standards Association (CSA). Consult the specification sheet enclosed with the anti-syphon valve for further information.

If the evaporative cooling equipment is already isolated from the potable water supply with a "Reduced Pressure Principle Backflow Preventer" (ASSE-1013), or a "Pressure Vacuum Breaker" (ASSE-1020), no further protection is needed. However, any existing apparatus should be tested in accordance with the manufacturer's specifications to ensure proper functioning.

Consult local plumbing codes to ensure installation compliance.

# Installation Instructions

The IOBIO™ Control should be installed as close as possible to the make-up water connection of the evaporative cooling equipment and should be attached to the side of the evaporative cooling equipment. Do not install the device at a location remote from the immediate vicinity of the evaporative cooling equipment.

If the make-up water frequently contains sand or other particulates, a commercially available water filter should be installed upstream to protect the IOBIO™ Control and the optional anti-syphon valve (if used). An occasional particle of sand, smaller than .020 inch diameter, will not harm the IOBIO™ Control, however, A CONTINUING FLOW OF SUCH PARTICLES WILL RENDER THE DEVICE INACTIVE AND MAY PREVENT THE ANTI-SYPHON VALVE FROM SEATING PROPERLY. A filter will not be needed with a normal potable water supply.

In the direction of make-up water flow, the major components should be installed in the following order:

- Service valve, if used (Supplied by others).
- Water filter, if required (Supplied by others).
- Water meter, if used (Supplied by others).
- Anti-syphon valve (Available option).
- IOBIO™ Control.
- Cooling tower water level control (float valve or electrically actuated valve)

Use the following instructions for installation of the IOBIO™ Control.

1. Turn off and lock-out the evaporative cooling equipment's pumps and fan motors before beginning to install the IOBIO™ Control.
2. Turn off make-up water to evaporative cooling equipment.
3. Identify a convenient location for the IOBIO™ Control on the side of the evaporative cooling equipment near the make-up water inlet connection. Allow 2 inches of clearance beneath the iodine canister to permit removal and replacement.
4. Locate a spot to mount the anti-syphon valve (if required), allowing a minimum valve elevation of 12 inches from the connections into the evaporative cooling equipment (Figure 2A) or the top of the IOBIO™ housing (Figure 2B), whichever is higher. The vertical dimensions are required for correct functioning of the anti-syphon valve. Whether or not the anti-syphon valve is installed a minimum straight run of pipe upstream of the IOBIO™ Control must be provided for correct functioning of the device.

ACCEPTED  
with CC-...  
in EPA Letter, Dated:  
**08 DEC 1993**  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act as  
amended, for the pesticide  
registered under EPA Reg. No.  
15118-1

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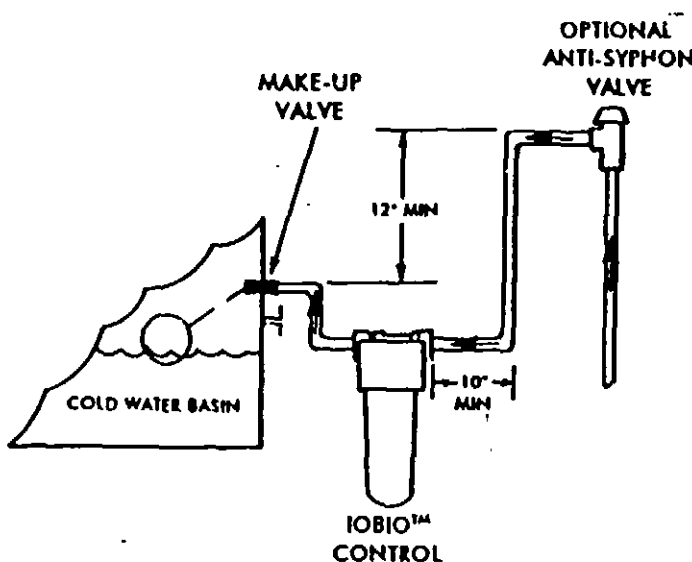


Figure 2A

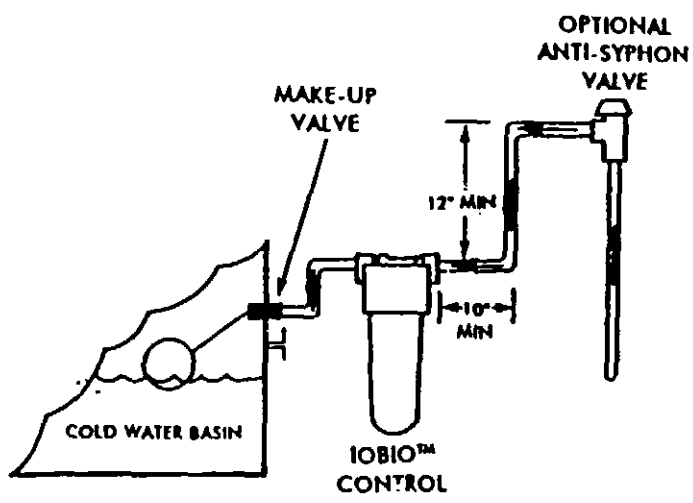


Figure 2B

5. For retrofit installations, remove the existing piping from the evaporative cooling equipment water level control mechanism.
6. Drill four one-quarter inch holes in the evaporative cooling equipment casing using the mounting brackets as templates. Attach mounting brackets with sheet metal screws provided (Figure 1). If more than one IOBIO™ Control is required, locate the additional devices as close as possible to one another. Multiple devices are to be piped in parallel with piping arranged to provide equal flow resistance through each device (Figure 3).
7. Attach the upper housing of the IOBIO™ Control to its bracket with screws provided. Observe the flow direction markings on water connections.
8. Open the ball valves that are located at the inlet and outlet of the optional anti-syphon valve (if used).
9. Attach the anti-syphon valve (if used) to its mounting bracket using the plastic strap provided. Close the test connections.
10. Piping from the anti-syphon valve (if used) to the IOBIO™ Control, and from the device to the evaporative cooling equipment water level control mechanism (float valve or solenoid valve), must be plastic to minimize corrosion. Install the PVC pipe thread adapters, using pipe dope or sealant.
11. Cut, deburr, and install PVC pipe using joint cleaner and adhesive.
12. Modify existing make-up water piping to make connection to bottom inlet of anti-syphon valve, if used, or to adapt to the PVC piping upstream of the IOBIO™ Control.
13. Remove the IOBIO™ canister from the canister package, and remove the plastic bag from around the canister. Following the instructions enclosed with the canister, remove the shipping cap and install the canister into the upper housing.

ACCEPTED  
 WITH COMMENTS  
 IN EPA L-101-1000

08 DEC 1993

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 15118-1

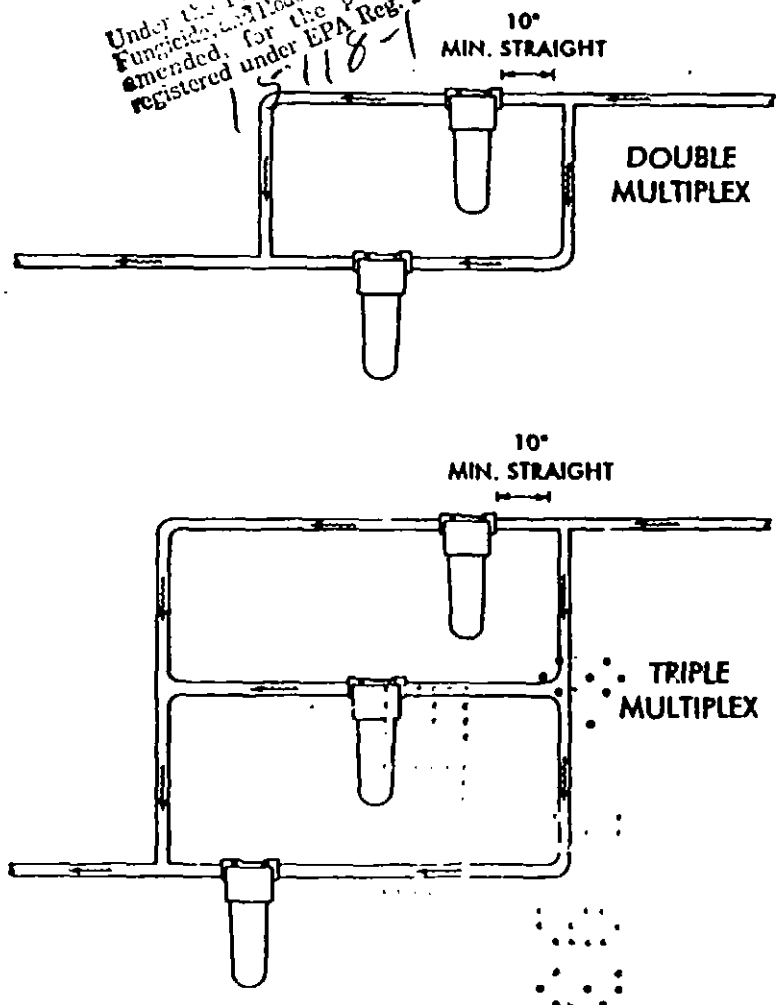


Figure 3

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14. When an expended canister is being replaced, the shipping cap from the fresh canister is used to close the expended canister for shipment back to the manufacturer. On a new installation of the IOBIO™ Control, the shipping cap should be rinsed under a faucet and then discarded.

**Do not retain the shipping cap(s) for other uses. It is contaminated with iodine and can cause harm to humans and domestic animals.**

15. Turn on make-up water to the evaporative cooling equipment and check for leaks.

16. In situations where the evaporative cooling equipment is operated in freezing weather, the canister and upper housing and adjoining piping should be wrapped with heat trace material and insulated.

**NOTE: Do not over-insulate! The canister is plastic which can be damaged by excessive heat. If the IOBIO™ Control is overheated to 250 degrees F, the entire device must be replaced.**

**HEAT TRACING SELECTION PROCEDURES**

SELECTION CONSTANTS								
MODEL	INSULATION THICKNESS*							
	½"		1"		1½"		2"	
	AMBIENT TEMPERATURE							
	(0°F)	(-20°F)	(0°F)	(-20°F)	(0°F)	(-20°F)	(0°F)	(-20°F)
IB4-010, 030	11	16	5	8	4	5	3	4
IB4-060	15	22	7	11	5	7	4	6
IB4-140	26	38	13	19	9	13	6	10
IB6-160	21	32	11	16	7	11	5	8
IB6-370	37	56	19	28	12	19	9	14

\*Insulation thickness based on closed cell neoprene.

To select the proper amount of heat tracing divide the constant by watt density of heating cable to determine length of heating cable required.

**EXAMPLE:**

Given an IOBIO™ model no. IB4-060 in an ambient temperature of 0°F with 4 watt/foot wire and ½" of insulation thickness select the amount of heat tape required.

Constant = 15      W/FT = 4  
 Amount of tape required  $\frac{15W}{4 W/FT} = 3.75 \text{ ft}$

Therefore wrap the IOBIO™ Control with 3.75 ft of heat tape

**NOTE:** The use of low watt density, self regulating heating cable is recommended. Follow the heating cable manufacturer's instructions in all cases.

# Operating and Maintenance Information

**OPERATING INSTRUCTIONS**

The IOBIO™ Control requires operator attention. The residual iodine concentration in the evaporative cooling equipment and recirculating water should be checked daily for several days following the initial installation of the IOBIO™ Control and following a canister replacement. Thereafter, the iodine concentration in the evaporative cooling equipment and recirculating water should be checked weekly during the operating season.

To measure the residual iodine concentration in the evaporative cooling equipment and recirculating water, use the test kit enclosed in the replacement canister package. Follow the instructions enclosed with the test kit. The residual iodine content in the water should be between 0.1 and 0.5 ppm.

The amount of iodine remaining in the canister can be determined by observing the black mass within the translucent canister. Opaque blue canisters are equipped with a sight glass to provide a visual indication when the iodine is nearing depletion. The operator should procure a replacement canister when the level of iodine beads is at the center of the sight glass on the opaque blue canister or when the black mass has diminished to 1½ inches from the bottom of the translucent canister.

**NOTE: Initial use of the IOBIO™ Control may loosen existing biological material and carbonate deposits in the system, causing strainers to plug. The operator should be alert to such an occurrence so that remedial action can be taken to avert a system shut-down.**

**COLD WEATHER OPERATION**

When the evaporative cooling equipment is secured for freezing weather, and after the make-up water to the evaporative cooling equipment is valved off, the plug at the bottom of the canister should be loosened to allow the water in the canister and adjacent piping to drain out.

The IOBIO™ Control, including the canister, must be heat traced if operated in freezing weather. Refer to "Installation Instructions."

ACCEPTED  
 WITH COMMENTS  
 IN EPA LETTER # 15118-1  
 08 DEC 1993  
 Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, this pesticide is registered under EPA Reg. No. 15118-1

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**CANISTER REPLACEMENT INSTRUCTIONS**

1. Turn off the make-up water to the evaporative cooling equipment. The ball valve at the outlet of the anti-siphon valve (optional) may be used for this purpose.
2. Remove any heat tracing and insulation from the expended canister, if necessary.
3. Remove drain plug from bottom of expended canister to drain canister and piping of water.
4. Remove the expended canister by unscrewing it from its upper housing. Use the plastic canister wrench supplied with the new canister. Place expended canister upside down over an open drain to empty any remaining water.
5. Remove the replacement IOBIO™ canister from its carton, and remove the resealable plastic bag.
6. In an open and well ventilated space, and while keeping face away and upwind of canister, *carefully* remove the shipping cap from the fresh canister. The canister is not under pressure, but a small amount of iodine vapor will be released when the canister is opened. Avoid breathing iodine vapors.

Do not discard the shipping cap. It is to be used to close expended canister for return mailing.

7. Observe upper face of canister, one-quarter inch thick doughnut shaped gasket should be in place around center tube.
8. Observe "O" ring at upper end of fresh canister. Ensure that it is well lubricated. If not, spray with silicone lubricant.
9. Install fresh canister by screwing it into the upper housing. Turn 4 inch diameter (translucent) canister clockwise until solid stop at end of thread is felt. Turn 6 inch diameter (opaque blue) canister clockwise until seal ring is firmly compressed. Use the canister wrench supplied with the original IOBIO™ kit.
10. Turn on the make-up water to the evaporative cooling equipment and check for leaks.
11. Replace the heat tracing and insulation on the device, if so equipped.

**CANISTER DISPOSAL INSTRUCTIONS**

**DO NOT THROW EXPENDED CANISTERS IN THE TRASH.** Ship the expended canister back to the manufacturer in the reusable carton that arrives with the replacement canister.

1. Reinstall plug at bottom of expended canister.
2. Install shipping cap onto expended canister.
3. Insert expended canister into plastic bag and reseal.
4. Insert bagged canister into mailing carton. Seal carton.
5. Attach prepaid mailing label to carton.
6. Mail from the nearest postal pick-up point.

**SYSTEM MICROBIOLOGICAL CONTROL DURING SHUTDOWN**

During extended shut-down of the evaporative cooling system, there are many situations where it is advisable to maintain biocidal control of the water system.

One example would be a water chilling system with the cooling tower mounted on the roof of a building and a chiller installed in a basement boiler room. In cool weather, the system would be shut down because the desired indoor environmental conditions can be maintained by circulating outdoor air.

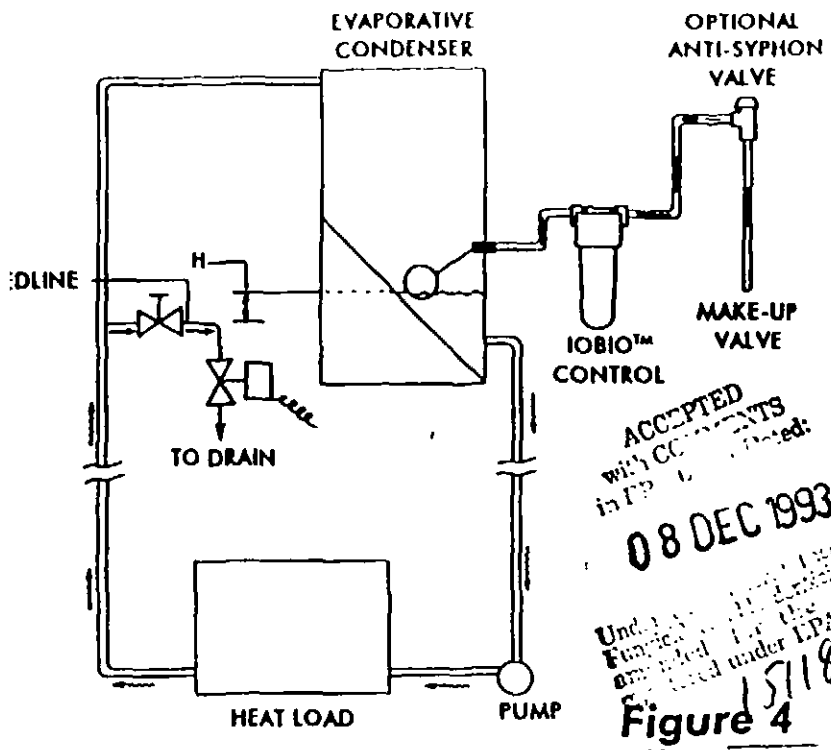
The portion of the system of least concern for microbiological growth would be the cooling tower because of the cool temperature of the water in the tower. On the other hand, the chiller could be installed in a boiler room where the temperature might be as high as 80° F, an ideal condition for growth of microbiological foulants in the condenser tubes.

A simple solution for continuous microbiological control can be achieved by maintaining a very small residual of iodine throughout the cooling system. See Figure 4.

Tap into the warm water return riser to the cooling tower at a point that is below the shut down water level in the cooling tower by 6 inches to 12 inches. Install a hand valve and electric solenoid valve as shown, with the discharge of the solenoid valve directed to drain. Wire the solenoid valve to open when the system is shut down. Adjust the hand valve for a small flow rate, such as one quart per minute.

Monitor the iodine content of the discharge water and adjust the flow rate downward until only a trace of iodine can be measured. On extremely large systems, or badly fouled systems, the flow rate required will be higher than with small, clean systems.

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**02 DEC 1993**  
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**15718-1**



**TS-1 GENERAL**

IOBIO™ Bacteria, Slime & Algae Control delivers iodine to the cooling system by way of the make-up water. The make-up water flow rate is an indirect indicator of the system's demand for biocidal control

Nominally, the make-up water will contain 3.0 ppm of iodine after it has passed through the IOBIO™ Control. Under normal operating conditions, this value will maintain a residual 0.3 ppm, nominally, in the recirculating water. An iodine residual in the range of 0.1 to 0.5 ppm is acceptable.

On a new installation of the IOBIO™ Bacteria, Slime & Algae Control, especially on a cooling system that contains biofilms or slime, the design iodine residual will not be achieved immediately. Depending upon the water volume in the system, the residual will not be achieved for several days, in the best case, to several weeks, in the worst case. Further, if the thermal load on the system during this start-up stabilization process is erratic or very light, the process may never stabilize until a reasonable thermal load is placed on the system for several weeks. See recommendations in the section covering system microbiological control during shutdown for idle system protection.

**TROUBLE SHOOTING GUIDE**

EXPERIENCED DIFFICULTY	POSSIBLE CAUSE	CORRECTIVE ACTION
High bacteria counts in recirculating water	Insufficient iodine residual	See TS-1
	No iodine delivery	See TS-2
Low operating iodine concentration in recirculating water	No thermal load	See TS-1
	IOBIO™ Control not delivering iodine	See TS-2
IOBIO™ Control not delivering iodine	No make-up water flow	See TS-1
	IOBIO™ canister plugged with suspended solids from make-up water. Bottom screen plugged.	See TS-3
	IOBIO™ canister exhausted	See TS-3
	IOBIO™ Venturi orifice plugged	See TS-3
	IOBIO™ Control installed backwards	Check flow direction arrow at pipe connections on upper housing
	Doughnut gasket missing/damaged	See TS-3
	IOBIO™ canister not screwed in snugly	See TS-3
Excessive concentration of iodine in recirculating water	Water level control valve leaking at shutdown	Check level control valve leakage
	Blow-down valve stuck open, or blow-down operating with the system shutdown	Check blow-down with system inoperative
	Elemental iodine carried over into lower sump	Check top screen for damage. (See TS-3)

If the cooling tower water level is controlled by an electric level sensor, the iodine residual in the recirculating water will not be a steady value. It will be high, 0.3 to 0.5 ppm, immediately after a fill cycle, and it will be low, from not measurable to 0.2 ppm, immediately before a fill cycle. This is satisfactory operation. The section covering system microbiological control during shutdown should be followed for situations where there will be extended time, i.e., one hour or more, between fill cycles with electric level control

**TS-2 Check Iodine Delivery**

Using the iodine test kit, supplied with the IOBIO™ Bacteria, Slime & Algae Control, measure the reaction due to chlorine in the water supplied to the cooling tower, upstream of the IOBIO™ Control. Then manually open the cooling tower water level control valve for several seconds, long enough for water to flow the distance from the IOBIO™ Control to the cooling tower, and measure the reaction in a water sample taken from the discharge of the valve into the cooling tower.

There should be a very distinct difference in the color reactions of the two measurements. The water discharging from the cooling tower water level control valve should provide a deep mauve color reaction. This indicates normal operation of the IOBIO™ Control.

**TS-3 IOBIO™ Device Examination**

If trouble-shooting steps point to failure of the IOBIO™ Control to add iodine into the make-up water, the following steps should be followed in the sequence indicated.

1. Valve off the make-up water to the IOBIO™ Control. Remove the pipe plug from the bottom of the canister. Place a glass container under the canister to catch the drain water. Observe the color of the water which trickles from the canister. A tea color, or light coffee

color is normal. If the water is clear, or nearly so, the iodine charge may be depleted. Refer to the operating instructions on how to determine when to replace expended canisters.

**NOTE:** The water drained from the canister will stain but is harmless to the skin. It is 1/100th the concentration of tincture of iodine sold in pharmacies for disinfecting skin lacerations. Keep away from mouth and eyes. Follow precautions for use.

2. Loosen canister from upper housing by unscrewing canister one turn. This will allow air to enter canister top and will accelerate canister drainage. This process serves to flush any foreign particulate matter from canister which might have plugged the protective screens. Observe the quantity of particulates which settle to the bottom of the glass container. If the quantity of particulates is 1/4 to 1/2 of a tea cup, it can then be assumed the canister was plugged. The canister can then be reinstalled, and a water filter must be installed to prevent reoccurrence of plugging. Refer to installation instructions.

3. After water has been drained from canister, remove canister from the upper housing. Observe the 1/4 inch thick doughnut gasket. A clear indentation should be present on the upper face of the gasket corresponding to the sealing surface in the upper housing. If the indentation is not present the canister may not have been screwed into place snugly. If the gasket has been damaged, replace the doughnut gasket with the spare supplied.

4. Observe the upper face of the canister for loose particulate matter. Wash loose matter from the upper face of the canister with a hose.

By looking upward into the upper housing, locate the small orifice in the venturi. Clean any obstructions from the orifice with a pencil point. Do not use a metallic tool, such as a drill bit to clear the orifice.

5. Inspect plastic screen on the upper face of the canister. It should be firmly in place, with no cracks or missing sections, to ensure that elemental iodine particles cannot escape from the canister.

6. Inspect canister "O" ring for damage. Replace, if necessary, with spare provided. Coat surface of "O" ring with silicone lubricant, and reinstall canister. Reinstall drain plug, using teflon tape as sealant. Turn on make-up water to IOBIO™ Control.

7. Recheck for iodine delivery, as prescribed in paragraph TS-2.

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15118-1



# Baltimore Aircoil

Worldwide manufacturing and sales facilities in:

- BALTIMORE AIRCOIL COMPANY, P.O. Box 7322, Baltimore, Maryland 21227
- BALTIMORE AIRCOIL COMPANY, P.O. Box 960, Madera, California 93639
- BALTIMORE AIRCOIL COMPANY, Midwest Division, P.O. Box 317, Paxton, Illinois 60957
- BALTIMORE AIRCOIL COMPANY, Millford Plant, P.O. Box 402, Millford, Delaware 19963
- BALTIMORE AIRCOIL OF CANADA, 35 Sinclair Avenue, Georgetown, Ontario, Canada
- BALTIMORE AIRCOIL INTERNATIONAL, Industriepark, B-3100 Heist-op-den-Berg, Belgium
- BALTIMORE AIRCOIL (AUSTRALIA) PTY., LTD., RMB 3977 Wisemans Ferry Road, Somersby via Gosford, N.S.W., 2250, Australia
- BALTIMORE AIRCOIL LTD., Princewood Road, Earlstrees Industrial Estate, Corby, Northants, England NN17-2AP
- BALTIMORE AIRCOIL ITALIA S.R.L., 23030 Chiuro (Sondrio) - Italy
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- BAC JAPAN CO., LTD., 1-10-1 Yuraku-Cho, Chiyoda-Ku, Tokyo 100, Japan
- BAC-PRITCHARD, P.O. Box 7322, Baltimore, Maryland 21227
- BAC-PRITCHARD, P.O. Box 510, Merced, California 95341
- CERAMIC COOLING TOWER COMPANY, P.O. Box 164009, Fort Worth, TX 76161-4009

Licenseses:

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# Baltimore Aircoil Company

## IOBIO™

### BACTERIA, SLIME, AND ALGAE CONTROL

REPLACEMENT CANISTER  
(TO BE USED ONLY WITH IOBIO™ APPLICATION KIT)

ACCEPTED  
with COMMENTS  
in EPA Label Review:  
08 DEC 1993

### DIRECTIONS FOR USE (CONTINUED FROM PACKAGE LABEL)

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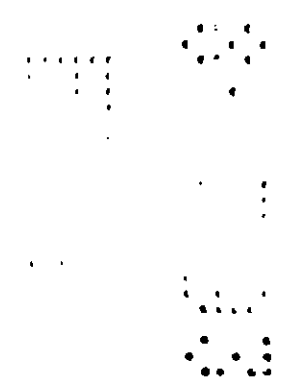
#### PRINCIPLE OF OPERATION

The IOBIO™ device is installed in the make-up water piping to the cooling tower, evaporative condenser, or evaporative fluid cooler. As make-up water flows through the device, the flow is divided into two streams, a primary stream and a much smaller secondary stream.

The secondary stream passes slowly and gently through elemental iodine, allowing it to become saturated with iodine at approximately 300 ppm (300 mg/l). The primary and secondary flows are then remixed such that the make-up water exiting the device contains approximately 3.0 ppm (3.0 mg/l) of elemental iodine in solution. This concentration entering the cooling tower through the water level control mechanism (i.e. float valve) is sufficient to maintain a very low residual concentration of iodine in the recirculating water of approximately 0.3 ppm (0.3 mg/l).

IOBIO™ Bacteria, Slime, and Algae Control does not intensify an existing corrosive or scaling condition, nor does it eliminate such conditions. Additional water treatment may be required for corrosive and/or scaling conditions. BAC recommends that the services of a competent water treatment specialist be obtained in these instances.

PATENT PENDING  
BAC Technical Publication No. MEMO 0106



PHYSICAL DESCRIPTION

The IOBIO™ device is constructed of two primary components, a permanent upper housing and a replaceable lower iodine canister. The iodine canister contains a quantity of elemental iodine designed to last a full operating season on a duty cycle typical of commercial air conditioning. On 24 hour, continuous, heavy load industrial installations, replacement may be required several times per year. Since the exact duty cycle is difficult to project on each application, it is suggested the IOBIO™ Device be monitored during the first season of use, and a replacement canister size be ordered that best matches the preferred replacement interval.

PARTS LIST

The IOBIO™ REPLACEMENT CANISTER package contains the following items:

- Iodine filled canister, capped and enclosed in resealable plastic bag.
- Directions for use.
- Iodine Test Kit.
- Plastic canister wrench.
- Extra "O" ring.
- Extra Doughnut gasket.
- Extra Drain Plug.
- Material Safety Data Sheet.
- Prepaid return mailing label.
- Reusable carton.

ACCEPTED  
 INSTRUCTIONS  
 in I.O.B.I.O. dated:  
**08 DEC 1993**

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the Pesticide registered under EPA Reg. No. 15118-1

REPLACEMENT INSTRUCTIONS

1. Turn off the make-up water to the evaporative cooling equipment. The ball valve at the outlet of the anti-syphon valve may be used for this purpose.
2. Remove plug at bottom of expended canister to drain canister, and piping of water.
3. Remove expended canister by unscrewing it from its upper housing. Place expended canister upside down over an open drain to empty any remaining water.

15 of 25

4. Remove the fresh IOBIO™ canister from its carton, and remove the resealable plastic bag.
5. In an open and well ventilated space, and while keeping face away and upwind of canister, CAREFULLY remove the shipping cap from the fresh canister. The canister is not under pressure, but a small amount of iodine vapor will be released when the canister is opened. Avoid breathing iodine vapors. DO NOT DISCARD THE SHIPPING CAP. It is to be used to close the expended canister for return shipping.
6. Observe the "O" ring at upper end of fresh canister. Insure that it is well lubricated with light grease and properly seated in its groove. If dry, apply thin coat of light grease.
7. Observe upper face of canister. The one-quarter inch (6.4 mm) thick doughnut shaped gasket should be in place around center tube:
8. Install fresh canister by screwing it into the upper housing. Turn 4 inch (102 mm) diameter (translucent) canister clockwise until solid stop at end of thread is felt. Turn 6 inch (153 mm) diameter (opaque blue) canister until "O" ring is firmly compressed.
9. Turn on the make-up water to cooling tower and check for leaks.

DISPOSAL INSTRUCTIONS

1. Reinstall plug at bottom of expended canister.
2. Install shipping cap onto expended canister.
3. Insert expended canister into plastic bag and reseal.
4. Insert bagged canister into shipping carton. Seal carton.
5. Attach prepaid shipping label to carton.
6. Mail from the nearest Postal pick-up point.

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08 DEC 1993  
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Fungicide... Act as  
amended... pesticide  
registered under EPA Reg. No.  
15118-1

OPERATING INSTRUCTIONS

The IOBIO™ Bacteria, Slime, and Algae Control requires operator attention. The residual iodine concentration in the cooling tower and recirculating water should be checked daily for several days following the initial installation of the IOBIO™ Device and following a canister replacement. Thereafter, the iodine concentration in the evaporative cooling equipment and recirculating water should be checked weekly during the operating season.

To measure the residual iodine concentration in the evaporative cooling equipment and recirculating water, use the test kit enclosed in the replacement canister package. Follow the instructions enclosed with the test kit. The residual iodine content in the water should be between 0.1 and 0.5 ppm (mg/l).

16 9-25

The amount of iodine remaining in the canister can be determined by observing the black mass within the translucent canister. Opaque blue canisters are equipped with a sight glass to provide a visual indication when the iodine is nearing depletion. The operator should procure a replacement canister when the level of iodine beads is at the center of the sight glass on the opaque blue canister or when the black mass has diminished to 1-1/2" (38 mm) from the bottom of the translucent canister.

When the evaporative cooling equipment is secured for freezing weather, and after the make-up water to the tower is valved off, the plug at the bottom of the canister should be loosened to allow the water in the canister and adjacent piping to drain out. Alternatively, and in situations where the cooling tower is operated in freezing weather, the canister and upper housing should be wrapped with heat trace material and LIGHTLY insulated. NOTE: DO NOT OVER INSULATE!. The canister is plastic which can be damaged by excessive heat. If the IOBIO™ Device is overheated to 250 deg. F (121°C), the entire Device must be replaced.

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# Baltimore Aircoil Company

## IOBIO™

BACTERIA, SLIME, AND ALGAE CONTROL

ANTI-SYPHON VALVE KIT

INSTRUCTIONS

### CONTENTS:

GENERAL INFORMATION.....Page 2

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PARTS LIST.....Page 3

TOOLS AND MATERIALS REQUIRED.....Page 4

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VALVE MFR'S. SPEC. SHEET.....Page 9

BAC Technical Publication No. MEMO0107

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**08 DEC 1993**

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157118-1

PLUMBING CODES REQUIRE THAT POTABLE WATER DISTRIBUTION SYSTEMS BE PROTECTED FROM CONTAMINATION BY NON-POTABLE WATER. Cooling tower water is considered to be non-potable. Contamination can occur when the potable piping is opened for service work at a location below the cooling tower, causing a syphoning effect at the tower.

Under most circumstances, BAC cooling towers require no mechanical isolation from the potable water supply because the make-up water valve (float-operated valve) discharge connection has been positioned at a height above the basin overflow that is more than the minimum required by model codes for an "air break".

However, when the IOBIO™ Device is installed in the make-up water piping, it must be mechanically isolated from the potable water system. The anti-syphon valve furnished with this kit is a "Pressure Vacuum Breaker" which meets the American Society of Sanitary Engineers (ASSE)-1020 specification and is approved for "high hazard" application by Building Officials & Code Administrators Intl. Inc. (BOCA), International Association of Plumbing & Mechanical Officials (IAPMO), International Conference of Building Officials (ICBO), and Southern Building Code Congress International (SBCCI). Consult the enclosed anti-syphon valve specification sheet for further information.

The valve in this kit is also listed by the Canadian Standards Association (CSA), however Canadian plumbing codes permit its use in "severe hazard" applications only when the building piping is mechanically isolated from the supply mains with a "Reduced Pressure Principle Backflow Preventer" (ASSE-1013).

If the cooling tower itself is already isolated from the potable water supply with a "Reduced Pressure Principle Backflow Preventer" (ASSE-1013) (U.S. or Canada), or a "Pressure Vacuum Breaker" (ASSE-1020) (U.S. only), no further isolation is required and this anti-syphon valve kit is not needed. Any existing apparatus should be tested in accordance with the manufacturer's specifications to ensure proper functioning.

It is recommended that the anti-syphon valve be installed using the PVC pipe and fittings enclosed with this kit. Under prolonged shut-down conditions, the water in the piping in the immediate vicinity of the IOBIO™ Device can become concentrated with iodine at up to 300 ppm. NOTE: AT 300 ppm IODINE CONCENTRATION, SOME CORROSION OF METALLIC PIPING WILL OCCUR. If the Device must be installed with steel or copper piping to comply with a local plumbing code, the pipe should be inspected at the time of each annual IOBIO™ cannister replacement, and corroded pipe should be replaced.

CONSULT LOCAL PLUMBING CODES TO ENSURE INSTALLATION COMPLIANCE.

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WATER PRESSURE REQUIREMENT

As with all hydraulic components, the anti-syphon valve will impose a pressure loss in the make-up water stream when it is installed. Sufficient pressure must be available to force the water flow through the anti-syphon valve, the IOBIO™ device, and the cooling tower water level control valve (float or electrically actuated). The pressure loss for the IOBIO™ device can be found in the IOBIO™ Installation, Operation and Maintenance Manual. The pressure loss that can be expected through the anti-syphon valve is shown on Figure #1.

In addition, a minimum line pressure of 15 psig is recommended at the anti-syphon valve to seat the internal air inlet valve, thereby preventing spillage of water from the anti-syphon valve bonnet.

Check the available line pressure before beginning the installation process. In general, if the minimum line pressure of 15 psig is available upstream of the cooling tower float valve, at the design make-up water flow rate, then the pressure loss imposed with installation of the IOBIO™ Device and the anti-syphon valve should not be prohibitive.

PARTS LIST

This anti-syphon valve kit contains the following items:

- Anti-syphon valve, 3/4 inch NPT.
- Valve mounting bracket.
- Mounting strap.
- Sheet metal screws for attaching bracket.
- Valve manufacturer's specification sheet.
- PVC Pipe.
- PVC Fittings
- Instructions

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**15718-1**

TOOLS AND MATERIALS REQUIRED FOR INSTALLATION-

- Drill.
- Drill bits.
- Hand wrenches.
- Pipe thread dope or sealant.
- PVC solvent cleaner.
- PVC pipe adhesive.
- Hack saw.

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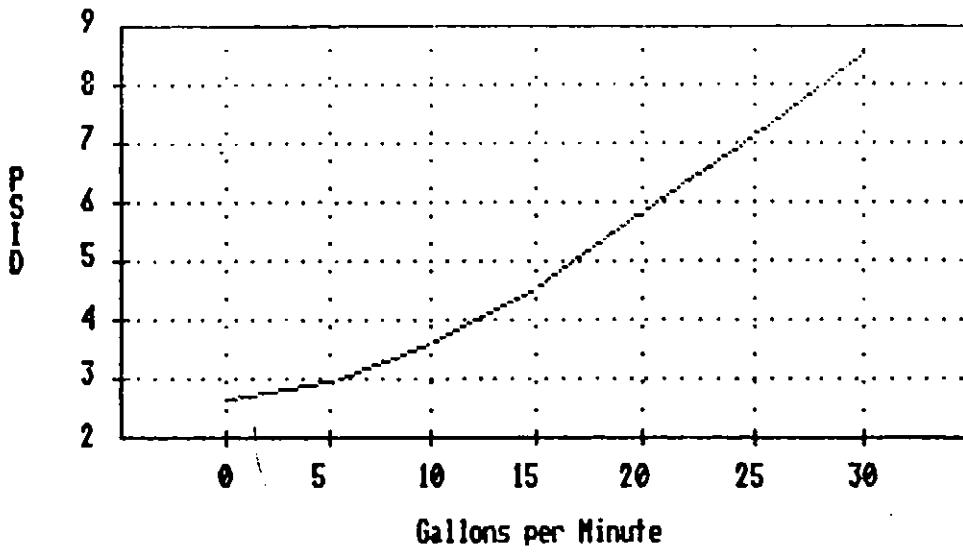
Additional tools and materials as necessary to reroute and modify existing make-up water supply piping (copper, steel, or PVC) to fit pipe thread connection at bottom of anti-syphon valve.

INSTALLATION

Coordinate the installation of the anti-syphon valve with the installation of the IOBIO™ Bacteria, Slime, and Algae Control, as described in the IOBIO™ Installation, Operation and Maintenance Manual.

- 1) Determine a convenient location to mount the anti-syphon valve on the casing of the cooling tower, immediately upstream of the IOBIO™ device. The anti-syphon valve must be positioned at an elevation 12 inches above the highest point in the piping, downstream of the valve. Also, a 10 inch minimum straight run of pipe, upstream of the IOBIO™ device is required. Refer to Figures #2 and #3.
- 2) Using the valve mounting bracket as a template, mark and drill two pilot holes in the cooling tower casing. Attach the mounting bracket, using the screws provided.
- 3) Attach the anti-syphon valve to the bracket using the plastic strap provided.
- 4) Complete piping and installation of the IOBIO™ device, following the installation instructions in the IOBIO™ Installation, Operation and Maintenance Manual.

Figure #1- Anti-Syphon Valve Pressure Loss



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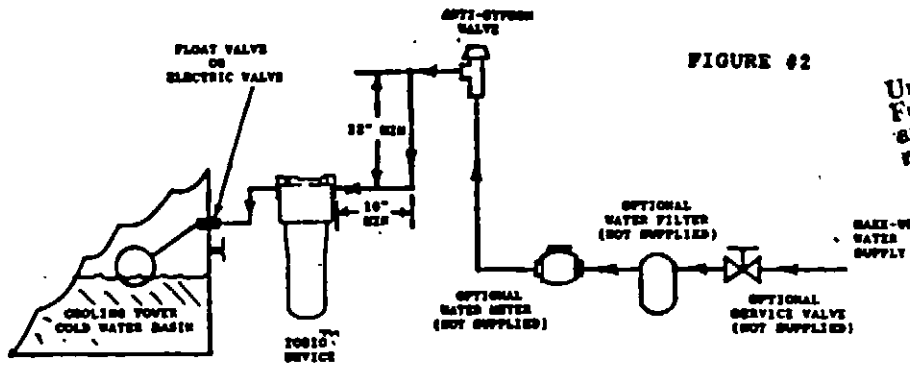


FIGURE #2

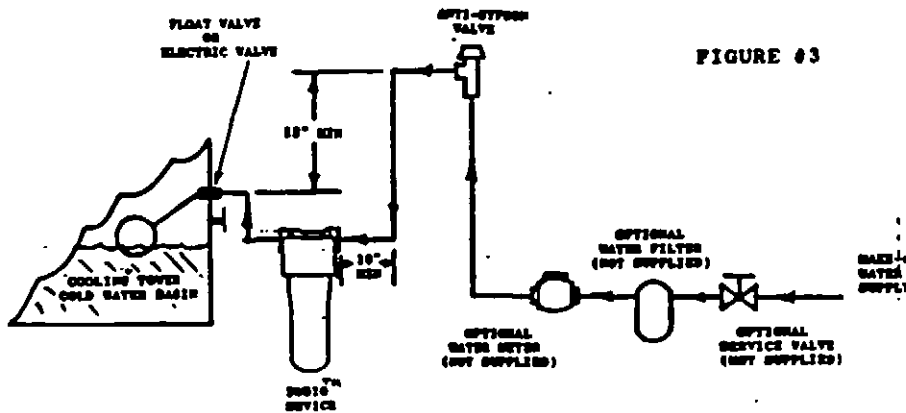


FIGURE #3

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**OPERATING INSTRUCTIONS**

During normal operation, the isolation ball valves should be in the fully opened positions. The test cocks should be closed.

If the supply pressure to the anti-syphon valve drops to 2 psig, or less, water will begin to leak from the valve bonnet. This is normal and indicates the protective feature of the anti-syphon valve is functioning. When the make-up water is shut off for IOBIO™ canister replacement or other service work, the ball valve in the outlet of the anti-syphon valve should be used for that purpose. By closing the outlet valve, the supply pressure is maintained in the valve body, preventing the escape of water from the valve bonnet.

**FREEZE PROTECTION**

If the cooling tower is secured during freezing weather, the IOBIO™ Device, the anti-syphon valve, and the remainder of the exposed make-up water supply piping should be drained of water. See the IOBIO™ Installation, Operating and Maintenance Manual for instructions on draining the IOBIO™ Device. The ball valves and drain cocks in the anti-syphon valve should be positioned at 45 degrees to facilitate draining.

If the cooling system is to be operated in freezing weather, the IOBIO™ Device, the anti-syphon valve, and the remainder of the exposed make-up water supply piping must be wrapped with heat trace wire and insulated. See the IOBIO™ Installation, Operating and Maintenance Instructions.

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MAINTENANCE INSTRUCTIONS

The anti-syphon valve should be tested yearly to ensure it is in good working order. Referring to Figure #4, which is a schematic of the components in the anti-syphon valve, the following procedures should be followed to evaluate (A), the air venting capability of the valve, and (B), and the internal check valve loading.

A. Air vent test:

1. Remove the air inlet canopy (bonnet).
2. Connect a transparent, ie. Tygon, tube to test cock No. 2. The tube should be extended upward from the top of the valve for a minimum of four feet.
3. Open test cock No. 2 to fill tube with water. Close test cock No. 2.
4. Close shutoff valve No. 2, then close shutoff valve No. 1.
5. Open test cock No. 2.
6. Slowly lower the elevated end of the transparent tubing, allowing the water in the tube to spill from the open end, while observing the air inlet valve. The air inlet valve must begin to open when the level of water in the tube is at, or higher than, 27-3/4 inches above the valve. When the water has been entirely drained from the tube, the air inlet valve must be fully open.
7. Close test cock No. 2, and remove tube.

B. Check Valve Internal Loading Test:

1. Attach tube to test cock No. 1. Open test cock No. 1.
2. Open shutoff valve No. 1 to fill tube, then close shutoff valve No. 1.
3. Open test cock No. 2, allowing water to drain from the valve body and the transparent tube. The level in the tube must stop falling, and subsequently hold steady, at a water height in the tube of 27-3/4 inches above the valve, or greater.

If the anti-syphon valve fails to pass either test (A) or (B), the valve must be replaced. Alternatively, the anti-syphon valve may be disassembled, the internal seats cleaned, and the valve reassembled and retested.

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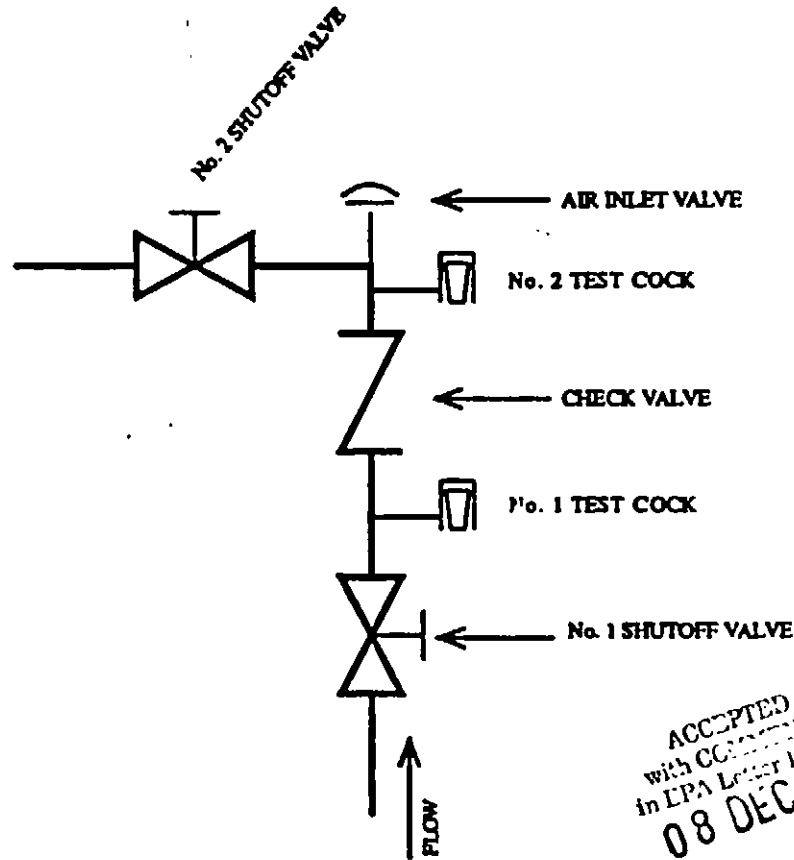
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FIGURE #4

**SINGLE CHECK VALVE PRESSURE VACUUM BREAKER**

Diagrammatic Sketch Showing Location Of Shutoff Valves, Check Valve, Air Inlet Valve And Test Cocks



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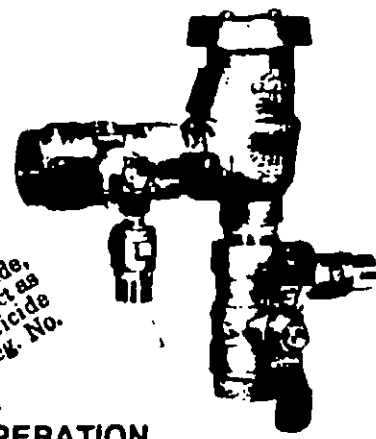


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IS-800M3

# INSTRUCTIONS FOR INSTALLING

# Series 800M3 Anti-Siphon Pressure Type Vacuum Breaker

Sizes 1/2" & 3/4"



IAPMO listed

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in 1993  
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## OPERATION

When the line pressure drops to 1 psi or below, the spring loaded disc float opens the atmospheric vent and the spring loaded check valve closes the inlet. This prevents back-siphonage. As water flows through the valve, it pushes the check valve open and lifts the disc float which closes the atmospheric vent, thus preventing leakage. The disc float is free floating without close fitting guides which assures freedom from sticking. The durable silicone disc on the disc float and the check valve permits use on hot and cold water lines.

## INSTALLATION

According to Plumbing Codes this type of valve must be installed as follows:

1. The valve must be installed at least 12" above the highest point on the downstream piping.
2. The valve must be installed with the supply line connected to the bottom or inlet of the valve and in a vertical position where it is available for periodic inspection, servicing and testing.
3. Because of possible water spillage due to valve operation, the valve must not be installed in a concealed location, inside a wall, or where freezing or spillage will cause water damage when a drain is not available.
4. ASSE standard 1020 requires that the atmospheric vent valve remains open until the valve body pressure exceeds 1 lb. Until this pressure is reached, some amount of spillage will occur at the atmospheric vent. In order to minimize this leakage on start-up, close the downstream shut-off valve and open inlet shut-off valve first.
5. Annual inspection of all water system safety and control valves is required and necessary. Regular inspection, testing and cleaning assures maximum life and proper product function.

## FREEZE PROTECTION

1. Close main shut-off valve.
2. Open upstream drain, test cocks and isolation ball valves to depressurize line.
3. Purge with air.
4. Leave test cocks and isolation ball valve handles in 45° angle to drain ball valves and prevent casting damage.

**ATTN. INSTALLER:** After installation, please leave this Instruction Sheet for occupant's information.

When installed in accordance with these instructions the valve is designed to prevent back-siphonage of polluted water into a potable water supply. The No. 800M3 is ideally suited for irrigation, industrial processing systems and other continuous pressure applications. The valve can be placed in the hot or cold supply lines connected to a potable water supply system where there is no possibility of back-pressure.

## EXAMPLES:

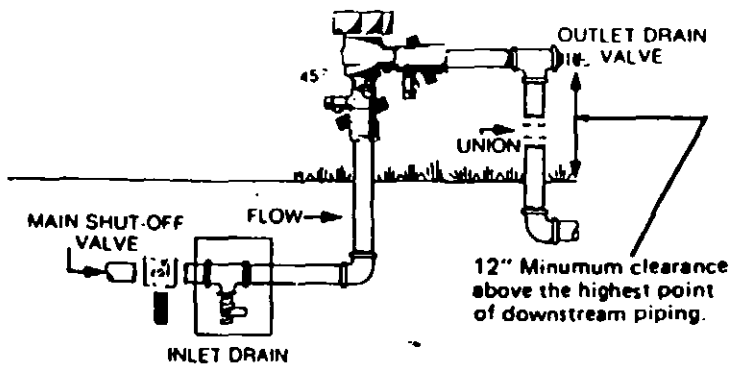
Where there is no danger of freezing and a drain or run-off is available.

- |                                    |                 |
|------------------------------------|-----------------|
| Cooling Tower and Process Water    | Swimming Pools  |
| Commercial Laundry Machines        | Photo Tanks     |
| Chemical Plating Tanks             | Heat Exchangers |
| Large Toilet and Urinal Facilities | Degreasers      |
| Live Stock Water Systems           |                 |

## PRESSURE - TEMPERATURE

WORKING TEMP:	33°F - 140°F
MAX. PRESSURE:	150 PSI
MIN. PRESSURE:	15 PSI

**Important Note:** Vacuum breakers are not designed, tested or approved to protect against backpressure backflow or water hammer shock. For protection against backpressure backflow, install a Watts #909 Reduced Pressure Principle Backflow Preventer. For protection against water hammer shock install Watts #15 Shock Arrestors.



HOQTRS: 815 Chestnut St., N. Andover, MA 01845  
 MAIL: Box 628, Lawrence, MA 01842 Telex: 94-7460  
 Tel. (508) 688-1811 Fax: (508) 794-1848/794-1674  
 International Subsidiaries: Watts Regulator of Canada Ltd  
 Tel. (416) 851 8591 Fax (416) 851 8788  
 Watts Regulator (Nederland) b v Telex: 844 35365

**LIMITED WARRANTY** Watts Regulator Company warrants each product against defects in material and workmanship for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge. This shall constitute the exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental or consequential damages, including, without limitation, damages or other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemicals, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication or improper installation of the product. **THE COMPANY MAKES NO OTHER WARRANTIES EXPRESS OR IMPLIED EXCEPT AS PROVIDED IN THIS LIMITED WARRANTY.**