



# Lime Buster XL™

IMS #136666

## INSTRUCTION MANUAL



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Lime Buster XL™ is a trademark of IMS Company



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## SAFETY SUMMARY

This manual uses the following signal words to call attention to the safety sign and to designate a degree or level of hazard seriousness.

1. **DANGER**: indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.
2. **WARNING**: indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
3. **CAUTION**: indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Also used to alert against unsafe practices or property damage only accidents.
4. **NOTE**: indicates general safe practices, machine use instructions and information, property damage only hazards, temporary hazards, precautions to avoid a hazard, results of not avoiding a hazard, or any combination of these messages.
5. **SYMBOL/PICTORIAL**: conveys a message without words.
6. **SAFETY ALERT SYMBOL**: indicates a potential personal injury hazard; an exclamation point inside a triangle.



## SAFETY SUMMARY (continued)

The following are examples and type of general alerts that could apply to this machine:

### **DANGER**

LIVE ELECTRICAL PARTS could cause DEATH or SHOCK.

LOCK OUT AND TAG OUT power before working on any electrical wiring.

Only QUALIFIED ELECTRICIANS are to do electrical work.

### **WARNING**

ACID COULD CAUSE BLINDNESS OR BURNS.

Wear full eye and skin protection.

Anyone who uses or services machine must follow manual.

### **WARNING**

CHANGES TO MACHINE could cause DEATH, INJURY, or DAMAGE.

Do not modify machine without written approval from IMS Company.

### **WARNING**

TOO STRONG ACID could cause DAMAGE or INJURY.

Use only Solventol® 2409 acid.

Do not use stronger mixture than stated in manual.

Solventol® 2409 is a registered trademark of Oakite Products Incorporated



## **SAFETY SUMMARY (continued)**

### **CHEMICAL SAFETY NOTES**

User is responsible for selection, handling and use of any chemical used with this machine. Chemical chosen must be safe for materials in user's mold, manifolds, hoses, heat exchanger, etc.

IMS Company supplies Solventol® 2409 acid powder for use with this equipment, based on Oakite specifications for the product.

While IMS has had good results with Solventol® 2409 on materials used in molds and heat exchangers, IMS does not warrant Oakite Solventol for fitness for use on any specific material. If you have a question about using Solventol® 2409 with a particular material, call Oakite at 1-800-526-4473.

Use this machine and any chemicals according to instructions in this manual and instructions of chemical manufacturer.

Do not use any chemical unless you have read and understood the current Material Safety Data Sheet for that chemical. You must have immediate access to the Material Safety Data Sheet when the chemical is in use.

Leaking acid can cause eye injury, burns and equipment damage. User must prevent leaks and repair any that might occur. Use Lime Buster XL™ only if there is someone monitoring it.



## SAFETY SUMMARY (continued)

### PERSONAL SAFETY NOTES

These are MINIMUM safety standards. If a chemical manufacturer calls for more or stronger protection to be used with its chemicals, follow their instructions.

1. Do not breathe dust from acid powder. Be very careful not to create dust when pouring acid powder. Wearing a dust mask minimizes risk.
2. Avoid breathing vapors from acid solution. Use only in a well ventilated area.
3. Avoid contact with acid powder or solution. Either could cause eye injury, burns or skin irritation.

Always wear full eye protection, a long sleeved shirt and full length pants. Wear chemical-resistant gloves and apron. Where contact is likely, wear a face shield, chemical-resistant apron or coveralls and foot covering.

4. Wash hands well after handling any chemicals. Do not eat, drink or smoke until you wash your hands.
5. Before handling or using any chemicals, know what to do if you or someone else gets any chemicals in their eyes or on their skin or clothing.

Read the Material Safety Data Sheet for instructions BEFORE handling or using the chemical. If the instructions are not clear to you, call the chemical manufacturer. Oakite's number is 1-800-526-4473.

6. Learn from product Material Safety Data Sheet how to store any chemicals BEFORE storing them. Some chemicals cannot be stored in the same area as some others. Explosions, fires or chemical damage could result from some combinations.
7. Know what to do in case of a spill or leak.
  - A. Some information will be on the chemical manufacturer's Material Safety Data Sheet. If you need more information, contact the chemical manufacturer.
  - B. Generally speaking, you will need to avoid contact with skin or eyes.
  - C. If sweeping up dry powder; be careful not to create dust. Put collected powder in a dry container. Dispose of powder properly.
  - D. You will need to properly dispose of any rags, mops or drying agent used to absorb spill. You may also need to neutralize spilled material.



## DESCRIPTION

The IMS Lime Buster XL™ circulates an acid solution through the water passages in a mold or heat exchanger to remove deposits of scale, lime and rust.

The deposits must be removed because they insulate the mold from the circulating water. As little as 1/64" of deposit will cut heat transfer as much as 40%, increasing cycle times and burdening temperature controllers. More time is needed every cycle to cool or heat the part. Small passages can get blocked, cutting off temperature control to part of the mold, affecting part quality.

By circulating an acid solution through the mold, the Lime Buster XL™ dissolves the minerals and flushes them away. The cleaned mold passages can then have full contact with temperature control fluid, for efficient heat transfer.

The equipment is most effective when used on a regular schedule

## SPECIFICATIONS

Voltage .....	115/60/1
Dimensions .....	27" wide x 35" deep x 32-1/2" high
Crated Weight .....	154 lbs.
Tank .....	22 to 40 Gallons, ..... Welded Polypropylene
Max. Operating Temperature .....	140° F
Mold Connections:	
Pump Outlet .....	1-1/2" NPT
Tank Inlet .....	1-1/2" NPT
Pump/Motor:	
Type .....	Centrifugal Pump, ..... Close Coupled to AC Motor
Power .....	1/4 hp
Speed .....	2850 rpm
Flow .....	44 gpm Open Discharge



## SETUP

Refer to *PARTS ID PHOTO* on Page 20 to identify parts.

### 1. Connect Tank to Mold

Plumb Lime Buster XL™ to your mold.

Be careful when doing plumbing. System must be free of leaks or acid will spill out during operation. Use a hose clamp over each fitting.

### 2. Fill Tank

#### A. Remove tank plug from top of tank.

If Lime Buster XL™ has been used before, there may still be acid in tank. In that case, be careful to avoid splashing acid.

#### B. Fill tank with water up to second line on tank (40 gallons). **DO NOT OVERFILL.**

**DO NOT UNDERFILL.** First line on tank is lowest fluid level where pump will work well (22 gallons). In addition to the 22 gallon minimum in the tank, remember that mold and lines will also hold solution.

### NOTE:

Rather than using full tank, which requires 20 pounds of acid powder; you can use just enough water for your application, and save on amount of acid needed. See WATER NEED CALCULATION on Page 17 for formula.





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## SETUP (continued)

### 3. Test Run with Water Only

Turn on Lime Buster XL™ and run it for a few minutes while checking for leaks in your installation. Repair any leaks before adding acid.

**CAUTION**

HOT LIQUID will DAMAGE PUMP and TANK.

Let mold or heat exchanger cool before descaling.

Do not let system heat acid solution above 140° F.

## SETUP (continued)

### WARNING

ACID COULD CAUSE BLINDNESS OR BURNS.

Wear full eye and skin protection.

Anyone who uses or services machine must follow manual.

### WARNING

Pouring water onto acid powder could start dangerous reaction — causing acid to splatter or steam.

ALWAYS put water in tank first, then add acid powder.

### WARNING

TOO-STRONG ACID could cause DAMAGE or INJURY.

Use only Solventol® 2409 acid.

Do not use stronger mixture than stated in manual.

#### 4. Add Acid Powder

- A. To help acid powder dissolve fully, let water come up to room temperature before you add acid powder.
- B. To control splashing, always fill and add through the FILL AND DRAIN PORT.
- C. SLOWLY add Solventol® 2409 acid powder to water at rate of 1/2 pounds acid per gallon of water.

If using full 40 gallons of fresh water, add 20 pounds of acid slowly.

If using another amount of water, add amount of acid recommended in WATER NEED CALCULATION on Page 17.

- D. Stir slowly to mix solution. Solventol® 2409 turns purple when mixed.
- E. Replace tank plug and pump mounting assembly on tank.

## OPERATION

### 1. Review Setup

Lime Buster XL™ must have been set up according to SETUP instructions in this manual.

#### **WARNING**

ACID COULD CAUSE BLINDNESS OR BURNS.

Wear full eye and skin protection.

Anyone who uses or services machine must follow manual.

#### **CAUTION**

HOT LIQUID will DAMAGE PUMP and TANK.

Let mold or heat exchanger cool before descaling.

Do not let system heat acid solution above 140° F.

### 2. Power Up

A. Plug Lime Buster XL™ into 115V, 60 cycle grounded outlet.

B. Turn on switch. Check for leaks in unit, lines, connectors, and mold or heat exchanger. Shut down unit and repair any leaks immediately.

### 3. Let Unit Run

A. Run unit for 2 to 4 hours, depending on how heavy the scale buildup is. The more often you clean your mold, the less time will be needed each time you clean it.

## OPERATION (continued)

- B. Occasionally look at the water lines to check color of acid.

If solution is purple, it is still acidic and is still cleaning passages. If it is yellow, loosened mineral deposits from the mold have neutralized the acid. In that case add a little acid powder as detailed below.

There is also a chance that loosened minerals in the water will cover up the purple or yellow colors, and the water will be gray. If adding a small amount of acid powder does not turn the water purple again, it is best to test the water with neutral litmus paper (available from IMS as part number 121711).

1. If the litmus paper darkens but remains purple, the solution is neutral and needs more acid powder.
2. If the litmus paper turns red, the solution is acidic.
3. If the litmus paper turn blue, the solution is alkaline and needs more acid powder.

**CAUTION**

LOW LIQUID LEVEL will DAMAGE PUMP.

Do not let pump run dry.

4. To add acid powder:
  - A. Turn off Lime Buster XL™.
  - B. Remove tank plug and carefully add acid powder a little at a time until solution is purple or litmus paper turns red.
  - C. Reinstall tank plug and restart Lime Buster XL™.
5. Check acidity every 30 minutes

After 2 to 4 hours, if the fluid stays purple (or litmus paper turns red) for a half hour while circulating through the mold, the descaling process is probably done.

## OPERATION (continued)

6. Turn off Lime Buster XL™ and check water passages

Flip ON/OFF switch to OFF position. Remove lines from mold inlet and lay lines in plastic bucket. Inspect water passages. If necessary, reconnect lines and run system for a while longer

7. Flush Mold

- A. Allow water lines to drain back into tank. Allow plenty of time; spilled acid could cause injury, damaged equipment or damaged clothing.

- B. Remove water lines from Lime Buster XL™, leaving them attached to mold. Place mold outlet hoses into plastic drum (55 gallon or larger) or other compatible container.

- C. Flush mold with fresh water, one line at a time.

- D. Turn water on slowly. Completely flush mold.

- E. Be careful to not overfill the plastic drum.

8. Properly Dispose of Flushing Water

- A. Using a very small amount at a time, pour a little Oakite Enprox® 714 to neutralize the diluted cleaner you just flushed from mold and/or into the Lime Buster XL™ tank. Add Enprox® 714 just until solution turns yellow.

Once the solution turns yellow, you know it is not acidic. At this point it could be either neutral or alkaline. You want it to be neutral. Test with neutral litmus paper.

1. If the paper darkens but remains purple, the solution is neutral.

2. If the paper turns red, the solution is still acidic. Add more neutralizer.

3. If the paper turns blue, the solution is too alkaline. Add a very small amount of acid and retest.

- B. Dispose of solution according to federal, state and local environmental regulations. In most cases, the neutralized solution will not be considered hazardous.

Call Oakite Regulatory at 1-800-526 4473 for any information you need to dispose of solution.

## OPERATION (continued)

### 9. Apply Rust Inhibitor to Mold

After the Lime Buster XL™ has been used, the mold passages are likely to rust. Unless your mold is going to be used immediately with circulating water, apply rust inhibitor to the mold passages. IMS aerosol Foaming Rust Inhibitor 103776 was formulated for this purpose, but aerosol cans might be impractical for large molds. In that case, running some IMS Pro-17 propylene glycol through the mold passages will help prevent rust. A small Lime Buster XL™ can be used for this purpose. A manual squirt can (oil can) can also be used, followed up with a gentle blast of compressed air.

### 10. Preventive Maintenance

- A. To ensure the longevity of your Lime Buster XL™ pump and motor assembly, the unit should be cleaned after every use.
- B. Spray or hose off all remaining neutralized acid that may be on the underside of the pump and motor assembly. Pay particular attention to the area where the impeller meets the motor. The bearing in this area can be susceptible to corrosion and/or rust and must be flushed properly. There is a hole in the pump housing which will allow you to do this. At this time the Lime Buster XL™ unit should be fully drained and dried, including the pump. It is recommended that lubricant such as white lithium grease be sprayed in the above mentioned bearing area to prolong its life. This will keep the equipment in proper working order.
- C. Never leave acidic solution in the tank for extended periods of time when not in use.
- D. Do not place pump housing upside down. This will allow acid to drip down into the motor, damaging the motor. **Doing so will void the warranty.**



Always place pump assembly on its side, protecting the pump motor.



## MAINTENANCE AND DISPOSAL OF ACID SOLUTION

1. Read and understand *SAFETY SUMMARY, CHEMICAL SAFETY NOTES AND PERSONAL SAFETY NOTES* sections of this manual before doing any of these procedures.

### **WARNING**

ACID COULD CAUSE BLINDNESS OR BURNS.

Wear full eye and skin protection.

Anyone who uses or services machine must follow manual.

2. The standard 1/2 pound per gallon mixture gives a 6% solution at about 1 ph. The solution will be purple. As scale from the mold gets into it, the solution will lose acidity. It will fade from purple to yellow.

There is also a chance that loosened minerals in the water will cover up the purple or yellow colors, and the water will be gray. If adding a small amount of acid powder does not turn the water purple again, it is best to test the water with neutral litmus paper (available from IMS as part number 121711).

- A. If the litmus paper darkens but remains purple, the solution is neutral and needs more acid powder.
  - B. If the litmus paper turns red, the solution is acidic.
  - C. If the litmus paper turn blue, the solution is alkaline and needs more acid powder.
3. Small amounts of acid powder can be added to bring solution back to strength. It will turn purple again when it is acidic.

Add acid powder just until solution turns purple or the litmus paper turns red.

Do not add more than needed.

For best descaling, the solution ph should be 1.0 (a ph of 7 is neutral; the lower the number, the higher the acidity). Add more acid powder to lower the ph level (raise acidity).

## MAINTENANCE AND DISPOSAL OF ACID SOLUTION (continued)

4. Dispose of acid solution according to environmental regulations in your area. These regulations will insist that the solution not be acidic.
  - A. Use supplied Oakite Enprox® 714 neutralizer or equivalent to neutralize the solution. Add a little at a time until the solution just changes to yellow.

11 gallons of fresh acid could need almost a half gallon of Enprox. A used solution should need less.
  - B. Once the solution turns yellow, it is not acidic. At this point it could be either neutral or alkaline.
  - C. Use litmus paper to check the solution.
    - 1) If the paper does not change color, the solution is neutral and ready for disposal.
    - 2) If the paper turns blue, the solution is alkaline from too much Enprox. Add a little Solventol and check again.
    - 3) If the paper turns red, the solution is acidic. Add a little Enprox and try again.
  - D. Dispose of the solution according to federal, state and local environmental regulations. In most cases, neutralized solution is not considered hazardous.

Call Oakite at 1-800-526 4473 for any information you need to dispose of solution.

### **CAUTION**

ACID AND ALKALINE WILL EAT THROUGH METAL CONTAINERS.

Do not store in metal.





## WATER NEED CALCULATION

Instead of filling the tank fully, you can save on acid powder by using the least amount of solution necessary. To determine this amount:

1. Read and understand the *SAFETY SUMMARY* and *PERSONAL PROTECTION NOTES* sections of this manual before doing any of these procedures.
2. Measure I.D. of internal passages in mold or heat exchanger, and I.D. of connecting hoses.
3. Use Pipe Capacity Table on next page to figure out capacity of those passages and hoses. Add up those capacities.
4. Add 22 gallons to that total (22 gallons is minimum amount of solution that pump needs in tank). This gives you total amount of solution needed to clean this particular mold or heat exchanger.

Do not go over 40 gallons, which is tank capacity (Mold and lines will drain back into tank when pump is shut down).

5. Add Solventol® 2409 acid powder slowly at ratio of 8 ounces (1/2 pound) per gallon of water.

EXAMPLE: 25 feet of 1" I.D. pipe, running to and from mold with 10 feet of 3/8" I.D. mold line:

$$\begin{array}{r} 25 \times 0.041 = 1.025 \\ 10 \times 0.006 = 0.06 \\ \quad \quad \quad + 5 \\ \hline = 6.085 \text{ gallons total} \end{array}$$

### WARNING

TOO-STRONG ACID could cause DAMAGE or INJURY.

Use only Solventol® 2409 acid.

Do not use stronger mixture than stated in manual.



## PIPE CAPACITY TABLE

<u>INSIDE DIAMETER OF PIPE (ACTUAL)</u>	<u>CAPACITY PER FOOT (IN GALLONS)</u>
.125 .....	0.0006
.187 .....	0.0014
.250 .....	0.0025
.3125 .....	0.004
.375 .....	0.006
.4375 .....	0.008
.500 .....	0.010
.5625 .....	0.013
.625 .....	0.016
.687 .....	0.019
.750 .....	0.023
1.000 .....	0.041
1.250 .....	0.064
1.375 .....	0.077
1.500 .....	0.092



## REPLACEMENT PARTS

<b>DESCRIPTION</b>	<b>IMS #</b>
Pump and Motor .....	131295
Motor Only .....	Inquire
Pump Impeller Assembly .....	Inquire
Pump Body Assembly .....	Inquire
Solventol® 2409 Acid Powder (45 lbs) .....	110221
Enprox® 714 Neutralizer (3 gal) .....	106097
Vinyl Hose, 1/2" (per ft) .....	110504
Manifold Nut, 3/8", polypropylene.....	109887
Wing Nut, 1/2" (nylon) .....	109404

## PARTS ID PHOTO





# NOTES AND SERVICE RECORD