



# Lime Buster XL™

IMS #136666

## INSTRUCTION MANUAL





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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.

**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 Gardacid 4294 acid. Do not use stronger mixture than stated in manual.



## 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 Gardacid 4294 (formerly known as Solventol® 2409) acid powder for use with this equipment, based on Chemetall Ltd. specifications for the product.

While IMS has had good results with Gardacid 4294 on materials used in molds and heat exchangers, IMS does not warrant Chemetall Ltd. Gardacid 4294 for fitness for use on any specific material. If you have a question about using Gardacid 4294 with a particular material, call Chemetall Ltd. 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 Safety Data Sheet for that chemical. You must have immediate access to the 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.

## 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 Safety Data Sheet for instructions BEFORE handling or using the chemical. If the instructions are not clear to you, call the chemical manufacturer. Chemetall Ltd. number is 1-800-526-4473.**

6. Learn from product 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 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 .....	1/5 hp
Speed .....	2850 rpm
Flow .....	44 gpm Open Discharge



## SETUP

Refer to PARTS ID PHOTO on Page 12 to identify parts.

### 1. Unpack Shipment

- A. Complete Lime Buster XL™ kit includes three containers: a pail of Gardacid 4294, a pail of Gardobond® Additive H 7212, and a carton containing the Lime Buster XL™.

**Inspect all three for damage. Report any damage to shipper.**

- B. Open carton and make sure it includes the Lime Buster XL™ and a small hose assembly that fits that can. Make sure there is no damage.
- C. Lay carton on its side and remove Lime Buster XL™. Remove 3" tank plug from top of tank and check that there is a 50 ft coil of clear PVC hose and a bag of fittings.

### 2. Connect Tank to Mold

- A. Remove wing nuts from pump mounting assembly. Remove plate and set it off to the side.
- B. Remove clear PVC hose and bag of plastic fittings from inside tank.
- C. Reinstall pump mounting assembly. Secure with wing nuts.
- D. Cut clear 50 ft hose into necessary lengths. Use hose and fitting kit to plumb unit to your mold. There is a range of fitting sizes in the kit. There are also plugs for any unused holes in the manifolds.

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.

## NOTE:

The pump mounting plate is square and can be mounted facing any direction without affecting performance. If more convenient, you can also change the position of the manifolds on the plate before installing the plate.

### 3. 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 11 for formula.

## 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.

4. 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.

Enprox® 714 is a registered trademark of Chemetall Ltd.



**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 Gardacid 4294 acid.

Do not use stronger mixture than stated in manual.

5. 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 Gardacid 4294 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 11.

- D. Stir slowly to mix solution. Gardacid 4294 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.
- B. Occasionally look at water lines to check color of acid. If solution is purple, it is still acidic and is still cleaning passages. If it is yellow, deposits from the mold have neutralized the acid. 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.
- C. Reinstall tank plug and restart Lime Buster XL™.

5. Check color every 30 minutes - After 2 to 4 hours, if the fluid stays purple for a half hour while circulating through the mold, the descaling process is probably done.

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 bucket (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.





## OPERATION (continued)

### 8. Properly Dispose of Flushing Water

- A. Using a very small amount at a time, pour a little Gardobond® Additive H 7212 to neutralize the diluted cleaner you just flushed from mold and/or into the Lime Buster XL™ tank. Add Gardobond® Additive H 7212 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 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.

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

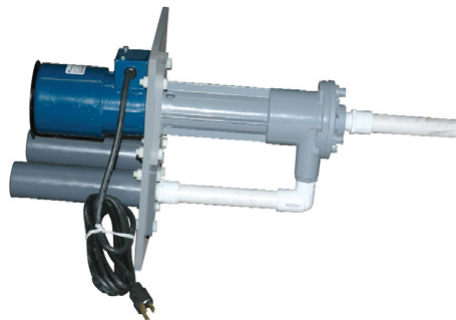
**Call Chemetall Regulatory at 1-800-526-4473 for any information you need to dispose of solution.**

### 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 III™ 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.

### **WARNING**

TOO-STRONG ACID could cause DAMAGE or INJURY.

Use only Gardacid 4294 acid.

Do not use stronger mixture than stated in manual.

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. 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).**

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 Gardobond® Additive H 7212 neutralizer or equivalent to neutralize the solution. Add a little at a time until the solution just changes to yellow.
  - 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 Gardobond® Additive H 7212. Add a little Gardacid 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 Chemetell 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 Gardacid 4294 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:

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

**WARNING**

TOO-STRONG ACID could cause DAMAGE or INJURY. Use only Gardacid 4294 acid.

Do not use stronger mixture than stated in manual.

**PIPE CAPACITY TABLE**

INSIDE DIAMETER OF PIPE (ACTUAL)	CAPACITY PER FOOT (IN GALLONS)
0.125 .....	0.0006
0.187 .....	0.0014
0.250 .....	0.0025
0.3125 .....	0.004
0.375 .....	0.006
0.4375 .....	0.008
0.500 .....	0.010
0.5625 .....	0.013
0.625 .....	0.016
0.687 .....	0.019
0.750 .....	0.023
1.000 .....	0.041
1.250 .....	0.064
1.375 .....	0.077
1.500 .....	0.092



## REPLACEMENT PARTS

DESCRIPTION	NEW IMS #	DESCRIPTION	NEW IMS #
Pump and Motor .....	113406	Vinyl Hose (per ft) .....	110504
Pump Impeller Assembly .....	158233	Manifold Bolt, 3/8", polypropylene .....	109887
Pump Body Assembly .....	Inquire	Screw for Lid, 1/2"-13, polypropylene .....	109883
Gardacid 4294 Acid Powder (41 lbs) .....	110221	Hex Nut, 3/8" - 16 nylon .....	109888
Gardobond® Additive H 7212 Neutralizer (5 gal) .....	175200	Wing Nut, 1/2" nylon .....	109404

