

**Inject-a-Cure  
Ag Solution Injection  
System**

*by:*

**SDI**

**Owner's  
Set-Up and  
Operations Manual**

*Manufactured by:*

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## Introduction

For hundreds of years farmers have been applying fertilizers and amendments to maintain proper soil conditions and provide an environment for healthy crops.

Gypsum is the most common and least expensive amendment and has been in use for over two centuries. It's only in the last several years the myriad benefits of gypsum have become widely understood and exploited. Up until recently the vast majority of gypsum used in agriculture was field spread, typically using the low-grade form found in abundance in the West. This procedure dramatically limits the application and the benefits that gypsum provides.

Realizing the potential, several attempts have been made over the years to introduce a gypsum solution directly into the irrigation water. The low purity and coarse grind of commonly available gypsum limited success and continued to plague the process in micro and drip irrigation.

In the early 1990's, several gypsum companies built mills designed exclusively for grinding gypsum to a very fine powder for agricultural use. This new technology combined with a vast supply of high-grade gypsum (typically 95%+), led to the development of what is now known as *solution grade gypsum*.

With this high-purity and fine grind gypsum now readily available, SDI was able to eliminate the need for the complicated "extractor" based machines that were originally developed using low grade "wallboard" gypsum. The SDI System was specifically designed to be simple, durable and virtually maintenance free, taking advantage of the new higher grade of gypsum available.

Along with the gypsum, the SDI machine is also suitable for the injection of other soil amendments like limestone and potassium products.

By applying only approved amendments and taking care to apply them at the appropriate time and rate, you will enjoy many years of service from your SDI Injection System.

## General Overview

The SDI Solution Injection System is designed to allow a variety of soil amendments to be thoroughly blended and then injected directly into the irrigation water. It works great in all types of irrigation systems, including flood, sprinklers, micro-sprinklers, drip and subsurface tape. A high pressure diaphragm pump is standard on all models for flexibility in injection pressure adjustment.

Its simple, durable and virtually maintenance-free design make it unique among other injection systems. With its thicker agitation bar and patented super strength bearings, the SDI system is the only injector of its kind that does not require frequent grease and maintenance!

And, we offer most every model with options like Honda gas engines, hydraulic motors instead of electric, automatic fill and automatic injection rate capability, trailer packages and more.

In normal use, the heavy-duty fiberglass main tank is first filled with water. The fresh water source can either be an existing pressurized irrigation line or with an optional fill pump, water may be pumped from a ditch, pond or other similar source.

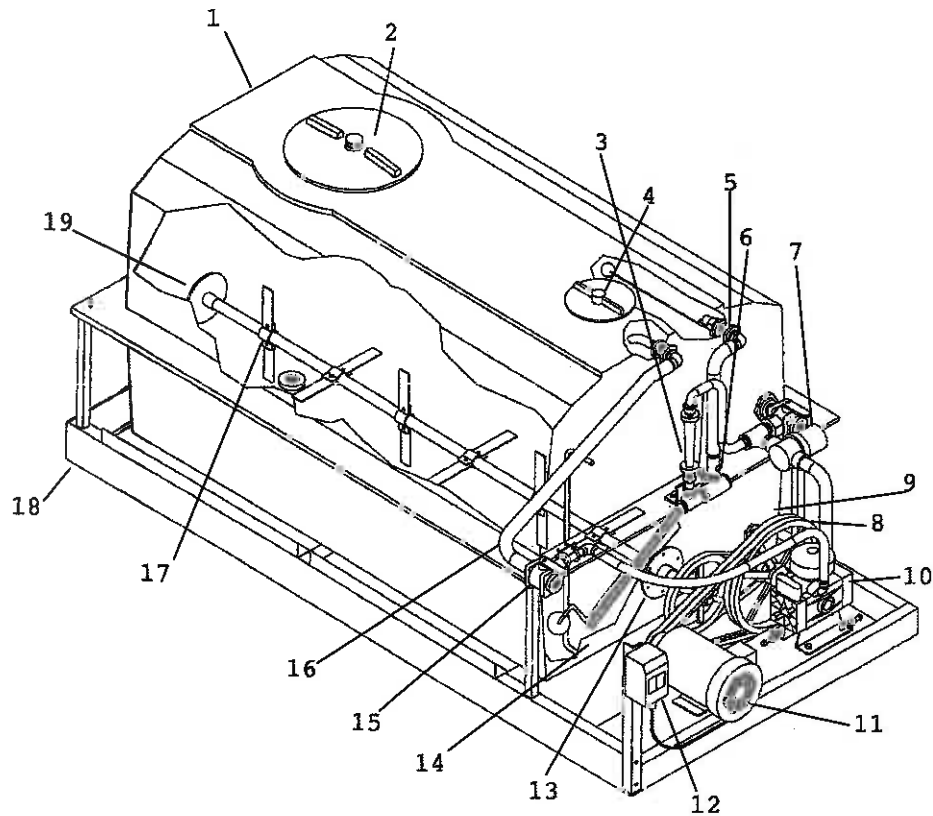
With the machine running, solution gypsum is then added to the water. Gypsum and other amendments may be conveniently added by 50 pound bag, 1 - ton bag or self-feeding silo.

The stainless steel agitation blades near the bottom of the tank mix the solution thoroughly to form a uniform slurry. The high-pressure diaphragm pump injects the mixture into the irrigation flow at a predetermined rate throughout the irrigation set.

Another unique feature of the *"Inject-a-Cure"* injection system is its ability to inject a solution either on a declining curve basis or at a fixed or flat rate, without additional equipment. Each model is equipped with a ball float valve and a floating suction intake. Controlled irrigation users can simply leave the fresh water intake valve open thereby maintaining a constant fluid level in the tank.

Anyone desiring a specific dilution rate may shut the fill valve. The slurry will then be output at a constant rate without dilution throughout the irrigation set as the level in the main tank is drawn down. Install a simple timer and the machine will automatically refill itself and be ready for the next use.

# **Ag Inject-a-Cure Equipment Features** **300 and 600 Gallon Models**



	<u>600 Gallon</u>		<u>300 Gallon</u>
<b>Dimensions</b>	<b>109"</b>	<b>Long</b>	<b>84"</b>
	<b>51"</b>	<b>Wide</b>	<b>44"</b>
	<b>53"</b>	<b>High</b>	<b>44"</b>
<b>Weight</b>	<b>850</b>	<b>Pounds</b>	<b>430</b>

## Ag Inject-a-Cure Features

- |  |   |
|--|---|
| <p>#1 Heavy-duty custom molded fiberglass mixing tank, 300 or 600 gallon available.</p>  | <p>#12 Mag starter with on/off switch provides for convenience and safety.</p>  |
| <p>#2 Large, vented lid opens for easy access filling and includes stainless steel basket inside to help prevent large debris from accidentally entering tank.</p> | <p>#13 Patented stainless steel packing gland assembly w/Teflon packing and greaseless tungsten carbide bearings.</p>                           |
| <p>#3 Fresh Water bypass allows simple metering adjustment for any application. Increases pump valve life.</p>   | <p>#14 Floating suction hose (inside) allows tank to be pumped empty for simple and accurate "constant rate" metering into irrigation flow.</p> |
| <p>#4 Repair access lid for internal component adjustment.</p>   | <p>#15 Discharge valve and outlet begins injection of amendments into the flow gauge and safety relief valve assembly.</p>                      |
| <p>#5 Fresh water inlet for filling tank. Includes auto shut-off valve (inside).</p>   | <p>#16 Discharge return line returns slurry to tank when discharge valve is closed during operation.</p>  |
| <p>#6 Fill valve opens to allow fresh water into fill tank and pre-dilute output slurry.</p>   | <p>#17 Patented one piece stainless steel agitator shaft w/tungsten carbide bushings and 6 stainless steel paddles provide optimum mixing.</p>  |
| <p>#7 Filter screen protects diaphragm pump from debris and includes a redirect valve to allow screen to be cleaned without turning off machine.</p>               | <p>#18 Sturdy all steel frame.</p>  |
| <p>#8 Dependable long-life dual "V" belt and pulley drive system.</p>  | <p>#19 Patented rear stainless steel and tungsten carbide bearing assembly.</p>   |
| <p>#9 Motor and belt guard—not shown.</p>  |   |
| <p>#10 High pressure diaphragm pump requires little maintenance and has excellent durability.</p>  |   |
| <p>#11 480V 3ph 2hp motor is standard with many others available. (Built-in sunshade extends motor life-not shown).</p>  |   |

**You have purchased a *superior injection system* designed for ease of use and built to provide many years of trouble-free service. By following the procedures and guidelines, this injection system will perform safely and reliably for many years to come.**

*Please take a moment to read through this documentation and familiarize yourself with the construction and proper operation of the SDI Injection System.*

**CAUTION: Misuse or improper operation could cause property damage and/or bodily injury. Please read the following precautions:**

#### **Keep Work Area Safe**

- Keep work area clean. Water, oil and other spills can make the ground or cement pad slippery and increase shock hazards.
- Never store flammable liquids or gasses near the machine.
- Only experienced operators should work on or near the machine. Keep all others at a safe distance.

#### **Keep Unit Grounded**

- Wiring and electric motors must be properly grounded. All wiring and fuses must be sized to comply with state and local electrical codes and meet proper current capacity.

**All electrical hook up must be done by a certified electrician.**

#### **Check for Worn or Damaged Parts**

- Examine hoses, belts, fittings and wires for wear and/or damage.
- Check drive belts, hoses and bearing packing regularly. Tighten or replace as required.

- Always operate belt driven models with belt guard attached.

If you have questions about how to operate and service your SDI Injection System or to order repair parts, please contact your local dealer or call our main office at 559-734-5555.

#### **Drain Tank**

- Always run the unit until all amendments have been injected and only fresh water remains in the tank before shutting down for any length of time.
- During storage or long idle periods, it is best to drain the main tank and hoses to prevent freezing and stagnate water conditions.
- Before moving trailer mounted models, be careful that all hoses and electric connections have been detached and properly stored.

#### **Injection Precautions**

- Injection unit should be located on hard, level ground or on a cement pad only.
- Use only appropriate high-pressure hose and fittings for installation and operation.
- Keep top lid closed during operation to prevent unwanted debris from entering the mixing tank.
- Never fill and operate the injector without one way check valves in place.

**WARNING:** This unit operates at very high water pressures (up to 250 psi). Never modify or obstruct the pressure regulator or bypass system. Damage and/or injury may result.

**Pre-Installation—**

**WARNING—DANGER**

**This Injection System is designed to mix and inject non-hazardous, non flammable soil amendments only. Never attempt to use the SDI system to inject corrosive acids or other hazardous or flammable products. The use of such products or procedures is prohibited and may result in severe damage and/or injury.**

**Important Safety Information:**

**Please read carefully before operating pump.**

**•Warning: DO NOT pump corrosive or hazardous chemicals or flammable/explosive fluids. DO NOT use in explosive atmospheres.**

The pump should be used only with liquids compatible with the pump component materials. **DO NOT** pump any amendments/chemicals not shown on the Approved Amendments Chart enclosed.

**Personal injury or property damage may result and the warranty will be void.**

**•Do not operate pump above set rpm. If a pulley must be replaced for any reason, be certain the replacement is the same diameter as the original factory pulley.**

**•Do not pump at pressures higher than 200 psi (150 psi maximum continuous).**  
**•Operate the pump between a temperature range of 45 to 140°F.**

**•Make certain the power source conforms to the requirements of your equipment and that the motor is wired to turn in the proper direction (note arrow on belt guard).**

**•Never operate the pump and motor without the belt guard in place.**

**•Release all pressure within the system before servicing any component.**

**•Drain all liquids from the system before servicing.**

**•Secure the discharge lines before starting the pump. An unsecured discharge line may whip, causing personal injury and/or property damage.**

**•Periodically inspect the pump and the system components. Perform routine maintenance as required.**

**•When wiring an electrically driven pump, follow all electrical and safety codes, as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).**

**•WARNING: Because of risk of electrical shock, all wiring should be done by a qualified electrician.**

**•WARNING: Do not handle a pump or pump motor with wet hands or when standing on a wet or damp surface, or in water.**

**•Do not operate a gasoline engine in an enclosed area. Be sure the area is well ventilated.**



•Use only pipe, hose and fittings rated for maximum rated pressure of pump or pressure at which pressure relief valve is set.  
**DO NOT USE "USED" PIPE OR HOSE!**

•Do not use this system for pumping anything intended for human or animal consumption.

#### **Installing the Inject-a-Cure Injection System:**

##### **1. Select a Location**

- A. Locate the injector on a smooth hard surface. Keep in mind you will need to tap into a pressurized line to fill the solution tank.
- B. If your irrigation system has a main filter, the tap for the solution injection port should be located before the filter.
- C. You will also need to allow access to the machine for filling and maintenance.

##### **2. Pre-Operation Set-Up**

- A. Check the ball float located on the inside of the main tank at the fresh water inlet fitting. Adjust the ball arm by bending it so that it does not come in contact with the top of the tank when in the fully closed (up) position.
- B. If your model has a lower level float valve near the bottom, make certain the fitting is tight and that the ball float moves freely in a vertical plane.
- C. Insert the stainless steel filter basket into top hatch opening.

##### **3. Fresh Water Supply:**

- A. Locate or install a 3/4" NPT fitting at the pressurized fresh water source. To minimize air getting into the unit, the water supply fitting should be located at 3 or 9 o'clock and downstream of any filters. Also install a water pressure regulator

set at 20-50 psi. Install a shut off valve (not included) and attach a 3/4" hose barb.

**NOTE:** You must install a valve to shut off the water supply to the injection system for maintenance and safety. A shut-off valve is also required in order to use the pump-down capability of the Inject-a-Cure unit.

- B. Attach a length of hose from the hose barb to the fresh water inlet located on front of the main tank, down at the bottom near the vertical sight glass. Be sure to use hose rated for the highest pressure in your irrigation system and attach each end with two hose clamps.
- C. If filtered water is not already available, splice a debris screen into the filter hose near the fresh water inlet fitting.

##### **4. Solution Injection Hook-Up**

- A. Locate or install a 1/2" NPT fitting (not included) into the irrigation system at a point *after* any main filters. For best results, solution should be injected at about a 45° angle, pointing in the direction of the flow of water and at least 2 feet down stream of the inlet water supply to solution unit.
- B. Attach a 1/2" hose barb and one end of the high-pressure hose (included) to the injection tap.
- C. Attach the other end of the 1/2" hose to the discharge outlet located on the front of the Inject-a-Cure unit.

- D. Splice the one-way check valve into the hose at a point near the solution injection tap. Use only high pressure design hose and hose clamps and be sure the arrow on the valve points towards the irrigation system.

**NOTE:** The check valve (not furnished), is required to prevent irrigation water from backing up into the machine

#### 5. Electrical Connection

- A. The electric motor that drives the pump and agitation bar is pre-wired to a mag starter in a weather tight control box to turn the unit on and off (Optional on some models).

Ensure the supply voltage is correct for the motor (i.e. 110, 240/480 volt, single or three phase). A breaker must be in place to automatically disconnect the power at the source in case of accidental contact or downed lines.

**Follow all state and local electrical and safety codes**, as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

**Warning:** Because of risk of electric shock, all wiring needs to be performed by a qualified electrician.

**Do not handle pump or pump motor with wet hands or when standing on a wet or damp surface, or in water.**

#### 6. Final Equipment Check

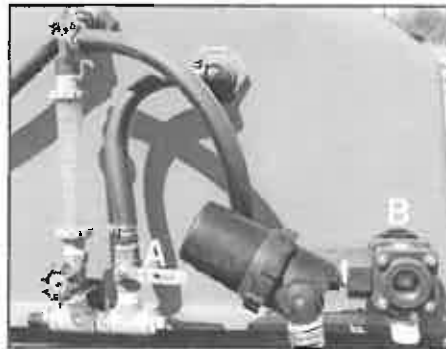
- A. Take time to check all fittings, clamps and connections to make sure all are secure. Check that the belt is tight and the belt guard is mounted securely in place.
- B. Double check to make sure all ball floats are mounted and adjusted correctly inside the tank.
- C. Be certain the oil is visible half

way up the clear sight tube on the diaphragm pump. (Fill with 30W non-detergent motor oil as necessary).

#### Daily Operation

##### 1. Fill the Main Tank with Water

- A. With irrigation system pressurized, open the fresh water fill valve "A" to begin filling the



holding tank with water. As the tank nears full, the internal ball valve will automatically shut off the flow of incoming water. Valve "A" is shown in the closed position in the photo.

- B. For *constant rate* output, close the fill Valve "A" once the tank is full. This will allow the tank to empty, injecting a consistent, non-diluted solution.

For declining rate application, the fill Valve "A" may be left open to maintain a *constant fluid level* in the tank. This will inject the soil amendment on a declining curve rate as the incoming water dilutes the slurry mix.

## 2. Turn the System On

- A. Check that the redirect Valve "B" located adjacent to the pump inlet debris screen, is in the *closed* position to draw liquid from the tank. (The handle should be facing away from the tank as shown). With the handle turned to right, the pump will draw air only.
- B. The discharge outlet, Valve "C" should be turned to the *closed* position. (Handle should be turned in line with the discharge flow as shown). This allows the pump to start up under no-load conditions to increase motor or engine life.
- C. Turn the machine "ON" at the



control box to energize the pump and agitation bar.

- D. Check for leaks around all fittings and the agitation shaft front bearing. A leaking front bearing housing can usually be stopped by turning the machine off and simply tightening the packing gland. (See "Maintenance" later in this manual).

## 3. Add Amendments

- A. For gypsum application, add the quantity of solution grade gypsum suggested by your water testing results, not to exceed the following amounts:

300 Gallon tank not to exceed

1,500 pounds of gypsum.

600 Gallon tank not to exceed  
3,000 pounds of gypsum.

**Caution: This Inject-a-Cure was designed for use with *true* solution grade gypsum only. Use of sub-standard gypsum can cause excessive wear, frequent filter flushing, clogging and may void the factory warranty.**

Please refer to "Solution Gypsum Specifications" later in this manual for the minimum specifications of acceptable product, prior to operation.

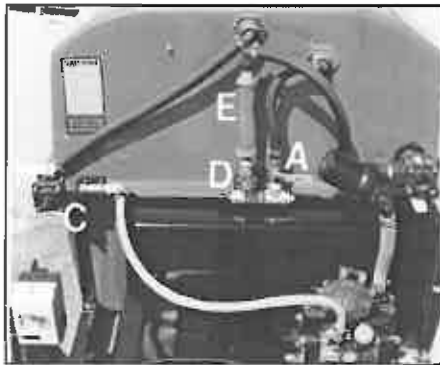
If adding gypsum from one ton bulk bags, be careful not to empty a full bag into the 300 gallon model—**this will overload the machine**

- B. Allow the machine to operate for a few minutes to insure the slurry is completely and uniformly blended.

## 4. Adjust Output and Begin Injection

- A. If a manual valve has been installed in the irrigation pipe at the point of injection, be sure to check that it is in the OPEN position.
- B. Slowly rotate the Discharge Outlet Valve "C" to the OPEN position (handle to left), to begin injection. The diaphragm pump will automatically adjust discharge pressure to compensate for any irrigation line pressure up to 150 psi.

- C. Rotate the Fresh Water Bypass Valve "D" counterclockwise to the fully "OPEN" position. Read and note the total gallons per minute water flow by reading the calibration lines on the fresh water sight glass (should be around 5-6 GPM with a standard pump).



- D. Refer to the "Discharge Rate Chart" in this manual to determine the desired GPM of slurry output for the desired application rate. Subtract this number from the total GPM flow determined in Step C above.
- E. Watch Sight Glass "E" and slowly rotate the Fresh Water Bypass Valve "D" clockwise to reduce the flow of fresh water down to the newly calculated net rate determined in Step D above.

**Example:** With Fresh Water Bypass Valve "D" turned all the way open, sight glass indicates 6 GPM total water flow. Desired injection rate is determined to be 2 gallons per minute of slurry ( $6-2=4$ ). Slowly close Fresh Water Valve "D" until the sight glass reads 4 gallons per minute. This will cause the diaphragm pump to automatically draw 4 gallons of fresh water plus 2 gallons of slurry from the holding tank.

- F. Reload the machine as desired when the water runs clear or after

refilling the tank in the constant rate (pump down) mode.

### Maintenance

You have selected the most "user friendly", maintenance-free injection system available for gypsum and other powdered amendments. Care in selecting and using only true, high-grade solution gypsum (and other compatible amendments), will keep your injector running smoothly with minimal attention.

Your SDI machine was designed with common brand name components whenever possible to reduce replacement costs and insure parts availability when maintenance is required.

The following outlines steps to service and maintain your SDI injection system.

#### *Before Each Start-Up:*

1. Check that the oil is visible half way up on the clear sight tube on the diaphragm pump. Fill with 30W non-detergent motor oil as required.
2. Turn the redirect valve to close off the the fluid in the main tank and clean the debris filter located on the front of the machine and any other screens that may be installed. Remember to turn the valve back on before starting the machine.
3. Check that the internal ball float valve(s) are adjusted and working properly.

4. Take time to check over all fittings, clamps and connections to make sure all are secure and not leaking. Be sure the belt is tight and the belt guard is in place.

5. If agitation shaft front bearing is leaking, simply tighten the adjusting nuts until the leak stops. **DO NOT OVER-TIGHTEN** the adjusting nuts. Only about 1/4 to 1/2 turn on each of the adjusting nuts should be required to stop any leak.

Over tightening will lead to rapid wear of the packing material and possibly the shaft. Occasional small adjustments are required to maintain the integrity of the seal. If one or more turn of the adjusting nuts does not stop the leak, replace the packing material or severe wear on the agitation shaft may result (See Replace Packing Material).

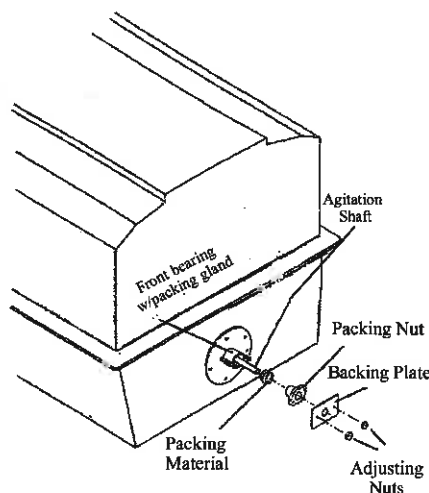
#### Every 500 Hours:

1. Change the oil every 500 hours or three months, whichever comes first. To drain the oil, follow these procedures:

**D30 and D50 Pumps:** Remove the drain plug and oil sight glass covers and rotate shaft until the oil stops flowing. Install the drain plug.

Slowly pour new oil into sight tube while turning the pump shaft. Turning the pump shaft purges all of the air out of the crank case. Always change oil when replacing diaphragms.

*Safety Note:* The bypass return outlet on the discharge valve and pressure relief valve must be connected directly to the main tank without any restrictions or valves.



#### Annually or as Needed:

**Replacing the Packing Material.** The packing gland is located on the front of the machine where the main agitator shaft extends out of the mixing tank. Once or twice a year, or whenever excessive leaking occurs that routine tightening of the adjusting nut will not stop, the packing material in the packing gland must be replaced.

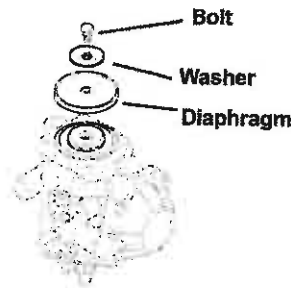
1. Turn off injector and secure against accidental start-up.
2. Remove fiberglass belt guard. Loosen both adjusting nuts and slide the backing plate and packing nut out away from the packing gland.
3. Dig out and discard any remaining pieces of the old packing material.

4. Wind new packing material around the shaft; use a screwdriver to push the packing material firmly down into the packing gland. Continue this process until the packing gland is full; cut the packing rope off.

5. Slide the packing nut and backing plate back towards the packing gland; tighten the adjusting nuts down hand tight.

6. Replace the belt guard and start the injection machine. If the packing is leaking, turn off the machine and tighten the adjustment nuts approximately 1/4 turn each. Continue this procedure until the leaking stops. **DO NOT OVERTIGHTEN!**

3. Remove the bolt securing the diaphragms (See Figure below).



#### Valve Replacement

Occasionally debris can build up and cause improper seating of the valves and/or damage to the o-rings, causing the pump to pulsate. To check for damage, follow these steps:

Remove the pump manifolds (heads). With the manifolds removed, valves can easily be removed and inspected for debris and wear. Replace valves, O-rings and manifolds as necessary.

#### Diaphragm Replacement (D30)

If pump oil becomes milky or it comes out the discharge outlet, one or more of the diaphragms have ruptured. The diaphragm material does age and should also be replaced annually or more often under heavy use. Change diaphragms every 500 hours or three months, whichever comes first.

1. Drain the oil as instructed previously.
2. Remove pump head bolts and heads.

4. Remove the old diaphragm and the washer (See Figure above).

5. Install a new diaphragm; then turn the crankshaft to bring the piston to its down-stroke and seat the diaphragm into the sleeve groove.

6. Install the washer and bolts removed in steps 3 and 4.

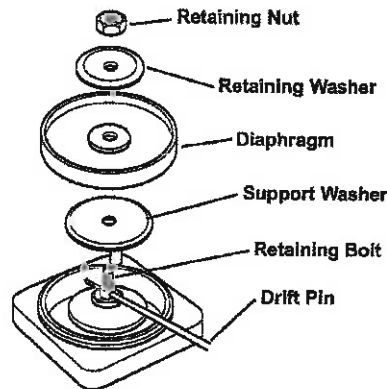
7. Replace the pulsation dampener diaphragm by first bleeding the air from the dampener. Remove the bolts from the dampener cover and replace the diaphragm. Reassemble the cover in place and charge the dampener to 20% of operating pressure.

8. Refill the crankcase with 30W non-detergent oil. Rotate the shaft to distribute the oil and fill to proper level.

### Diaphragm Replacement D50

Change diaphragms every 500 hours or three months whichever comes first.

1. Drain the oil from crankcase as instructed previously.
2. Remove the pump manifolds and valves.
3. Remove the pump head retaining nuts and heads.
4. Turn the crankshaft to bring the



diaphragm to the top of its stroke. Insert a drift pin into the hole in the retaining bolt to hold it in place. Remove the retaining nut, retaining washer and the diaphragm. (See Figure above).

5. Turn the crank shaft to bring the piston to the bottom of its stroke and seat the new diaphragm into the sleeve groove. Install the retaining washer and tighten the retaining nut while holding the retaining stud in place with the drift pin. Clean any excess oil from the area and install the heads, valves and manifolds.
6. Replace the pulsation dampener diaphragm by first bleeding the air from the dampener. Remove the cover retaining bolts from the

dampener cover and replace the diaphragms. Reassemble the cover and bolts in place and charge the dampener to 20% of operating pressure.

7. Refill the crankcase with 30W non-detergent oil. Rotate shaft to distribute oil and fill to proper level.

### Winter Storage/Freezing Conditions

1. Drain water from main tank
2. Open all valves.
3. Flush pump with a 50/50 mixture of water and antifreeze while rotating crankshaft.

## Trouble Shooting Guide

Symptom	Probable Cause	Corrective Action
The pump does not draw fluid	Pump is drawing air	Turn redirect valve handle 90°
	One or more pump valves are not seating properly.	Remove valve (s) and check for debris.
	Suction line is plugged or collapsed. Clogged debris filter	Examine suction hose for blockage Clean debris filter.
The liquid flow is erratic	The charge in the pulsation dampener is incorrect	Check pressure in pulsation dampener (20-40% working pressure).
	One or more pump valves are not seating properly	Remove valve (s) and check for debris. Check and clean valve seats.
Output drops and pump is noisy	Oil level is too low	Add 30W motor oil to bring level half way up sight glass.
Oil comes out the discharge port or oil is a milky color	One or more diaphragms split	Replace diaphragm (s). (Refer to Maintenance Section).
Pump seems to operate in reverse	Electric motor wired backwards	Have a certified electrician check and repair wiring
Agitation shaft bearing leaking	Packing gland loose Worn out packing material	Tighten packing nut on front Replace with 1/4" Teflon packing.
Irrigation filters plugging or require frequent flushing	Injecting too thick of slurry Poor quality gypsum Fresh water is contaminated	Increase fresh water bypass GPM  Install a screen on the incoming fresh water line



### **Solution Gypsum Specifications**

**Caution:** This SDI machine was designed for use with true solution grade gypsum only. Use of sub-standard gypsum:

- Causes excessive wear to the pump, pump valves, pressure relief valve, pressure orifice, ball valves, micro sprinklers, emitters, etc.
- Impacts filters—requiring more frequent flushing.
- May not go into true solution and could build up inside irrigation lines
- May void the factory warranty.

To avoid these problems, we recommend using Solution Grade Gypsum with a minimum analysis of:

**Purity: Average—95%  
(92% Guaranteed).**

**Grind: 100% thru 200 mesh,  
95% passes thru 325 mesh**

**Never Use:**

**Anhydrous Gypsum (Anhydrite)**

**Agricultural Grade/Spreadable  
Gypsum**

**Ground up (Wallboard) Gypsum**

***Refer to the Gypsum Application Rate  
Chart on the following page***

# **Gypsum Application Rate Chart**

# ***SDI's Inject-a-Cure Solution Injection***

## **Lbs./Hour vs Meq/L**

1MEQ GPM	LB/HR	2MEQ GPM	LB/HR	3MEQ GPM	LB/HR	4MEQ GPM	LB/HR	5MEQ GPM	LB/HR	6 MEQ GPM	LB/HR
100	4	100	9	100	13	100	17	100	22	100	26
150	6	150	13	150	19	150	26	150	32	150	39
200	9	200	17	200	26	200	35	200	43	200	52
250	11	250	22	250	32	250	43	250	54	250	65
300	13	300	26	300	39	300	52	300	65	300	78
350	15	350	30	350	45	350	60	350	76	350	91
400	17	400	35	400	52	400	69	400	86	400	104
450	19	450	39	450	58	450	78	450	97	450	117
500	22	500	43	500	65	500	86	500	108	500	130
550	24	550	48	550	71	550	95	550	119	550	143
600	26	600	52	600	78	600	104	600	130	600	156
650	28	650	56	650	84	650	112	650	140	650	168
700	30	700	60	700	91	700	121	700	151	700	181
750	32	750	65	750	97	750	130	750	162	750	194
800	35	800	69	800	104	800	138	800	173	800	207
850	37	850	73	850	110	850	147	850	184	850	220
900	39	900	78	900	117	900	156	900	194	900	233
950	41	950	82	950	123	950	164	950	205	950	246
1000	43	1000	86	1000	130	1000	173	1000	216	1000	259
1050	45	1050	91	1050	136	1050	181	1050	227	1050	272
1100	48	1100	95	1100	143	1100	190	1100	238	1100	285
1150	50	1150	99	1150	149	1150	199	1150	248	1150	298
1200	52	1200	104	1200	156	1200	207	1200	259	1200	311
1250	54	1250	108	1250	162	1250	216	1250	270	1250	324
1300	56	1300	112	1300	168	1300	225	1300	281	1300	337
1350	58	1350	117	1350	175	1350	233	1350	292	1350	350
1400	60	1400	121	1400	181	1400	242	1400	302	1400	363
1450	63	1450	125	1450	188	1450	251	1450	313	1450	376
1500	65	1500	130	1500	194	1500	259	1500	324	1500	389
1550	67	1550	134	1550	201	1550	268	1550	335	1550	402
1600	69	1600	138	1600	207	1600	276	1600	346	1600	415
1650	71	1650	143	1650	214	1650	285	1650	356	1650	428
1700	73	1700	147	1700	220	1700	294	1700	367	1700	441
1750	76	1750	151	1750	227	1750	302	1750	378	1750	454
1800	78	1800	156	1800	233	1800	311	1800	389	1800	467
1850	80	1850	160	1850	240	1850	320	1850	400	1850	480
1900	82	1900	164	1900	246	1900	328	1900	410	1900	492
1950	84	1950	168	1950	253	1950	337	1950	421	1950	505

*Continued on following page.*

# **Gypsum Application Rate Chart**

# ***SDI's Inject-a-Cure Solution Injection***

## **Lbs./Hour vs Meq/L**

1MEQ GPM	LB/HR	2MEQ GPM	LB/HR	3MEQ GPM	LB/HR	4MEQ GPM	LB/HR	5MEQ GPM	LB/HR	6 MEQ GPM	LB/HR
2000	86	2000	173	2000	259	2000	346	2000	432	2000	518
2050	89	2050	177	2050	266	2050	354	2050	443	2050	531
2100	91	2100	181	2100	272	2100	363	2100	454	2100	544
2150	93	2150	186	2150	279	2150	372	2150	464	2150	557
2200	95	2200	190	2200	285	2200	380	2200	475	2200	570
2250	97	2250	194	2250	292	2250	389	2250	486	2250	583
2300	99	2300	199	2300	298	2300	397	2300	497	2300	596
2350	102	2350	203	2350	305	2350	406	2350	508	2350	609
2400	104	2400	207	2400	311	2400	415	2400	518	2400	622
2450	106	2450	212	2450	318	2450	423	2450	529	2450	635
2500	108	2500	216	2500	324	2500	432	2500	540	2500	648
2550	110	2550	220	2550	330	2550	441	2550	551	2550	661
2600	112	2600	225	2600	337	2600	449	2600	562	2600	674
2650	114	2650	229	2650	343	2650	458	2650	572	2650	687
2700	117	2700	233	2700	350	2700	467	2700	583	2700	700
2750	119	2750	238	2750	356	2750	475	2750	594	2750	713
2800	121	2800	242	2800	363	2800	484	2800	605	2800	726
2850	123	2850	246	2850	369	2850	492	2850	616	2850	739
2900	125	2900	251	2900	376	2900	501	2900	626	2900	752
2950	127	2950	255	2950	382	2950	510	2950	637	2950	765

## Discharge Rate Chart

## SDI's Inject-a-Cure *Solution Injection*

Amendment Application Rate Lbs./Hour	Discharge Rate GPM (Discharge Gallons/Minute) @ Slurry Mix (Dry Lbs./Gallon)					
	6 lbs. Dry/Gallon	5 lbs. Dry/Gallon	4 lbs. Dry/Gallon	3 lbs. Dry/Gallon	2 lbs. Dry/Gallon	1 lbs. Dry/Gallon
60	.16	.20	.25	.33	.50	1.00
120	.33	.50	.50	.66	1.00	2.00
180	.50	.60	.75	1.00	1.50	3.00
240	.66	.80	1.00	1.33	2.00	4.00
300	.83	1.00	1.25	1.66	2.50	5.00
360	1.00	1.20	1.50	2.00	3.00	6.00
420	1.16	1.40	1.75	2.33	3.50	7.00
480	1.33	1.60	2.00	2.66	4.00	8.00
540	1.50	1.80	2.25	3.00	4.50	9.00
600	1.66	2.00	2.50	3.33	5.00	10.00
660	1.83	2.20	2.75	3.66	5.50	11.00
720	2.00	2.50	3.00	4.00	6.00	12.00
780	2.16	2.60	3.25	4.33	6.50	13.00
840	2.33	2.80	3.50	4.66	7.00	14.00
900	2.50	3.00	3.75	5.00	7.50	15.00
960	2.66	3.20	4.00	5.33	8.00	16.00

Refer to the "Gypsum Application Rate Chart." Find your irrigation flow rate (in GPM) under the desired treatment level (MEQ) to determine the gypsum application rate (LBS/HOUR). Then:

1. Find the closest Lbs./Hour rate in the left hand column above.
2. Follow the table to the right under the column which reflects the Slurry Mix in the tank (Dry Pounds/Gallon).
3. Read the number indicated as the Discharge Gallons Per Minute (the GPM of slurry to be injected).

**Sample: Setting slurry discharge for gypsum.** (Mixed in the tank at the recommended rate of 4 Lbs. gypsum/gallon of water).

Desired gypsum application = 240 Lbs./Hour. Find 240 in the left column, then follow it to the right under "4 lbs. Dry/Gallon".

Read Discharge Gallons/Minute = 1.00. Therefore, fresh water bypass should be opened fully, then reduced by 1 gallon per minute.

### Compatible Amendments—Application Chart:

**\*\* The following dry materials are compatible with the “Inject-a-Cure” Solution Injection System\***

- **Always** put gypsum into mixing tank first when combining with other amendments.
- **Never** combine the listed amendments that are shown as **Do Not Mix** - gypsum.
- **Never** combine Phosphate based products with calcium.
- **Always Test** a small sample of any and all amendments for compatibility with gypsum, *even if known* to be compatible, before loading in the Inject-a-Cure for mixing. SDI is not responsible for any damage if you have a compatibility problem with adding any amendments with gypsum in the Inject-a-Cure. Please contact your amendment supplier for amendment compatibility assurance.

### 600 Gallon Unit/300 Gallon Unit

**Solution Grade Gypsum, alone: 3,000 lbs./1,500 lbs. Max.\*\***

<u>Description</u>	<u>Mixed With Gypsum</u> <u>Lbs.</u>	<u>Without Gypsum</u> <u>Lbs.</u>
Ammonium Nitrate	1000/500	3600/1800
Ammonium Sulfate	400/200	2000/1000
Calcium Nitrate	400/200	4000/2000
Humic Acid	35 gal/15 gal	35 gal/15 gal
Milled Limestone**	-Do Not Mix-	400/200
Magnesium Sulfate	100/50	100/50
Potassium Sulfate (Potash)	-Do Not Mix-	1200/600
Potassium Nitrate	400/200	1200/600
Zinc Sulfate	100/50	100/50
10-62-0	-Do Not Mix-	2400/1200

**\*Caution:** The above amendments are compatible with the construction of the “Inject-a-Cure” injection machine only when purchased in a form appropriate for direct injection. Always be sure to confirm with the amendment supplier, that what you are buying is suitable for injection directly into irrigation water.

Failure to do so may cause improper operation and/or damage to the injection machine which is not covered by the manufacturer’s warranty. Use of a sub-standard quality of solution grade gypsum can reduce the maximum by as much as 25%.

**\*\*Limestone** must be ground to at least 325 mesh minus. Consult your supplier for details.

## **Optional Equipment Operation and Maintenance**

### **Auxiliary Fill Pump**

Used to fill the main mixing tank from a ditch or pond, the auxiliary fill pump is self-priming, centrifugal style pump, providing a high volume of water at a relatively low pressure. It operates by a direct-drive belt from the motor's pulley, so the pump is working at all time when the injection unit is operating.

#### **To fill the tank:**

1. Check that a suction hose is installed and that the free end is submerged in water. A debris screen should be attached to prevent large debris from being sucked into the pump. When drawing water from a pond, use a floating suction device to pump water from near the top of the pond, to prevent sand, direct and/or other debris from entering the pump and mixing tank.
2. With the irrigation machine on, turn Fill Valve to the open position. This allows the auxiliary fill pump to begin filling the main tank.
3. When the mixing tank is full, a float valve will automatically shut off the incoming water to prevent the tank from overflowing. You may then leave the Fill Valve open, for maintaining a continuous level of fluid in the machine, or you may turn off the valve and allow the mixing tank to pump down for flood and other uncontrolled irrigation applications.

#### **Caution:**

The centrifugal pump continues to turn even if the Fill Valve is closed. A small fresh water bypass tube is connected between the centrifugal pump and the main tank, allowing a very small amount of fresh water to continue circulating, to prevent the pump from overheating. **You must keep the suction hose submerged at all times during operation.**

*Failure to do so, will allow the auxiliary pump to run dry and cause the pump to burn up. Also, check the small bypass tube on a regular basis to insure that it has not become clogged by debris. **Damage resulting from running the pump dry or running too hot is not covered under the factory warranty***

For winter storage, be sure to drain all water from the pump and flush with a 50/50 mixture of water and anti-freeze.

## **Miscellaneous Conversion Data**

### **General**

1 Acre = 43,560 Square Feet  
1 Acre Foot = 43,560 Cubic Feet (ft<sup>3</sup>)

### **Water**

1 Cubic Foot (ft<sup>3</sup>) = 7.48 Gallons  
1 Acre Foot = 325,829 Gallons  
1 Acre Inch = 27,251 Gallons

1 Liter x 0.265 = Gallons  
Gallons x 3.78 = Liters  
Gallons/325,829 = Acre Feet  
Acre Feet x 325,829 = Gallons

### **Water Flow**

3 Acres x Depth (inches) = Acre Inches  
A1 x 27,152 = Total Gallons  
TG/GPM = Irrigation Hours

### **Gypsum Application Rates—Soil**

Recommended tons/acre x acres to treat/2 = Total Gypsum Requirement

TGR/Ox = Total tons gypsum needed for injecting. (x = gypsum purity percentage. i.e. 50, 75, 92, etc.)

TTG x 2,000—Total Pounds Gypsum  
 TPG/.0043=Total Gallons(TG/GPM/60  
 =Total hours of irrigation for full  
 application in shortest time.

**Gypsum Application Rates—Water**  
 Pounds Per Acre Foot/325,829= Pounds  
 Per Gallon Treatment Rate  
 Millequivalents per liter (meq/ltr x.  
 000716=Pounds Per Gallon  
 Treatment  
 PPG x GPM x 60—Pounds Per Hour  
 Application Rate  
 PPG x 325,829 = Pounds Per Acre Foot  
 Application Rate

#### Fresh Water Bypass Operation

The high pressure pump will first draw from the fresh water line. The amount of slurry injected is determined simply by setting the fresh water flow to the pump's maximum capacity, then reducing the fresh water GPM by the amount of slurry desired. The pump will then automatically withdraw the difference from the mixing tank.

**Maximum Pump Capacity-Fresh Water Flow = Net amount of gypsum slurry injected.**

**Example:** Desired slurry output is determined to be 2 GPM. Maximum pump capacity is 6 GPM.

1. With the machine running, the fresh water valve is opened until the pump's maximum GPM rate is achieved (6 GPM in this example).
2. Since the desired slurry output is 2 GPM, slowly close the fresh water valve until the fresh water flow meter reads 2 GPM *less* (6-2=4 in this example).
3. With the fresh water restricted to only 4 GPM, the positive displacement pump will automatically make up the difference by withdrawing 2 GPM from the Mixing Tank.

**Main Advantage:** Able to put more gypsum in mixing tank, less wear and tear on pump, eliminates pressure relief valve and makes adjusting desired output much simpler.

