FERTIGATION INJECTORS

Amiad Fertigation Injectors are your key to higher yields and healthier crops.

<table>
<thead>
<tr>
<th>Injection rates</th>
<th>Injector types</th>
<th>Min. operating pressure</th>
<th>Max. operating pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 600 liter/hour</td>
<td>1. hydraulic motor</td>
<td>less than 1 bar (15 psi)</td>
<td>up to 8 bar (120 psi)</td>
</tr>
<tr>
<td>(158 US gal/hour)</td>
<td>2. diaphragm pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. electric injector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**features:**

- Amiad Injectors bring accuracy and efficiency to agriculture fertigation
- Wide range of models supporting field crops, orchards, vegetables, horticulture, and greenhouses and even gardening, golf courses and municipal landscaping
- No more waste of expensive chemicals, labor and machinery
- Preventing uncontrolled chemical pollution, unnecessary soil compress and crop damage
- Simple operation and maintenance
- Excellent mechanical strength, corrosion resistance and chemical durability
How Amiad Fertilizer Injectors Work

General
Amiad’s fertilizer injectors bring accuracy and efficiency to the various needs of agriculture fertigation. As a method of applying fertilizers and chemicals via the irrigation water directly to the crop roots, the development of the fertigation method caused a giant productivity leap in modern agriculture. With the proper fertigation equipment, fertilizers can be applied together with the irrigation water so wherever the water goes the fertilizer goes with it. With fertigation, fertilizer is applied only where needed, when needed, and in the proper dose and quantity. No more waste of expensive chemicals, labor and machinery. No more uncontrolled pollution, unnecessary soil compress and crop damage.
Amiad’s fertilizer injector line is a family of various fertilizer injectors supporting fertigation needs in field crops, orchards, vegetables, horticulture and greenhouses and even in gardening, golf courses and municipal landscaping.

The Main Products in Amiad’s Fertilizer Injector Line are:
- Amiad Hydraulic Fertilizer Injector – Based on a linear hydraulic motor and powered by the hydraulic pressure of the irrigation system.
- Amiad TMB Diaphragm Injector – Based on a diaphragm-type pump and operates by the irrigation water mains.
- Amiad EFI Electric Fertilizer Injector – Based on computerized diaphragm pump and powered by AC power or by DC solar energy.
Amiad Hydraulic Fertilizer Injector

Amiad hydraulic fertilizer injector is constructed from corrosion and chemical resistance materials. The unit is resistant to nearly all known chemicals presently used in agriculture and horticulture. Amiad hydraulic fertilizer injector needs no external power to operate. Its linear hydraulic motor is powered by the hydraulic pressure of the irrigation system. The injector uses this pressure as the energy source for injecting fertilizer to the pressurized irrigation lines. Water enters the hydraulic motor through the upstream Drive-Water Port and exits the motor to the drain line through the Water-Exhaust Port. The liquid fertilizer enters the injector through the Suction Port and is injected to the downstream irrigation line through the injection line.

The water consumption of the hydraulic motor is 3 times the quantity of the chemical injected and can produce an injection rate of up to 1.4 US gpm (320 liter/hour). The Injector is supplied ready to operate. The user has to supply two ¾” manual valves, one for the Drive-water port and the other for the Injection port. A 25 mm drainage line should be also connected to the injector’s Water-exhaust port.

Controlling the Injection Rate:
Since the injection rate is proportional to the irrigation line pressure, the required injection rate can be adjusted by throttling the injection line using the ¾” manual valve on the injection port. The volume of fertilizer injected at each pulse is 33 cc; therefore the hourly rate of injected fertilizer in liter/hour is easily calculated by counting the actual number of pulses per minute and multiplying this number by two.

Amiad also supplies very accurate chemical resistant flow regulators, ranging between 2.6 US gallons (10 liter) and 21.1 US gallons (80 liter) per hour.

The Flow Regulator assembly contains interchangeable color coded flow regulators to be installed in the chemical injection line. The flow regulator assembly also contains a chemical resistant filter for preventing the flow regulators from clogging.

Controlling the Quantity of Injected Fertilizer:
The following methods are used to control the quantity of the fertilizer injected:

- Manual operation – Manually operating the cut-out unit when the desired amount of fertilizer is applied.
- Using a suction-type unit – This add-on unit contains an automatic cut-out assembly and is placed at the bottom of an intermediate fertilizer tank. The needed amount of fertilizer is then filled in the tank and the fertigation is started manually. When the level of the fertilizer reaches the base of the cut-out unit the injector operation is automatically stopped.
- Using an automatic metering valve – This valve is installed in the Drive-water line. It should be set to a quantity exactly 3 times the required amount of fertilizer to be injected. In this type of installation adding a flow regulator assembly is required.
- Computerized operation – Adding an Amiad Pulse Transmitter to the injector’s motor and a Control Valve to the Drive-water line. The pulse transmitter and the control valve can be connected to almost any type of irrigation controller or irrigation computer. The controller controls the timing, the method, and the quantity of the fertigation process.
Suction type injector
(4-01)

Gravity feed type injector
(4-02)

Duplex injector
(4-03)
## Technical Specifications

### Hydraulic and Diaphragm Injectors

<table>
<thead>
<tr>
<th>Injector</th>
<th>Hydraulic Injector</th>
<th>Duplex Injector</th>
<th>TMB 50L</th>
<th>TMB 250L</th>
<th>TMB 600L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Injection rate</td>
<td>320 l/h (84 g/h)</td>
<td>640 l/h (168 g/h)</td>
<td>50 l/h (13 g/h)</td>
<td>250 l/h (66 g/h)</td>
<td>600 l/h (158 g/h)</td>
</tr>
<tr>
<td>Minimum pressure</td>
<td>0.5 bar (7 psi)</td>
<td>0.5 bar (7 psi)</td>
<td>2 bar (30 psi)</td>
<td>8 bar (120 psi)</td>
<td>7 bar (105 psi)</td>
</tr>
<tr>
<td>Maximum pressure</td>
<td>8 bar (120 psi)</td>
<td>7 bar (105 psi)</td>
<td>5 kg (11 lb)</td>
<td>7 kg (15 lb)</td>
<td>24 kg (53 lb)</td>
</tr>
<tr>
<td>Max. working temperature</td>
<td>60°C (140°F)</td>
<td>60°C (140°F)</td>
<td>60°C (140°F)</td>
<td>60°C (140°F)</td>
<td>60°C (140°F)</td>
</tr>
<tr>
<td>Water consumption</td>
<td>3 x Injection</td>
<td>3 x Injection</td>
<td>2 x Injection</td>
<td>2 x Injection</td>
<td>2 x Injection</td>
</tr>
<tr>
<td>Connections</td>
<td>¾” &amp; 25 mm</td>
<td>¾” &amp; 25 mm</td>
<td>½”</td>
<td>½” &amp; ¾”</td>
<td>¾”</td>
</tr>
<tr>
<td>Unit weight</td>
<td>5 kg (11 lb)</td>
<td>7 kg (15 lb)</td>
<td>3.5 kg (7.7 lb)</td>
<td>12 kg (26.5 lb)</td>
<td>24 kg (53 lb)</td>
</tr>
</tbody>
</table>

### Amiad Electric Fertilizer Injectors

<table>
<thead>
<tr>
<th>Injector</th>
<th>EFI-533L</th>
<th>EFI-250L</th>
<th>EFI-60L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection method</td>
<td>Electric</td>
<td>Electric</td>
<td>Electric</td>
</tr>
<tr>
<td>Max. Injection rate</td>
<td>533 l/h (141 g/h)</td>
<td>250 l/h (66 g/h)</td>
<td>60 l/h (16 g/h)</td>
</tr>
<tr>
<td>Maximum pressure</td>
<td>60°C (90 psi)</td>
<td>60°C (90 psi)</td>
<td>60°C (90 psi)</td>
</tr>
<tr>
<td>Max. working temperature</td>
<td>60°C (90 psi)</td>
<td>60°C (90 psi)</td>
<td>60°C (90 psi)</td>
</tr>
<tr>
<td>Connections</td>
<td>¾”</td>
<td>¾”</td>
<td>¾”</td>
</tr>
<tr>
<td>Unit weight</td>
<td>7 kg (15.4 lb)</td>
<td>6.75 kg (14.9 lb)</td>
<td>6.25 kg (13.8 lb)</td>
</tr>
<tr>
<td>Construction materials</td>
<td>Pump housing: Polypropylene</td>
<td>Valves: EPDM</td>
<td>Pump housing: Polypropylene</td>
</tr>
<tr>
<td></td>
<td>Diaphragm: Santprame</td>
<td>Fasteners: St. st 316</td>
<td>Fasteners: St. st 316</td>
</tr>
<tr>
<td></td>
<td>Base: Aluminum</td>
<td>Pipes: PVC</td>
<td>Base: Aluminum</td>
</tr>
<tr>
<td></td>
<td>Protection grade: IP 65</td>
<td>Controller and pump housing: Polypropylene</td>
<td>Protection grade: IP 65</td>
</tr>
</tbody>
</table>
Amiad TMB Diaphragm Injector

Amiad TMB Diaphragm Injector is driven solely by the irrigation line water. It needs no external power to operate and its only energy source is the line pressure. The TMB injector can be operated anywhere in the field as long as the water pressure exceeds the minimum operation requirements. No pressure loss is caused in the main irrigation line. The TMB injector is constructed from corrosion and chemical resistance materials; the unit is resistant to nearly all known chemicals presently used in agriculture and horticulture. The injector comprises of two diaphragm assemblies that are connected together by a central rod. The first diaphragm assembly consists of a fertilizer chamber and a water chamber while the second assembly includes a water chamber only. Water enters to both water chambers simultaneously through the upstream Drive-water port causing the central rod to move and inject the content of the fertilizer chamber into the irrigation line through the fertilizer outlet valve at a pressure which is double the pressure of the irrigation line. When this injection stroke is completed the central rod movement is reversed, performing a suction stroke. During the suction stroke, the content of the water chamber is emptied through the drain-water port and the fertilizer chamber is re-filled with fertilizer. This two-stroke operation is constantly performed during the fertigation process; injection stroke using the water pressure energy and suction stroke using spring-powered flexible diaphragms. The water consumption of the hydraulic motor is 2 times the quantity of the chemical injected and can produce an injection rate of up to 2.6 US gpm (600 liter/hour).
The Injector is supplied ready to operate; the user has to supply two ¾” manual valves, one for the drive-water port and the other for the injection port. A 1” (25 mm) drainage line should be also connected to the injector’s water-exhaust port.

Controlling the Injection Rate:
Since the injector’s injection rate is proportional to the irrigation line pressure, the required injection rate can be adjusted by throttling the drive-water line using the ¾” manual valve of the injection port.

Controlling the Quantity of Injected Fertilizer:
The following methods are used to control the quantity of fertilizer injected:

- **Manual operation** – Manually operating the injector and switching it off when the desired amount of fertilizer is applied.
- **Computerized operation** – Adding a Micro-switch Pulse Transmitter to the injector’s central rod and a Control Valve to the drive-water line. The pulse transmitter and the control valve can be connected to almost any type of irrigation controller or irrigation computer. The controller controls the timing, the method, and the quantity of the fertigation process.
TMB 50L – Up to 50 liter/hour
(13 US gal/hour)

TMB 250L – Up to 250 liter/hour
(66 US gal/hour)

TMB 600L – Up to 600 liter/hour
(158 US gal/hour)
Amiad EFI Electric Fertilizer Injector

Amiad’s EFI Injector is a computerized fertilizer injector based on a diaphragm pump that is powered by AC power or by DC solar energy. The EFI injector delivers liquid fertilizers with outstanding 2% accuracy to wide range of fertigation applications.

Due to its innovative design, the EFI injector is easy to install and operate. Only one connection valve is needed at the irrigation main line. With its rugged construction and weather resistant case, the EFI resists nearly all known chemicals presently used in agriculture and horticulture.

The EFI Integrated Computer Raises the Performance of the Injector to New Heights:

- Stand-alone operation providing environmental protection in cases of water meter or irrigation computer failures.
- Automatic detection and release of air penetrating the fertigation line.
- Protective shutdown in case of injection line clogging or pump overload.
- Over-dosing protection in cases of irrigation controller failure.
- Built-in data logging capabilities.
- Operation of alarm signals when malfunctions are detected.
- Multi-national operation; liters and gallons.

Controlling the Injection Rate and Quantity:

The EFI injector can be operated in the following control modes:

- Stand-alone mode – the injector controls the injection rate (quantity and programmed) without being connected to external accessories.
- Linked to an irrigation controller – the injector receives operation parameters from an irrigation controller.
- Connected to a water meter – the injector adjusts the fertilizer injection rate according to the real time flow-rate of the irrigation system.

Amiad EFI Injector Specifications:

- Power supply – 110/220 V AC, 12V DC, Solar panel.
- Fluctuating irrigation line pressure – 14.5 – 70 PSI with +/- 5% accuracy.
- Constant irrigation line pressure – 14.4 – 80 PSI with +/- 2% accuracy.
- Designed and manufactured according to CE and UL standards.
- Available in three models – up to 533 l/h (141 US g/h) of injection rate.
Amiad’s Chemical and Corrosion Resistance Accessories

As a complementary line to its fertilizer injector product family, Amiad supplies high quality, chemical & corrosion resistance accessories. These products serve in wide variety of applications controlling chemicals, liquid fertilizers and water flow.

The chemical & corrosion resistance accessory line consists of 3 main products:

¾” NC Chemical Resistance Hydraulic Valve:
- With its Glass-re-enforced Polypropylene body, its 316 SS spring and its Viton seal this valve guarantees corrosion-free operation and chemical resistance to most of the chemicals presently used in the agricultural and the industrial markets.
- Amiad’s NC valve is the only ¾” chemical resistance valve that comes as a standard with two quick connectors.
- The pilot system of the valve is completely separated from the flow of liquid through the inlet and the outlet of the valve. Therefore the valve can be controlled by means of pressurized water or air, while valuable and/or corrosive chemical flows through its body.
- The normally closed feature of the valve ensures immediate closure of the valve in case the pressurized-water control tube is cut or disconnected. This prevents pollution, losses, and damage in case of a malfunctioning control system.
- The valve can be installed in any position, in one inlet and one or two outlet configuration or in two inlet and one outlet configuration.
- Amiad’s NC valve has excellent hydraulic performance with a maximum working pressure of 20 bar (290 psi) and only 1.5 bar (20 psi) of control signal needed to open against 10 bar line pressure.

¾” Chemical Resistance Non Return Valve (Check valve):
- With its Glass-re-enforced Polypropylene body and Viton seal, this device guarantees corrosion-free operation and chemical resistance to most of the chemicals presently used in the agricultural and the industrial markets.
- Amiad’s chemical resistance check valve is also a ¾” quick connector.
- The device works in any position.
- Maximum working pressure - 20 bar (290 psi).

¾” Chemical Resistance Quick Coupler:
- With its Glass-re-enforced Polypropylene body and Viton seal, this device guarantees corrosion-free operation and chemical resistance to most of the chemicals presently used in the agricultural and the industrial markets.
- Maximum working pressure - 20 bar (290 psi).