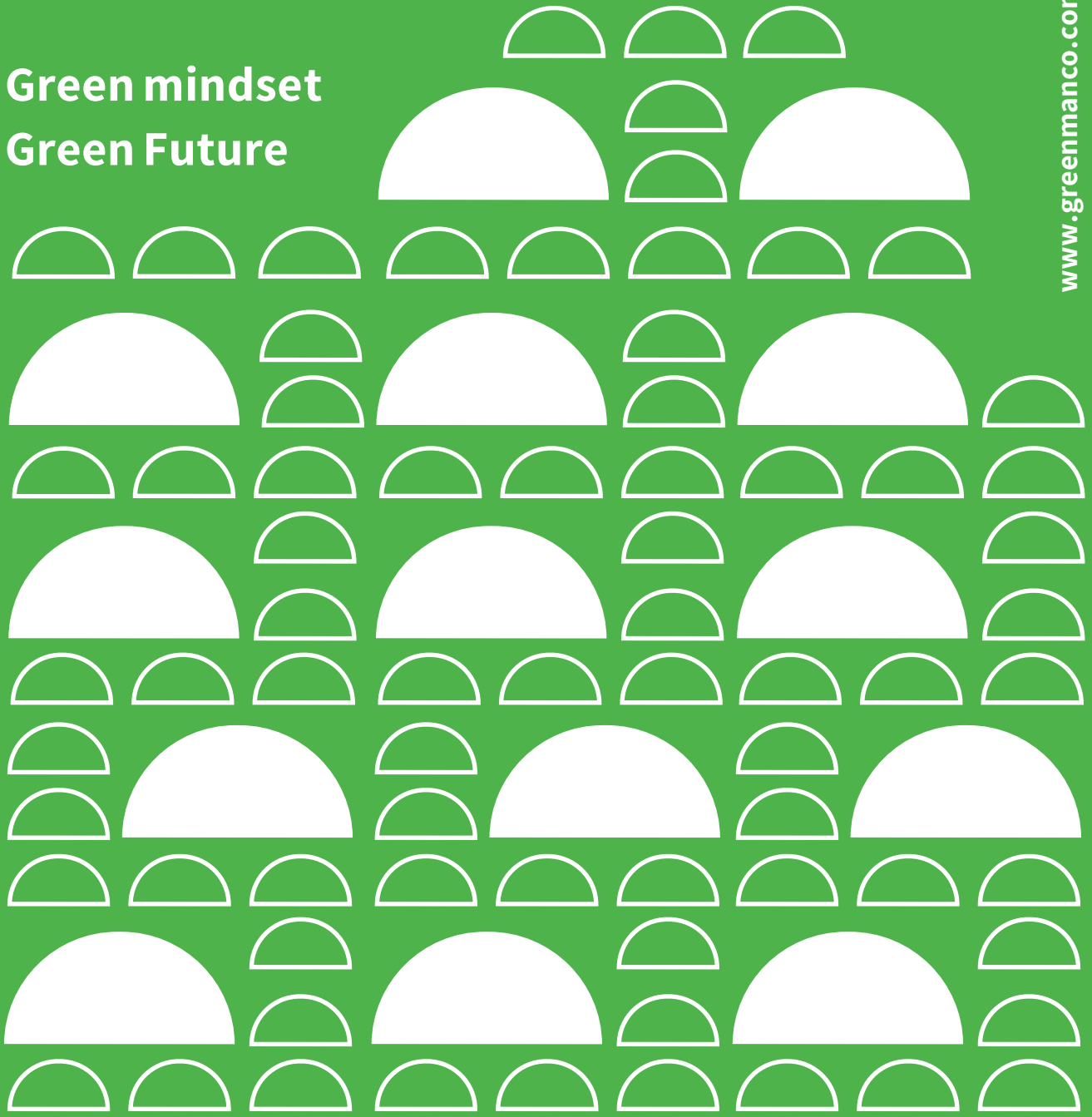


Green mindset  
Green Future



www.greenmanco.com



**GREENMAN**

Green mindset, green future



Greenman General Catalogue

powered by **PACKMAN** industrial group



## ABOUT **Greenman**

Packman Company started its activity as a private corporation by five graduates from Technical Faculty of Tehran University with the aim of improving the level of technical knowledge in the country in 1975. Packman Company has always been a leader in country's industries with a strong background in the direction of producing equipment and providing services in the field of technical knowledge in various industries such as power plants, petrochemicals and oil, hospitals, construction, agriculture, etc., relying on their specialist forces ability.

Currently, there is a special opportunity for development of the agricultural industry in the country due to the climatic and geographical situation of Iran and the need for non-oil exports.

The GREENMAN sub-set has been established as a new design for agricultural industrial systems due to the traditional growth of the agricultural industry, which has led to waste of water and energy resources of the country, and since Packman Company is always ready to serve in industry and agriculture sector with the best quality.

GREENMAN is proud to be present in all areas of engineering design and equipment manufacturing alongside the industry's activists, relying on its capabilities in engineering, research and development, product production and process optimization.

These areas are:

- Heating, cooling, ventilation and humidity facilities
- Water treatment and irrigation facilities
- CO2 injection system
- Climate control system, power supply and lighting
- Energy systems and optimal design
- Cold storage and product storage



### What Greeman does

GREENMAN specializes in agriculture and industrial greenhouses. This company is proud to cooperate with a group of expert and experienced engineers in fields of engineering and agriculture, considering the importance and delicacy of greenhouse issues.

### Some of the engineering services provided by GREENMAN include:

- Design and modeling of cooling, heating and air conditioning systems with specialized greenhouse standards and using TRNSYS, ANSYS FLUENT and ENERGYPLUS software and...
- Designing all parts of the CO<sub>2</sub> dosing system According to greenhouse cultivation and construction conditions.
- Designing new greenhouses with special and energy-oriented systems with the help of TRNSYS, ANSYS FLUENT and proprietary developed code at GREENMAN.
- Design of RO water purification system and fertilizer and chemical dosing package
- D3 modeling and providing piping maps of greenhouse facilities





# List of Greenhouse Products Group **Greenman**

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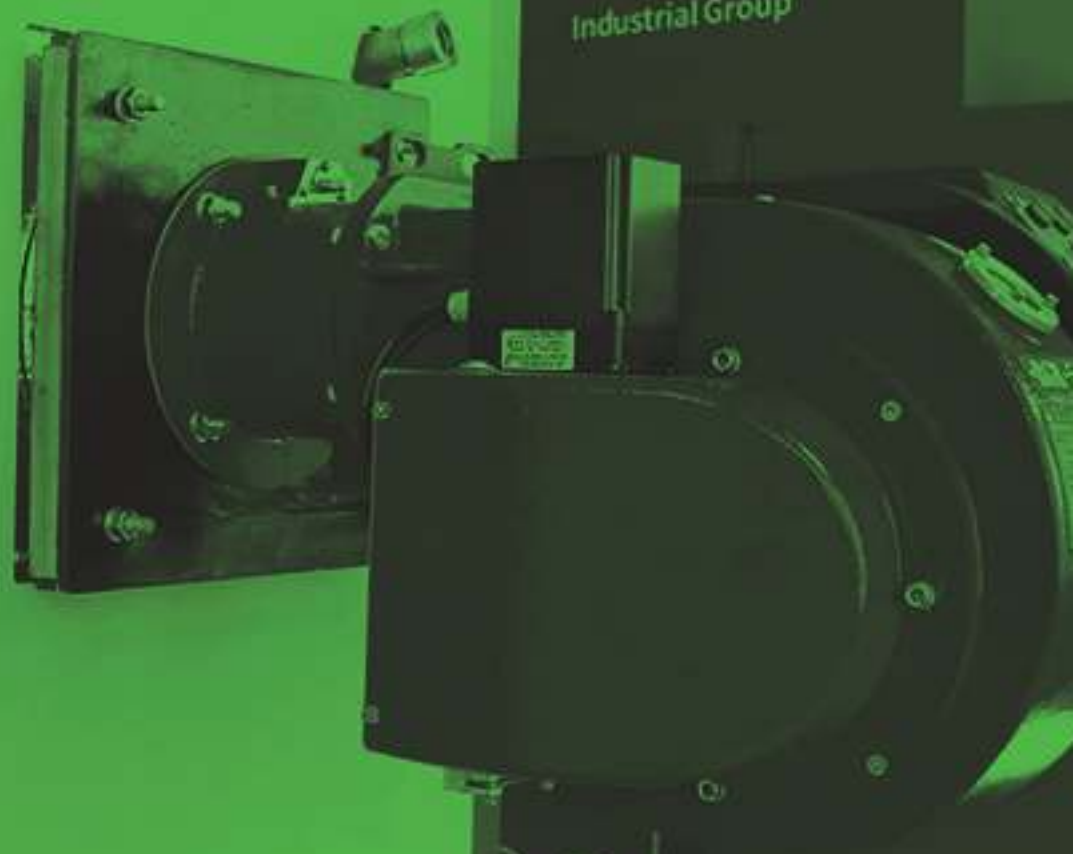
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HEATCO  
PACKMAN 50  
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**PACKMAN**  
Industrial Group





## HEATCO

### Hot water Boiler With The Ability To CO<sub>2</sub> Injection

Maintaining the plant's comfort temperature is one of the most important issues in the optimal growth of greenhouse plants. For this purpose, various heat and cold production systems have been designed for the greenhouse. The central heating method is one of the most powerful methods for heating an industrial greenhouse unit. Greenman Company is a manufacturer of central heating boilers, equipped with thermal shock protection system, anti-condensate corrosion system, redesigned combustion chamber for carbon dioxide injection, Lonax burner with the lowest amount of production emissions and all electromechanical modular in various capacities. 100 kW to 20 MW capacity diversity allows the use of these boilers in the central heating system of any greenhouse. These boilers can be well connected with under floor heating system and CO<sub>2</sub> injection system and not be damaged by thermal shocks caused by long distances.

#### Advantage

The main specifications of the burner and central heating boiler package are:

- Design based on standard designs include three-pass, wet back and high efficiency.
- The redesigned system to boiler protection from shocks caused by asymmetry of the thermal profile, changing the greenhouse heating requirement, Dynamic shock caused by off-season operation in order to CO<sub>2</sub> injection, heat exchange with a continuous logarithmic temperature difference compared to the path of combustion products to reduce the amount of pollution.
- Manufacture of hot water boilers according to EN 12953 standard
- Use of High Temperature Steel (17MN) and DIN17175 35.8 ST-European tube.
- Welding in accordance with WPS and PQR approved by reputable inspection companies.
- Fully automatic submerged welding with preheated A.W.S.E7018 electrodes.



- Stainless steel coating and 3-inch insulation with rock wool
- National standard plate of Iran
- Ability to monitor the buyer on the material of sheets, tubes and electrodes used during construction
- Practical supervision by the standard representative of Iran Quality and Standard Inspection Company



Capacity (kw)	Unit	100-20,000
<b>Technical Data</b>		
Pressure	bar	6-12
Temperature	°C	90
Efficiency	-	92%
Fluid	-	Water



# RECO





## RECO Combustion Products Condenser

Use of energy in the greenhouse cycle and new designs can increase productivity and return capital to the production cycle. The need to use carbon dioxide in combustion products can be an important matter considering the importance of CO<sub>2</sub> injection in increasing the efficiency of the production process in the greenhouse. There are certain requirements for the use of CO<sub>2</sub> in combustion products. Reducing the combustion products temperature is one of these requirements.

In addition to facilitating gas conditions for injection into the greenhouse, this work causes the return of thermal energy to the greenhouse cycle. A water to smoke exchanger is used for this purpose.



Thermal Capacity (kw)	Unit	50-1180
Technical Data		
Pressure	bar	6-10
Smoke hot side temperature	°C	60-240
Material	-	SS316L



# PLANTA





## PLANTA

### Protective Monitoring System And Carbon Dioxide Dosing

Pollutants such as NOx and CO are the highest risk in the method of carbon dioxide extraction from combustion products. In addition to harming humans, these pollutants cause widespread damage to greenhouse products. Also, in addition to the destruction of dosing lines, the high temperature of the combustion products causes damage to the plants on the discharge route. A smart brain with the task of monitoring, checking, measuring and correcting the above parameters is essential to use the carbon dioxide extraction package.



Capacity (CFM)	Unit	300-4500
Technical Data		
Temperature	°C	60
Material	-	SS316L
Equipment	-	Equipped with air mixing damper, equipped with NOX and CO sensors



# OPTICO





## OPTICO Heating Package And Carbon Dioxide Injection For Small Greenhouses

Greenhouse owners need a system that can simultaneously provide thermal energy for a small industrial greenhouse and supply its carbon dioxide and at the same time be affordable. Actually OPTICO is a CO<sub>2</sub> injection package consisting of a condensing boiler and a carbon dioxide dosing device which directly sends boiler exhaust fumes into the greenhouse for CO<sub>2</sub> injection. In addition to reducing the occupied space and initial cost, OPTICO has improved communication and coordination by substituting a condensing boiler for the three-pass boiler and smoke condenser assembly.



Capacity (kw)	Unit	100-600
Technical Data		
Pressure	bar	4-8
Temperature	°C	80
Material	-	98%
Efficiency	-	SS316L



# TRANSHEAT



## TRANSHEAT Buffer Tank To Support The CO<sub>2</sub> Injection System


Thermal energy storage buffer tank is necessary to prevent the boiler thermal energy waste during off-season CO<sub>2</sub> injection, increasing the greenhouse reliability coefficient in the supply of heating water and thermal energy storage for several hours.



Total volume (m <sup>3</sup> )	Unit	100-4000
Technical Data		
Pressure	bar	Atmospheric
Height	m	6-12



# WINDA

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## WINDA

### Air Cooler To Connect The Combustion Products Condenser

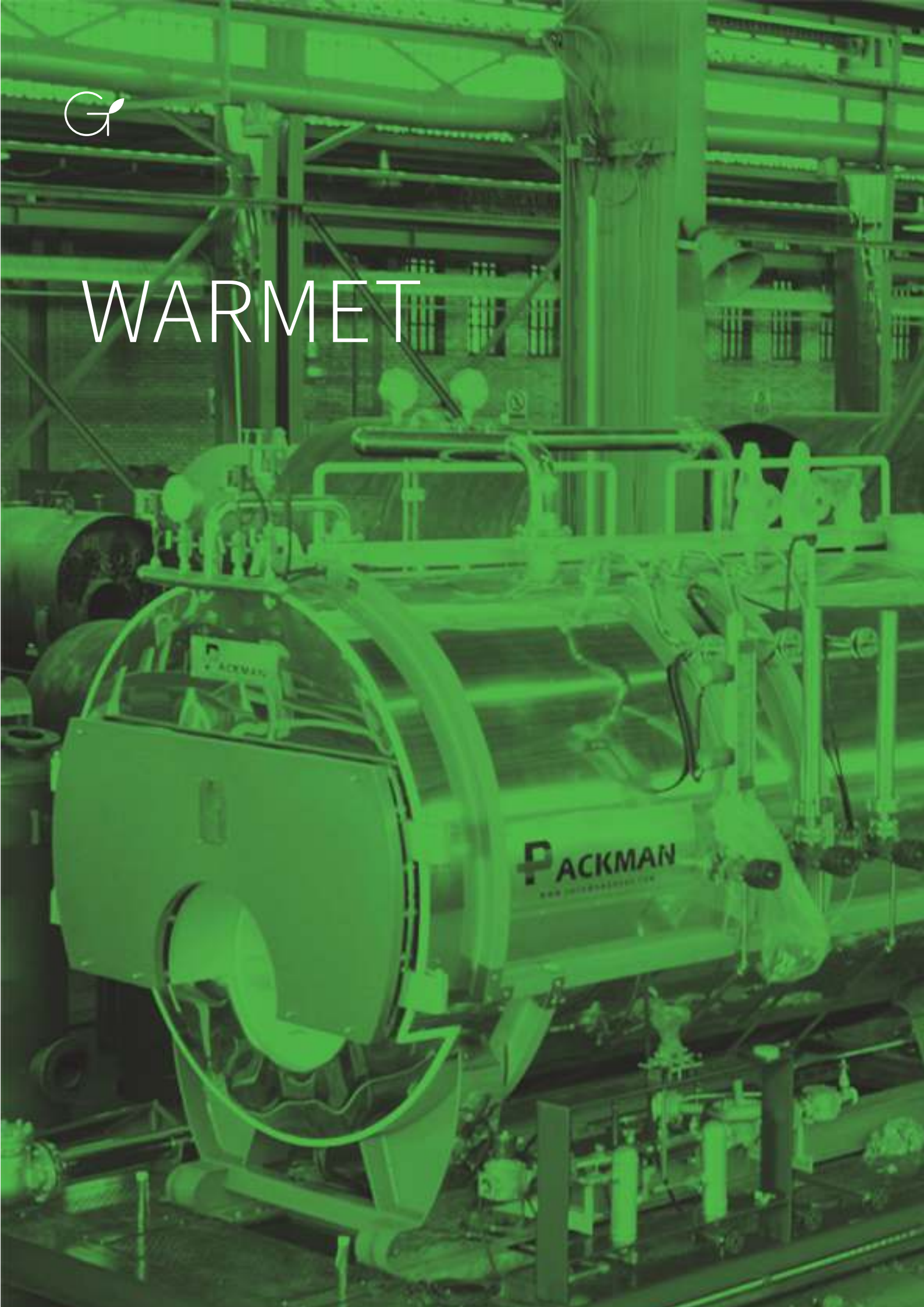
In CO<sub>2</sub> injection system, the buffer tank is used to dissipate the boiler heat when necessary. The buffer tank stored heat is used for heating the greenhouse during the night. In some cases, the night heating load is not able to fully discharge the buffer tank. In this way, the air cooler is used to dissipate the heat of the buffer tank. Using an air cooler together with a buffer tank increases the number of possible days for CO<sub>2</sub> injection. Air cooler is an air cooler with a fan, which reduces the temperature of the water due to the contact of the air with the pipes containing hot water in the ambient temperature. Normally, finned tubes are used to increase the efficiency and reduce the volume of the device.



Capacity	Unit	According to the customer's design and request
Technical Data		
Pressure	bar	0-100
Temperature	°C	-40 - +250
Material	-	Carbon steel/stainless steel finned aluminum
Efficiency	-	%98



# WARMET



## WARMET Steam Package, Equipped With Control Equipment To Adjust Humidity And Temperature

In order to simultaneously increase humidity and temperature, some cultivations need direct injection of steam. A steam boiler is used for this purpose. The use of steam boilers requires initial costs for installation and operation by specialists. An automatic set in the form of a package is necessary for the greenhouse industry.



Capacity (kg/hr)	Unit	100-300
Technical Data		
Pressure	bar	1-10
Equipment	-	Pressure sensor, display, level controller, valves and pumps, temperature sensor, control system



# FLORO



## FLORO Water Treatment Package Includes Pre-Treatment, RO System And Post-Treatment

There is a defined standard to irrigation water for greenhouse plants. Also, it is necessary to obtain water with low salts, considering the export aspect and also the protection of the cultivation bed. Agricultural water in most cities of Iran needs to be purified and change the compounds dissolved in the water due to the geographical conditions and the desert nature of most of the country's regions. GREENMAN uses reverse osmosis (RO) desalination devices to reduce the amount of dissolved salts in water. This device controls the amount of solutes, color and odor, bacteria, pH and other parameters by using pre-treatment, reverse osmosis treatment and post-treatment according to the need.



Discharge Capacity (m <sup>3</sup> /hr)	Unit	300-4500
Technical Data		
Greenhouse Area	h	1-10
Max. Input TDS	ppm	2000
Min. Input TDS	ppm	100
Description	-	The analysis will help in the optimal design of the device



# GROTEM





## GROTEM Irrigation And Feeding Water Pre-Heating Package

Plants irrigate with cold water reduces and even stops their growth. The ideal water temperature for irrigation is 17-22 degrees Celsius. It is necessary to heat the irrigation water to the desired temperature before storing it and starting irrigation in cold seasons. The irrigation preheat package is equipped with a boiler, heat exchanger, storage tank, control equipment and precise instruments and equipment to display the status of the equipment that keeps the irrigation water warm in the temperature range of 17-22 degrees.



Thermal Capacity (kw)	Unit	100-500
Technical Data		
Pressure	bar	6-10
Temperature	°C	80
Efficiency	-	86%
Fluid in transit	-	Water
Description	-	With the control system



# FERMIN







## **FERMIN**

### **Feeding Control And Fertilizer Dosing Package**

Plants need different amounts of nutrients and water in different periods of growth and productivity. In addition to increasing productivity and protecting plants, an automatic irrigation and fertilization system reduces the costs of traditional fertilizer use. GREENMAN's fertilizer dosing system is equipped with a precise control panel and various sensors. It also adds plant nutrients to irrigation water in PVC tanks.





# CLIMA





## CLIMA

### Heating Control Panel, Carbon Dioxide, Buffer Tank And Energy Storage

Due to the large space and the complexity of environmental and internal factors in industrial greenhouses, the possibility of controlling the optimal conditions of the plant by a human operator is greatly reduced, and as a result, it is difficult to ensure product quality and plant safety. The smart greenhouse is a revolution in the agricultural industry. It increases the conditions and possibility of industrial agriculture through sensors and actuators using greenhouse climate control system and automation system. The greenhouse climate control device is a programmable and flexible monitoring and control system that measures and controls greenhouse variables including temperature, humidity, light, water and gases in the greenhouse by relevant sensors.

After receiving the information, the central controller calculates the amount of changes required by the system and sends the necessary commands to change the status of the operators so that the desired variable changes optimally. Also, this device is able to show the status of the greenhouse and input and output information on the screen and record the information on the memory.



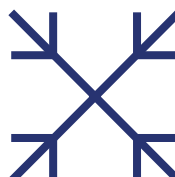
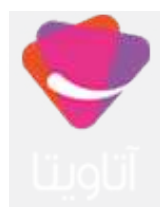


### Advantage

- Ease of greenhouse climate management
- Energy management and fuel consumption reduction
- Increasing the speed and accuracy and minimizing the human error of the workforce
- Time processing of information and timely change of operators
- Control of soil moisture and water temperature
- Light and gas concentration (CO<sub>2</sub>) control
- Irrigation and fertilization parameters control
- Cooling and heating control
- Lighting, adjusting fans, ventilators and central ventilation system
- Increase the product quality and speed



# Some Of Our CUSTOMERS





# PACKMAN GROUP

## History

The Packman Company was founded in February 1975, and was soon afterwards registered in companies Registration Office. In early years the Packman construction and service branch focused on building installations. Different mega power plants were built by cooperating with Brown Boveri and Asseck companies in 1976.

The company started its official activities in construction of High-Pressure Vessels such as Hot-Water Boilers, Steam Boilers, Storage Tanks, Softeners and Heat Exchangers from 1984.

Packman Company is one of the first companies which supplied the high quality and standard hot water boilers to the customers.

Packman has exported its products to countries such as Uzbekistan, United Arab Emirates and other countries in the Middle East. It is one of the largest producers of hot-water and steam boilers in the Middle East.

Now we are proud to announce that the Packman industrial group has five major sub-brands that have product titles in all field of HVAC equipment and engineering services, and we do not know this success except with the help and support of our customers.

1. Construction Services Industry Association
2. Industry Association
3. Construction Companies' Syndicate
4. Technical Department Association
5. Mechanical Engineering Association
6. Engineering Standard Association

### Departements:

#### Sales Deps:

- ∩ Power Plant & Petrochemical
- ∩ Industrial
- ∩ Hospitally Service
- ∩ Commercial & Residential
- ∩ Sport Complex & Pool

#### Technical Deps:

- ≡ Manufacturing R&D
- ≡ Innovation Center
- ≡ EPC Execute Unit
- ≡ Product Develop Unit
- ≡ Sales Engineering Dep.

#### Others:

- ≈ After Sales Service
- ≈ Project Control
- ≈ Financial Office
- ≈ Commercial Office
- ≈ Marketing Department



# PACKMAN GROUP Brands



**PACKMAN**  
Industrial Group

Designer & manufacturer of Condensing, Hot Water, Steam, Hot Oil & Waste Heat Boilers, Heat Exchangers, Autoclave Pressure & Storage Vessels & etc



**GREENMAN**  
Green mindset, green future

Engineering & Designing Commercial Greenhouse Plant, CO2 Dosing System, Flue gas Condenser & Special HVAC Systems, Sustainable Agriculture & etc



**ROMAN**  
Water solution

Designer & manufacturer Reverse Osmosis Plant & Package, Water Treatment, Softener & Filters and Chemical Dosing Systems & etc



**RAADMAN**  
a look to the future

Designer & manufacturer of Industrial Mono & Dual Block Gas, LPG, Light & Heavy Oil Burners, Premixed & Postmixed Burners, Watertube burners, Process burners, Special application burners & Combustion Solutions & etc



**CHILLMAN**  
Coolest hvac around

Designer & manufacturer of Air & Water Cooled Chillers, Air Handling Units, Fancoil, HVAC Equipment, Cold Storage Room & etc



1. Isfahan Factory



2. Vilashahr Factory



3. Parand Factory



4. Parand (2) Factory



5. Bonyad Factory



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