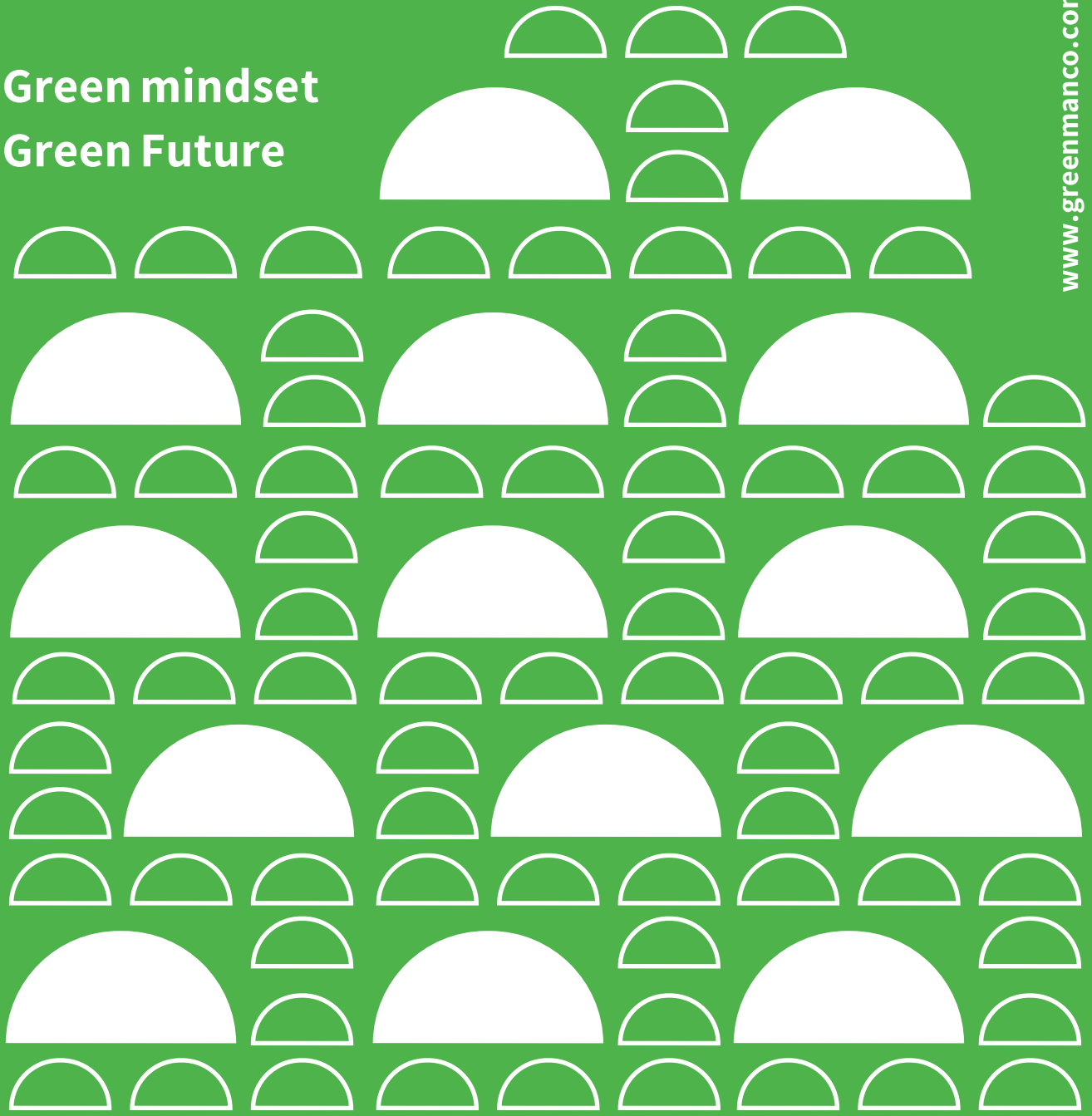


**Green mindset  
Green Future**



[www.greenmanco.com](http://www.greenmanco.com)



**GREENMAN**

Green mindset, green future



**RECO**

**Flue Gas Condenser**

powered by **PACKMAN** industrial group





# ABOUT GREENMAN





## About Greenman

Packman Company started its activity by five graduates of Technical Faculty of Tehran University with the aim of improving the level of technical knowledge of the country in 1975. With a strong background in equipment production and service provision, Packman Company has been engaged in the field of technical knowledge in various industries such as power plant, petrochemical and oil, hospital, construction, agriculture, etc. Relying on the capabilities of its expert forces, this company has always been a leader among the industries of the country.

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

Considering the traditional growth of the agricultural industry, which causes the country's water storages and energy resources to be wasted, this group has entered into the design of agricultural industrial systems, and in this regard, GREENMAN has been established as a new department. GREENMAN is proud to be present in all fields of engineering design and equipment manufacturing by relying on its capabilities in engineering, research and development, product production and process optimization.

### **Our field of activity include the following:**

- Heating, cooling, ventilation and humidity facilities
- Water treatment and irrigation facilities
- Carbon dioxide enrichment system
- Energy systems and optimal design
- Climate control system, electrical engineering and artificial lighting
- Cold storage and product storage





## About Greenman

GREENMAN specializes in agriculture and industrial greenhouses. Considering the importance and delicacy of greenhouse issues, this group is proud to cooperate with a group of expert and experienced engineers in the fields of engineering and agriculture. Some of the engineering services provided by GREENMAN are as follows:

- Design and modeling of cooling, heating and air conditioning systems with specialized greenhouse standards using ANSYS FLUENT, TRNSYS and ENERGYPLUS software and...
- Designing all parts of CO<sub>2</sub> dosing system according to the conditions of greenhouse cultivation and structure
- New greenhouses design with special and energy-optimized systems using ANSYS FLUENT, TRNSYS software and the home made code developed exclusively in GREENMAN
- RO water treatment system design and fertilizer and chemical dosing package
- 3D modeling and presentation of piping maps for greenhouse facilities





# RECO







## **RECO** **Flue Gas condenser**

The use of energy in the greenhouse cycle and new designs can increase productivity and return capital to the production cycle. It is important to use carbon dioxide in combustion products, considering the importance of carbon dioxide dosing in increasing production efficiency in the greenhouse.

There are certain requirements for the use of carbon dioxide in combustion products. Reducing the temperature of combustion products 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 flue gas exchanger is used to do this (This exchanger is called a flue gas condenser in some references).



www.greenmanco.com



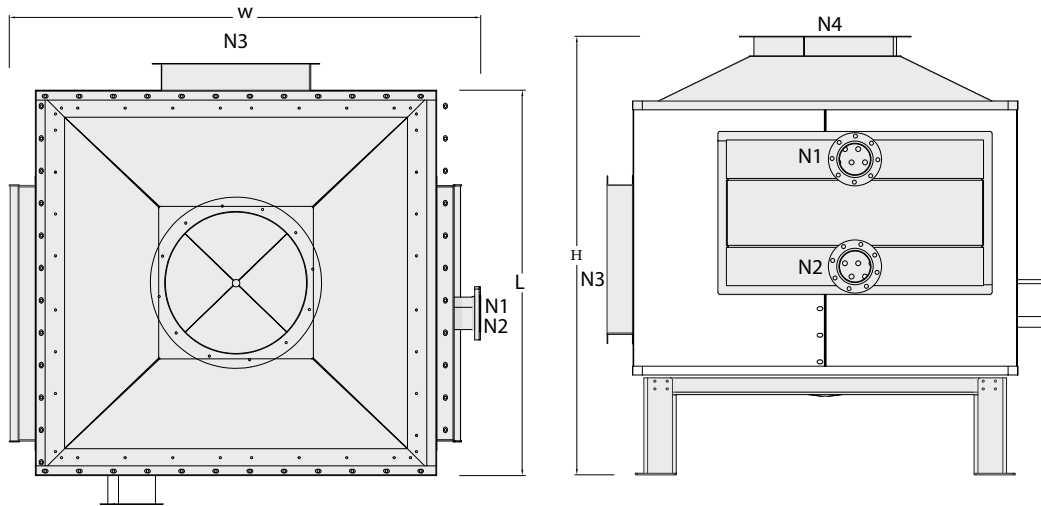
The flue gas condenser produced by GREENMANN under the RECO brand is a type of gas-to-water exchanger that cools the gases resulting from boiler combustion to inject carbon dioxide into the greenhouse.

RECO equipment is produced in different capacities. 20 kW to 1200 kW is a range that covers all necessary capacities.

It should be mentioned that the possibility of increasing the concentration of carbon dioxide in the greenhouse is reduced and the desired maximum efficiency cannot be achieved without the use of RECO equipment and smoke cooling in the indirect heat exchange method.

RECO produced in GREENMAN is designed for a flue gas temperature of maximum 210 degrees suitable for greenhouse HEATCO boilers. Temperature, pressure and inlet and outlet nozzles are installed on the body based on different applications. Stainless steel material is used in all parts that are in contact with smoke. Carbon steel materials are also used for parts that are not connected to flue gas. Raw materials and manufacturing methods are under quality control to produce safe and reliable products. The exchanger is the main part, which is designed and manufactured according to the design temperatures, the available space and the optimization of the geometric characteristics of the pipes and fins in the technical unit of GREENMAN.





RECO	Unit	RECO 0.75	RECO 1	RECO 1.5	RECO 2	RECO 2.5	RECO 3	RECO 4
<b>Technical Specifications</b>								
Net capacity of the boiler	KW	750	1000	1500	2000	2500	3000	4000
Design capacity	KW	78	101	152	204	256	305	408
Water mass flow of	kg/s	3	3	5	6	8	10	13.5
Water inlet size (N1)	inch	2	2	3	3	3	4	4
Flue gas inlet size (N3)	mm	400*400	400*400	400*400	500*500	500*500	600*600	700*700
Chimney outlet size (N4)	mm	307	377	377	377	377	442	551

RECO	Unit	RECO 5	RECO 6	RECO 7	RECO 8	RECO 9	RECO 10	RECO 12
<b>Technical Specifications</b>								
Net capacity of the boiler	KW	5000	6000	7000	8000	9000	10000	12000
Design capacity	KW	509	612	713	816	916	1020	1220
Water mass flow of	kg/s	15	18	21	24	26	30	37
Water inlet size (N1)	inch	4	5	5	5	5	6	6
Flue gas inlet size (N3)	mm	800*800	800*800	800*800	900*900	900*900	900*900	900*900
Chimney outlet size (N4)	mm	551	551	600	653	757	757	757

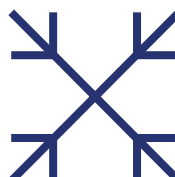
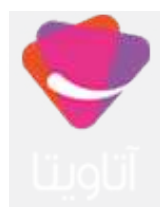
Inlet gas temperature: 180 °C  
 Pipe diameter: 31.45 mm  
 Inlet water temperature: 30 °C

Outlet gas temperature: 50 °C  
 Pipe thickness: 1.651 mm  
 Outlet water temperature: 40 °C





# 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



# SOME OF Certificates are



www.greenmanco.com





# Green mindset Green future



**PACKMAN**  
Industrial Group



**GREENMAN**  
Green mindset, green future



**ROMAN**  
Water solution



**RAADMAN**  
a look to the future



**CHILLMAN**  
Coolest hvac around

+9821-42362

[www.greenmanco.com](http://www.greenmanco.com)

No 14, 10th Alley, Beyhaghi St, Argentina Sq, Tehran, Iran