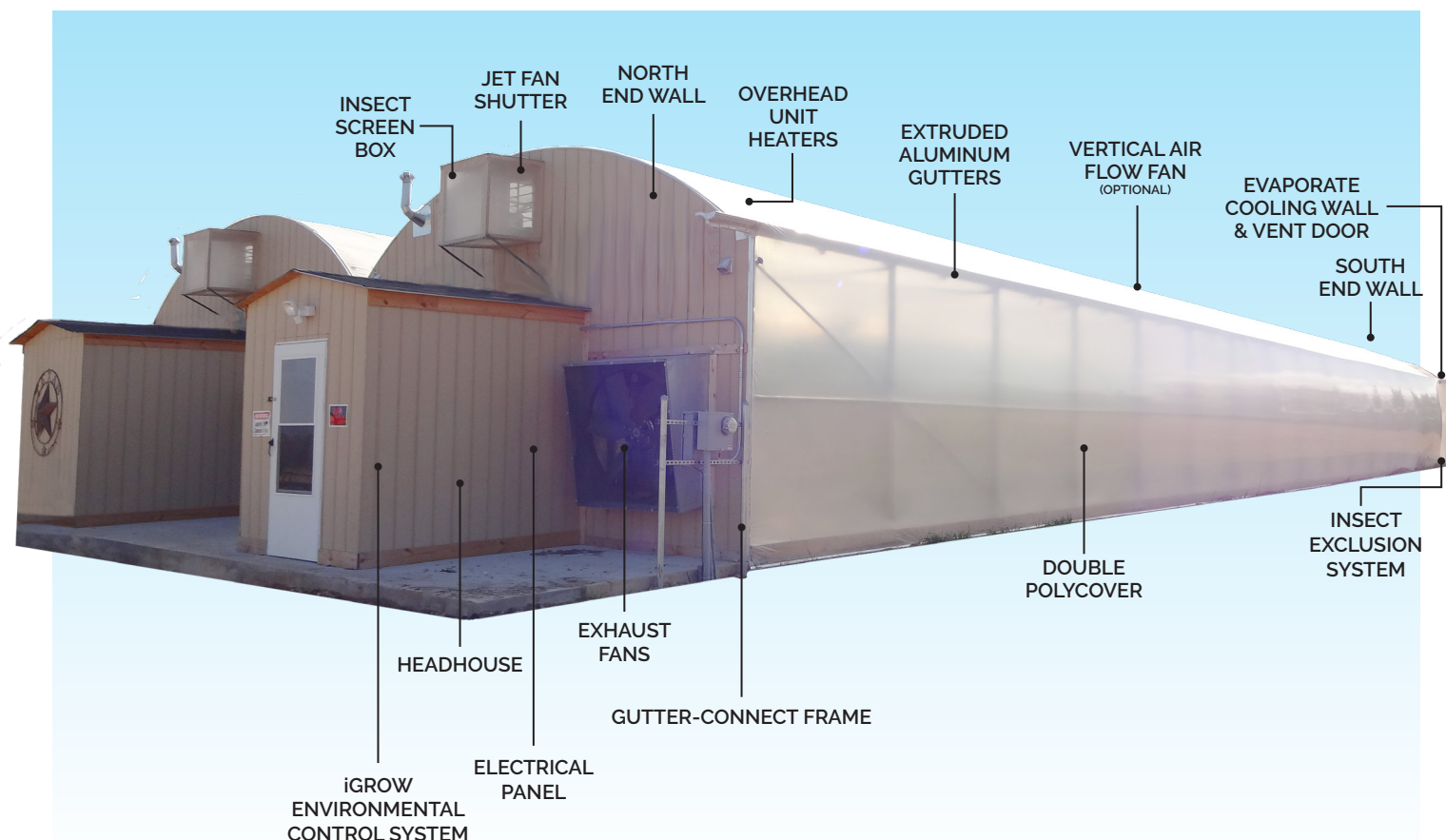


GUTTER-CONNECT GREENHOUSE PACKAGE



CropKing specializes in the sale and technical assistance of hydroponic growing systems, and our gutter-connect greenhouses are an essential component of these hydroponic packages. Our frame design and equipment selection were chosen to optimize crop production from the NFT and Bato Bucket systems.

Commercial growers throughout the US and beyond have seen high yields and commercial success through the use of our hydroponic system packages.

Call your sales rep at **(330) 302-4203** or visit **CropKing.com** for more information.

WHAT MAKES A CROPKING HYDROPONIC GREENHOUSE DIFFERENT?

THE SHORT ANSWER IS CROPKING.

CropKing has been in the business of manufacturing greenhouses and hydroponic systems for over 35 years. This experience and knowledge is reflected in the structures that we sell and the technical support we offer to our customers.

In its most basic form, a greenhouse is simply bent steel and plastic. A hydroponic greenhouse system includes the addition of plumbing, fertigation and environmental controls. We have always used the highest quality components possible, knowing that

not all steel and plastic used in greenhouse construction are identical.

Increased demand for greenhouse vegetable production systems and supporting supplies has led to several companies offering similar products to those that CropKing has offered for the last 35 years.

The real difference lies in the knowledge of our team, the decades of experience in soilless vegetable systems and the impact on your structures, systems, and overall success that this strong background provides.

- **STRUCTURE DESIGNED FOR STRENGTH:** CropKing's gutter connected greenhouses are designed with a maximum of 20 lb snow and 90 mph wind loads, with higher loads available for climates where they are required. CropKing structures use only American made, triple galvanized Gatorshield steel from Allied Tube. Additionally, CropKing only uses extruded aluminum gutters because they do not rust and are stronger than steel gutters. Our aluminum gutters support enough weight to allow easy walking access to your greenhouse roof. Aluminum transfers heat better than steel which will aid snow melt in your gutters. CropKing aluminum gutter has the profile extruded directly into the gutter for attaching the poly roof film layers.
- **HIGH QUALITY AMERICAN MADE COOLING:** CropKing uses American Coolair (a superior vendor in the greenhouse industry) for its cooling system products. The fans have aluminum shutters rather than plastic, which seal better and last longer in the elements. The fans operate at a lower RPM for more efficiency and quieter operation.
- **COMPLETED GROWING SYSTEMS:** When you spend thousands of dollars on a hydroponic growing system we don't feel you should have to spend hundreds of hours drilling your drain line plumbing or your top covers, so we include them pre-drilled and pre-punched for your convenience. CropKing includes a back-up feed pump with the NFT system to avoid unnecessary interruption.
- **TOP-NOTCH TECHNICAL SUPPORT:** In greenhouse production, the grower's opportunity for success relies not only on the growing system and structure, but also on their access to knowledge assistance. At CropKing, our horticultural and technical team has the experience in soilless systems and vegetable crops to aid growers in avoiding and addressing issues with their crops. There really is no substitute for accessible, experienced assistance.

CropKing strives to not only sell greenhouses but develop relationships with our customers to ensure their success. Through research, product development and open communication we have developed some of the most successful growers in the industry.

THE CROPKING GUTTER-CONNECTED GREENHOUSE

is a series of 22' wide bays connected by an aluminum gutter. The structure can be expanded by adding additional bays as your business grows. Our standard single bay measures 128 ft. long, so 16 bays (352 ft. wide) equal approximately one acre. The column posts, which support the gutter, are spaced 8' on center.



This structure has a 90 mph wind load rating, which is increased to 130 mph when the cover is removed. The frame has a 20 lb. snow load when the greenhouse is heated to a minimum of 50°F. Arches are on 4' centers and three runs of purlins attached with cross-connectors and pipe straps are along the length of the structure. The sidewalls and endwalls are connected with cross-connectors and wind braces. The structure is made from Gatorshield galvanized (rust resistant) structural steel with a minimum of 50,000 psi yield and 55,000 psi tensile strength. The arches are 1.66" steel, and the bottom chords and purlins are 1.315" steel.

- 10 ft. high extruded aluminum gutter (necessary for taller vine crops)
 - 10 ft. column post height, spaced every 8 ft.
 - 2.5" wide square steel column posts
 - 1.66" diameter 14GA frame members
 - Members are attached using aluminum cross-connectors, pipe straps, and brace bands
- 8 ft. high gutter (usually used for shorter leaf type crops)
 - 8 ft. column post height, spaced every 8 ft.
 - 1.90" diameter 13GA column post
 - 1.66" diameter 14GA frame members
 - Members are attached using aluminum cross-connectors, pipe straps, and brace bands

THE EXTRUDED ALUMINUM GUTTERS

do not rust like steel gutters and are bracketed to each column post to secure the spanning arches.



The gutter is 8" wide, which is wide enough for a person to walk along the gutter during polycover installation. The extrusion contains a quicklock base so the quicklock cap can be locked in place to secure the polycover. This polylock package makes the installation and replacement of the polycovers simple.

THE DOUBLE POLYCOVER

greenhouse film serves several purposes:

- Prevents the entry of pests and diseases
- Protects the crop from strong winds and precipitation
- Retains heat during the winter months

The main body of the greenhouse is covered with two layers of 6mil greenhouse plastic. The top layer is a UV-A film and the inner cover is an IR film. IR film can deliver year-round savings by preventing infrared radiation (heat) from escaping during the winter and it blocks infrared radiation during the summer, which reduces the amount of ventilation required. Air is pumped between the layers of poly with an inflation fan kit to help add insulation and keep the covers taut so they do not wear out from flapping in the wind.



THE NORTH END WALL is typically framed using locally purchased, heat treated 2"x 4" or 2" x 6" lumber and then covered with the grower's choice of material, such as T-111 barn siding. There is very little sunshine that reaches the crop from the north end of the greenhouse, so covering it with a solid material and insulating it saves on heating costs. Alternatively, polycarbonate and steel end wall framing can be purchased from CropKing.



THE SOUTH END WALL is framed using locally purchased heat-treated 2"x4" or 2" x 6" lumber and covered in twin-wall polycarbonate that is part of the greenhouse covering package. Alternatively, the south endwall can be framed with steel purchased from CropKing, but we often find it is more economical for the grower to frame the endwalls in locally purchased, heat-treated lumber.



THE HEADHOUSE is constructed from local building materials, which adds a double entrance to the greenhouse. This is the first line of defense against pests and cold air during the winter months. A head house is a great location to place the injection system, the electrical panel, and computer.

THE INSECT EXCLUSION SYSTEM extends the greenhouse frame 8' past the south endwall and is framed in thrip screen material. Thrip screen, with a mesh of 50 (0.0117 inch opening) is fine enough to prevent the entry of thrips (1 mm long or less, 0.0394 inch), which are typically the smallest greenhouse pest, thereby also excluding any larger greenhouse pest from entering the greenhouse when the intake door opens up on the evaporative cooling (wet wall). The insect exclusion package also includes an entrance door allowing rear access to the vent door and wet wall, a second entrance door into the head house, and an air curtain to prevent pests from entering into the head house. This package also includes a screened box to cover the intake of the gable vent fan



THE OVERHEAD UNIT HEATERS are manufactured by Modine, a well-known name in the greenhouse industry. These heaters are dependable and have fewer maintenance issues than alternative heaters. They were designed to function efficiently in the humid air of a greenhouse. CropKing sizes them based on the coldest temperature in your area. The primary heater (the one that runs most of the time) is a 93% efficient heater. The backup heater, a less expensive 80% efficient heater, is designed to only come on if the primary heater cannot handle the load.

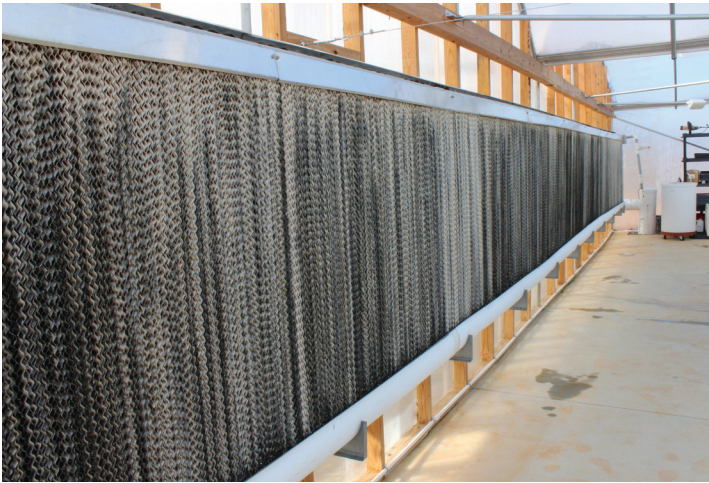


THE MOTORIZED GABLE FAN AND SHUTTER brings outside air into the top of the greenhouse for de-humidification and cooling during the winter months. Located above the entrance door in each bay, the gable fan pulls air into the top of the greenhouse, which is picked up by the vertical airflow fans (VAFs), and the VAFs disperse the air throughout the greenhouse. Even in the month of January when it is very, very cold outside, sunshine on the greenhouse can raise temperatures high enough to pose a threat to the crops. However, it is not good to open up the large evaporative cooling doors in the back of the greenhouse and shock the plants with a blast of frigid air. Allowing small amounts of cold air into the top of the greenhouse through the gable fan and blending it in gently with the warm moist air in the greenhouse works well and reduces shock to the crops.

THE VAF (VERTICAL AIR FLOW) system circulates air in a vertical vortex to prevent thermal and humidity stratification. Extensive side-by-side research at CropKing resulted in significant improvements in crop quality and growth by using a vertical airflow system rather than a convection tube to move the air from the heaters and gable fans down the full length of the greenhouse. We also saw a marked improvement in powdery mildew control with the VAF fans. Two of these VAF fans are located in each bay of the greenhouse.



THE EXHAUST FANS are manufactured by American CoolAir, a renowned manufacturer of agricultural fans. 2 exhaust fans with slope wall housing are located on the north endwall of each bay. Air is pulled from the south end of the greenhouse through American CoolAir's evaporative cooling system and pushed out through these fans.



THE EVAPORATIVE COOLING WALL AND VENT DOOR are located at the south end of the greenhouse. When the exhaust fans are activated, they pull outside air through the open vent door. This air is cooled as it is drawn across the wet wall pads, pulled through the crops, and then exhausted out through the exhaust fans at the north end of the greenhouse. The power vent door is operated by the iGrow Controller (the “brain” of the greenhouse) and is opened and closed as needed. The framework of the door is made of extruded aluminum to avoid rusting and is covered with 8mm polycarbonate. The door is powered by a heavy duty, right angle gear motor with limit switches to adjust opening and closing positions.



THE iGROW CONTROL SYSTEM is the computerized environmental control system. This is the brain of the greenhouse that allows the grower to have precise control of the heating and cooling equipment as well irrigation. The iGrow 1400 has 12 outputs and includes temperature and humidity sensors housed in special radiation housing. Also included is an outside air temperature sensor. This unit(s) is mounted and pre-wired to the electrical breaker panel.

THE ELECTRICAL BREAKER PANEL is a prewired electrical panel that is pre-mounted on a white painted board with the relay box and the iGrow 1400, and is ready to install in the greenhouse. Simply provide incoming power and run the wires from the terminal strips out to the equipment in the greenhouse. Our panels are NEMA enclosures because of the greenhouse environment. CropKing uses only UL listed components, however some codes require that the constructed panel be UL listed. In some areas, agricultural buildings are exempt from electrical zoning. Please check with your local electric codes.

