# The Open Air

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## 1. Introduction

The house of choice for growers whose crops require maximum light and ventilation, the Open Air by Rough Brothers is the pinnacle of open roof structures. With a variety of advantages, the Open Air provides an environment most like the outdoors.

This unique roof design allows the roof to be partially open in rain and snow as the peak gutter catches the precipitation, eliminating unwanted moisture on your crop. Airflow is increased, resulting in ideal growing conditions for your crops and a comfortable work environment.

## 2. Why Rough Brothers?

By working closely with you, we can help you select, construct and maintain the optimal structures and systems to meet your needs. Whether you are expanding your growing range, giving your garden center a fresh look or just starting out, Rough Brothers' experience is second to none. Our people are a diverse group; backgrounds include engineers, educators, garden center managers, and growers, all working together to help you reach your dreams. From thermostats to computer-driven environmental controls or hand-watering to Ebb and Flo, we can help you determine your needs.

## 3. Features

The use of growth regulators is decreased as the design of the Open Air allows the environment to harden and condition your crop, resulting in less damage when shipped, improved longevity on the garden center bench, and increased performance in the garden.

Multiple glazing systems are available: glass, double poly, 8mm twinwall or 16mm twinwall. Venlo style peak offers easy reglazing when glazed with double polyethylene. The rack and pinion drive system minimizes maintenance. Standard and custom widths are available; standard widths are 24' and 36', and the Open Air is available in various heights to accommodate your needs. Complete design specifications and structural details are available.

## 4. Uses & Application

- Growers & Nursery Management
- Retail Garden Centers

# 5. Specifications

## 5.1. Available Widths

The standard widths of the Open Air structures are 24'-0", 36'-0" and 42'-0" wide. Custom widths are always available. The structural details below are based on a 24'-0" width

## 5.2. Post Top

A cast post top with an integral drip gutter support will bolt to the post and support the gutter saddle

## 5.3. Gutter Saddle

A galvanized steel gutter saddle will be at each post to splice the gutter and to bolt to the post top. The seal between the gutter saddle and the gutter is created using a black "puttylastic" strip.

## 5.4. Condensation Gutter

An aluminum extruded drip gutter is located under each gutter.

## 5.5. Downspouts

Cast aluminum downspout is used where downspouts are required. The hole in the gutter is predrilled for ease of installation of the downspout.

## 5.6. Gutter Extensions

There are many options in the gutter extensions depending on the situation:

1. Open ended to let the water run off the greenhouse
2. Welded end with no downspout
3. Welded in with a downspout

## 5.7. Bar Joists

At each interior post there will be a bar joist which shall span across the structure at 12'-0" centers. This not only strengthens the structure substantially, it also provides

simplified installation of additional equipment such as:

- Hot Water Heating Systems
- Shade and Energy Curtains
- Watering Booms
- Hanging Basket Systems
- Monorails

## 5.8. Hinge

The roof structure pivots on an aluminum extruded hinge.

## 5.9. Roof Glazing Options

- 6 mil double poly inflated
- 4mm tempered glass
- 16mm acrylic
- 8mm polycarbonate

## 5.10. Roof Bars

- Glass house- aluminum extruded glazing bars with white PVC capping
- 8mm polycarbonate house - aluminum extruded glazing bars with white PVC capping

## 5.11. Roof Closure

An aluminum extruded profile which fastens to the roof bars and closes the roof to the top gutter. The closure allows cracking of the open roof during adverse weather conditions.

## 5.12. Roof Gutter

A galvanized steel U-gutter runs continuous at the ridge of the greenhouse.

## 5.13. A-Frames

Galvanized steel frames are used at 12' 0" centers to support the drive shaft and support the roof gutter.

## 5.14. Ventilation

Full open position will provide maximum ventilating and air-flow capacity.

## 5.15. Rack & Pinion

A positive drive system shall be used with an easily understood and maintained rack and pinion drive system. Racks shall be spaced on 12' 0" centers.

## 5.16. Drive Motor

Each zone will be driven with a single drive motor with a gearbox at each peak. The drive motor will have a variable frequency drive to allow the roof to close quicker than opening.

## 5.17. Control Box

Each motor will have a reversing motor control box to wire the motor.

## 5.18. Computer Control

A computer control system with a weather station is required to install this type of house. This can be accomplished with either a simple weather station with a vent control or a more intricate environmental control system.

# 6. Equipment

- Benching
- Shade & Curtain Systems
- Enviromental Controls
- Heating
- Irrigation
- Cooling
- Plant Growth Lighting
- Material Handling

# 7. Our Services Include

- Design & Build
- Systems Integration
- Project Management
- Installations

- Maintenance