



## Ceres HighYield™ Greenhouse Specifications

**CLIENT** - Greene County Career Center

**LOCATION** - Xenia, Ohio

**DESIGN PARAMETERS** -

- A. Wind Load - TBD
- B. Snow Load - TBD
- C. Seismic Rating - TBD

**BUILDING PARAMETERS AND CAPABILITIES** -

- A. (1) Energy Efficient 30' x 54' Ceres HighYield™ Passive Solar, Offset Gable Greenhouse
  - a. Minimum South eave height of 10', minimum peak of 16' and slope of south roof is 3:12
  - b. 50% or more of the surface area of the greenhouse to be insulated to a value of R-14 or higher
  - c. Structural plans must be engineered and stamped for local wind and seismic conditions
- B. (1) Attached Clean Entry?

**For Additional Assistance, Contact:**

Ceres Greenhouse Solutions

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- Continue to Specifications Below -

## **PART 1 - GENERAL**

### **1.1 CERES GREENHOUSE SOLUTIONS TO PROVIDE**

- A. Design and Engineering of steel, insulated metal panel and polycarbonate greenhouse structure
- B. Accessories and equipment design integration and sourcing per client request
- C. Engineered stamped plans and calculations for permitting
- D. Construction drawings set for engineered foundation and structural materials

### **1.2 RELATED SECTIONS/NOT PROVIDED BY CERES**

- A. Related construction materials and labor necessary to prepare the glazed structure site. This related work to be provided by other trades
  - a. Site preparation
  - b. Material receiving/unloading
  - c. Coverings to protect materials from surrounding trades
  - d. Excavation
  - e. Concrete
  - f. Masonry
  - g. Greenhouse Construction
  - h. Mechanical
  - i. Electrical rough-in and control wiring
  - j. Plumbing rough-in and hookup

### **1.3 REFERENCES**

- A. Ceres Greenhouse Solutions designs for local code requirements
  - a. Manufacturer product specifications can be submitted for review by the local permitting office.

### **1.4 DELIVERY, STORAGE & HANDLING**

- A. Deliver materials to job site freight prepaid
- B. Take precaution when unloading and storing materials to protect all prefinished surfaces and glazing materials.
- C. Inspect and report any freight damages and missing pieces to freight carrier and Ceres Greenhouse Solutions while the truck is on site. Do not sign off unless inspected.
- D. Inventory each delivery based upon material inventory sheet from manufacturer
- E. Store off ground in a secure location that is a dry and covered area protected from weather conditions and theft

## 1.5 WARRANTIES

### A. Steel frame manufacturer warranty

- a. 20 years - Manufacturer pledges the frame system will be free from any structural defects for a period of 20 years.
  - i. The completed frame structure with sheet metal and trim must be erected within thirty (30) days of the date of delivery to retain warranty eligibility. Damage or physical appearance of coatings and paint finishes caused from improper storage beyond the 30-day deadline will not be covered under warranty.
  - ii. If any frame component part is dysfunctional and does not meet quality expectations, upon proof of purchase, the manufacturer will replace that part at no cost. This also applies to missing components confirmed and reported to the manufacturer's Customer Service. This benefit will be in effect for 30 days from the date of delivery and applies to materials only. Replacement components will be shipped as soon as available via ground delivery. Customers may request and pay for expedited shipping.

### B. Insulated Metal Panel manufacturer warranty

- a. Two year warranty from date of shipment to the customer covering defective materials or workmanship
- b. PVDF Coatings including primer and backer
  - i. Warranty against chip, crack, check or peel for a period of 20 years from date of installation (except for such crazing that may occur on tightly roll-formed edges and brake bends).

### C. Glazing manufacturer warranty

- a. Triple Wall Polycarbonate
  - i. 15 year warranty
  - ii. Plus 5 yr. Extended warranty against yellowing

### D. Automated Louvers and Fans manufacturer warranty

- a. One year warranty
  - i. Manufacturer's obligation under warranty is limited to repair or replace or otherwise make good, at the factory, any parts which, within one year after the date of shipment of equipment to the original purchaser, after being returned to us with transportation prepaid. Upon manufacturer examination, defects will be confirmed and warranties will be carried out.

### E. GAHT™ System Inline Centrifugal Fans

- a. Three year warranty
  - i. During the entire warranty period: The manufacturer will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the factory, together with a copy of the bill of sale and identified with RMA number.

### F. Additional accessory warranties to be addressed upon selection/order placement.

## 1.6 SCHEDULING AND COORDINATION

- A. No concrete and/or other related construction work (in the area) should begin until the construction drawings set are approved by the architect, Ceres Greenhouse Solutions and the general contractor.
- B. All related construction work such as foundation, knee walls, stem walls, door openings etc. should be governed by the approved construction drawings set.
- C. General contractor to coordinate and contract with all sub-contractors providing electrical, plumbing, control wiring, etc to the greenhouse structure.
- D. Field dimensions will be obtained by the general contractor or architect and shared to Ceres Greenhouse Solutions. The general contractor will be responsible for ensuring all job site dimensions will be built to the approved Greenhouse construction drawings set.
- E. Coordinate all work through the client selected general contractor.

## PART 2 - PRODUCTS

**2.01 ACCEPTABLE MANUFACTURERS** - Design based on Ceres Greenhouse Solutions' HighYield™ Passive Solar Greenhouse, as provided by:

- A. Ceres Greenhouse Solutions  
1898 S Flatiron Ct, Ste 125  
Boulder, CO 80301  
(303) 495- 5006  
[www.CeresGS.com](http://www.CeresGS.com)
- B. Specific model
  - (1) 30' x 54' Offset Gable HighYield™ Greenhouse Kit
    - a. East - West Orientation

## 2.02 MATERIALS

- A. Structural Framing System
  - a. Offset Gable truss design
  - b. 6' on center truss spacing
  - c. 14-gauge 2" x 4" galvanized steel framing structure engineered to local wind, snow and seismic standards
  - d. 14-gauge 2" x 3" gable framing
  - e. Intermediate framing 2" x 2" or 1.5" x 1.5" for purlins and girts
  - f. Framed for 12' South eave height, and 18' offset gable peak
  - g. 20-year manufacturer's warranty on steel framing
  - h. Includes stamped structural drawings for permitting

B. Insulated Metal Panels (Wall Panels)

- a. Wall Panels: North, West, and East End wall to be 2" thick, 40"W, R-16 Insulated Metal Panels. Insulation material is CFC-free foamed-in-place polyisocyanurate foam 2.1 pcf density. Joint configuration of offset tongue and groove with concealed fastener. Exterior metal surface embossed in 26ga G-90 galvanized steel with standard PVDF exterior coatings. The interior metal surface is embossed with 26ga Imperial White. Panels have overlapping self-aligning joint allowing for easy sealant application
- b. Tested and approved under a variety of North American Standards:
  - i. FM 4880: Class 1 Fire Rating
  - ii. Class 1 Exterior Wall System
  - iii. CAN/ULC S101: Fire Endurance
  - iv. CAN/ULC S127: Flammability
  - v. CAN/ULC S134: Fire Test of Exterior Wall Assemblies
  - vi. ASTM C518/C1363: Thermal Transmission
  - vii. ASTM E283: Air Infiltration
  - viii. ASTM E331: Water Penetration
  - ix. ASTM E72: Structural Strength
  - x. ASTM E84: Flame Spread
  - xi. AAMA 501.1: Air/Water Infiltration

C. Insulated Metal Panels (Roof Panels) Roof Panels: North facing roof to be 2.5" thick, 40"W, R-20 Insulated Metal Panels. Insulation material is CFC-free foamed-in-place polyisocyanurate foam 2.1 pcf density. Joint configuration is overlapping with exposed fasteners and saddle clips. Metal facings of 26ga galvanized steel with PVDF coatings. The interior metal surface embossed with 26ga Imperial White

- a. Panels include fasteners, concealed fastener clips, sealants, brake formed flashings.
- b. Tested and Approved under a variety of North American Standards:
  - i. FM 4880: Class 1 Fire Rating
  - ii. FM 4471: Class 1 Roof Assembly
  - iii. CAN/ULC S102: Flame Spread
  - iv. CAN/ULC S126: Flame Spread (Roof)
  - v. CAN/ULC S127: Flammability
  - vi. ASTM C518/C1363: Thermal Transmission
  - vii. ASTM E1646: Water Penetration
  - viii. ASTM E1680: Air Infiltration
  - ix. ASTM E72: Structural Strength

D. Glazing

- a. Triple Wall Polycarbonate to cover South facing wall and South facing gable roof
  - i. 16mm thickness
  - ii. 3-Wall
  - iii. Approx weight lbs/sq.ft: .57
  - iv. 76% Light Transmission
  - v. R.Value 2.4

E. Ventilation

- a. Shutter Mounted Exhaust Fans
  - i. The exhaust fans are sturdily constructed, direct drive, horizontal discharge fan that is typically used for general ventilation. The fans are housed and constructed of heavy duty aluminum with built in shutters that automatically open when the fan starts and

- gravity closes when the fan stops.
- ii. Fan sizes vary based on volume of greenhouse specified. With a combination of the specs of these two fan sizes:
  1. 24" Exhaust Fan with Shutter
    - a. 1100 RPM
    - b. 1/3 HP Single Phase
    - c. 115/230 Voltage (Single Phase)
    - d. 4.4/2.2 AMPS (Single Phase)
    - e. 43lbs
    - f. 5310 CFM at .125" Static Pressure
    - g. Framing Dimension: 26" x 26"
  2. 36" Exhaust Fan with Shutter
    - a. 850 RPM
    - b. 1/2 HP Single Phase
    - c. 115/230 Voltage (Single Phase)
    - d. 6.6/6.3 AMPS (Single Phase)
    - e. 88lbs
    - f. 8000 CFM at .125" Static Pressure
    - g. Framing Dimension: 39" x 39"
- b. Motorized Backdraft Dampers
  - i. Sturdily constructed from all aluminum extrusions. Positive seal damper blades with vinyl gaskets keep leakage less than 1%.
  - ii. Fan sizes vary based on volume of greenhouse specified. With a combination of the specs of these two fan sizes:
    1. 26" Motorized Backdraft Damper
      - a. 115 Volts
      - b. 1 AMP
      - c. Framing Dimension: 26 1/2" x 26 1/2"
    2. 39" Motorized Backdraft Damper
      - a. 115 Volts
      - b. 1 AMP
      - c. Framing Dimension: 39 1/2" x 39 1/2"

#### F. Air Circulation

- a. High Velocity Horizontal Airflow Fan to mount to trusses
  - i. 18" Blade Diameter
  - ii. All metal construction
  - iii. Commercial duty 3 speed motor with pull chain control
  - iv. 1/8 HP Motor
  - v. 1.45/1.35/1.27 AMPS
  - vi. 1290/960/760 RPM
  - vii. 5700/4100/3200 CFM
  - viii. Epoxy coated OSHA guard
  - ix. 9' heavy duty 120V cord with cord wrap
  - x. Steel ceiling mount assembly included
  - xi. 26 lbs

#### G. Geothermal Heating/Cooling

- a. The GAHT™ System is a ground to air heat exchanger, often referred to as a 'Climate Battery'. Ceres Greenhouse Solutions is an industry leader in climate battery technology, having

designed and installed more systems in greenhouses than any other company in the world.

b. Components:

- i. Intake Pipe - 18" pipe along the North wall takes air from the peak of the greenhouse to the underground perforated
- ii. 4" perforated, corrugated piping, covered with sock to connect and continue air transfer from the 18" intake piping.
- iii. Inline Fan - custom sized fans circulate air underground
- iv. Pipe Manifold - a customized pipe layout provides option to source air from either the peak of the greenhouse, or external air for either heating or cooling
- v. Exhaust Pipe - 18" pipe exhausts air back into greenhouse to moderate temperature
- vi. \*\* To be controlled with either Automated Controller (below) or series of thermostats

H. Automated Controller

- a. To automate climate control equipment within the greenhouse. To be sized when climate control equipment is selected. Also will allow for remote controlling of the greenhouse, as well as data collection and storage.

## **PART 3 - EXECUTION**

### **3.1 SITE PREPARATION, UNLOADING, LIFTING AND INSPECTION**

- A. Client selected greenhouse contractor to direct, supervise and inspect all site work related to the greenhouse structure.
- B. Site preparation to be done in accordance with the client selected architects' leveling plans. Related site work to be square, level and plumbed accordingly. All dimensions to be in accordance with Ceres Greenhouse Solutions' final construction drawings set.
- C. Client selected general contractor / structural contractor to supply all labor and necessary equipment to unload all of the materials from the various delivery trucks. Ceres Greenhouse Solutions will work with general contractor to schedule deliveries with time slot estimates.
- D. Client selected general contractor / structural contractor responsible for equipment needed to lift the structural components to desired installation heights in accordance with final construction drawings. General contractor to accept all associated lifting and equipment costs.

### **3.2 INSTALLATION**

- A. Client selected greenhouse structural contractor shall build in accordance with Ceres Greenhouse Solutions' installation instructions per construction documents
- B. All construction work to be performed to industry standards and requirements
- C. All contractors to follow safety rules and conditions set forth by client selected general contractor

## PROJECT BASE KIT RENDERINGS