



## **HIGH PERFORMANCE GREEN BUILDING SYSTEM™**

### **THREE PART SPECIFICATION SECTION 07480 EXTERIOR WALL ASSEMBLIES**

#### **PART 1 - GENERAL**

##### **1.1 SECTION INCLUDES**

Specifications that are to be used in preparing details and documentation for projects using Green-Source Products' High Performance Green Building System™ (HPGBS™). Green-Source Products HPGBS™ can be customized to exact architectural and engineering plans and specifications.

##### **1.2 RELATED SECTIONS**

- A. Section 05100 Structural Metal Framing
- B. Section 05400 Cold-Formed Metal Framing
- C. Section 07200 Thermal Protection
- D. Section 07400 Roofing and Siding Panels
- E. Section 10600 Partitions
- F. Section 13120 Pre-Engineered Structures

##### **1.3 REFERENCES**

- A. Steel Stud Manufacturers Association (SSMA) ICBO ER-4943P "Product Technical Information", Copyright 2001 by the Steel Stud Manufacturers Association.
- B. L-Shaped Header Field Guide, North American Steel Framing Alliance, Copyright 1999.
- C. American Institute of Steel Construction (A.I.S.C.) "Manual of Steel Construction", 13th edition.
- D. American Iron and Steel Institute (A.I.S.I.) "North American Specification for the Design of Cold Formed Steel Structural Members", 2001 with 2004 amendments.
- E. American Welding Society (A.W.S.) D.1.3, 1998 "Structural Welding Code-Sheet Steel".



- F. American Society for Testing and Materials (ASTM):
1. ASTM A 370: Test Methods and Definitions for Mechanical Testing of Steel Products.
  2. ASTM A 500: Standard Specifications for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  3. ASTM A 513: Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
  4. ASTM A653/A653M-07: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  5. ASTM A787-05: Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing.
  6. ASTM C36/C36M-03: Standard Specification for Gypsum Wallboard.
  7. ASTM C203-05a: Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
  8. ASTM C272-01(2007): Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
  9. ASTM C303-07: Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
  10. ASTM C518-04: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  11. ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  12. ASTM D1621-04a: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  13. ASTM E72-05: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
  14. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
  15. ASTM E90-04: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  16. ASTM E96/E96M-05: Standard Test Methods for Water Vapor Transmission of Materials.
  17. ASTM E119-08a: Standard Test Methods for Fire Tests of Building Construction and Materials.
  18. ASTM E2226-08: Standard Practice for Application of Hose Stream.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. System Performance Requirements: Comply with the requirements of the Standards and Reports Listed in Paragraph 1.3 of this section.



## 1.5 SUBMITTALS

- A. Submission of a Purchase Agreement that outlines the scope of work for a specific project that will detail materials referred to in this section.
- B. Submit Green-Source Products “Job Information Sheet” to obtain critical design information from customer prior to start of shop drawings. Customer to return information sheet to Green-Source Products with complete set of structural and architectural drawings for the project.
- C. Shop Drawings will be provided showing:
  - 1. Plan view of the sequential layout of the panels to aid in installation.
  - 2. Anchorages and connection details showing integration of the panel system with the other components in the project provided with a professional engineer’s seal, if requested.
  - 3. Tables with wind, live, dead load, calculations by professional structural engineer as required per project, by Architect.
  - 4. Individual panel construction plans showing dimensional layout of each panel, and manufacturing tolerances, to be approved by customer and utilized by Green-Source Products in the manufacture of the panel system to insure proper fabrication.

## 1.6 SYSTEM DESCRIPTION

- A. Green-Source Products HPGBS™ building system is a fully engineered, highly insulated, structural building system designed to meet or exceed all major building codes. This system integrates tubular or light gauge galvanized steel and expanded polystyrene (EPS), which provides complete wall or roof sub-systems. This system has been in use for over 20 years and has provided unprecedented energy efficiency, tremendous design flexibility and a substantially stronger structure than conventional framing.
- B. Individualized wall panel size and configuration is dependent upon the project design requirements. The maximum overall size of the wall panels shall be no greater than 10 feet x 38 feet for ease of shipment. Wall panel thickness shall typically be between 3-1/2 inches and 12 inches. Used for both residential and commercial projects including:
  - 1. Curtain Walls used for the construction of retail, healthcare, multifamily housing, industrial plants, manufacturing facilities, hotels, office buildings, condominiums, churches, day cares, community centers, and others.
    - a. Exterior non-load-bearing cladding panels.
    - b. Custom designed for wind loads attached to steel frame or masonry structures.
    - c. Curtain wall panels can be supplied in vertical or horizontal sections up to 38 feet.
    - d. Curtain wall panel thickness from 3-1/2 inches to 12 inches.



- e. Thermal efficiency from R-16 to R-50.
  - f. All window, door, and other openings factory installed in wall panels as per architectural plans and specifications.
  - g. Flexible custom attachment details dependent upon the project design requirements.
  - h. Compatible with all exterior and interior finishes.
2. Load Bearing Exterior Walls used for retail, healthcare, multifamily housing, industrial plants, manufacturing facilities, hotels, office buildings, condominiums, churches, day cares, community centers, and others.
- a. Can be designed to carry multiple floors.
  - b. Eliminates some or all of the red iron structural framing.
  - c. Shear wall structure can be integrated into the bearing wall panels as per architectural and engineering plans and specifications.
  - d. Bearing wall panel thickness from 3-1/2 inches to 12 inches.
  - e. Thermal efficiency from R-16 to R-50.
  - f. All window, door, and other openings factory installed in wall panels as per architectural plans and specifications.
  - g. Flexible custom attachment details dependent upon the project design requirements.
  - h. Compatible with all exterior and interior finishes.
  - i. Has been tested to ASTM E119-08a fire test, and ASTM E2226 – 08 Standard Practice for Application of Hose Stream.
3. Demising Walls and Corridor Walls used for retail, healthcare, multifamily housing, industrial plants, manufacturing facilities, hotels, office buildings, condominiums, churches, day cares, community centers, and others.
- a. Can be designed to carry multiple floors
  - b. Shear wall structure can be integrated into the bearing wall panels as per architectural and engineering plans and specifications.
  - c. Bearing wall panel thickness from 3-1/2 inches to 12 inches.
  - d. Can be classified as non-combustible.
  - e. Wall panels sections up to 10 feet high x 38 feet long.
  - f. Has been tested to ASTM E119-08a fire test, and ASTM E2226 – 08 Standard Practice for Application of Hose Stream.
- C. Individualized roof panel size and configuration is dependent upon the project design requirements. Roof panel maximum width is 4 feet and maximum length of 40 feet. Roof panel thickness shall typically be between 7-1/4 inches and 12 inches. Used for both residential and commercial projects including:
1. Load Bearing Roof Panels used for the construction of retail, healthcare, multifamily housing, industrial plants, manufacturing facilities, hotels, office buildings, condominiums, churches, day cares, community centers, and others.
- a. Roof lines including gables, hips or flat.
  - b. Thermal efficiency from R-30 to R-50.
  - c. Roof panels can span from 8 feet to 15 feet @ live loading of 30 to 50 pounds per square feet as per the architectural and engineering plans and specifications.



- d. Compatible with structural design using either red iron structural steel or bar joists.
  - e. Flexible custom attachment details dependent upon the project design requirements.
  - f. Compatible with all exterior and interior finishes.
- D. Green-Source Products HPGBS™ panels shall be composed of:
1. UL Certified modified expanded polystyrene (EPS) rigid insulation.
  2. Integrated into the EPS rigid insulation light gauge galvanized steel for structure, according to the architectural and engineering specifications for the project.
  3. The light gauge galvanized steel is integrated into the EPS rigid insulation opposed on the inside and outside to eliminate thermal bridging and produce structural composite super energy efficient wall and roof panels.
  4. The light gauge galvanized steel is screwed together with tie screws at a maximum of 3 feet apart.
  5. The wall panels are connected together with 1-1/2 inch x 1-1/2 inch 20 gauge (min.) galvanized steel angle or light gauge galvanized steel track screwed into the light gauge galvanized steel with TEK screws, on the top inside and out and on the bottom outside.
  6. The inside bottom angle or track of the wall panel is attached to the sub structure of the project as per the Architectural plans and specifications for the project.
  7. The outside bottom angle or track of the wall panel is attached to the sub structure of the project with tie downs as per the Architectural plans and specifications for the project.
  8. Structural headers for openings are integrated into the wall panels as per the Architectural drawing and specifications for the project.
  9. The roof panels are connected to the structural members of the structure by specially shaped 20 gauge (min.) galvanized steel screwed into the light gauge galvanized steel with TEK screws.
  10. Dimensional and engineered lumber or steel structural members may be used to tie wall panels together and also for structural support for the Green-Source Products HPGBS™.
  11. Other components shall be custom designed as necessary to meet the project design as well as the structural requirements.
- E. Performance Requirements
1. Load Criteria:
    - a. Standard wall heights of 9 feet have a design wind load of up to 40 pounds per square foot.
    - b. Green-Source Products HPGBS™ can be engineered to wall heights of up to 20 feet and design wind load of up to 40 pounds per square foot.
    - c. Standard wall heights of 9 feet have a design axial load of 2,250 pound per lineal foot.
    - d. Standard roof panels have a design horizontal roof load of 40 pounds per square foot with appropriate purlin or ridge beams at 12 foot on center.



- e. The Green-Source Products HPGBS™ is customized to exact architectural and engineering drawings and specifications.
2. Fire rating:
  - a. Drywall of 1/2 inch or 5/8 inch provides the necessary rating as required by uniform building codes.
  - b. ASTM-119 load bearing assembly is available.
  - c. EPS rigid foam flame spread: 20
  - d. EPS rigid foam smoke developed: 150-300
  - e. EPS rigid foam may ignite between 600-650°F. By comparison Douglas fir wood products ignite at approximately 500°F. EPS rigid foam contains 0.0833% of the combustibles present in wood products.
3. STC sound rating:
  - a. STC sound rating of up to 59 is available in engineered assembly.
4. Sound Absorption:
  - a. @1,000 cps rating 0.36  
@2,000 cps rating 0.54  
@4,000 cps rating 0.38
5. Thermal Efficiency:
  - a. Insulation Core:  
UL certified modified expanded polystyrene (EPS)  
Rigid insulation core shall have a minimum density of .90 pcf TYPE I complying with ASTM C578
  - b. Thermal Resistance Values (R):  
Wall Panel Thickness:

	9 ¼"	7 ¼"	6"
at 40° F	38	30	25
at 75° F	35	28	23

Roof Panel Thickness:

	12"	8"	6"
at 40° F	50	33	25
at 75° F	46	30	23

## 1.7 QUALITY ASSURANCE

- A. Qualifications:
  1. Green-Source Products shall be the exclusive manufacturer of the Green-Source Products HPGBS™.
  2. Contractor shall be knowledgeable in the proper installation of the Green-Source Products HPGBS™.
  3. All supplied components such as EPS, light gauge steel, fasteners, adhesives, and any other third party supplied components shall be certified by Green-Source Products, as to the quality and suitability for use.
- B. Regulatory Requirements:
  1. The Green-Source Products HPGBS™ can be designed to meet or exceed all code requirements for structural and fire safety and can be in accordance with all applicable building codes.



2. The use of the Green-Source Products HPGB™S shall be in accordance with all applicable building codes.
3. The Green-Source Products HPGBS™ can be designed to meet the code requirements for high-velocity hurricane zones.

C. Third Party Inspection:

1. The Green-Source Products HPGBS™ shall be subject to the review and approval of the authorizing building officials.
2. The installation of the Green-Source Products HPGBS™ shall be subject to the inspection and approval of the authorizing building officials.

## **1.8 DELIVERY, STORAGE, HANDLING**

- A. The Green-Source Products HPGBS™ shall be unloaded and handled so as to not compromise their structural and thermal integrity.
- B. Store panels in a clean, dry, safe area and supported at least 6 inches above the ground to prevent contact.
- C. Protect all components and accessories from corrosion, deformation, deterioration, and damage when stored at job site.
- D. Contractor shall take precautions to avoid any concentrated loads or loading beyond the design criteria of the Green-Source Products HPGBS™ during construction.
- E. After installation, roof panels shall be covered so as to protect them from prolonged exposure to weather elements.

## **1.9 PROJECT CONDITIONS**

- A. Foundations and all sub structures that the Green-Source Products HPGBS™ will be connected to, shall be dimensionally accurate, square, level, and plumb.
- B. Foundations and all sub structures that the Green-Source Products HPGBS™ will be connected to, shall be inspected and approved for dimensional accuracy, square, level, and plumb in accordance to accepted building tolerances.
- C. Inspection and confirmation of the foundations and sub structures accuracy shall be provided to Green-Source Products by the Contractor responsible.
- D. Any adverse conditions are to be reported, in writing to the owner, architect, and Green-Source Products. Do not proceed with installation until adverse conditions are corrected.



- E. Application of sealants, primers, elastomeric coatings, brick stone facing, or any other form of interior or exterior finishes to the Green-Source Products HPGBS™ shall be done under the conditions set forth by the manufacturer of those products.

#### 1.10 SEQUENCING AND SCHEDULING

- A. Installation of the Green-Source Products HPGBS™ shall be coordinated with the other professional building trades.
- B. Concrete foundations or slabs on grade must be complete and properly cured, ready to accept the wall panel anchorages and attachments prior to the installation of the Green-Source Products HPGBS™.
- C. Exterior finishes must be completed in a timely manner following the installation of the Green-Source Products HPGBS™ so as to protect them from prolonged exposure to weather elements.

#### 1.11 WARRANTY

**Green-Source Products Limited Warranty.** Green-Source Products warrants that its HPGBS™ Panel System will conform to the applicable panel's specifications and panel layout drawings at the time of delivery to Buyer and will be free from material defects in workmanship and materials for a period of one (1) year from the date of Green-Source Products' delivery of the Panel System and/or other products to Buyer, pursuant to Green-Source Products' standard Terms and Conditions. **GREEN-SOURCE PRODUCTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND GREEN-SOURCE PRODUCTS EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND/OR FITNESS FOR ANY PARTICULAR PURPOSE.** This warranty does not extend to defects in goods not manufactured by Green-Source Products. Buyer hereby accepts, and agrees to pursue, the warranty provided by any third-party manufacturer of goods or equipment not manufactured by Green-Source Products, as its sole remedy for alleged defects in such goods or equipment. Green-Source Products hereby transfers and otherwise assigns to Buyer, to the greatest extent assignable, all such third-party warranties



**Limited Warranty Commencement and Condition Precedent to Claims.**  
**THE ONE-YEAR TIME PERIOD OF THIS LIMITED WARRANTY SHALL COMMENCE UPON GREEN-SOURCE'S DELIVERY OF THE PANEL SYSTEM AND/OR OTHER PRODUCTS TO BUYER, AS SET FORTH HEREIN. HOWEVER, BUYER UNDERSTANDS AND AGREES THAT IT SHALL NOT BE ENTITLED TO ASSERT ANY CLAIM, OR PURSUE ANY REMEDIES, PURSUANT TO THIS LIMITED WARRANTY UNTIL BUYER HAS PAID GREEN-SOURCE PRODUCTS IN FULL, WITHOUT SET-OFF OR OTHER WITHHOLDING, FOR THE PRODUCTS. BUYER AGREES THAT FULL AND FINAL PAYMENT FOR THE PRODUCTS IS AN EXPRESS CONDITION PRECEDENT OF ITS RIGHT TO ASSERT CLAIMS OR REMEDIES HEREUNDER, AND EXPRESSLY WAIVES AND RELEASES ALL CLAIMS OR REMEDIES UNTIL IT HAS PAID GREEN-SOURCE PRODUCTS IN FULL, OR IN THE EVENT IT FAILS TO PAY GREEN-SOURCE PRODUCTS IN FULL PRIOR TO THE EXPIRATION OF THIS LIMITED WARRANTY.**

## **PART 2 - PRODUCT**

### **2.1 MANUFACTURER**

- A. The Green-Source Products, LLC HPGBS™ and components are all proprietary products of and manufactured exclusively by:  
Green-Source Products, LLC  
1170 Ivanhoe Road  
Cleveland, Ohio 44110

### **2.2 MATERIALS**

- A. UL Certified modified expanded polystyrene (EPS) rigid insulation core, minimum density of .90 pcf TYPE I complying with ASTM C578.
- B. Integrated into the EPS rigid insulation light gauge galvanized steel for structure, ASTM A787-05 according to the architectural and engineering specifications for the project.
  - 1. Typical shape of framing member is 2 inch x 1 inch tubular galvanized steel, but shall vary in shape according to the architectural and engineering specifications.
  - 2. 1-1/2 inch x 1-1/2 inch 20-gauge (minimum) galvanized steel angle or light gauge galvanized steel track shall be used to connect wall panels together and also to the foundation and structural members of the project.
  - 3. Specially bent shapes are used to connect the roof panels, wall corners, and other connections as required.
  - 4. Minimum thickness shall be 20 gauge.
  - 5. Minimum corrosion protection shall be G90 galvanized.



- C. Structural headers for openings are integrated into the wall panels as per the Architectural plans and specifications for the project.
- D. Fasteners shall be plated to resist corrosion according to specifications from the manufacturer authorized by Green-Source Products. All fasteners for installing the Green-Source Products HPGBS™ shall be supplied or recommended by Green-Source Products.
- E. Dimensional and engineered lumber and structural steel member components may be used to tie wall panels together and also for structural support for the Green-Source Products HPGBS™. Species or gauge, and dimensional specifications shall be supplied by the lumber or steel manufacturer authorized by Green-Source Products.
- F. Weather-resistive barriers along with proper flashing and taping procedures shall be used on all vertical surfaces of the Green-Source Products HPGBS™. Weather-resistive barriers and components shall be supplied or recommended by Green-Source Products.
- F. Sill sealer shall be used under the entire panel where coming in contact with concrete, masonry or treated lumber. Sill sealer shall be supplied or recommended by Green-Source Products.
- G. Adhesives, caulks, and sealants shall be compatible with all components of the Green-Source Products HPGBS™ and supplied or recommended by Green-Source Products.

## **PART 3 – EXECUTION**

### **3.1 INSPECTION**

- A. Contractor shall inspect conditions of substrate, grade, and other conditions which may affect correct installation of the Green-Source Products HPGBS™. Contractor shall inspect alignment and level of foundations and all sub structures that the Green-Source Products HPGBS™ will be connected.
- B. Any adverse conditions are to be reported, in writing to the owner, architect, and Green-Source Products. Do not proceed with installation until adverse conditions are corrected.

### **3.2 PREPARATION**

- A. Foundations and all sub structures that the Green-Source Products HPGBS™ will be connected to, shall be dimensionally accurate, square, level, and plumb.



- B. All structural systems and decks shall be dry and free from extraneous materials which may prevent the fastening of the Green-Source Products HPGBS™.

### **3.3 INSTALLATION**

- A. Installation instructions shall be customized for each project in accordance with the architectural and engineering plans and specifications for the project.
- B. Installation shall be in strict compliance with layouts, details, and structural drawings supplied by Green-Source Products specific to each project.

### **3.4 PROTECTION**

- A. In following good site practices it is recommended that the Green-Source Products HPGBS™ components shall be protected from permanent or temporary damage prior to, during, and following installation until proper exterior finishes and sealants are applied.
- B. Contractor shall take precautions to avoid any concentrated loads or loading beyond the design criteria of the Green-Source Products HPGBS™ during construction.
- C. After installation, roof panels shall be covered so as to protect them from prolonged exposure to weather elements.
- D. Weather-resistive barriers along with proper flashing and taping procedures shall be used on all vertical surfaces of the Green-Source Products HPGBS™. Preventing water intrusion from the exterior, while allowing wetness from inside the structure to escape through the wall and diffuse to the outside.
- E. Exterior finishes must be completed in a timely manner following the installation of the Green-Source Products HPGBS™ so as to protect them from prolonged exposure to weather elements.