guardian *structural technologies*
3-Part Specification

SECTION 07480
EXTERIOR WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

This section includes specifications that are to be used in preparing details and documentation for projects using GUARDIAN STRUCTURAL TECHNOLOGIES building system.
GUARDIAN STRUCTURAL TECHNOLOGIES building system can be customized to exact architectural plans and engineering 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.I.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.

G. EPA Indoor airPLUS Construction Specifications Version 1 (Rev. 04)

H. U.S. Army Corps Air Leakage Testing Protocol

PERFORMANCE REQUIREMENTS

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

1.4 SUBMITTALS

A. Submission of a Purchase Agreement that outlines the Scope of Work "SoW" for a specific project that will detail materials referred to in this section.

B. Submit GUARDIAN STRUCTURAL TECHNOLOGIES Project Information Sheet "PIS" to obtain critical design information from client prior to start of shop drawings. Client to return PIS to GUARDIAN STRUCTURAL TECHNOLOGIES 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 tolerances to be approved by client and utilized by GUARDIAN STRUCTURAL TECHNOLOGIES in the fabrication of the panels to ensure proper fabrication.

1.5 SYSTEM DESCRIPTION

A. The GUARDIAN STRUCTURAL TECHNOLOGIES building system is a fully engineered, highly insulated, structural building envelope designed to meet or exceed all major building codes. This building system integrates light gauge galvanized steel and expanded polystyrene (EPS), which provides complete wall or roof sub-systems. This technology 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 depends 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 ranges from R-16 to R-50.
    f. All openings (i.e. window, door and other) factory installed in wall panels as per architectural plans and specifications.
    g. Flexible custom attachment details are dependent upon the project design requirements.
    h. Compatible with all finishes, exterior and interior.

2. Load Bearing Exterior Walls are 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 ranges from R-16 to R-50.
    f. All openings (i.e. window, door and other) factory installed in wall panels as per architectural plans and specifications.
    g. Flexible custom attachment details are dependent upon the project design requirements.
    h. Compatible with all finishes, exterior and interior.
    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 are 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 depends 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 include gables, hips or flat.
    b. Thermal efficiency ranges 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 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 are dependent upon the project design requirements.
    f. Compatible with all finishes, exterior and interior.

D. GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be composed of the following:

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 18-gauge (minimum) 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 provide structural support for GUARDIAN STRUCTURAL TECHNOLOGIES building system.
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. GUARDIAN STRUCTURAL TECHNOLOGIES building system 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 feet on center.
    e. GUARDIAN STRUCTURAL TECHNOLOGIES building system are 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 index (ASTM E84): 5-20. Test results from EPS manufacturer as per EPS specified.
    d. EPS rigid foam smoke development index (ASTM E84): 95-300. Test results from EPS manufacturer as per EPS specified.
    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 an 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

1.6 QUALITY ASSURANCE

A. Qualifications:

1. GUARDIAN STRUCTURAL TECHNOLOGIES shall be the exclusive fabricator of GUARDIAN STRUCTURAL TECHNOLOGIES building system wall and roof panels.
2. Contractor shall be knowledgeable in the proper installation of GUARDIAN STRUCTURAL TECHNOLOGIES building system.
3. GUARDIAN STRUCTURAL TECHNOLOGIES shall certify any other third party supplied components such as EPS, light gauge steel, fasteners, adhesives, as to the quality and suitability for use.

B. Regulatory Requirements:

1. GUARDIAN STRUCTURAL TECHNOLOGIES building system wall and roof panels 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be in accordance with all applicable building codes.
3. GUARDIAN STRUCTURAL TECHNOLOGIES building system can be designed to meet the code requirements for high-velocity hurricane zones.

C. Third Party Inspection:

1. GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be subject to the review and approval of the authorizing building officials.
2. The installation of GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be subject to the inspection and approval of the authorizing building officials.

1.7 DELIVERY, STORAGE, HANDLING

A. GUARDIAN STRUCTURAL TECHNOLOGIES building system should 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system during construction.

E. After installation, roof panels shall be covered so as to protect them from prolonged exposure to weather elements.

1.8 PROJECT CONDITIONS

A. Foundations and all sub structures that GUARDIAN STRUCTURAL TECHNOLOGIES building system will be connected to, shall be dimensionally accurate, square, level, and plumb.

B. Foundations and all sub structures that GUARDIAN STRUCTURAL TECHNOLOGIES building system will be connected to, shall be inspected and approved for dimensional accuracy, square, level, and plumb in accordance with accepted building tolerances.

C. The Contractor responsible shall provide inspection and confirmation of the foundations and sub structures accuracy to GUARDIAN STRUCTURAL TECHNOLOGIES.

D. Any adverse conditions are to be reported, in writing to the owner, architect, and GUARDIAN STRUCTURAL TECHNOLOGIES. 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be done under the conditions set forth by the fabricator of those products.

1.9 SEQUENCING AND SCHEDULING

A. Installation of GUARDIAN STRUCTURAL TECHNOLOGIES building system 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system.

C. Exterior finishes must be completed in a timely manner following the installation of GUARDIAN STRUCTURAL TECHNOLOGIES building system so as to protect them from prolonged exposure to weather elements.

1.10 WARRANTY

GUARDIAN STRUCTURAL TECHNOLOGIES' Limited Warranty – GUARDIAN STRUCTURAL TECHNOLOGIES warrants that its BUILDING SYSTEM wall and roof panels will conform to the 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 GUARDIAN STRUCTURAL TECHNOLOGIES delivers the BUILDING SYSTEM and/or other products to Buyer, pursuant to GUARDIAN STRUCTURAL TECHNOLOGIES' standard Terms and Conditions. **GUARDIAN STRUCTURAL TECHNOLOGIES MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND GUARDIAN STRUCTURAL TECHNOLOGIES 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 GUARDIAN STRUCTURAL TECHNOLOGIES. Buyer hereby accepts, and agrees to pursue, the warranty provided by any third-party manufacturer of goods or equipment not manufactured by GUARDIAN STRUCTURAL TECHNOLOGIES, as its sole remedy for alleged defects in such goods or equipment. GUARDIAN STRUCTURAL TECHNOLOGIES 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 DELIVERY OF THE GUARDIAN STRUCTURAL TECHNOLOGIES BUILDING 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 GUARDIAN STRUCTURAL TECHNOLOGIES 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 GUARDIAN STRUCTURAL TECHNOLOGIES IN FULL, OR IN THE EVENT IT FAILS TO PAY GUARDIAN STRUCTURAL TECHNOLOGIES IN FULL PRIOR TO THE EXPIRATION OF THIS LIMITED WARRANTY.

PART 2 - PRODUCT

2.1 FABRICATION

A. GUARDIAN STRUCTURAL TECHNOLOGIES building system and components are products of and fabricated exclusively by GUARDIAN STRUCTURAL TECHNOLOGIES.

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 18-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 18 gauge.
5. Minimum corrosion protection shall be G60 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 GUARDIAN STRUCTURAL TECHNOLOGIES. All fasteners for installing GUARDIAN STRUCTURAL TECHNOLOGIES building system shall be supplied or recommended by GUARDIAN STRUCTURAL TECHNOLOGIES.

E. Dimensional and engineered lumber and structural steel member components may be used to tie wall panels together and also provide structural support for the GUARDIAN STRUCTURAL TECHNOLOGIES building system. Species or gauge, and dimensional specifications shall be supplied by the lumber or steel manufacturer authorized by GUARDIAN STRUCTURAL TECHNOLOGIES.

F. Weather-resistant barriers along with proper flashing and taping procedures shall be used on all vertical surfaces of the GUARDIAN STRUCTURAL TECHNOLOGIES building system. Weather-resistant barriers and components shall be supplied or recommended by GUARDIAN STRUCTURAL TECHNOLOGIES.

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 GUARDIAN STRUCTURAL TECHNOLOGIES.

G. Adhesives, caulks, and sealants shall be compatible with all components of the GUARDIAN STRUCTURAL TECHNOLOGIES building system and shall be supplied or recommended by GUARDIAN STRUCTURAL TECHNOLOGIES.

PART 3 – EXECUTION

3.1 INSPECTION

A. Contractor shall inspect conditions of substrate, grade, and other conditions which may affect correct installation of GUARDIAN STRUCTURAL TECHNOLOGIES building system. Contractor shall inspect alignment and level of foundations and all sub structures to which GUARDIAN STRUCTURAL TECHNOLOGIES building system will be connected.

C. Any adverse conditions are to be reported, in writing to the owner, architect, and GUARDIAN STRUCTURAL TECHNOLOGIES. Do not proceed with installation until adverse conditions are corrected.

3.2 PREPARATION

A. Foundations and all sub structures to which GUARDIAN STRUCTURAL TECHNOLOGIES building system will be connected, 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system.

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 GUARDIAN STRUCTURAL TECHNOLOGIES specific to each project.

3.4 PROTECTION

A. In following good site practices, GUARDIAN STRUCTURAL TECHNOLOGIES building system and 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system during construction.

C. After installation, roof panels shall be covered so as to protect them from prolonged exposure to weather elements.

D. Weather-resistant barriers along with proper flashing and taping procedures shall be used on all vertical surfaces of the GUARDIAN STRUCTURAL TECHNOLOGIES building system to prevent 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 GUARDIAN STRUCTURAL TECHNOLOGIES building system so as to protect them from prolonged exposure to weather elements.