HercuWall™ - The Panelized Shell and Demising Wall System Advantage. From drawings and factory fabrication to delivery and installation, our patented AlignedAssembly process replaces the guesswork and rework of stick building with planned precision, simplified handling and fast execution.

HercuWall consists of a series or “kit” of panels which are manufactured utilizing expanded polystyrene (EPS) foam, a standard building and insulation material. HercuWall panels are designed and manufactured to match the height of the wall being constructed. Each HercuWall foam panel contains voids which are filled with concrete on-site. The voids determine the final shape of the concrete within the walls. The unique reinforcing system, called HercuStrip TechnologyTM, acts as the primary vertical structural reinforcing component of the wall system. The shape of the concrete within the form is not a solid continuous concrete wall but a wall with a continuous #4 rebar reinforced concrete bond beam at the top, a continuous unreinforced concrete base beam at the bottom, and vertical concrete “studs” regularly spaced connecting the top and bottom beams. After the concrete is placed and cures within the wall, the forms stay in place as high-performance insulation, mounting surfaces for exterior and interior finishes, and as a weather resistive barrier.

This specification is provided in CSI 3-part format and is intended to be edited by design professionals for projects specifying HercuWall. Please call us for assistance at 866-468-6299.

SECTION 031119

INSULATED CONCRETE PANEL SYSTEM

1. GENERAL
   * + 1. DESCRIPTION OF WORK
          1. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

Factory-manufactured panels including structural concrete, load-bearing and non-load bearing exterior and interior walls including accessories required for complete installation of the system.

* + - * 1. Related Work: The following items are not included in this Section and are specified under the designated Sections:

Section 01 80 00 – Performance Requirements

Section 03 30 00 – Cast-In-Place Concrete

Section 03 40 00 – Precast Concrete

Section 04 00 00 – Masonry

Section 05 00 00 – Metals

Section 06 00 00 – Wood & Plastics

Section 07 13 00 – Sheet Waterproofing

Section 07 14 00 – Fluid-Applied Waterproofing

Section 07 18 00 – Traffic Coatings

Section 07 24 00 – Exterior Insulation and Finish System (EIFS)

Section 07 27 00 – Air Barriers

Section 07 46 00 – Siding

Section 07 60 00 – Flashing and Sheet Metal

Section 07 65 00 – Flexible Flashing

Section 07 92 00 – Joint Sealants

Section 08 00 00 – Openings

Sections 09 22 00 through 09 25 00 – Supports for Plaster and Gypsum Board, Gypsum Plastering, Portland Cement Plastering, Other Plastering

Sections 09 70 00 through 09 80 00 – Wall Finishes/Acoustical Treatment

* + - 1. PERFORMANCE REQUIREMENTS
         1. Code Compliance: Provide panel system complying with the following codes and standards as applicable in the jurisdiction of the Project:

International Building Code (IBC), 2021, 2018, 2015, 2012, 2009, 2006.

International Residential Code (IRC), 2021, 2018, 2015, 2012, 2009, 2006.

California Green Bulding Standards Code (CAL Green), 2022, 2019, Title 24, Part 11.

National Green Building Standard, ICC 700, 2020, 2015, 2012, 2008.

Florida Building Code (FBC) Building, 2023, 2020

Florida Building Code (FBC) Residential, 2023, 2020

* + - 1. ADMINISTRATIVE REQUIREMENTS
         1. Preinstallation Conference: Conduct conference at Project site.

Require representatives of each entity directly concerned the Work of this Section to attend, including the following:

Engineer of Record.

Contractor’s superintendent.

Independent testing agency responsible for verifying mix design performance.

Ready-mix concrete manufacturer.

HercuWall Installer

Concrete Subcontractor.

Concrete pump operator.

Agenda Shall Include:

Review concrete design mixture and examine procedures for ensuring quality of concrete materials, prior to submitting design mixtures.

Special inspection and testing and inspecting agency procedures for field quality control.

Cold- and hot-weather concreting procedures.

Curing procedures.

Anchor rod and anchorage device installation tolerances.

Steel reinforcement installation.

* + - 1. SUBMITTALS
         1. Product Data: Submit manufacturer's product data and installation instructions for each material and product specified in this Section.
         2. Shop Drawings: Provide shop drawings showing details of construction and relationship with adjacent construction. Comply with requirements indicated on the Structural Drawings.

Include concrete design mix, shear anchor layout, track layout and similar items.

Include a diagram showing the location of each panel, as designated by a unique number.

* + - * 1. Evaluation Reports

Submit copy of valid product evaluation report, demonstrating compliance with this specification and applicable codes for site condition.

* + - * 1. Minutes of Pre-Installation Conference: Prepared by General Contractor.
        2. Special Inspections During Construction: Submit written reports.
      1. QUALITY ASSURANCE
         1. Installation Package: Maintain one copy of the manufacturer's installation package on-site throughout the duration of panel installation and concrete work.
         2. Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

* + - * 1. Installer Qualifications: Trained and recommended by manufacturer.
        2. Certified ACI Concrete Testing Service: Engage a qualified independent testing service to perform special inspections in accordance with IBC requirements, including verification of field preparation of materials, expiration dates, and installation of components/

Coordinate timing of inspections such that they can be completed and approved without delaying the progress of the work.

Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver insulating concrete form system units and accessories with manufacturer's printed installation instructions and in manufacturer's original packaging.
         2. Unload and store panels in a manner to prevent bending, warping, twisting, and surface damage.
         3. Protect insulating concrete form system units and accessories from excessive exposure to sunlight while on pallets.
         4. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.
      2. PROJECT CONDITIONS
         1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of panels to be performed according to manufacturers' written instructions and warranty requirements.
         2. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).

Do not use frozen materials or materials containing ice or snow.

Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

* + - * 1. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:

Maintain concrete temperature below 95 deg F (35 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

* + - * 1. Preinstallation Conference: Conduct conference at project site a minimum of two weeks prior to start of installation. Review methods and procedures related to panel assemblies including, but not limited to, the following:

Meet with The Owner, Architect, testing and inspecting agency representative, Installer, and installers whose work interfaces with or affects panels including the installation of doors and windows.

Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.

Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

* + - 1. WARRANTY
         1. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.
      2. REFERENCE STANDARDS
         1. American Society for Testing and Materials (ASTM)

ASTM C165: Standard Test Method for Measuring Compressive Properties of Thermal Insulations

ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

ASTM C272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions

ASTM C303: Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation

ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM D1621: Standard Test Method for Compressive Properties Of Rigid Cellular Plastics

ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics

ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

ASTM D2863: Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

ASTM E72: Standard Methods of Conducting Strength Tests of Panels for Building Construction

ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials

ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials

ASTM E336: Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings

* + - * 1. National Fire Protection Association (NFPA)

NFPA 259: Standard Test Method for Potential Heat of Building Materials

NFPA 268: Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source

NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

NFPA 2

1. PRODUCTS
   * + 1. INSULATED CONCRETE PANELS
          1. Basis-of-Design: HercuWall and HercuWall HD Series 8 Panels by Nudura, 8980 South McKemy Street, Suite 101, Tempe, AZ 85284, Tech@Nudura.com, <https://hercuwall.com>, 866-468-6299. No substitutions.

Assembly: Expanded polystyrene (EPS) form plastic shaped with vertical tongue and grooved edges for interlocking, light gauge steel top and bottom tracks, and reinforcing. Types as applicable to the project:

Series 8 Type A: Nominal thickness 8 inches.

Series 8 Type S: Nominal thickness 8 inches.

Series 8 Type SW: Nominal thickness 8 inches, with weather-resistive barrier film hot-roll laminated onto the exterior face of the Type S wall panel and corner panels.

Series 8 Type I: Nominal thickness 9 inches with 1 inch thick expanded polystyrene used as an additional thermal isolation barrier on the exterior face of the Type S panels.

Materials:

Foam Plastic: Expanded polystyrene (EPS) complying with ASTM C578, Type II expanded polystyrene with a nominal density of 1.50 pcf. ASTM E84 or UL 723 flame spread index of 25 or less and smoke developed index of 450 or less.

HercuStrip: Cold-rolled steel with nominal thickness of 0.022 (HercuWall), 0.033 (HercuWall HD) inches and minimum yield strength of 40 ksi, hot-dipped galvanized with G90 coating thickness per ASTM A 653.

Top and Bottom Tracks: Cold-rolled steel with nominal thickness of 0.022 inches and minimum yield strength of 33 ksi; hot-dipped galvanized with G90 coating thickness per ASTM A 653.

Window and Door Casings: Minimum 20 gauge (0.033 inches) (0.84 mm) thickness complying with ASTM A653/A653M SS Grade 33 with G60 galvanized coating.

CFC Box Beams: Cold-formed steel/concrete box beams, nominal 16 gauge (0.06 inches) (1.6 mm) thickness compying with ASTM A653/A653M SS Grade 33 with G60 galvanized coating.

Truss Saddle Brackets: Cold-formed steel, nominal 20 gauge (0.035 inches) (0.89 mm) thickness compying with ASTM A653/A653M SS Grade 33 with G90 galvanized coating.

Embeds: Cold-formed steel, nominal 20 gauge (0.035 inches) (0.89 mm) thickness compying with ASTM A653/A653M SS Grade 33 with G90 galvanized coating.

Rebar Clips: Factory-applied to HercuStrip with integral snap-on feature.

Rebar (Steel Reinforcing Bars): Deformed reinforcing bars complying with ASTM A615 Grade 60 with minimum yield strength of 60 ksi and nominal bar diameter of 1/2 inch, No. 4 rebar.

Concrete: Minimum compressive strength of 4,000 psi at 28 days, normal-weight concrete, conforming with IBC Sections 1903 and 1905 as applicable. Coordinate quantity of water held back at the batch plant for adjustment on the jobsite.

Water-Resistive Barrier Film: Polyester thin film with attaching adhesive integrated on the film, nominal 3 mils thick. Shall be used under applicable mechanically-fastened cladding assemblies.

Seaming Tape: HercuWall Seaming Tape, UV stabilized, polyethylene water-resistant sheathing tape, nominal 8 mils thick.

Seaming Tape: HercuWall Seaming Tape, UV stabilized, polyethylene water-resistant sheathing tape, nominal 8 mils thick.

Air/Water-Resistive Barrier Membrane: Shall be produced by Tremco CPG, Inc. and be verified compatible with cladding type selected for design of the building structure. Use of this membrane shall replace items k., l., and m. above. Systems include those listed below. Refer to applicable system literature for additional associated transition and flashing components:

Tremco ExoAir 230

Dryvit (Tremco) Backstop NTX

Fasteners: Corrosion resistant.

Sealants Under Bottom Track: Manufacturer's recommended sealant complying with ASTM C 920, Class 25 or 3 ½ inch continuous sill plate gasket.

Fire Resistance Tests: Assembly shall pass ASTM E119 requirements.

One-Hour Rating: HercuWall Series 8 Type S, SW or A covered with one layer of 5/8 inch Type X gypsum boards installed on both sides of the panel

Two-Hours Rating: HercuWall Series 8 Type S, SW or A covered with two layers of 5/8 inch Type X gypsum boards installed on both sides of the panel.

Non-Combustible Construction, Building Type I-IV Construction: Assembly shall pass NFPA 285 requirements.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion. Inspect foundation to confirm locations of dowels and rebar studs.

Inspect slab to confirm flatness and levelness tolerances have been met. Require that non-conforming slabs are corrected and brought to within tolerance.

Verify unsatisfactory conditions have been corrected prior to start of installation.

* + - 1. INSTALLATION
         1. Install panels in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

Ensure that special inspections have been performed prior to concrete placement.

Ensure that tongue and groove between panels are fully engaged.

Verify sheathing tape is installed to panel joints, top track and bottom track as applicable.

Verify weather-resistive barrier is intact and without damage as applicable.

Verify slump flow and collection of concrete samples are performed in accordance with manufacturer's recommended methods.

Place concrete in accordance with manufacturer's recommendations and approved submittals.

* + - 1. TOLERANCES
         1. Installation Tolerances: Align wall panel units within installed tolerance of 1/4 inch in 20 feet non-accumulative, on level, plumb, and location.
      2. REPAIR
         1. Repair panels damaged during or after installation in accordance with manufacturer's recommended methods. Replace panels which have been damaged beyond successful repair.
      3. CLEANING
         1. Waste Management

Clean up and properly dispose of all debris remaining on job site related to the installation of the insulated concrete forms.

* + - 1. PROTECTION
         1. Assure final finishes are installed over form product or provide temporary coverage of installation to reduce EPS foam surface exposure to ultra violet light should final finish application be delayed longer than 18 months after form product installation.
         2. Consult with exterior finish contractor concerning exposure of EPS to ultraviolet light to ensure proper finish to ICF walls.

END OF SECTION