DIVISION 07 – SECTION 2100
Short Form Guide Specification

THERMAL, AIR BARRIER AND WATER BARRIER WALL SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide a thermal, air barrier and water-resistive barrier wall system for exterior cold-formed metal wall assemblies that have passed NFPA 285 without exterior gypsum wall sheathing. Work includes.
    a. Provide exterior wall insulation.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section [054000 - Cold-Formed Metal Framing:] [_ _ -_____:]
   Load-bearing, metal exterior wall framing assemblies.
3. Section [092116 – Gypsum Board Assemblies:] [_ _ -_____:]
   Interior gypsum board wall finish.

C. General Notes:

1. The design and construction of the exterior cold-formed metal wall assemblies and supporting structure is the responsibility of the project architect, engineer, general contractor and the building owner. The structure must be designed to resist all live, dead, snow, wind and construction loadings without excessive deflections as dictated by the governing building codes.
2. The selection and use of exterior wall insulations, as well as other wall system components, to meet the requirements for any given project is at the sole discretion of the owner or his designated agent or representative.
3. Only skilled, trained workmen familiar with ECOMAXci FR Air Barrier exterior wall insulation and the various other components of the wall system shall be used to perform the required work.

1.2 SYSTEM DESCRIPTION

A. Furnish and install an exterior installation that effectively controls thermal, air and water performance and provides continuity of the building envelope enclosure while meeting fire code compliance per NFPA 285 without exterior gypsum wall sheathing. The system shall include the following:

1. Exterior wall insulation secured to the exterior of the metal wall framing assembly.
2. Joint, penetration and gap sealing material for sealing component joints, penetrations through the wall system and gaps between the building envelop enclosure components and wall opening frames.

B. Performance Characteristics:

1. Thermal performance: Exterior wall insulation tested per: ASTM C518, Shall have a stabilized R-value of 6.5 per inch of thickness with a minimum six month exposure capability to outdoor elements and 15 year thermal warranty.
2. Air barrier performance: When tested in accordance with ASTM E2357, at a test pressure of not less than 6.24 psf, air infiltration shall not exceed 0.04 cfm square foot (0.2 L/s*m^2) of fixed wall area. Testing should be conducted at positive and negative sustained wind loading of 12.5 psf (600 Pa) for one-hour duration in each direction, pressure cycling of the wall at 2000 cycles in both the positive and negative direction, ending with wind gust loading at 25 psf.
3. Water penetration: When tested in accordance with ASTM E331, no uncontrolled water penetration shall occur at a minimum differential pressure of 6.24 psf for minimum test durations of 2 hrs.
4. Mold resistance: Wall system components shall provide non-food source for fungal growth.

C. All joints, penetrations and gaps of the wall system shall be made water tight and air tight.

D. Fire Resistance:
1. System complies with NFPA 285.
2. Fire-stopping measures, per code, should be included at the floor line in the stud cavity when the wall assembly extends beyond the edge of the floor line.

E. WARNING:
1. Polyisocyanurate is an organic material which will burn when exposed to an ignition source of sufficient heat and intensity and may contribute to flames spreading.

F. Code Compliance: Exterior wall system and component materials shall comply with the following requirements:
1. Exterior Wall Insulation:
a. Class 1 (< 25 Flame Spread Index and < 450 Smoke Developed Index) classified at max. thickness per ASTM E84 criteria.
b. Fire Performance Evaluation as a component of an NFPA 285 approved wall assembly per the requirement of the International Building Code.
2. System complies with ASTM E2357:
3. System complies with NFPA 285:

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM International) (www.astm.org):
1. C203 Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
2. C209 Test Methods for Cellulosic Fiber Insulating Board
3. C518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. C1289 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
3. D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

4. D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
5. D2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
6. E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
7. E96 Standard Test Method for Water Vapor Transmission of Materials.
8. E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
9. E2357 Test Method for Determining Air Leakage of Air Barrier Assemblies.

B. Canadian Standards Association/Underwriters Laboratories of Canada (CAN/ULC) (www.ulc.ca):
1. S770 Standard Test Method Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.
2. S704 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.

C. National Fire Protection Association (NFPA) (www.nfpa.org):
1. NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus.

D. Underwriters Laboratories (UL) (www.ul.com):
1. UL 1715 Room Fire Test Standard of Interior Finish Material.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Submit manufacturer's product data and installation instructions for each wall system component product required.
2. Reports: Submit documentation verifying wall system components meet or exceed specified requirements.
   a. ASTM E2357 air barrier system testing
   b. ASTM E331 water penetration testing
   c. NFPA 285 fire testing that has passed without exterior gypsum wall sheathing
   d. UL1715 fire testing
3. Samples:
   a. Submit 12x12 inch sample(s) of ECOMAXci FR Air Barrier exterior wall insulation
   b. Submit 3 total sample(s) of each exterior wall insulation's fasteners/washers and veneer anchors
   c. Submit 5 inch long strip sample(s) of R-SEAL 6000 flashing
   d. Submit 5 inch long strip sample(s) of R-SEAL 3000 tape

1.4 Quality Assurance:

A. Only skilled, trained workmen familiar with ECOMAXci FR Air Barrier exterior wall insulation and the various other components of the wall system shall be used to perform the required work.

B. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.

(Include the following for sustainable design submittals.)

C. Sustainable Design Submittals:
   1. The United States Green Building Council (USGBC) developed the Leadership in Energy and Environmental Design (LEED)® Rating System as the standard for green buildings. The LEED system establishes basic requirements for various aspects of sustainable design.
   2. Rmax ECOMAXci FR Air Barrier exterior wall insulation products may help in the process of qualifying for LEED credits in a number of categories.
      a. EA Prerequisite 2: Minimum Energy Performance
      b. EA Credit 1: Optimize Energy Performance
      c. MR Credit 2: Construction Waste Management
      d. MR Credit 3: Materials Reuse
      e. MR Credit 4: Recycled Content
      f. MR Credit 5: Regional Materials

D. Pre-installation Meeting: Prior to commencement of application of the ECOMAXci Wall Solution, review and document methods and procedures related to installation, including the following:
   1. Participants: Authorized representatives of the Contractor, [Construction Manager,] [Owner,] Architect, [Engineer,] Applicator, Independent Inspector.
   2. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
   3. Review exterior wall insulation methods and procedures related to application including manufacturer's installation guidelines.
   4. Review construction schedule and confirm availability of products, applicator personnel, equipment and facilities.
   5. Review governing regulatory requirements, and requirements for insurance and certificates as applicable.
   6. Review field quality control procedures.

1.5 Warranty:

A. Submit the following warranties:
   1. Exterior wall insulation: Six month exposure and 15 year thermal warranty
   2. Tape: Limited Warranty
   3. Flashing: Limited Warranty

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Rmax Operating, LLC; Sales & Technical office: 13524 Welch Road, Dallas, TX 75224, Toll Free Tel: 1-800-527-0890, Tel: 972-387-4500, Fax 972-385-4673, Web: www.rmax.com, E-mail: Technical@rmax.com

B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2 MATERIALS

A. Exterior Wall Insulations: Closed-cell polyisocyanurate (POLYISO) foam core bonded to glass fiber reinforced aluminum foil facers on both sides. The printed side, exposed to the exterior, has a heavy and durable aluminum reflective surface.

1. Physical properties:
    a. ASTM C1289 Type I, Class 1
    b. Compressive Strength (ASTM D1621): 25 psi, minimum
    c. Aged Thermal Resistance (ASTM C518, measured at Mean Temp of 75°F): [R-6.5 per 1 inch] of thickness with 15 year thermal warranty
    d. Flexural Strength (ASTM C203): Minimum 40 psi
    e. Water Absorption (ASTM C209): Maximum. 1.0 percent by volume
    f. Water Vapor Permeance (ASTM E96): < 0.3 perms
    g. Maximum Service Temperature: 250°F
2. Required Products: Rmax Operating, LLC ECOMAXci FR Air Barrier exterior wall insulation.
    a. Panel Size: 4 feet wide x 8-12 feet long, square edge panels
    b. Thickness and Stabilized R-Value: Nominal inch thickness [1.0 inch, R-6.5] [1.5 inch, R-10][2.0 inch, R-13.1][2.5 inch, R-16.7][3.0 inch, R-20.3].

B. Accessories:

1. Insulation Fasteners: Provide self-taping steel screws with minimum 2 inch diameter plastic plate/washer.
    a. Acceptable Products: Rodenhouse Inc. Plastic Grip CBW2 Low Profile Flat Plastic Washers and Grip Deck galvanized self-drilling screws or equivalent, as determined by component manufacturer.
2. Insulation Tape: Provide insulation manufacturer's recommended tape for sealing joints, fasteners, seams, and minor facer repair penetrations through the insulation layer.
    a. Required Products: Rmax R-SEAL 3000 aluminum foil tape, 4 inch wide.
3. Insulation Flashing: Provide insulation manufacturer's recommended flashing for sealing at corners, ceiling and floor transitions, windows, doors, and other through wall penetrations.
    a. Required Products: Rmax R-SEAL 6000 flashing with a butyl rubber adhesive, 9 inch or 12 inch wide.
4. Insulation Caulk: Provide insulation manufacturer's recommended caulk for sealing small penetrations and anchors.
    a. Acceptable Products: Henry HE925-BES or equivalent.
5. [Brick Ties]: Provide insulation manufacturer's recommended brick ties.
    a. Acceptable Products:
        i. BLOK-LOK BL-607
        ii. Heckmann Building Products Pos-I-Tie
        iii. or equivalent.

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Rmax ECOMAXci FR Air Barrier exterior wall insulation is shipped in approximately 48 inches high, wrapped bundles. Rmax requires that insulation bundles be unloaded from trucks by a fork- lift truck or similar equipment with suitable forks to slide under bundles. Rolling or tumbling bundles off delivery trucks will damage the insulation and cause the Rmax warranties to become void.

B. Insulation bundles shall be stored on pallets or other dunnage at least 4 inches above ground level. Dunnage supplied by Rmax for shipment of the insulation is not adequate for use in storage of the materials. Bundles placed directly on the ground may cause the Rmax warranties to become void.

C. Insulation materials should be kept free of dirt and other foreign matter.

D. The wrapping materials used to ship the bundles are not adequate for weather protection at the job site. Additional coverage, such as tarps, should be added over the boards to keep them dry once off loaded from the delivery truck.

E. WARNING: DO NOT install or seal wet insulation within a exterior wall assembly. Installation of wet insulation, tape, flashing or any other components within the wall assembly shall cause the Rmax warranties to become void.

3.2 PROJECT CONDITIONS

A. Confirm that all building structural steel members have been erected. Exterior wall stud framing finished surfaces shall be clean and free of irregularities that will affect the placement or performance of the ECOMAXci Wall Solution, including, but not limited to dirt, debris, miscellaneous fasteners or warped, defective or otherwise damaged framing.

B. Exterior wall steel studs framing members shall be a minimum of 3 5/8 inch depth, minimum 20 gauge and spaced a maximum of 24 inches on center with lateral bracing every 4 feet vertically.

C. Confirm that the metal exterior wall steel stud framing bottom track sitting on the floor and the top track attached to the ceiling have been sealed per standard building practices to prevent air leakage at these locations.

D. Verify that metal wall studs, opening framing, bridging, bracing and other framing support members and anchorage have been installed within thermal wall system alignment tolerances and requirements.

E. Do not proceed with ECOMAXci Wall Solution installation until unsatisfactory conditions have been corrected.

F. Installation of the ECOMAXci Wall Solution constitutes acceptance of existing conditions and responsibility for satisfactory performance.

G. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum result. Do not install products under environmental conditions outside manufacturer’s absolute limits.

H. ECOMAXci Wall Solution should not be installed during adverse weather conditions, such as rain, sleet, snow or heavy winds.

I. Do not install wall system components on walls when water of any type is present. Do not apply any wall system component that is damp or wet.

J. If insulation boards get wet, ensure they are fully air dried before installing, sealing or covering.

K. Verify that all surfaces to receive R-SEAL 3000 & R-SEAL 6000 are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious materials that would impair bond.

L. Verify that items required to penetrate the thermal wall system are placed and penetrations gaps and cracks are properly sealed before installation is complete.

M. At no point between working days should the ECOMAXci FR Air Barrier be left partially taped. All taping and flashing of a started section shall be completed and all exposed foam edges shall be sealed by R-SEAL 3000 before the work day ends.

3.3 WALL SYSTEM INSTALLATION

A. Install ECOMAXci Wall Solution in accordance with manufacturer's recommendations. Properly installed exterior wall insulation will completely cover all exposed steel framing members without gaps, voids, or compressions, and it will also act as the exterior air and water barrier material.

1. Starting at an end wall condition, where possible, the insulation boards should be placed on the wall with the long dimension horizontal and level to the floor/slab. The insulation boards should be oriented with the Rmax Solutions shield facing the exterior side of the building.
2. Each row of insulation should be staggered a minimum of one stud spacing to the row below. All boards must be tightly abutted together.
3. Each insulation board shall be secured with a fastening pattern of 12 inches o.c. along the edge of each exterior wall facade and at the perimeter of each board where backed by framing. The pattern shall be 16 inch o.c. in the field along framing.
4. Plates/washers should never break the foil facing of the boards. Do not countersink plates/washers.
5. One fastener can be used to bridge a maximum of three adjacent board joints.
6. The bottom edge of the lowest row of boards along each wall facade should be placed a minimum of 1 inch BFF (Below Finished Floor) where possible or reference the architectural plans. The top edge of the highest row of boards along each wall facade should be placed at the top of the parapet or stud framing.
7. At changes in wall directions (corners) the boards should snugly fit in an overlap.
8. 4 inch wide R-SEAL 3000 shall be used to seal all joints of adjacent insulation boards, as well as cover all insulation fasteners. It can also be used to repair minor damages to the foil facer of the ECOMAXci FR Air Barrier insulation.
9. Any damages to the foam core and major damages to the foil facing that occur during installation must be replaced by fully cutting out the damaged area. The removed piece should be large enough to span entire stud spacing to ensure new joints are backed by framing. A new piece of ECOMAXci FR Air Barrier insulation can be cut to fill the open area. This new piece shall be fastened and sealed similar to other insulation boards as outlined in this document.

10. All surfaces to which the R-SEAL 3000 and R-SEAL 6000 are to be applied should be free of moisture, oils, dust, dirt and other debris that could inhibit adhesion. Clean surfaces with a dry cloth as necessary.
11. Center tape along joint and fastener locations. Maintain a minimum 3/4 inch radial coverage beyond plastic washers. Do not allow the tape to form voids or buckle as it is applied.
12. Apply tape in a shingle like fashion, working from bottom of the section up. In other words, first apply tape to the bottom horizontal joint, then both vertical joints and finally the top horizontal joint. A minimum of 2 inch overlap is required when connecting ends of tape segments.
13. 9 inch or 12 inch wide R-SEAL 6000 must be used to seal at corners, ceiling and floor transitions, windows, doors and other throughwall penetrations.
14. Use standard flashing practices. Flashing should always be installed in a shingle-like fashion, starting with the bottom and working up.
15. R-SEAL 6000 shall be used at board terminations including but not limited to: building foundations, slabs, shelf protrusions, roofing membranes or blocking, to seal the end joints where butyl rubber tape is compatible.
16. When installing the exterior veneer, care should be taken to minimize the damage to the insulation, tape, and flashing so as not to break the water and air seal provided by the ECOMAXci Wall Solution. Any damages beyond anchor penetrations must be repaired.
17. ECOMAXci Wall Solution is non-structural and must not be used to support any exterior cover materials.
18. Exterior anchor penetrations such as BLOK-LOK BL-607 or Heckmann Building Products Pos-I-Tie® brick ties must be sealed using a sealant such as Henry HE925-BES or equivalent.
19. For all other veneer penetrations, consult manufacturer's installation instructions for more details on how to maintain water and air barriers.
20. Refer to the RMAX website for the complete and most current installation instructions before construction begins.

END OF SECTION