

TECH SOLUTIONS 213.0 NAHB MODEL GREEN HOME BUILDING GUIDELINES: ACHIEVING POINTS WITH DOW BUILDING SOLUTIONS PRODUCTS



SUMMARY

This document includes general information about the *National Association of Home Builders (NAHB) Model Green Home Building Guidelines* that was officially launched in February 2008. In addition, this document lists many of the categories and points that may be achieved to earn NAHB green home certification at various levels. The certification requirements for Bronze, Silver and Gold levels are 237 points, 311 points and 395 points, respectively. Using products and systems from Dow Building Solutions can help home builders earn 92-155 points toward the home's certification.

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General Information

The NAHB brought green to the mainstream with its National Green Building Program for all home builders. A green home focuses on energy efficiency, water and resource conservation, the use of sustainable or recycled products, and measures to protect indoor air quality. An online scoring tool is provided by NAHB to facilitate the scoring and certification efforts.

The effort to create *NAHB Model Green Home Building Guidelines* started in 2004. NAHB is in the process of making the guidelines meet the ANSI standard. The ANSI standard is undergoing approval and will be available later in 2008. After the standard is approved, the green program will be based on the ANSI standard instead of current guidelines. The ANSI standard will include provisions that define green attributes for subdivisions, multi-family dwellings, remodeling projects, additions and single-family homes.

The success of the NAHB Green Building Program requires the professionalism of the network of verifiers. The verifier performs rough inspection, final inspection and documentation for the builder. However, the verifier's responsibility does not include doing research for the builder. The verifier only verifies the green features the builder claims. The NAHB Research Center will administrate and certify the homes after the builder submits the final documentation.

The process for the builder to get homes certified is:

1. Design the home
2. Score the home using the NAHB Green Scoring Tool
3. Hire an NAHB-approved verifier to do rough and final inspections and claim points
4. Apply for NAHB National Green Building Program certification

The NAHB Research Center has the final authority on whether or not to award the points claimed.

There are seven sections in the *NAHB Model Green Home Building Guidelines*:

- Section 1: Lot Design, Preparation and Development
- Section 2: Resource Efficiency
- Section 3: Energy Efficiency
- Section 4: Water Efficiency
- Section 5: Indoor Environmental Quality
- Section 6: Operation, Maintenance and Homeowner Education
- Section 7: Global Impact

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CERTIFICATION REQUIREMENTS

Table 1 shows the potential certification levels and point requirements.

There are three certification levels: Bronze, Silver and Gold. The minimum points listed in Table 1 must be achieved for each of the seven sections in the guidelines and the total points required for a particular certification level. The minimum points achieved in any of the seven sections and the total points determine the certification level achieved. Excess points in one section cannot be traded off to meet the minimum points required for another section.

Example: A home achieves a total of 311 points after final inspection. The total points are broken out into the seven different sections as follows:

- Lot Design: 10
- Resource Efficiency: 60
- Energy Efficiency: 62
- Water Efficiency: **12**
- Indoor Environmental Quality: **55**
- Operation, Maintenance and Homeowner Education: 7
- Global Impact: 5
- Additional 100 Points of Your Choice: 100

Even though the total points for the house appear to qualify it as Silver, it qualifies as Bronze because the Water Efficiency total achieved is less than the minimum point requirement for Silver (13 points required, only 12 achieved). The extra point in the Indoor Environmental Quality total cannot be added to Water Efficiency.

POTENTIAL POINTS FOR DOW BUILDING SOLUTIONS PRODUCTS

Current Dow Building Solutions products can help builders achieve the following points in the following sections of the *NAHB Model Green Home Building Guidelines*. Direct quotes from the guidelines appear in italics and notes on potential points that can be earned by using Dow products appear in standard text.

Section 2: Resource Efficiency

2.1.5 Use building materials that require no additional finish resources to complete application onsite. 4 pts

Use at least one material that requires no onsite finishing. That material must be used in at least 80 percent of the construction for that type of material. THERMAX™ Insulation can be used in basements and crawl spaces exposed without finish materials.

2.1.6 Use precut or pre-assembled building systems or methods.

B. Provide a panelized wall framing system. 6 pts

Requires 80 percent of the wall framing be panelized. Dow's broad product portfolio, including STYROFOAM™ Brand Extruded Polystyrene Insulation*, GREAT STUFF PRO™ Insulating Foam Sealants, WEATHERMATE™ Housewraps and STYROFOAM SIS™ Brand Structural Insulated Sheathing, along with other building materials, can serve as key components in panelized wall framing systems.

TABLE 1: NAHB NATIONAL GREEN BUILDING PROGRAM CERTIFICATION LEVELS

	Bronze (min)	Silver (min)	Gold (min)
Lot Design, Preparation and Development	8	10	12
Resource Efficiency	44	60	77
Energy Efficiency	37	62	100
Water Efficiency	6	13	19
Indoor Environmental Quality	32	54	72
Operation, Maintenance and Homeowner Education	7	7	9
Global Impact	3	5	6
Additional 100 Points From Sections of Your Choice	100	100	100
Total Points Required	237	311	395

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*STYROFOAM™ Brand Extruded Polystyrene Insulation products include STYROFOAM™ Brand Square Edge Insulation, STYROFOAM™ Brand SCOREBOARD™ Insulation, STYROFOAM™ Brand Residential Sheathing, STYROFOAM™ Brand Residing Board, STYROFOAM™ Brand DURAMATE™ Plus Insulation, and STYROFOAM™ Brand Tongue and Groove Insulation.

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D. Provide modular construction for the entire house. 7 pts

Requires 80 percent of the volume be from modules. Dow products, such as STYROFOAM™ Brand Extruded Polystyrene Insulation*, GREAT STUFF PRO™ Insulating Foam Sealants, WEATHERMATE™ Housewraps and STYROFOAM SIS™ Brand Structural Insulated Sheathing, along with other building materials, can serve as key components in modular systems.

2.1.7 Use a frost-protected shallow foundation (FPSF). 4 pts

Requires FPSF be used. STYROFOAM™ Brand Extruded Polystyrene Insulation* is an ideal insulation solution for FPSF.

2.2.9 Provide a water-resistive barrier (WRB) or a drainage plane system behind the exterior veneer system or the exterior siding. 8 pts

Requires a water-resistive barrier be used on all exterior surfaces of the envelope. STYROFOAM™ Brand Extruded Polystyrene Insulation*, STYROFOAM SIS™ Brand Structural Insulated Sheathing, most Dow polyisocyanurate insulation** and WEATHERMATE™ Housewraps are approved water-resistive barriers when installed according to Dow's instructions for installing as a water-resistive barrier.

2.2.11 Install enhanced foundation waterproofing. 7 pts

Requires waterproofing instead of damp-proofing for foundations. STYROFOAM™ Brand Extruded Polystyrene Insulation* is frequently used in warranted systems offered by waterproofing companies.

2.4.1 Use recycled-content building materials. 1 pt

Requires verification of 10 percent of recycled-content material for 80 percent of the class of material used. Scores 3 points for two materials, and 1 point each for the next three, with a total 6 points maximum. STYROFOAM SIS™ Brand Structural Insulated Sheathing qualifies for this credit because its structural layer is composed of recycled post-consumer cellulose.

2.6.1 Use materials manufactured from renewable resources or agricultural byproducts such as soy-based insulation, bamboo or wood-based products. 1 pt

Requires renewable materials such as wood, bamboo and soy-based products be used for 50 percent of the class of material used. Scores 3 points for two products, and up to 3 more points for additional products. STYROFOAM SIS™ Brand Structural Insulated Sheathing qualifies for this credit because its structural layer is composed of recycled cellulose.

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**Dow polyisocyanurate insulation products include TUFF-R™, Super TUFF-R™ and THERMAX™ Sheathing.

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2.7.1 Use products that contain fewer resources than traditional products. 3 pts

Requires products contain fewer resources to meet same end use as traditional products. STYROFOAM™ Brand Extruded Polystyrene Insulation*, most Dow polyisocyanurate insulation** and STYROFOAM SIS™ Brand Structural Insulated Sheathing can provide multiple functions such as insulation, water-resistive barrier and wall bracing to allow fewer resource components on the wall compared to traditional fiberglass, oriented strand board (OSB) and housewrap. Continuous foam sheathing can also help achieve a highly energy-efficient wall using 2x4 framing instead of 2x6.

Section 3: Energy Efficiency

3.1.1 Home is equivalent to IECC 2003 or local energy code, whichever is more stringent. (Required)

3.1.3 Conduct third-party plan review to verify design and compliance with the Energy Efficiency section. (Required)

STYROFOAM™ Brand Extruded Polystyrene Insulation*, Dow polyisocyanurate insulation**, GREAT STUFF PRO™ Insulating Foam Sealants, WEATHERMATE™ Housewraps and STYROFOAM SIS™ Brand Structural Insulated Sheathing are key elements, along with other energy-efficiency features, designed to achieve IECC 2003 or local energy code requirements.

3.2. Performance Approach

3.2.1 Home is X% above IECC 2003

- A. 15%, 37 pts*
- B. 30%, 62 pts*
- C. 40%, 100 pts*

STYROFOAM™ Brand Extruded Polystyrene Insulation*, Dow polyisocyanurate insulation**, GREAT STUFF PRO™ Insulating Foam Sealants, WEATHERMATE™ Housewraps and STYROFOAM SIS™ Brand Structural Insulated Sheathing, along with other energy-

efficiency features, can help exceed IECC 2003 to achieve the x% energy-efficiency improvements. Dow can also perform an energy analysis to determine the percentage improvements for specific energy-efficiency features.

3.3 Prescriptive Approach

3.3.1 Building Envelope

A. Increase effective R-value of building envelope using advanced framing techniques, continuous insulation, and/or integrated structural insulating system. Measures may include but are not limited to:

- *ICFs, 8 pts*
ICF is the abbreviation for “insulated concrete forms.” Third-party systems that use STYROFOAM™ Brand Extruded Polystyrene Insulation*, such as THERMOMASS (trademark of Composite Technologies Corporation) and Superior Walls from Superior Walls of America, Ltd., qualify for the intent of this credit with the system providing both insulation and thermal mass effect.

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- *Advanced framing or insulated corners and interior/exterior wall intersections, insulated headers on exterior walls, 6 pts*
STYROFOAM™ Brand Extruded Polystyrene Insulation* and Dow polyisocyanurate insulation** can help achieve preferred insulated headers in advanced framing systems.
- *Continuous insulation on exterior wall, 4 pts*
Requires continuous insulation used to eliminate thermal shorts on exterior walls. STYROFOAM™ Brand Extruded Polystyrene Insulation*, Dow polyisocyanurate insulation** and STYROFOAM SIS™ Brand Structural Insulated Sheathing are designed to provide continuous insulation without thermal shorts.
- *Continuous insulation on cathedral ceiling, 4 pts*
Requires continuous insulation used to eliminate thermal shorts on cathedral ceilings. STYROFOAM™ Brand Extruded Polystyrene Insulation* and Dow polyisocyanurate insulation** are designed to provide continuous insulation without thermal shorts.

B. Incorporate air sealing package to reduce infiltration. (All measures that apply to project must be performed.) 10 pts

Requires air sealing packages be used in 11 places stated in the guidelines to reduce air infiltration. WEATHERMATE™ SILL SEAL Foam Gasket, WEATHERMATE™ Housewraps, GREAT STUFF PRO™ Insulating Foam Sealants, STYROFOAM™ Brand Spray Polyurethane Foam Insulation, FROTH-PAK™ FS Foam Insulation Kits and FROTH-PAK™ Foam Sealant Kits are designed to reduce air infiltration around the house.

3.3.2 HVAC Design, Equipment and Installation

B. Design radiant floor or hydronic space heating system. 8 pts
STYROFOAM™ Brand Extruded Polystyrene Insulation* is designed for use in radiant floor heating systems.

L. When installing ductwork: no building cavities used as ductwork; install all heating and cooling ducts and mechanical equipment within the conditioned building envelope; no ductwork installed on exterior wall. 8 pts

STYROFOAM™ Brand Extruded Polystyrene Insulation*, Dow polyisocyanurate insulation**, STYROFOAM™ Brand Spray Polyurethane Foam Insulation, FROTH-PAK™ FS Foam Insulation Kits and FROTH-PAK™ Foam Sealant Kits can be used in cathedral attics and closed crawl spaces, which allow installation of heating and cooling ducts and mechanical equipment within the conditioned building envelope.

Section 5: Indoor Environmental Quality

5.1 Minimize Potential Sources of Pollutants

5.1.4 Ensure a tightly sealed door between the garage and living area, and provide continuous air barrier between garage and living areas including air sealing penetrations, walls, ceilings and floors. 9 pts

GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant and FROTH-PAK™ Foam Sealant Kits can be used to air seal penetrations between the garage and the living area.

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**Dow polyisocyanurate insulation products include TUFF-R™, Super TUFF-R™ and THERMAX™ Sheathing.

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Section 7: Global Impact

7.1.3 Use low- or no-VOC sealants. Construction adhesives: the greater of 15% by weight or 200 grams/liter. Sealants and caulk: the greater of 4% by weight or 60 grams/liter. Contact adhesives: the greater of 80% by weight or 650 grams/liter. 5 pts

Requires VOC concentrations for construction adhesives and sealants meet the limits specified in the California Air Resources Board (CARB) Regulations for Reducing Volatile Organic Compound Emissions From Consumer Products.

GREAT STUFF PRO™ Insulating Foam Sealants are exempt according to the December 2007 CARB Regulations for Reducing Volatile Organic Compound Emissions From Consumer Products and the Ozone Transport Commission (OTC) Model Rule for Consumer Products.

GREAT STUFF PRO™ Insulating Foam Sealants and ENERFOAM™ Foam Sealants are compliant with current CARB and South Coast Air Quality Management District (SCAQMD) Rule 1168 Adhesives and Sealants (amended Jan. 7, 2005) and the OTC Model Rule for Adhesives and Sealants (effective

Jan. 1, 2009). The VOC content of these products is less than 14 percent.

ENERBOND™ and GREAT STUFF PRO™ Wall & Floor Adhesives are compliant with the OTC Model Rule for Adhesives and Sealants (effective Jan. 1, 2009). The VOC content is less than 13 percent.

The VOC content of FROTH-PAK™ Polyurethane Foam Spray System is <3 percent and STYROFOAM™ Brand Spray Polyurethane Foam System is <7.5 percent, as determined per current CARB, SCAQMD Rule 1168 (amended Jan. 7, 2005) and the OTC Model Rule for Adhesives and Sealants (effective Jan. 1, 2009). The VOC content is stated assuming the two-part system, consisting of the isocyanate side and the polyol side, was mixed and reacted together as specified. The VOC content of the FROTH-PAK™ FS Foam Insulation Kit and the STYROFOAM™ Brand Spray Polyurethane Foam System are not regulated.

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SUMMARY

Table 2 shows the total potential points that Dow products can contribute based on the sections described previously.

Compare Table 2 and Table 1 to see how Dow products can help home builders achieve the desired certification level.

Supplemental Information

Supplemental information related to the sections described above can be found in the *NAHB Verifier's Resource Guide* and *NAHB Model Green Home Building Guidelines*. For additional information regarding these publications as well as the online NAHB Green Scoring Tool, visit www.nahbgreen.org.

Scope and Restrictions

This list of potential points is only applicable to the *NAHB Model Green Home Building Guidelines* released in February 2008. Future versions of these guidelines may impact the potential points based on new additional requirements.

REFERENCES

- *NAHB Model Green Home Building Guidelines*
- *NAHB Verifier's Resource Guide*
- www.nahbgreen.org

TABLE 2: TOTAL POTENTIAL POINTS⁽¹⁾ WHEN USING DOW PRODUCTS⁽²⁾

	Potential Points	
Lot Design, Preparation and Development	0	
Resource Efficiency	41	
Energy Efficiency	Performance: 37-100	Prescriptive: 48
Water Efficiency	0	
Indoor Environmental Quality	9	
Operation, Maintenance and Homeowner Education	0	
Global Impact	5	
Additional 100 Points From Sections of Your Choice	vary	
Total Points Potential	92-155	

- (1) These potential points are suggestions only and need to be verified by NAHB-approved verifiers. NAHB Research Center has the final authority to resolve any discrepancies regarding points.
- (2) Not all the products listed in this document are available in all areas. Check with your local Dow sales representative or distributor to determine available products in your area.

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NOTICE: Changes to the International Residential Code require the installation of a water-resistive barrier (WRB) within most exterior wall assemblies in residential construction. The following Dow insulated sheathing products qualify as a WRB when installed according to the installation instructions developed for "installation of foam sheathing as a water-resistive barrier": STYROFOAM™ DURAMATE™ Plus, STYROFOAM™ Residential Sheathing, STYROFOAM™ Tongue and Groove, STYROFOAM SIS™, STYROFOAM™ Square Edge, STYROFOAM™ Residing Board, STYROFOAM™ High Performance Underlayment, THERMAX™ Sheathing, TUFF-R™ and Super TUFF-R™ and therefore do not require the use of a building paper or a housewrap as a WRB. When a WRB is not needed, these Dow foam sheathings may be installed according to standard installation instructions for foam sheathing from Dow. Be sure products and installation instructions meet code requirements for your particular location. Note: WEATHERMATE™ and WEATHERMATE™ Plus Housewraps have already qualified as water-resistive alternatives to the prescribed felt (see Evaluation Reports NER-593 and NER-640 for approved alternative).

STYROFOAM™ Brand Extruded Polystyrene Insulation

CAUTION: This product is combustible. Protect from high heat sources. A protective barrier or thermal barrier may be required as specified in the appropriate building code. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

Dow Polyisocyanurate Insulation

CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.

GREAT STUFF PRO™, ENERFOAM™ and ENERBOND™ products contain isocyanate and a flammable blowing agent. Read the label and Material Safety Data Sheet carefully before use. Eliminate all sources of ignition before use. Wear gloves, and goggles or safety glasses. Provide adequate ventilation or wear proper respiratory protection. Contents under pressure.

FROTH-PAK™ Polyurethane Spray Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing, gloves, goggles or safety glasses, and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter may be required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure.

STYROFOAM™ Brand Spray Polyurethane Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing, gloves, goggles and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter is required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure. STYROFOAM™ Brand SPF should be installed by a trained SPF applicator.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.

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