

Construction Services Memorandum

August 29, 2006

To: MSHA Design and Construction Partners
From: Construction Services

Subject: MSHA's *Green Build Standards* - Amendment #2

As a result of the ongoing implementation and utilization of MSHA's *Green Building Standards* on current projects, further clarification and/or modification related to specifics of the standards is necessary.

This **Amendment #2** clarifies and/or modifies MSHA's *Green Building Standards* dated August 2005 as follows:

Amendment 2.1, MSHA *Green Building Standards*, SECTION 3 R2 ENERGY EFFICIENCY – BUILDING ENVELOPE:

In reference to the table provided, all “R Values” are simply the minimum values for the insulation materials; they are not “composite,” “average,” or any other form of factored values.

Commentary:

Understanding that the referenced standard sets forth only a minimum R value for the insulation materials, this standard falls short in expressing the importance for careful design and proper analysis in defining and analyzing the effectiveness of the building envelope as a system. Specifically, it is hoped that designers and engineers will consider the overall effectiveness of the proposed wall systems, including analysis and consideration of glazed areas (thermally much less efficient), and the percent of actual framing (once again less thermal efficiency) occupying the wall, floor, and/or ceiling envelopes, and appropriately adjust the minimum insulation R values to achieve effective thermal performance. As an example, tall wood framed buildings generally require more structural wall framing on the lower levels to support building loads – more framing results in less thermal efficiency as there is less net area for cavity wall insulation. In these cases it would be prudent to use either a more effective insulation product (higher minimum R value) or additional insulation (perhaps continuous rigid in this case) to boost the effective thermal performance of the wall envelope, resulting in a wall that more closely meets or exceeds the thermal performance of the upper floors which generally have less need for added framing and, therefore, have more net insulation area. Similarly, walls with high percentages of glazed area not only have reduced thermal performance due to the lower R values of glazing, they are generally framing “dense” as well, requiring more structure to meet vertical and horizontal loading requirements in and about the glazed openings. Once again, careful consideration of the “effective” overall thermal resistance of the building envelope as a system would suggest that more thermally effective materials and/or systems, should be considered to achieve better performance.

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In summary, the R values listed in the table should be considered as minimums – what could be reasonably expected in a conventionally framed simple structure with standard framing materials and standard spacing, with a reasonable glazed area included in the building envelope. Alternative designs that require additional framing or that include large amounts of glazing must address these negative impacts to the thermal envelope performance and include provisions to meet the minimum R values when compared to a more conventionally framed building.

Amendment 2.2, MSHA *Green Building Standards*, SECTION 3 R2 ENERGY EFFICIENCY – BUILDING ENVELOPE:

In reference to the table provided, and in particular “continuous” insulation as referenced in the ** footnote, when considering the effective R values of plastic foam insulation products, the Long-Term Thermal Resistance (LTTR) value for such products shall be considered the R value for the product.

Commentary:

It is acknowledged that plastic foam insulations manufactured with blowing agents other than air experience “aging” which results in a reduction in effective R value over time. It has been recognized in the plastic foam insulation industry that a standard that recognizes and quantifies this known process is a much more acceptable way of evaluating and selecting products. Therefore, Long-Term Thermal Resistance (LTTR) values, tested in accordance with recognized standards (i.e. ASTM C 1303-95) shall be used for such products in evaluating and selecting products for MaineHousing projects.

Amendment 2.3, MSHA *Green Building Standards*, SECTION 6 R1 INSPECTION/COMMISSIONING:

Commentary:

While “Commissioning” isn’t a new practice, it is a new requirement for MaineHousing projects. As further clarification as to MaineHousing’s expectations in meeting this requirement, we offer the following:

It is the intent of this requirement for the Owner to retain a qualified third party to provide professional services that are two-fold: to review the mechanical systems design and equipment selections during the design phases including review and comment of their compatibility with the overall building design as related to energy conservation, systems function, and code compliance; and secondly, to provide quality assurance and test monitoring during construction to help assure that the design intent is met. It is not the intent of this requirement to diminish in any way the responsibilities and liabilities of the design team of record or to diminish the work of the contractors employed to carry out the work. The commissioning agent is an “advisor” to the Owner and the other members of the project team.

The expected work products are to include periodic reports documenting the review and recommendations relative to the systems design as the project design evolves. These should

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include input from the concept stage through to the completion of the construction documents. During construction, periodic field reports of physical inspections of the project at various stages of completion should be provided. Reviews and comments related to the systems shop drawings process should be documented. Lastly, review and comment on systems test monitoring and test results should be documented. Lastly, a concluding document shall be provided stating that, in the opinion of the Commissioning Agent, the building systems have or have not been designed and/or installed properly.

In summary, the specifics related to commissioning of MaineHousing's projects will likely evolve over time. It is hoped that the mechanical engineering community can assist in the evolution of this process and ongoing comments and suggestions are welcomed.

Amendment 2.3, MSHA *Green Building Standards*, SECTION 6 R2 INSPECTION/COMMISSIONING:

In reference to the "Requirement" which states: "1 Blower Door test conducted with calibrated equipment operated by a trained and qualified technician to be performed before the drywall is installed if polyethylene is the air barrier & after installation if airtight drywall approach (ADA)" is further clarified and modified as follows (Note: See Amendment #1 for General Commentary about Blower Door Testing):

Through careful research and analysis of existing buildings, MaineHousing has established a minimum standard that must be met and verified by sufficient blower door testing for all projects as follows:

Maximum building envelope leakage is to not exceed 0.25 cubic feet per minute per square foot at 50 pascals negative pressure (0.25 CFM/SF @ 50 PA)

Commentary:

The SF (Square Foot) reference in the standard is the total building envelope square footage area measured using the inside surface dimensions. The intent is to analyze the surface that is being tested by the blower door – the effectiveness of the air sealing.

Signed: Donald R. McGilvery, Construction Services Manager

END OF AMENDMENT #2