

ENERGY STAR® Insulation Installation Grading Information

Source: 2006 Mortgage industry national Home Energy Rating Systems Standards

When it is possible to inspect insulation as installed (i.e., new construction), inspectors shall rate the installation as "Grade I, II, or III" according to the following guidelines, regardless of insulation material or installation process. Note that all insulation installation techniques require proper care to ensure they are completed correctly; if they are not, thermal performance can suffer dramatically. These guidelines apply to cavity fill insulation, continuous rigid insulation, and any other field-installed insulation products. NOTE: Builder Option Package (BOP) requires that insulation be installed to Grade I

1. "Grade I" shall be used to describe insulation that is generally installed according to manufacturers instructions and/or industry standards. A "Grade I" installation requires that the insulation material uniformly fills each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions (such as blocking or bridging), and is split, installed, and/or fitted tightly around wiring and other services in the cavity. To inspect, probe in, around, or through the insulation and/or vapor retarder in several places to see whether these requirements are met. Replace or repair the vapor retarder and insulation as necessary. During inspection (typically before drywall is installed), if the exterior sheathing is visible from the building interior through gaps in the cavity insulation material, it is not considered a "Grade I" installation.

To attain a rating of "Grade I", wall insulation shall be enclosed on all six sides, and shall be in substantial contact with the sheathing material on at least one side (interior or exterior) of the cavity.

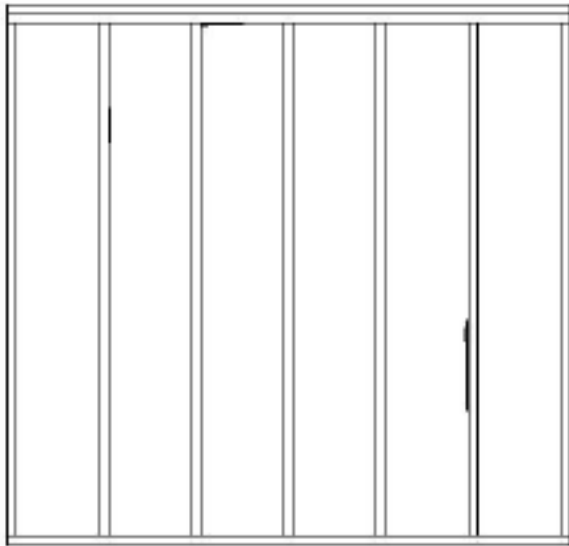
For rim or band joist insulation, use the inspection guidelines under "Walls—Insulation value" to assess "Grade I", "Grade II", or "Grade III" installation.. For exterior applications of rigid insulation, insulation shall be in firm contact with the structural sheathing materials, and tightly fitted at joints to be considered a "Grade I" installation.

For faced batt insulation, Grade I can be designated for side-stapled tabs, provided the tabs are stapled neatly (no buckling), and provided the batt is only compressed at the edges of each cavity, to the depth of the tab itself, and provided it meets the other requirements of Grade I.

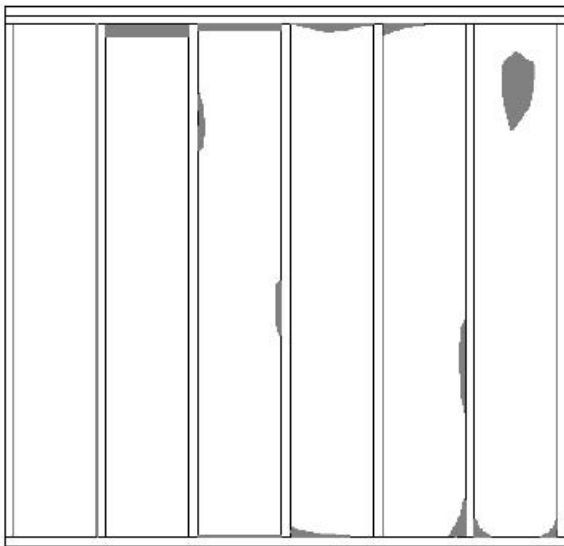
For sprayed or blown-in products, density shall be sufficient that the fill material springs back when compressed slightly with a hand or finger, and provided it meets the other requirements of Grade.

Interpretation:

The following illustrations represent the boundary conditions between Grade I and Grade II, that is, the installation shall be at least this good to be labeled as "Grade I":



Occasional very small gaps are acceptable for "Grade I".



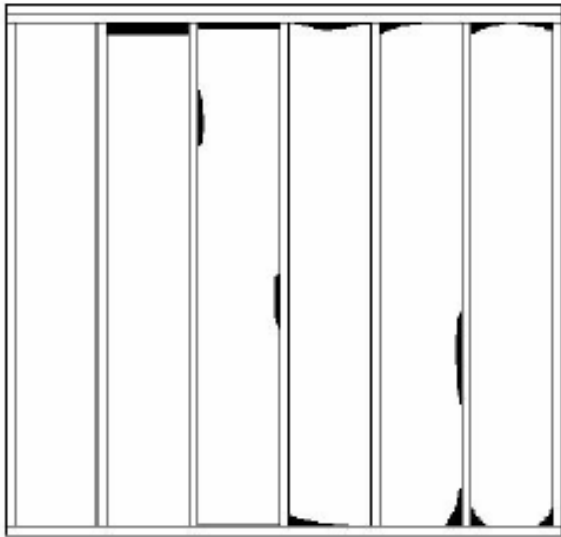
Compression or incomplete fill amounting to 2% or less, if the empty spaces are less than 30% of the intended fill thickness, are acceptable for "Grade I".

The following standards may be applied as a reference: NAIMA, Recommendations for Installation in Residential and Other Light-Frame Construction—Fiber Glass Home Insulation (PUB # BI402), Recommendations for Installation in Residential and Other Light-Frame Construction—Fiber Glass Loose Fill Insulation (PUB # BI403), CIMA, Technical Bulletin #2 -- Standard Practice for Installing Cellulose Building Insulation, Technical Bulletin #3-- Standard Practice for Installation of Sprayed Cellulosic Wall Cavity Insulation. For other products and materials, manufacturer's installation instructions will apply.

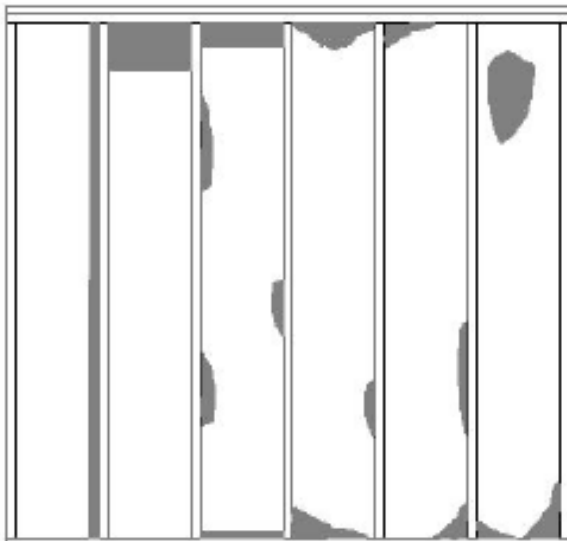
2. "Grade II" shall be used to describe an installation with moderate to frequent installation defects: gaps around wiring, electrical outlets, plumbing and other intrusions; rounded edges or "shoulders"; or incomplete fill amounting to 10% or more of the area with less than 70% of the intended thickness (i.e., 30% compressed); or gaps and spaces running clear through the insulation amounting to no more than 2% of the total surface area covered by the insulation. To attain a rating of "Grade II", wall insulation shall be enclosed on all six sides, and shall be in substantial contact with the sheathing material on at least one side (interior or exterior) of the cavity.

Interpretation:

The following illustrations represent the boundary conditions between Grade II and Grade III, that is, the installation shall be at least this good to be labeled as "Grade II":



No more than 2% of surface area of insulation missing is acceptable for "Grade II"



No more than 10% of surface area of insulation compressed or incomplete fill, by more than 30% (70% or less of intended thickness) is acceptable for "Grade II".

3. "Grade III" shall be used to describe an installation with substantial gaps and voids, with missing insulation amounting to greater than 2% of the area, but less than 5% of the surface area is intended to occupy. More than 5% missing insulation shall be measured and modeled as separate, uninsulated surfaces according to 3.B.5.p. This designation shall include wall insulation that is not in substantial contact with the sheathing on at least one side of the cavity, or wall insulation in a wall that is open (unsheathed) on one side and exposed to the exterior, ambient conditions or a vented attic or crawlspace. The presence of an air-impermeable barrier such as housewrap will be considered to enclose the building cavities.

Interpretation:

The following illustration represents the boundary conditions between Grade III and the situation whereby one must measure the uninsulated areas; that is, the installation shall be at least this good to be labeled as "Grade III":

