

Design Right and Build Strong: WEBCAST

Storm-resistant homes
using closed-cell spray
foam for strength
and energy efficiency

July 16, 2008
2 PM EDT

QUESTIONS AND ANSWERS

All information provided is believed to be accurate and reliable, but is presented without warranty of any kind. Statements concerning possible use of products are made without warranty that such use is free of patent infringement, and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated.

A. General Application

- | | |
|---|---|
| 1. What modular home manufacturers are using the spray foam? | <i>Mattamy Homes in Ontario, Canada is currently using closed-cell SPF and Palm Harbor Homes is currently developing a closed-cell SPF application for their production lines.</i> |
| 2. What about cold climate foam application?? We see foam popping away from framing during cold weather application? Thoughts?? | <i>First, SPF must be properly applied to insure proper adhesion. Excess moisture and/or cold temperatures on the surface to which the foam is applied can cause this problem. Also, excessive pass thickness can cause cracking and delamination. Always apply SPF per manufacturer's instructions.</i> |
| 3. [Should one use] closed cell or open cell in your homes | <i>Closed cell can be applied in all climates. Open cell is best suited for mixed or warm climates. Ask your manufacture for proper use of open cell in cool climates.</i> |
| 4. Can you address when and where ocSPF should be used v. ccSPF in wall assemblies? | <i>Closed cell can be applied in all climates. Open cell is best suited for mixed or warm climates. Ask your manufacture for proper use of open cell in cool climates.</i> |
| 5. I would assume the chemical make-up of the foam has no effect on metals or wood over time? | <i>SPF has no known negative affect when applied on wood or metal substrates.</i> |
| 6. How does the SPF effect deck replacement during re-roof applications | <i>Like other construction adhesives, InsulStar[®] Plus will improve wind uplift resistance, and will make removal of roof decks more difficult than on decks that are simply fastened.</i> |
| 7. Bill - Are you installing primarily open-cell or closed-cell SPF in the homes you are building? | <i>I am installing NCFI's InsulStar SPF in my homes.</i> |
| 8. Up in Michigan, we're more concerned with insulation than hurricanes, etc. Can you address this briefly, ccSPF vs. ocSPF and traditional batt insulation? What about whole house ccSPF insulation? | <i>In Michigan, ccSPF would be the best option for whole house insulation. In cool climates where the moisture drive is from the inside to the outside, you need the vapor barrier attributes of close-cell SPF to eliminate condensation on the sheathing. Both open and closed-cell SPF act as air barriers which is one distinct advantage over traditional insulations such as fiberglass batts.</i> |
| 9. Do you take out the old batt or blown insulation prior to your foaming? | <i>If you are applying SPF in the walls, you will need to remove the old batt or blown insulation first then clean and dry the surface before applying the SPF. If you are insulating the roof deck and creating an unvented attic by sealing off the soffits and vents, then you must remove the insulation and vapor barrier that is on the floor. If you are only applying InsulStar[®] Plus to the roof deck for wind uplift and are not sealing the vents in the attic, then the insulation on the floor should remain.</i> |

<p>10. Can you meet the IRC energy code requirements easily?</p>	<p><i>The energy code requirements listed in the I-Codes specify that the R-value in building assemblies must be met via the performance or prescriptive methods. Closed-cell InsulStar[®] and open-cell Sealite[™] SPF can easily meet the requirements of either method.</i></p>
<p>11. For Joseph: how does ccSPF compare to cellulose moist-spray insulation?</p>	<p><i>As compared to moist-spray cellulose, ccSPF has a higher R-value per inch, adds structural strength, is a vapor retarder and air barrier, does not settle, and does not require drying time.</i></p>
<p>12. What about cold weather areas?</p>	<p><i>Closed-cell can be applied in all climates. Open-cell is best suited for mixed or warm climates. Ask your manufacturer for proper use of open-cell in cool climates – a vapor retarder may be required.</i></p>
<p>13. How does closed cell insulation compare with open cell regarding air infiltration over time? There have been some reports that closed cell is more rigid and more likely to crack away from framing elements than open cell.</p>	<p><i>Delamination, cracking and voids can be avoided for both open and closed cell SPF by ensuring that the SPF system is installed by an experienced and trained professional contractor who is certified by the manufacturer.</i></p>
<p>14. What is the R value of the closed cell insulation per inch of foam?</p>	<p><i>NCFI's InsulStar[®] Plus has an aged R-value of 6.4 per inch. Each manufacturer's foam has a different R-value per inch so refer to the manufacturer's literature for their R-values.</i></p>
<p>15. Is closed or open-cell foam more sound proof?</p>	<p><i>Acoustical properties (STC, NRC values) for insulations are often measured on the materials alone. Because spray foams seal framed walls against air leakage, they also prevent sound transmission through framed walls caused by flanking of sound through air leakage paths. Because open-cell foams are softer and more compliant than the rigid closed-cell foams, they tend to be slightly better in terms of noise reflectance (NRC). STC numbers are about the same between open-cell and closed-cell foams installed in frame walls.</i></p>
<p>16. What does your panel feel the difference on performance is between open cell and closed cell spray foam? What is preferred</p>	<p><i>Compared to traditional insulations such as fiberglass or cellulose, both open and closed cell SPF's are far superior in performance. They are both excellent air barriers and do not sag over time. Closed cell SPF has higher R-values, acts as a vapor barrier and provides structural strength.</i></p>
<p>17. Will it pump into uninsulated existing exterior framewalls and expand properly?</p>	<p><i>In order to install SPF in a wall, either the exterior or interior sheathing must be removed.</i></p>
<p>18. How does insulation perform re. pests and insects?</p>	<p><i>SPF performs well at keeping the creeping or crawling insects out of your home by sealing all the cracks and crevices. It does not repel or keep burrowing insects, such as termites, from burrowing through the foam to get to food sources. Foam is not a source of food for burrowing insects. Special design considerations are specified in the code for the use of SPF in areas susceptible to high termite infestations.</i></p>
<p>19. Does the application go directly on a plywood and rafter? Is there a preparation that has to occur, or is it applied directly?</p>	<p><i>NCFI recommends that the substrate must be dry and free of dust, dirt, and loose particles.</i></p>
<p>20. Between the different seasons, there can be some swelling and shrinkage of the wood. Is this a concern with ccSPF.</p>	<p><i>Both open and closed-cell SPF adheres strongly to wood and is able to expand and contract with it.</i></p>

B. Installed Cost

1. No ROI presented? No comparison against other techniques?	<i>Return on Investment varies from region to region based on cost of insulation, cost of energy, and climate. We find that many homeowners are readily willing to upgrade their insulation package and recognize a net positive cash flow due to their energy savings.</i>
2. I have a concern about the cost of foam v. blown cellulose in walls and the relative improvement in performance.	<i>Spray foam may costs more, but with ccSPF, you get higher R-value per inch, added structural strength, an air barrier, vapor retarder, and it won't sag over time.</i>
3. What is a "budget" CSF for a retrofit roof with 10/12 pitch roof?	<i>You must contact your local SPF contractor. This can only be determined on a case-by-case basis. NCFI can get you in contact with a contractor in your area.</i>
4. What is the difference in cost between closed cell and open cell spray foam...what thickness of each do you suggest?	<i>The thickness depends on the R-value required for your assembly in your area. Open-cell typically costs less per R-value, but closed cell can have advantages over open-cell that outweigh the price difference. Contact a local SPF contractor.</i>

C. Fire Safety

1. Does the foam give off toxic gas when it burns?	<i>All organic materials including wood, carpeting, wallpaper, and most building materials give off toxic gasses when burned. SPF is installed with protective barriers that slow down its involvement in fires to allow adequate time for egress or fire suppression.</i>
2. Is there an increased flammability hazard for foam-insulated attics?	<i>Any organic materials such as wood and foam products of all types can burn. Foam plastics are formulated with flame retardants to lessen ignition load. Contact your particular SPF supplier to confirm that your product meets building code requirements.</i>
3. Are there any fire issues? Is the material combustible? Does the air tight construction give you less time to get out of the structure if it catches on fire, consuming all of the oxygen?	<i>Please see the responses above and the audio copy of the webcast recording.</i>
4. Does the foam need to be protected from exposure to flame?	<i>Check with your local building code and manufacturer regarding thermal and/or ignition barrier requirements.</i>
5. Are the ccSPF products UL approved.	<i>NCFI's InsulStar® is UL listed and is included in some UL approved assemblies.</i>
6. Joe - when you apply spray foam to the walls in a crawl space, what thermal barrier should be used? Framing and drywall is not easy to install. Robert Bales P.Eng.	<i>Consult local building codes. Ignition barrier may be allowed under certain circumstances.</i>
7. What about fire rating of the foam for flame spread & smoke development	<i>NCFI's InsulStar® Plus meets <25 flame spread and <450 smoke as tested by ASTM E-84</i>

8. DO CODES REQUIRE THE FOAM INSULATION TO BE PROTECTED BY WALLBOARD IN THE NEWLY CREATED CONDITIONED SPACE ?

This question is addressed specifically in Chapter 26 of the 2006 IBC.

9. I am from Florida and I am a real believer in un-vented attics because I use it regularly and it works. I used SPF before it was widely accepted by our local jurisdiction, not to mention the FBC. The FBC has made code changes to accept this technology which is great, but recently there has been quite a few code official discussions on the required protection of the SPF with an ignition barrier. Do most SPF materials require this ignition barrier or do the building officials just not understand this product?

SPF requires an ignition barrier in unoccupied attics and crawlspaces, unless alternative testing performed by the foam manufacturer shows otherwise. Some SPF products may be applied with an approved intumescent coating instead of an ignition barrier. Consult the data provided by the foam manufacturer to determine if ignition barriers are required in certain applications.

10. What is your opinion about the use of ignition barriers in closed cell applications versus open cell applications

Both open and closed cell spray foam materials have nearly the same burning characteristics per ASTM E84. Both will require an ignition barrier in unoccupied attics and crawl spaces, unless alternative testing performed by the foam manufacturer shows otherwise. Some SPF products may be applied with an approved intumescent coating instead of an ignition barrier. Consult the data provided by the foam manufacturer to determine if ignition barriers are required in certain applications.

11. My previous question about UL approved applies to insulation and fire. My city is very weary of ccSPF and prefers if no one uses it unless it is UL approved.

NCFI's InsulStar® is UL listed and is included in some UL approved assemblies.

D. Environmental Impact

1. Building "green" is a big deal these days and there is a soy based SPF available. Do you have any experience with this soy based product and how does it compare with regular SPF products?

All buildings insulated with SPF insulation are inherently green because it is highly energy efficient. Soy containing SPF typically has 5-8% renewable content. Soy and non-soy containing SPF's have similar properties. Contact the manufacturer for product specific information.

2. How much is petroleum an issue with this product in terms of "Green Building"

If you consider the amount of petroleum that is saved during the life of the home that is properly air sealed and insulated over the amount of petroleum used to make the product, the product is very green.

E. Moisture, Mold and Mildew

1. A water-feature next to a casement wall is allowing percolation of moisture through the brick, downward to the floor-plate and then to the baseboard for a fully finished basement. Would ccSPF applied to the inside surface of the wall and adjacent poured pad (and then "float" the furring and sheetrock wall over the foam) provide adequate sealing to allow repair of this problem (e.g., without an interior tile drain)?

In general, closed cell SPF is a barrier to water penetration. This question, however, can not be answered in this forum. It would require further questioning. Please contact a local SPF contractor or building science expert such as those on our panel.

<p>2. In an attic application can spray foam insulation be used as a first layer (on roof sheathing) with batt insulating following to reduce the cost of using spray foam? Does this increase the possibility of vapor getting trapped in the wall cavity?</p>	<p><i>The 2007 supplement to the 2006 IRC, section 806.4, specifies what thickness of air impermeable insulation (SPF) is required in each climate zone to be use in combination with air permeable insulation (fiberglass batts, cellulose, lose fill). This should not increase the possibility of vapor getting trapped provided you follow the recommendations of the 2007 supplement. NCFI's InsulStar® products are vapor retarders over 1.5 inches.</i></p>
<p>3. What are your thoughts on the low rise (closed cell) foam trapping moisture in the roof deck if a leak occurs</p>	<p><i>Foam will not trap moisture in the roof deck if a leak occurs. Minor leaks will be localized in the decking material and will eventually dry out. In the event that the shingles and underlayment fail, ccSPF may act as a secondary water barrier protecting the contents of the home from water damage.</i></p>
<p>4. When roofing is not vapor-permeable (e.g., epdm), and indoor humidity is expected to be very high (e.g., indoor pool), is direct-applied CC spray foam still appropriate? Does one use a vapor barrier on the inside? Or, would one try to vent above the insulation in this situation?</p>	<p><i>In abnormally high humidity applications such as a swimming pool, NCFI first recommends consulting with us. An additional vapor retarder may be needed in this case in cool climates.</i></p>
<p>5. How does SPF prevent mold?</p>	<p><i>NCFI's InsulStar® and Sealite™ products include an anti-microbial agent. Also, they both act as air barriers which limit the amount of moisture that can pass through the wall.</i></p>
<p>6. Will the roof sheathing deteriorate if moisture is trapped between the foam and the sheathing?</p>	<p><i>Closed cell spray foam has negligible water permeability, minimal water absorption, and excellent adhesion allowing it to act as a secondary rain water barrier to limit damage when primary roof assembly rainwater control membrane leaks. Rainwater migration is severely limited due to the low water transmission and high adhesion ("water proofing") characteristics of the foam and damage is limited to the area immediately adjacent the hole in the primary rainwater control membrane. This tends to contain the damage, making it easier to identify the source and preventing it from spreading through out the assembly and to interior finishes which can be costly to repair.</i></p>
<p>7. Is there a problem with the ability of moisture to move through open cell insulation vs. closed cell installation?</p>	<p><i>No, water vapor is allowed to pass through both products.</i></p>

F. Roofing

<p>1. If a leak should occur, foam will prevent early detection. SHingle manufacturer warranty effect?</p>	<p><i>If the roof deck membrane is compromised, SPF will contain the leak area resulting in less damage. In a storm, if the shingles and underlayment are blown off, InsulStar® Plus will protect the home from water damage. There is no effect on the warranty for some shingle manufacturers.</i></p>
<p>2. What about underlayments?</p>	<p><i>Underlayments are required between the shingles and roof deck.</i></p>
<p>3. What is your thought on up grading the under layment to a peel & stick to help with the water leak problem??</p>	<p><i>Using a peel & stick underlayment makes sense for all roofs regardless of the insulation system.</i></p>

4. Dr. Lstiburek stated that there was a 5%-10% decrease in the life of shingles. Was that a vented vs. unvented or a shingle color stat?

Unvented roof decks have a minor impact on shingle life – about 5-10%. In comparison, shingle color has a 25-30% impact on shingle life. Latitude and days of sunlight has an even greater impact on shingle life.

5. What about shingle fastener pull out

SPF does not affect shingle fastener pull out because SPF is applied on the underside of the roof deck.

6. What is the impact on temperature and life of roof shingles when using an insulated, un-vented roof deck?

Shingles are designed to withstand high temperature fluctuations because they are installed in many different colors, environments and orientations, all of which influence the life of the shingle more than the effect of insulating the roof deck, as shown by Dr. Lstiburek's work.

7. You refer to leaking not being an issue, but what about a situation where penetration of water occurs and results in a saturated plywood or osb? what is the resolution, and isn't this a concern?

A situation that would result in a roof deck being saturated would be visible from the outside and inside long before the decking became saturated.

8. Do leaks in foam require removal to eliminate possibility of mold on wood framing?

Roof decks with leaks should be repaired.

9. The issue about leaks is detection. Will ocSPF indicate leaks sooner than ccSPF? The hope is that the repair can be made before deterioration of the deck.

In our experience, we have not noticed a difference in detecting roof leakage between open and closed cell SPF. Leaks have been detected in both ocSPF and ccSPF.

G. Structural Testing and Performance

1. I am interested in closed-cell foam's performance in earthquakes. I'm in Southern California. If possible, perhaps you could spend a few minutes discussing that, too. Thanks.

See NAHB study of ccSPF with shear walls. NAHB. (1992). "Testing and Adoption of Spray Polyurethane Insulation for Wood Frame Building Construction Phase 2 -- Wall Panel Performance Testing." Prepared for The Society of the Plastics Industry, Inc., Polyurethane Foam Contractors Division by the NAHB Research Center, Upper Marlboro, MD. NAHB. (1996). "Communication between Bob Dewey of NAHB and Mason Knowles of The Society of the Plastics Industry, Inc., Spray Polyurethane Foam Division." National Association of Home Builders.

2. What about using advanced framing with OSB sheathing as bracing with housewrap, rigid one inch insulation with taped seams and in my case brick cladding? The insulation board would be the primary drainage plane and the housewrap would act as a secondary drainage plane. Closed-cell insulation would be my choice.

Sounds like a good choice.

3. How well does CCSF work on a structure if you live in an earthquake zone?

Unknown by these tests. However, the NAHB Report (see above) may have suitable references

4. The insulation can be install and structural concrete roof? This is the typical construction roofs in Puerto Rico, a caribbean island.

SPF can be installed on a structural concrete roof for insulation reason. It will not add any significant structural strength over the concrete. Please contact NCFI for design considerations.

<p>5. Would anyone care to offer an opinion on Honeycomb Core Structural Building Panels and their promise for the future of strength and safety</p>	<p><i>No, we have not studied this product.</i></p>
<p>6. Is ccSPF viable for application in other wind-prone areas, like the Great Plains (Oklahoma, Texas, etc.)?</p>	<p><i>Improved structural performance of housing requires that individual components be better fastened together. This goes for wind (hurricane/tornado) and for earthquakes. Overall, the benefits of retrofitting a house will provide significant benefits even in tornado-prone regions. Note that the majority of tornadoes are in the F3 category and lower - approximately same wind speeds for Cat 3 hurricanes. There may be some other physical phenomenon occurring that may be different (significantly lower barometric pressure perhaps) but ccSPF should improve connections, especially in areas where the building codes have not benefited from latest knowledge i.e. (pre IRC 2003/2006 codes).</i></p>
<p>7. What about gable ends?</p>	<p><i>Clarify question. The benefits for the roof uplift retrofit are the same. Closed-cell SPF were tested on roofs, not walls, so it is unknown if it will help improve the attachment of the gable end wall to the structure.</i></p>
<p>8. [Why is there] a differential pressure concern is inside the attic?</p>	<p><i>Differential pressure (or internal pressurization) during high winds will be reduced with an unvented roof so the overall uplift forces should be reduced.</i></p>
<p>9. Would it be good to use liquid nail on the 4x8 roof sheet on the top of the truss?</p>	<p><i>Liquid nails have been used to attach roof sheathing. Confirm that tests have been done to substantiate performance. Other products are on the market similar to Liquid nails. Some, like ccSPF, have been tested and are included in the FBC. All such adhesive products should be verified through long-term testing that they have certifiable performance after years in high temperature and other adverse conditions, and that methods to repair the roof structure at a future date are acceptably cost-effective.</i></p>
<p>10. What application-level of ccSPF should be used in Charlotte NC region for plywood-sheath roof-deck?</p>	<p><i>Consult building codes for R-value requirements. For structural purposes, it is recommended to us what was tested, 3 in. thick layer of InsulStar[®] Plus unless other tests show other thicknesses will work</i></p>
<p>11. Why would you need to spray foam under a concrete roof other than just for insulation?</p>	<p><i>I'm not sure of any other reason. It could be used to seal cracks between concrete panels and walls. But should not be required for structural purposes.</i></p>
<p>12. What is the difference in up lift resistance between open cell and closed cell foam?</p>	<p><i>Open cell foam was not tested so I do not know.</i></p>
<p>13. David, Do you have a link to that NAHB study of closed-cell foam performance in seismic events? Thanks.</p>	<p><i>See NAHB study of ccSPF with shear walls. NAHB. (1992). "Testing and Adoption of Spray Polyurethane Insulation for Wood Frame Building Construction Phase 2 -- Wall Panel Performance Testing." Prepared for The Society of the Plastics Industry, Inc., Polyurethane Foam Contractors Division by the NAHB Research Center, Upper Marlboro, MD. NAHB. (1996). "Communication between Bob Dewey of NAHB and Mason Knowles of The Society of the Plastics Industry, Inc., Spray Polyurethane Foam Division." National Association of Home Builders.</i></p>

14. What do you attribute the superior performance of the 6d common nail over the 8d ringshak nail with the use of the 3" fill?

I believe it was installation techniques of the foam or specific gravity of the southern yellow pine.

15. Field tests of InsulStar Plus statistically too small?

InsulStar® Plus was tested at the University of Florida. The results were reviewed by a professional engineer and presented to the Florida Building Commission. They certified InsulStar Plus with Florida Product Approval (FL#9975).

16. Would you expect there to be any difference in test results if you were to have butted two 4 x 4 OSB sheathing panels together to form the 4 x 8 test panel, which would have provided a "seam" joint in the middle of the panel as would be seen in actual construction of a complete roof?

Yes. No tests have been done on this yet. Stay tuned. Although the half-size sheets would have nails at edge spacing (typically 6 in. apart), the nails would be installed in close proximity with other nails for adjacent panel. Researchers have suspected that nailing into wood at less than 3 in. apart may have no increase in strength in normally and immediately adjacent may even weaken/degrade the strength of the wood member. However, this question is still open.

17. What effect on depth or height of top chord?

Addition of ccSPF will not significantly affect the flexural stiffness of the roof assembly to the degree necessary to reduce the depth of the roof joists or truss members

18. Dr. Prevatt previously stated that everything there is plywood not OSB.

OSB only was used in the UF tests. OSB sheathing is the most common material used in roof sheathing in residential construction. Except for the High Wind velocity Zone in Florida it is still permitted by code in new construction. The UF tests were designed to predict the minimum expected performance of a ccSPF retrofit in existing construction.

H. Unvented Attic Application

1. What allowance for ventilation do we have to make with a metal roof over a ccSF sprayed roof deck? We are in a relatively humid climate in Middle Tennessee., Thank you

There is no additional allowance needed for ventilation with metal roofs.

2. Does not the current FBC require structures to be designed as enclosed?

Code does not require the attics to be unvented.

3. It is my understanding that generally fiberglass shingles require ventilation directly under the roof sheathing to maintain shingle warranties. If spray foam is placed over a ventilation baffle, do you still see similar strengths in roof decks? Secondly what are the R values, and in a temperate climate how do we limit the dew point location to keep from raining in the attic?

Some shingle manufacturers recognize that their shingles can withstand the relatively small increase in temperature due to the roof deck being unvented and will not void their warranties. InsulStar® Plus's performance is based on the foam being applied directly to the roof deck without baffles. InsulStar Plus has an R-value of 6.4. All foams are different, so check with your manufacturer to see what they are reporting for R-values. Code required R-values are more than adequate to control condensation in an unvented attic when using ccSPF under the roof deck.

4. Do you have to add additional register openings in the attic to keep it from being too hot?

A properly insulated unvented attic will stay within a couple degrees of the living space as shown by Dr. Lstiburek's data. When insulating the roof deck and creating an unvented attic in this way, the insulation and any vapor barrier must be removed from the attic floor.

<p>5. Would the thermal performance of an unvented attic space vs a vented space be the same if the conditioning equipment were NOT located in the attic?</p>	<p><i>Thermal performance is only one of several reasons to install an unvented attic. Generally we recommend unvented attics if HVAC equipment or duct work is located in the attic or if the attic may be converted into living space in the future. Additional reasons include enhancing wind uplift resistance, blocking wind-driven rain, providing a secondary water barrier and reduced fire hazard from wind blown embers. If none of these are applicable, we generally recommend insulating the floor of the attic keeping the attic ventilated.</i></p>
<p>6. How do you think non-vented concept would work in zone 5 and 6 (PA North)</p>	<p><i>Unvented attics work well and are approved per use by the 2006 IRC model building code in all U.S. climates. Check with your state and local jurisdictions to be sure unvented attics are approved in your region.</i></p>
<p>7. Application compliant with Florida Building Code - Building, Section 1203.2 attic ventilation requirements?</p>	<p><i>According to Section 1203.2 of the 2007 Florida Building Code there is an exception that allows unvented attics if the attic space is designed by a Florida-licensed engineer or a registered architect. This is not in the 2004 Florida Building Code. The Building Code is used for commercial buildings. Unvented attics are allowed, however, under section R806.4 of the 2004 and 2007 Florida Residential Code that applies to residential dwellings.</i></p>
<p>8. Does the color of metal roofs make a difference similar to shingles? Do tile roofs present a problem of retention and/or debris threats?</p>	<p><i>No, the durability of metal roofs is not affected by color.</i></p>
<p>9. How do you deal with bathroom vents with a non-vented roof</p>	<p><i>Bathroom vents in vented or unvented attics should always be vented directly to the outside to avoid moisture condensation in the attic space</i></p>
<p>10. How does the conditioned attic design (utilizing foam on the bottom of the roof sheathing) perform in a predominantly heating climate such as the UP of Michigan. How is moisture movement and condensation handled in this climate?</p>	<p><i>Unvented attics work well in all climates. Moisture is controlled by installing the correct R-value and using the correct type of SPF. Closed cell works in all climates.</i></p>
<p>11. What is the energy penalty (if any) of a vented attic vs unvented attic without foam?</p>	<p><i>If HVAC ducts are located in the attic, a 25% energy savings is realized by creating an unvented attic using SPF over traditional unvented attics.</i></p>
<p>12. Can someone speak about building department acceptance of non vented attics?</p>	<p><i>Unvented attics work well and are approved per use by the 2006 IRC model building code in all U.S. climates. Check with your state and local jurisdictions to be sure unvented attics are approved in your region.</i></p>
<p>13. This question is for Joe regarding the unvented attic illustration. I noticed the insulated envelope followed the soffit extension and fascia. I assume this was illustrated this way because of the need to ensure that all portions of the roof sheathing maintain the same temperature instead of varying degrees in different areas of the roof deck plane. Otherwise, it seems it could provide excessive ice build-up in northern climates. Hence, in northern climates, would it be critical to ensure that all eave extensions are fully insulated (gable and soffit)?</p>	<p><i>Yes.</i></p>

<p>14. The 2006 IRC now has a provision (IRC806.4) which allows non-vented attic space with closed cell foam insulation. The Washington State Building Code Council did not adopt this section in the Washington State Amendments to the I-Codes. Without this provision, it is still required that attics be cross ventilated. Additionally, all rafter spaces with direct applied ceilings are still required to be cross ventilated. Do you have any advice to combat this ruling?</p>	<p><i>This is currently being challenged by the spray foam industry and it will hopefully be changed in time.</i></p>
<p>15. How do non-vented attics perform in cold regions with ice damming issues? Particularly with mountain regions that typically retain several feet (4-6 feet) of snow during the winter.</p>	<p><i>The SPF keeps the warm air from leaking through the roof deck which keeps the snow from melting. The roof deck stays uniformly cold from the ridge to the eave helping to eliminate ice damming issues.</i></p>
<p>16. When insulating the roof of an existing house do we need to remove the insulation from the ceiling?</p>	<p><i>When creating an unvented attic by applying SPF on the roof deck, the insulation and any vapor barrier on the attic floor must be removed.</i></p>
<p>17. What about pressure differential between inside & outside?</p>	<p><i>SPF blocks the air movement and moisture problems caused by pressure differentials.</i></p>
<p>18. Does an unvented attic help with ice damming?</p>	<p><i>An unvented attic using SPF will keep the warm air from the interior from reaching roof deck during the winter by being an efficient air barrier and by having the correct R-value. The roof deck will remain cool from the ridge to the eaves helping to eliminate ice damming issues.</i></p>
<p>19. When you do a closed cell spray foam retrofit in an existing attic should you leave the existing fiberglass insulation in the ceiling?</p>	<p><i>If you install spray foam in the attic whether on the floor leaving the attic ventilated or on the roof deck creating an unvented attic space, you should remove any existing insulation or vapor barrier on the floor of the attic.</i></p>
<p>20. Do you see any value in putting hard plastic vents from soffit to roof ridge vent as far as cooling roof deck and asphalt shingles.</p>	<p><i>Installing plastic vents from the soffit to the ridge vent between the roof deck and the insulation are unnecessary and only add expense.</i></p>
<p>21. In Washington State, we are being required to install baffles to the roof deck prior to spraying. What are your thoughts on baffles vs no baffles?</p>	<p><i>Installing these vent baffles prior to creating an unvented attic does not cause any harm. It is only an added expense. However, the baffles would eliminate the wind uplift protection provided by InsulStar® Plus.</i></p>
<p>22. What are the code air change rate requirements for conditioned attic?</p>	<p><i>There is no requirement of a conditioned attic.</i></p>
<p>23. How does the SPUF sprayed on the bottom of the roof deck effect Ice Damming</p>	<p><i>SPF installed on the roof deck in an unvented roof construction will help eliminate ice damming by keeping the warm air from reaching the roof deck.</i></p>
<p>24. What about shadow lines from trusses in cold areas are you saying all attic spaces should totally encapsulate the wood members?</p>	<p><i>We have not observed this when using SPF. Therefore, we do not advocate encapsulating the wood rafters.</i></p>

I. Indoor Air Quality and VOCs

<p>1. What is the inhalation-hazard for building inhabitants (not the installers) due to TSI leakage (from urethane)?</p>	<p><i>We believe you are referring to TDI. SPF is not formulated with TDI. SPF is formulated with MDI and is fully reacted in the foam reaction. Any overspray or mists containing MDI will quickly react with water in the air within minutes. There are no MDI inhalation hazards to building inhabitants. There are many common household materials (mattresses and furniture) that are made with MDI.</i></p>
<p>2. What is the environmental effect, if any, of the foam system?</p>	<p><i>The polyurethane foam system has no known negative effect on the indoor air quality. In fact, polyurethane foam insulation is used in a variety of applications in the home ranging from cushioning to insulation in refrigerators.</i></p>
<p>3. Most foams continue to cure after first being applied. Does this material do that? Is there any off gassing that can affect human health?</p>	<p><i>SPF insulation is a very quick reacting foam. It traditionally has a gel time of <10 seconds and is fully cured in <1 minute. A Canadian study suggests that after 72 hours there is no off gas detected from foam insulation.</i></p>
<p>4. Can someone speak about the indoor air quality issues we hear about in super insulated tight homes?</p>	<p><i>Best air quality is achieved in ultra tight houses with controlled ventilation. Build tight, ventilate right. Follow ASHRAE standard 62.2 for ventilation recommendations. The tighter you build the more external contaminants you exclude.</i></p>
<p>5. Is there any difference between open cell and closed cell regarding indoor air quality? open cell foam is touted as better because it is a water based delivery system. What are your thoughts on this?</p>	<p><i>Open and closed cell foams use similar materials. The only difference is the blowing agent that is at levels of < 10% in the cell gas of the closed-cell foam. This blowing agent does not escape from the cells in any measurable levels nor is it considered hazardous.</i></p>
<p>6. What kind of off gassing is there and how does that work with retrofitting?</p>	<p><i>The off gassing associated with SPF is during the spraying of the insulation and immediately afterwards. To address this process, it is only applied by trained contractors using proper personal protective equipment (PPE). The space is ventilated and there are no detectable levels of raw materials present within 72 hours of spraying.</i></p>