

SPECIAL Report



NATIONAL ROOFING CONTRACTORS ASSOCIATION

Direct-To-Deck Polystyrene Insulation

November 1997

NRCA has noted the recent introduction of polystyrene roof insulation products, both extruded polystyrene and expanded polystyrene, for use in fire classified roof assemblies directly over steel structural roof decks--commonly referred to as a "direct-to-deck" roof assembly. While earlier introductions of polystyrene insulation used in direct-to-deck roof assemblies required the use of sand in the flutes of the steel roof deck or employed polystyrene insulation with either a chemical bottomsides coating or impregnation, the current generation of assemblies appears to require neither sand in the deck flutes nor chemically-treated polystyrene.

Direct-to-deck assemblies utilizing polystyrene insulation deviate from what the roofing industry has traditionally recognized as a requirement for fire classified roof assemblies, namely, to include an approved thermal barrier (e.g., gypsum board) directly over steel roof deck before applying the polystyrene insulation.

The use of specific polystyrene insulation products in certain direct-to-deck roof assemblies has been subject to fire testing by Underwriters Laboratories, Inc. (UL). UL has developed an alternative fire test procedure for the evaluation of thermoplastic foam roof insulation without a thermal barrier. This alternative fire test method is notably different from ANSI/UL 1256 and FM 4470, which are the long-standing, widely recognized test methods used in the United States to determine fire classifications for roof assemblies. UL has conducted a series of large-scale fire tests in an attempt to correlate the results of their alternative fire test procedure with ANSI/UL 1256 and FM 4470 for verification purposes. These large-scale tests were reportedly conducted in general accordance with the "White House" fire test, which is the technical basis for ANSI/UL 1256 and FM 4470. Reportedly, these White House tests successfully verified the validity of UL's alternative fire test procedure.

At this point, Factory Mutual (FM) does not deviate from their FM 4470 test method to address direct-to-deck roof assemblies utilizing polystyrene insulation. FM does not currently approve the use of polystyrene insulation in direct-to-deck roof assemblies and FM has indicated they have no immediate intention of providing such approvals in the future.

Fire-Classified Constructions and Products

UL's *Roofing Materials and Systems Directory, 1997 Edition*, lists the following roof deck construction numbers, and polystyrene insulation manufacturers and products for the current generation of direct-to-deck roof assemblies.

<u>Roof Deck Construction No.</u>	<u>Product Manufacturer(s)</u>	<u>Product</u>
440	Dow Chemical USA	Styrofoam® Deckmate Styrofoam® Deckmate Plus
457	Owens Corning Specialty and Foam Products Division	Foamular® Thermapink 18 Foamular® Thermapink 25
458	AFM Corp. Arco Chemical Co. BASF Corp. Huntsman Chemical Corp. Miwon Petrochemical Corp. Plymouth Foam Products, Inc. Polyfoam Packers Corporation Powerfoam Insulation Div., Metl- Span Corp. StyroChem International, Inc. Styro-Stop, Inc.	EPS

Building Code Compliance

For many types of buildings, the building codes generally require roof assemblies to be fire classified. Building codes generally require the fire classification of roof assemblies to be determined by ANSI/UL 1256 or FM 4470, and not UL's alternative fire test method or the White House test. When polystyrene insulation is installed as a part of a roof assembly in a direct-to-deck application, even though certain of these roof assemblies are fire classified by UL, the model building codes generally do not directly recognize or approve these particular assemblies as fire classified. This is because these codes do not directly reference UL's alternative fire test method or the White House test as approved manners of determining a fire classification. **It is important for roofing professionals to realize the listing of direct-to-deck roof assemblies utilizing polystyrene insulation in UL's *Roofing Materials and Systems Directory* does not indicate compliance with the model building codes.**

Most building codes, including the three model building codes, contain provisions for special approval of alternate materials or construction methods. These provisions may provide the basis for special approval or acceptance for a direct-to-deck roof assembly utilizing polystyrene insulation.

NRCA has concerns regarding the polystyrene insulation manufacturers' and suppliers' reliance on these special approval provisions in codes for acceptance of their products in direct-to-deck roof assemblies. Specifically, the special approval process potentially puts the designer and the party who is requesting the building permit (commonly the contractor) in the position of substantiating code compliance to the building official in order to obtain the special approval.

Also, because a building permit is typically not obtained until after a project is bid and the contract for the work is signed, NRCA has concerns regarding the contractor's obligations by a contract should the special approval not be granted by the building official.

NRCA considers it the project designer's responsibility to assure that his design and the materials he specifies are in compliance with the applicable building code.

Special Approval Process

Many building officials will sometimes "accept" an alternate product or construction method based upon the special approval provisions of the code. In these situations, the building official will typically review the circumstances of the specific project and may request substantiating data from the party requesting the special approval--that is, the party requesting the building permit--prior to making a decision. It should be noted this review and acceptance is at the local building official's discretion; the building official is not obligated to accept an alternate product or method under the special review process. In some instances a building official will not accept alternate products or construction methods even when seemingly adequate substantiating data exist.

To facilitate the special approval process, subsidiary groups of the model codes often publish an Evaluation Report for specific alternate products or construction methods. An Evaluation Report is typically paid for by the manufacturer or supplier of the alternate product or method, and is an objective analysis of the specific conditions, if any, under which a product or construction method may be accepted by a building official. **It is important for roofing professionals to realize an Evaluation Report or other supporting data, in itself, does not assure acceptance by the local building official.** Such information is only intended as substantiation to assist the building official in making a decision regarding the acceptance of a product or construction method in the circumstances of a special approval.

When a building code official requests substantiating data for special code approval regarding a direct-to-deck roof assembly utilizing polystyrene insulation, NRCA encourages the party requesting the building permit (usually the contractor) to rely on the manufacturer and supplier of the polystyrene insulation, and the designer and specifier (if any), to provide the necessary code substantiation information.

Project Specifications, Proposals, and Bids

NRCA considers it the project designer's responsibility to assure that his design and the materials he specifies are in compliance with the applicable building code. In the event a designer is intending to utilize a direct-to-deck roof assembly, NRCA recommends the designer attempt to determine code acceptance for the direct-to-deck roof assembly. If code acceptance cannot be assured, NRCA recommends the designer include in his design and the bid documents specific provisions for an alternate roof assembly that will clearly comply with the code. These alternate roof assembly provisions can provide the basis for revision of the contract if the direct-to-deck roof assembly is not accepted by the building official.

In the event the designer can assure that his direct-to-deck assembly design will be accepted by the local building official, the designer should clearly indicate that in the bid documents. In this instance, NRCA considers the above recommended provisions for an alternate roof assembly to be unnecessary.

For projects where the designer has not made a specific representation of having assured code acceptance or included specific provisions for an alternate roof assembly should the direct-to-deck roof assembly be found not acceptable, NRCA encourages bidding contractors to promptly notify the project designer of concerns regarding code compliance. A copy of this *Special Report* can be included with this notification to the project designer.

In the event the project designer does not adequately address the issue of code compliance, NRCA encourages bidding contractors to qualify their bids as necessary for projects utilizing direct-to-deck roof assemblies.

Closing Comments

NRCA recommends that all manufacturers and suppliers who market polystyrene insulation for use in direct-to-deck roof assemblies clearly represent building code compliance for their product(s). They also should clearly explain the situations where their products are not in compliance with building codes.

NRCA encourages these manufacturers and suppliers to make their code compliance information, and any applicable product Evaluation Reports, readily available to roofing professionals.

Further developments regarding the building code compliance of polystyrene insulation used in direct-to-deck roof assemblies are likely during the coming months.

NRCA endeavors to keep its members, and the roofing industry, informed of significant developments on this and other technical issues. Should there be any questions regarding the information contained in this *Special Report*, or if NRCA can be of any assistance, readers are encouraged to contact the NRCA Technical Services Department.



The voice of professional
roofing contractors.

November 1997

To: **All NRCA Members**

Re: **Direct-To-Deck Polystyrene Insulation**
NRCA *Special Report*

Dear NRCA Member:

Enclosed is a *Special Report* addressing building code-related concerns regarding the use of polystyrene insulation in direct-to-deck roof assemblies.

If you are involved in roofing projects utilizing polystyrene insulation in direct-to-deck roof assemblies, I recommend you closely read the *Special Report*. This report contains specific recommendations for roofing contractors, designers, and manufacturers.

After you have studied the report, if you have questions regarding code acceptance of a specific manufacturer's polystyrene insulation, I encourage you to contact the specific insulation manufacturer.

Should you have any questions or comments regarding this *Special Report*, or if we may be of assistance in other roofing-related technical issues, please do not hesitate to contact NRCA's Technical Services Department.

Very truly yours,

A handwritten signature in black ink, appearing to read "M.S. Graham", with a long horizontal flourish extending to the right.

Mark S. Graham
Associate Executive Director, Technical Services

Enclosure

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