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**FROM:** Director Technical Services, Commercial Products Division

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\*SUPERSEDES EXISTING DOCUMENTS

The following bulletin reinforces and clarifies Atlas' existing position regarding the proper use of ACFoam® polyiso roof insulation. This Technical Bulletin is effective immediately. Projects bid prior to 1/03/00 will be considered on a project-by-project basis.

## **MULTI-LAYERING OF ROOF INSULATION**

In 1994, Atlas issued Technical Bulletin 94-1009, which outlined our recommendation for multiple layers of ACFoam® installed with offset (staggered) joints. At that time, we cited the elimination of thermal bridging, prevention of thermal loss at insulation joints, reduction of moisture migration into the roof system, and reduction of membrane splitting as benefits provided by multiple layers of roof insulation. In other words, a single layer application can contribute to loss of design thermal value, moisture migration into the roof system, and ridging or splitting of the roof membrane. The benefits of multiple layers of rigid board insulation of all types have been well known for years. Industry authorities, including NRCA, ORNL and RIEI, have recognized these benefits; and many have followed our long-standing recommendation for the use of multiple insulation layers. Unfortunately, reports from the field indicate that single-layered applications are still commonplace. Therefore, the recommendations set forth in Technical Bulletin 94-1009 are repeated here with greater emphasis and in further detail.

## **SINGLE-PLY SYSTEMS**

- Insulation Mechanically Fastened Through All Layers: When a coverboard is not used, Atlas strongly recommends the use of multiple layers when the total desired or specified R-value requires an insulation thickness greater than 2.7" thick.
- For a desired thickness greater than 2.7", the minimum thickness for the bottom layer is 1.3" and 1.5" for the top layer. These thicknesses maintain fire and wind ratings. When layers greater than 1.5" thick are needed in a multi-layered application, the thicker layer should be placed on the bottom, followed by a minimum 1.5" thick layer. Please refer to our published R-value/thickness chart to ensure that the desired or specified thermal value is provided. (This recommendation does not apply to Tapered ACFoam®).
- Atlas understands that designers and contractors may choose to specify or install ACFoam® in an application or in a thickness not recommended by Atlas. When non-recommended use of ACFoam® occurs, Atlas cannot assume or share in responsibility for roof system performance.
- The joints of each layer must be offset (staggered) to prevent continuous vertical joints through the full insulation thickness.

## HOT-APPLIED BUR AND MODIFIED BITUMINOUS ROOF SYSTEMS

Although coverboards are generally required for hot-applied BUR and modified bituminous systems and do create a multi-layered insulation system, multiple layers of ACFoam® installed with staggered joints beneath the coverboard can further improve the thermal performance of the roof system.

- Bottom Layer Mechanically Fastened with Successive Layers Mopped: When a coverboard in an approved assembly is used, any thickness of ACFoam® equal to or greater than 1.5" is acceptable. However, thermal efficiency may be increased by the use of multiple layers of ACFoam®. When the total required polyiso insulation thickness is equal to or greater than 3.0" thickness, the minimum recommended thickness is 1.5" for both the bottom and top layer. Please refer to our published R-value/thickness chart to ensure that the required thermal value is provided.
- The joints of each layer must be offset (staggered) to prevent continuous vertical joints through the full insulation thickness.

## CONSTRUCTION-GENERATED MOISTURE

Cold weather often dictates that the shell or building envelope be substantially closed before interior work can proceed. In other words, exterior walls and roofs are sometimes constructed before the concrete floor slab is placed or other moisture-producing activities begin. At this point, heaters, which also produce large quantities of moisture, are often employed to provide more comfortable working conditions and to assist in drying the construction. Since the building is basically closed, adequate ventilation is often unavailable to prevent these large quantities of moisture from entering the roof system. In addition, loose-laid or partially attached roof systems may promote air intrusion, drawing moisture-laden air up from the building interior into the roof system. These levels of moisture are well known and well documented. {See NRCA Roofing and Waterproofing Manual, The Manual of Low-Slope Roof Systems (Griffith and Fricklas), and Roofs (Baker)}.

- In the absence of adequate ventilation, a vapor/air retarder is recommended to limit the movement of moisture into the roof system. Therefore, Atlas cannot assume responsibility for the performance of ACFoam® roof insulation when installed under these high moisture conditions unless a properly installed, effective vapor/air retarder is present. Location of the vapor/air retarder within the roof system is the responsibility of the designer. The inclusion of a vapor/air retarder may affect insulation fastening requirements, wind uplift ratings, or other approvals.
- Consult the roof system manufacturer for fastening and approval requirements when insulation is placed over a vapor/air retarder.

## COVERBOARDS

The use of coverboards (e.g. high-density wood fiber or perlite) over a base layer of insulation creates a multi-layered application and has long been standard practice in hot-applied BUR and modified bituminous systems. Some industry experts, contractor organizations, consultants, and specifiers also recommend the use of a coverboard over standard industry grade polyiso roof insulation in single-ply applications, especially in fully adhered systems, because it protects the foam/facer interface from traffic and certain adhesive solvents.

- **The roof system designer or the system manufacturer, who issues the roof warranty, should be consulted for coverboard requirements and approvals.**

- When construction traffic or material storage is expected on the finished roof, Atlas recommends the use of a coverboard or other adequate protection, such as plywood, placed over the finished roof. The placement of an adequate protective layer over the finished roof system should also protect the membrane from damage and is normally recommended by the roof system manufacturer. The coverboard should possess higher compression resistance than the base layer to help distribute loads caused by construction and frequent maintenance traffic.

**In the absence of adequate protection, Atlas cannot assume responsibility for foam crushing, facer/foam separation, or other forms of damage.**

## COLD WEATHER APPLICATIONS

Millions of square feet of roofing have been successfully installed in cold weather, but it does present the contractor with difficult installation conditions that require special care and modified techniques to ensure a trouble-free installation. For example, cold weather may require shorter mop leads to avoid the rapid cooling of asphalt before insulation or membranes are placed. Sealants are also affected by cold weather and should be maintained above the manufacturer's recommended minimum application temperature.

Similarly, materials used in single-ply systems, especially adhesives used in fully adhered systems, are temperature sensitive, requiring careful attention during application. For example, adhesive drying time (open time) can be significantly increased in the presence of low temperatures and high humidity, conditions that are common during portions of the fall, winter, and spring in certain regions of North America. Membranes should also be allowed to relax before they are applied.

**Improperly applied membrane or adhesive may affect membrane-to-insulation bond strength, as well as facer-to-foam bond strength or foam cohesive strength near the facer in polyiso roof insulation.** As a polyiso roof insulation manufacturer and not a membrane system manufacturer, Atlas makes the following recommendations.

- The membrane system manufacturer's recommendations should be followed carefully, including adhesive application and membrane relaxation guidelines. Consultation with the membrane system manufacturer prior to installation, especially in cold weather, is recommended.
- Adhesives should be maintained at temperatures above the membrane manufacturer's recommended minimum temperature at the point of application. Heated on-site storage areas and roof top hot boxes may be necessary.
- Materials to receive adhesive application should also be maintained at temperatures warm enough to prevent rapid cooling of the adhesive as it is applied.
- Special care should be taken to allow solvents in adhesives to evaporate ("flash off") in accordance with the membrane manufacturer's recommendations. The difference in drying rates between shaded and sunlit areas should be considered. When the membrane is placed over insufficiently dried adhesive, the solvents may be trapped and forced downward into the insulation.

