

RETROFIT APPLICATION GUIDE

EXPOSED FLOORS OVER UNHEATED SPACES

The following are suggestions for best practices from various sources. Each Company is responsible for its own individual Safety, HCP and PPE programs. Always follow all fire and building codes and equipment manufacturers' manuals, labels, and listings.

OBJECTIVE

To insulate and air seal an exposed floor over unheated spaces (garages, patios and vented crawl spaces).

This application particularly benefits:

- Homes with comfort problems due to inadequate insulation and air-sealing.
- Homes with heating/cooling distribution problems.

Huntsman Building Solutions' spray polyurethane foam (SPF) has been used in exposed floor assemblies for over 40 years. These systems continue to perform very well and generate substantial energy savings. For best results and consideration of specific issues with respect to your building, it is recommended that you consult a trained BPI or RESNET rater before and after the retrofit.

AutoCAD drawings for these assemblies are attached. If there are any questions regarding the retrofit application, please contact the Huntsman Building Solutions Building Science/Engineering Department.

Set Customer's Expectation Early

Vacate occupants and pets during and after application according to Product Specific Re-Occupancy times. These guidelines require specific ventilation rates (air changes per hour) for a minimum time after completed application, before the building can be safely reoccupied. The guidelines can be found on the HBS website.

Before beginning, discuss the project with the homeowner including all health and safety considerations. Instruct the homeowner to remove all portable personal belongings from the work area. Verify that there are no moisture problems in the space. If in doubt have the area reviewed by a Professional Engineer.

CONSIDERATIONS

Removal of Existing Insulation

HBS spray foam should not be applied over existing insulation materials. When insulating an exposed floor, any existing insulation in the area of application must be removed. This will allow for proper air sealing around large gaps at the sill and around any unique features.

HBS spray foam insulation should be spray applied directly to the bands of floor system, in direct contact with framing members.

HBS spray foam is approved for direct application on rigid ductwork. Rigid Heating and cooling ducts can be enclosed in insulation to both insulate and air seal the ductwork. Joints should be sealed with foil tape or other approved sealant prior to installation of spray foam. The insulation can help prevent condensation on duct surfaces and help maintain distribution temperatures up to the final air delivery point. HBS spray foam should not be applied directly to flexible ductwork.

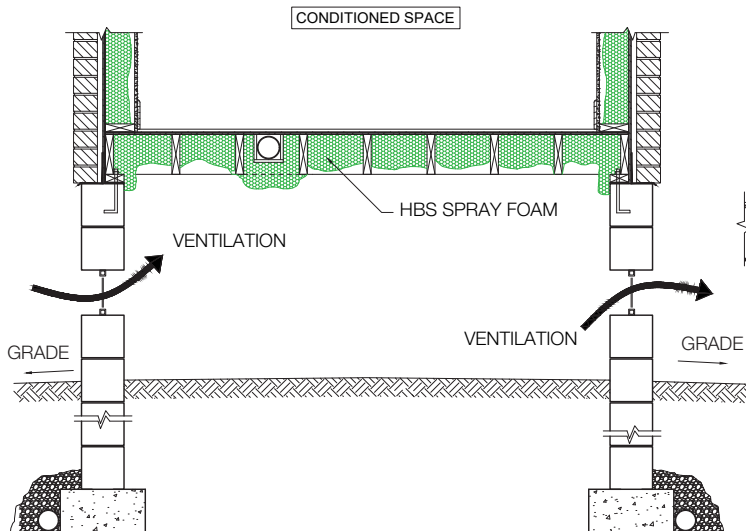
Damp Crawl Spaces

It is recommended to use HBS closed-cell spray foams in areas over damp crawl spaces or in proximity to ground moisture. Use of HBS open cell foams is not recommended in areas with a high relative humidity or where constant vapor drive may occur.

STEP-BY-STEP GUIDELINES for the Huntsman Building Solutions Contractor

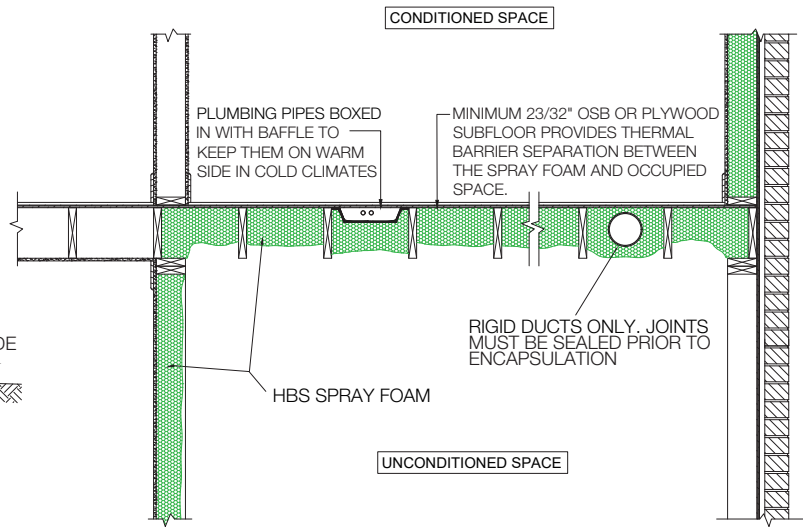
1. Prior to removal of existing insulation, ensure all workers are wearing proper PPE as set up by your company's Safety and PPE Guidelines.
2. Existing insulation batts and blankets on the floor, sill, and rim area shall be removed.
3. Place tarps or polyethylene over possessions left in the space. Remember to consider the area the spray rig is going to be located (Spill Hazard). Seal any openings to separate the work area from the rest of the building. Typical methods could include taping polyethylene tarps over the openings with overlapping flaps that permit access by laborers.
4. Place warning signs at the entrance to the space restricting entry to the space to workers wearing the prescribed full PPE. At a minimum, warning signage should state: "CAUTION: Spray foam is being applied, personal protective equipment required, otherwise do not enter – No Smoking – No Eating".
5. Shut down and seal off HVAC openings in the work area to prevent migration of contaminants to other areas of the building. Don't forget to unseal and restart the HVAC system prior to re-occupancy after the SPF has fully cured and the work area has been ventilated according to the products specific ventilation rates.
6. Seal all mechanical exhaust vents, including the air pathway to the common area and conditioned air supply vents, in the work area. Shut off any combustion devices such as domestic water heaters, furnaces and fireplaces.
7. Place a suitably sized exhaust fan capable of removing Air Changes per Hour from the work area, such that it vents directly to the exterior away from the building and begin exhausting air from the space.
8. Ensure Sprayer and Helper are wearing full Personal Protective Equipment (PPE) including a Supply-Air Respirator (SAR) with full-face protection (hood or full-facepiece type) and chemically resistant gloves and full-body protection to prevent skin contact as directed by their company's Safety and Hazard Communication Program.
9. After testing spray equipment outside the building, bring hose and gun into the work area by a direct route.
10. Apply spray foam as required (as per contract) to:
 - Provide specified coverage of rim/band joist area.
 - Provide specified thickness to underside of exposed floor
11. Apply Ignition Barrier/Thermal Barrier coating on areas intended to be left uncovered as required by Building Code.
12. Clean up any debris in the work area and remove surplus material and all spray equipment (guns, hoses, coating sprayers etc.) while wearing PPE.

FINISHED ROOM OVER UNOCCUPIED SPACE



NOTES:

1. REFER TO PRODUCT SPECIFIC CODE COMPLIANCE REPORTS FOR THERMAL BARRIER, IGNITION BARRIER AND EXPOSED FOAM REQUIREMENTS.
2. FOR ADDITIONAL INFORMATION CONTACT THE HBS BUILDING SCIENCE / ENGINEERING DEPARTMENT.



NOTES:

1. MINIMUM 23/32" WOOD STRUCTURAL SHEATHING CAN BE USED AS A SUB-FLOOR ABOVE UNCONDITIONED SPACES TO SATISFY THERMAL BARRIER REQUIREMENTS IN ACCORDANCE WITH THE INTERNATIONAL RESIDENTIAL CODE.
2. SPRAY FOAM SHALL BE COVERED BY APPROVED THERMAL BARRIER WHERE APPLICABLE. CONSULT WITH LOCAL CODE OFFICIALS FOR PROJECT SPECIFIC GUIDANCE.
3. FOR ADDITIONAL INFORMATION CONTACT THE HBS BUILDING SCIENCE / ENGINEERING DEPARTMENT.