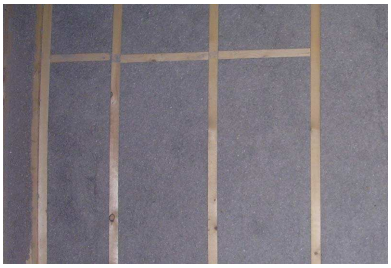
Installation Guidelines for Vertical Assemblies

These installation guidelines provide the foundation for the proper installation and testing of spray applied GREENSHIELD cellulose insulation.



PERFORMANCE DRIVERS:

- Installed R-value for optimum thermal performance
- Complete cavity fill system minimizing installation gaps and voids
- Installed moisture percentage with 25% or less before covering

ASSUMPTIONS

1. The builder is familiar with the guidelines for the installation of GREENSHIELD Sprayed Applied Cellulose.
2. The insulation contractor has been trained and is fully aware of the manufacturer's installation guidelines.
3. The contractors' crew has been trained in the operation of the wall spray equipment, and has received training in the best practices for GREENSHIELD insulation.
4. The insulation contractor has a quality assurance process that ensures in-field compliance with the installation standards as set forth by the manufacturer.

PRE-INSTALL

Prior to installation, the team should prep the house to insure it is ready for the spray applied application.

Because this installation system relies on vacuum material recovery it is important that all floors and cavity sill plates be swept clean of any debris and small metal particles that could be pulled into the spray equipment.

During the prep phase open receptacles and vent openings should be covered with tape to keep loose cellulose material from collecting in the openings.

Pre-install preparation can be the responsibility of the installation crew or could be managed by a separate crew responsible only for pre-install setups.

INSTALLATION GUIDELINES
Standard cavity 2"x4"x16" o.c.

Installation technique and base skills are critical to a good spray applied installation. Key install factors include:

- Material flow
- Installation moisture
- Recycle mix and appearance
- Foot stance and distance from wall
- Nozzle positioning or angle of spray
- Movement across and up the cavity
- Managing spray head speed to insure good pre-wetting of the cavity
- Minimum overspray

Carolina Precision Fibers, Inc.
P.O. Box 624
Elkin, NC 28671
9CPFI03v1

Carolina Precision Fibers, Inc.

Phone: 336-527-4140
Fax: 336-527-4145
Email: info@carolinafibers.com
www.carolinafibers.com

- Control of flyoff
- Attention to detail for spraying the top of each cavity to avoid “sagging” or “smileys”. Nozzle should be held perpendicular to the cavity. Be sure the back corners are sprayed and pre-wetted for good adhesion.

Installation moisture and density will affect speed, application performance and coverage. A critical installation factor for spray applied GREENSHIELD is installed moisture. The standard of care for installation moisture within the industry has been discussed to be less than 25% before it is covered.

In a typical installation, installed moisture will be in the range of 25% - 30% [maximum 35%]. Immediately following the installation, moisture will begin to evaporate from the cellulose. The rate of release will be dependent on the climate zone and the ambient conditions. The cavity should not be covered until the product moisture is 25% or less.

Installation contractor should have a process in place for their climate zone that defines the maximum allowable installed moisture that will provide a rockready installation moisture of 25% or less to meet the builders schedule. In some regions this may require the material be installed very close to, or below, the 25% threshold.

Where code requires a vapor barrier be applied, and no exemption is allowed, the cavity should not be covered until the material moisture is 25% or less.

The drying cycle for cellulose is an important installation factor. It does affect installation risk for the contractor, and should be managed and cared for the same as any other operation risk. The control process once in place will provide a well managed installation system with significantly less risk supported by installation data.

- In areas with high relative humidity [RH] the drying cycle may be longer
- When outside temperatures are below freezing, drying cycle may be longer
- If installed moisture is greater than 35% it may be necessary to allow for additional drying time
- As installed density increases, or the cavity dimensions are increased either in depth or width, the drying cycle may be longer due to increased material mass.

Ambient climate conditions, cavity depth and width, and installed moisture all affect the drying cycle. Whenever possible, reduce the installation moisture as close to 25% as possible regardless of climate zone without sacrificing the balance of application speed and installed quality.

Application limitations may exist depending on the equipment selected for the spray applied program. Where cycle speed and drying cycle time are important to meet production schedules, a dual hopper system is recommended. Monitor moisture and tip sizes as necessary with recycle to help maintain a more consistent cavity-to-cavity moisture level and an overall low moisture level for the house.

Kerosene heaters should not be used to dry the cellulose insulation. These dryer systems generate high levels of moisture which can negatively affect drying cycle. Providing good air circulation is the preferred method for reducing drying time. Open windows and doors to provide air flow and to remove evaporated moisture to the outside.

CHANGING VERTICAL WALL DIMENSIONS
2x4x24” o.c and 2x6 Advanced Framing

As wall dimensions change, the degree of difficulty increases for the spray applicator. The experience, the skill of the applicator and their attention to basics are important for a good, high performance quality installation.

The increase in depth and width will affect material mass which affects drying time. The additional mass may cause sagging as the material dries.

The back corners are important with 2x6 or advanced framing cavities. Care should be taken to ensure these corners are wetted properly for good adhesion of the cellulose to the side walls. One method to consider is to make a preliminary pass up and down the cavity and being careful to hit the top plate and top corners.

As the cavity is sprayed, carefully control the overspray. Too much overspray may affect final appearance after the cavity has been screeted or scrubbed. Excess material may also contribute to a wall fall-out. Too much overspray can result in more manpower and time to complete the job.

Smileys at the top plate can be troublesome for some applicators in a 2x6 advanced framing cavity. Some considerations include:

1. Make a pre-pass up and down the cavity and spray into top back corners;

2. Spray the cavity; move on and let the vacuum operator reinforce the material with a broom; or

3. Spray the top portion of the cavity in 2 passes layering the material.

Cavities with more depth, and possibly more width, may require blocking or bridging of some kind to eliminate sag within the cavity.

Blocking is cross member support installed approximately ½ the distance to the top of the cavity. Blocking may be framing scraps or any structured material that will not bend under weight. Tiger teeth have been used successfully.

The same moisture guidelines apply to vertical cavities regardless of dimensions. Cavities should not be covered until the material moisture is 25% or less.

INSTALLED MOISTURE MANAGEMENT
Risk management considerations

It is strongly recommended that the insulation contractor have in place a moisture management operations protocol that records and captures installed moisture for every spray applied installation.

The moisture management system should be implemented to protect the contractor from subsequent questions regarding the installation several months after install,

A moisture management system put in place should consider these components:

- Production form completed by the installer for each job. Consider posting a copy on the job before leaving the site.

- Consider a sample set per house with guidelines at 5 or more sample readings spaced evenly across the floor area. Readings should be made in a consistent manner ➔ same place in cavity using the same moisture meter.

- Consider implementing random QA inspections by the spray supervisor the day following installations to capture moisture data before sheetrock is installed. Capturing post installation moisture data will provide the contractor information on the drying cycle in their climate zone. This random QC moisture check could follow a sampling of 1:7 [one-in-seven] or 15%.

  Templates for forms and the data capture spreadsheets can be developed and provided to the contractor by a GREENSHIELD representative.

MOISTURE TESTING

Moisture readings should be taken in accordance with a standard protocol followed by all crews.

A moisture testing protocol should consider the following:

- Parameters for the number of samples per house

- Where in each cavity each sample should be taken

- Space minimums between sampled cavities

- Approved moisture testing devices to be used by each crew

- Allowable tolerances per reading or for the floor or whole house average with specific steps to be taken if the average for the cavity, floor or house is outside the acceptable range.

SUMMARY CONSIDERATIONS

Processes implemented by the contractor for a spray applied installation are critical to the application appearance, performance, efficiency and profitability of the spray installation program.

Checklist of considerations:

- Good pre-install program
- Focus on spray technique
- Balance over speed and quality
- Management of installed moisture
- Do Not Cover until material moisture is 25% or less
- Equipment choices can affect installation performance
- Installation techniques need to change when cavity dimensions change
- Installation guidelines need to be climate specific or climate sensitive
- Implement a supervisor QA monitoring system to capture post installation moisture data.
- Manage installation hours per crew to maximize profitability for the spray installation program

For additional information, please contact your
GREENSHIELD Territory Manager

Call us at 866-476-3278

Email: info@carolinafibers.com