



SPRAY-ON INSULATION PRODUCTS

APPLICATOR MANUAL



Insulseal

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RESTAURANTS

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COMMERCIAL

MIXED-USE BUILDINGS

OFFICE ENVIRONMENTS



UL Labeled Product - Monoglass Spray-On Insulation

NOTES:

Monoglass® Spray-On Insulation Applicator Manual

| | | | |
|-------------------------------------|------|---------------------------------|---|
| Table of Contents | 3 | Section 3. | Section 6. |
| Introduction | 4 | Troubleshooting | Tinting & Painting 16-18 |
| | | & Maintenance | |
| | | 10-12 | |
| Section 1. | | • 3.1 Fiber Clog | • 6.1 Tinting with |
| Spray Machines & | | 10 | Color Spray Tints |
| Monoglass Spray Nozzle | 5 | • 3.2 Reason for Clog | 16-17 |
| | | 11 | • 6.2 Painting Monoglass & |
| • 1.1 Fiber Spray Machines | 5 | • 3.3 Spray Tip Clogs | Sonoglass |
| • 1.2 Machine Operation | 5 | 11 | 18 |
| • 1.3 Monoglass® Spray Nozzle | 5 | • 3.4 Overspray | |
| | | 11 | |
| | | • 3.5 Adhesive | |
| | | 11 | |
| | | • 3.6 Spray Machine | |
| | | 12 | |
| | | • 3.7 Pulley Belts | |
| | | 12 | |
| | | • 3.8 Liquid Pump | |
| | | 12 | |
| | | • 3.9 After Shut-Down..... | |
| | | 12 | |
| | | • 3.10 Spray Tip Maintenance | |
| | | 12 | |
| | | • 3.11 Spray Tip Replacement. | |
| | | 12 | |
| | | • 3.12 Seals | |
| | | 12 | |
| | | • 3.13 Damaged or | |
| | | Out-of-Round Hoses | |
| | | 12 | |
| Section 2. | | Section 4. | Section 7. |
| Site Equipment, Preparation | | Application Tips | INSULSEAL Protective |
| & Application | 6-10 | 13-15 | Coating |
| | | | 18-20 |
| • 2.1 Equipment | 6 | • 4.1 Application Tips | • 7.1 Introduction & |
| • 2.2 Power | 7 | 13 | Coverage Guide |
| • 2.3 Water | 7 | • 4.2 Spray Patterns | 18 |
| • 2.4 Lighting | 7 | 14 | • 7.2 Application Guide ... |
| • 2.5 Building Conditions | 7 | • 4.3 Cold Weather | 19-20 |
| • 2.6 Ventilation | 7 | Precautions | |
| • 2.7 Heating / Application | | 15 | |
| Temperature | 7 | | |
| • 2.8 Masking | 7 | Section 5. | Section 8. |
| • 2.9 Surface Preparation | 7-8 | Sonoglass Spray-Applied | Inspections: Thickness |
| • 2.10 Safety Precautions | 9 | Acoustic Treatment | & Density Testing |
| • 2.11 Adhesive Ratio | | 16 | 20-21 |
| & Mixing | 9 | • 5.1 Application Guide | • 8.1 Scope and Procedure .. |
| • 2.12 Start Up Procedure | 9 | 16 | 20 |
| • 2.13 Shut-Down Procedure ... | 10 | | • 8.2 Thickness Testing |
| • 2.14 Coverage | 10 | | 20-21 |
| • 2.15 Tamping | 10 | | • 8.3 Density Testing |
| | | | 21 |



INTRODUCTION

This manual has been prepared to assist installing contractors in their efforts to provide quality workmanship in the field application of Monoglass products. It also contains data available to general contractors, design authorities and testing facilities to determine the installed thickness and density of product.

The settings and instructions put forth in this manual are guidelines that have been prepared to assist you in spraying Monoglass products. Actual job site conditions may necessitate that you adjust your technique and settings. **If you are unsure of how to proceed, contact Monoglass Incorporated for advice.** The correct installation of Monoglass products are the responsibility of the Installing Contractor.

IMPORTANT NOTE

Sections 1 through 5 discuss standard applications of Monoglass Spray-On Insulation. For applications of Sonoglass Acoustic Treatment, Insulseal, or Color Spray Tints, please refer to the TABLE OF CONTENTS on page 3 for additional application guides. The correct installation of Monoglass products are the responsibility of the Installing Contractor.

JOB SITE MEETINGS & COORDINATION WITH OTHER TRADES

It is the responsibility of the Installing Contractor to attend any required job site meetings and to make the General Contractor or appropriate authority aware that damage caused to Monoglass products by other trades is NOT the responsibility of Monoglass Incorporated or the Installing Contractor.

SAFETY DATA SHEETS

Current product M.S.D.S. and S.D.S. are available for download or printing on-line at www.monoglass.com, or contact Monoglass Incorporated.

MANUFACTURER'S LIABILITY

Our published data reflects independent test results. However, due to variables in field conditions and equipment performance, Monoglass Incorporated does not guarantee any specific coverage. Liability, if any, is limited to replacement of material only.

The information in this manual is subject to change without notice. Monoglass Incorporated will periodically issue specific technical bulletins or updates to this manual. It is your responsibility to ensure you have the most up to date information.

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The performance data herein reflects Monoglass Incorporated's expectations based on tests conducted by recognized testing facilities in accordance with recognized standard methods. No agent, employee or representative of Monoglass Incorporated or its subsidiary or affiliated companies is authorized to modify the performance data.

SECTION 1. Spray Machines & Monoglass Spray Nozzle

1.1 Fiber Spray Machines

It is recommended that the contractor use specific fiber spray machines for the application of Monoglass® products. Recommended equipment is available at:

Krendl Equipment Company, Ltd.

1201 Spencerville Avenue
Delphos, Ohio 45833 USA
Phone: 419-692-3060 / Support 1-800-459-2069
Fax: 419-695-9301
www.krendlmachine.com

Cool Machines Inc.

740 Fox Road
Van Wert, Ohio 45891 USA
Phone: 419-232-4871
Fax: 419-238-0613
www.coolmachines.com

Standard insulation blowing machines have in the past been converted to spray Monoglass® products, however, optimum coverage and texture are difficult to obtain. Typically, alterations are required to these machines in order to have them spray Monoglass® properly. Even with alterations, we do not guarantee the results.

1.2 Machine Operation

Please refer to the machine manufacturer's Operators Manual for all information on operation, maintenance, troubleshooting and safety precautions.

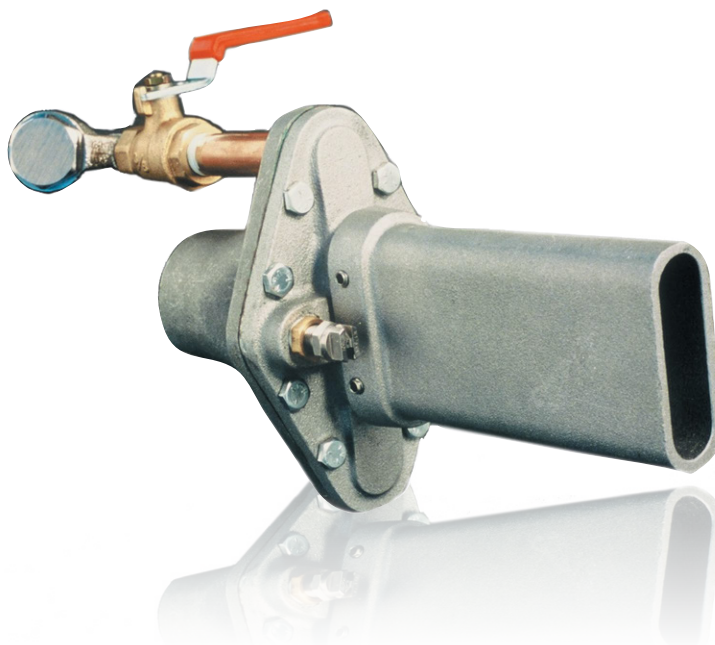
1.3 Monoglass® Spray Nozzle

The Monoglass® Spray Nozzle was designed specifically for use with Monoglass® Spray-On insulation, helping to improve the finished look of the work while blending the required amount of adhesive into the fiber during application.

The Monoglass® Spray Nozzle is available from Monoglass® Incorporated.

Spare parts also available from Monoglass® Inc:

- Replacement spray tips
- Filter screens
- Gaskets
- 2" O.D. short pole (11")
- Depth gauges



SECTION 2. Job Site Equipment, Preparation & Application

2.1 Equipment

Be sure all necessary equipment is available before starting to spray. Items other than those listed below may be required.

| ITEM | QUANTITY | DETAIL |
|--|-------------|--|
| Spray Machine | 1 | Contact Monoglass for preferred equipment (see page 5, section 1.1) |
| Wheel Kit | 1 | Wheels as required for spray machine, unless it's truck mounted |
| Monoglass Spray Nozzle | 1 | With 2" O.D. extension short pole |
| Spray tips | 4 | Stainless steel VVSS1502 1/8" |
| Fiber Hose | Min. 50' | 2" – I.D. |
| Fiber Hose | Min. 50' | 2.5" – I.D. |
| Fiber Hose | Min. 50' | 3" – I.D. |
| Reducer | 1 | 3" to 2.5" |
| Reducer | 1 | 2.5" to 2" |
| Liquid Pump | 1 | 2 or 3 piston type diaphragm, 300 psi |
| Liquid Line | 150' | Tested burst 300 psi, with suitable connectors to attach to spray nozzle |
| Water Hose | 50' | Standard hose |
| Pump Hoses | 1 Each | Intake and recirculation hoses for adhesive |
| Filter | 1 | Filter for adhesive intake hose |
| Mixer | 1 | Although adhesive can be mixed by hand, a drill with auger is preferred. |
| Power Cord(s) | As required | Heavy duty with ground |
| Power Source | As required | Ensure job site power is compatible with spray machine and pump requirements. |
| P.P.E. minimum requirements Refer to product S.D.S. sheets at www.monoglass.com | 1 | Personal Protective Equipment - N95 dust mask, or respirator, certified eye wear, gloves – other as required by local regulations. |
| 50-gallon drum, plastic | 1 or 2 | Plastic mixing drums for adhesive (do not use metal as it will rust) – two drums are preferable |
| Fresh Water | 1 | Source for fresh potable water to mix adhesive |
| Miscellaneous | | Set of tools, duct tape, box cutter, brooms, snow shovel (plastic), clean up equipment, polyethylene sheeting, board for tamping, etc. |
| Hose Clamps | 6 | As required to join fiber hose sections |
| Depth Gauge | 1 | Depth gauge to measure thickness of application. Available from Monoglass Inc. |

SECTION 2. Job Site Equipment, Preparation & Application (Continued)

2.2 Power

Arrange for adequate compatible power at spray machine location.

2.3 Water

Be sure adequate clean (cold or warm ... not hot) potable water is available.

2.4 Lighting

Provide sufficient illumination for adequate sprayer control of texture and thickness.

2.5 Building Conditions

Monoglass is applied with a water based adhesive and as such it is subject to damage from water. In order to apply Monoglass properly all areas where the Monoglass will be applied must not be subject to direct contact with water. The areas being sprayed need to be water tight. In certain circumstances, Monoglass may also be subject to damage from high winds.

2.6 Ventilation

When spraying in enclosed areas such as basements, crawlspaces, stairwells, shafts, rooms with no natural ventilation, or areas of high humidity, adequate ventilation must be provided to ensure proper drying and prevent bond failure. Lack of adequate ventilation causes air to become saturated. The drying process stops until the saturated air is removed and replaced with fresh, warm, dry air. **A minimum of 3 complete air changes per hour must be provided.** Local circumstances may also dictate the use of dehumidifiers.

For installations where Monoglass will be enclosed into a wall or ceiling assembly, painted, coated with Insulseal or any other topcoat, the insulation must be allowed to dry completely before closing it behind drywall or any other materials.

2.7 Heating / Application Temperature

The temperature of the substrate and ambient air shall not be at or below 1°C (34°F) during the application of Monoglass® Spray-On and until the product has dried completely. Do not use propane heaters to dry the applied Monoglass®. Use dry heat only, until Monoglass® is dry through to the substrate. Please see Section 4.3 Cold Weather Precautions for additional information.

2.8 Masking

Use polyethylene sheeting and tape as necessary to protect finished adjacent surfaces from overspray. Protect sprinkler heads, smoke detectors, lights, electrical outlets and any other sensitive items as required.

2.9 Surface Preparation

- A. Surfaces should be properly prepared as required. Substrates that are contaminated may cause bond failure or leaching of color through to the finished surface of the insulation. Pressure wash, clean, sand blast, prime and/or seal as required. For more information, please see Section 2.9E. Ensure that concrete has completely cured prior to applying Monoglass.
- B. On porous surfaces such as concrete, pre-wet with adhesive/water mix and block off sections of the spray surface (refer to Diagram 1 & 2, page 14. Pre-wetting will ensure better adhesion of fibers to substrate.

SECTION 2. Job Site Equipment, Preparation & Application (Continued)

2.9 Surface Preparation (Continued)

- C. Wood, drywall and any other surfaces which could bleed color should be primed/sealed prior to application to prevent staining of the Monoglass Insulation. Primer/sealer must be allowed to cure completely in accordance with manufacturer's instructions prior to the application of Monoglass.
- D. Painted surfaces should be pre-treated with Monoglass Adhesive or other sealer prior to insulation application. Rusty surfaces will need to be sealed in with a proper primer, not just adhesive. Use spray equipment liquid pump at normal setting (approximately 200 psi) if you are using Monoglass adhesive as a sealer. **If you are using a sealer or primer, follow the manufacturer's instructions.** Adhesive or sealer must be allowed to dry completely; check bond of adhesive or sealer to the painted surface to ensure it has bonded well prior to Monoglass application. This helps to encapsulate the substrate, reducing leaching and improving the bond of the Monoglass fiber. Paint should also be checked for adequate bond to substrate and not show signs of flaking or peeling. **Monoglass has tested a variety of primers (see Tech Bulletin on Page 22), if you are unsure which one to use, please contact us.**
- E. Prior to spraying, it is important to determine if the substrate is clean. If the substrate is not clean then typically pressure washing is sufficient, however, if a more aggressive cleaning is required the following methods can be used.
 - 1. Spray the entire surface with diluted Muriatic (Hydrochloric) Acid. This can be sprayed with any type of equipment that can produce a fine mist. This should be sprayed at a concentration of 5% acid diluted in water. Leave the sprayed solution in place for about 1 week and it will dissolve any grease or residue. You can then simply spray over top of this.
 - 2. You can also use an Industrial De-greaser – simply follow the instructions on the product. Again, you can leave this in place and spray over top of it.
 - 3. You can paint the entire surface with an etching paint – this basically does the same thing as the above options 1 & 2, but leaves a painted surface which can then be sprayed with Monoglass.

All of the above can be used on concrete or metal. Where form release agents are present, you also have the option to use a concrete grinder and simply remove a very thin surface layer of the concrete and then spray normally.

When applying products noted above, the applicators MUST wear all Personal Protective Equipment (P.P.E.) required by the manufacturers of these products. Monoglass Inc. will not in any way be held responsible for any injury, illness sustained, or damage caused by these products. Please follow all instructions as required by the manufacturer of the cleaning products. Your safety is YOUR responsibility.

Once clean, there is a simple test to determine if the glue will bond well to the substrate. Spray an area with diluted adhesive and let it dry, then return and attempt to scrape the adhesive off with a drywall knife or other similar tool. If the adhesive comes off in a clean sheet, this is NOT a good bond. If the adhesive comes off in small flakes and is difficult to remove, you have a good bond.

SECTION 2. Job Site Equipment, Preparation & Application (Continued)

2.10 Safety Precautions

A particle dust mask and Personal Protective Equipment should be worn at all times when insulation material is being handled, and during spraying application. For complete details refer to Safety Data Sheets (SDS), available from Monoglass Inc. and www.monoglass.com. Your safety is YOUR responsibility.

2.11 Adhesive Ratio & Mixing

- A. Mix 8 parts clean water to 1 part Monoglass® Adhesive as directed on product label. Add contents of small jug found inside adhesive pail into adhesive/water solution and mix thoroughly. If any crystals are found inside small interior jug, add warm water to crystals and stir until dissolved. As you fill the 50 gallon drum with water, gradually add the adhesive to the water. Do not empty the entire pail of adhesive into a dry drum and **then** add water, or you will have to mix this very thoroughly to achieve the proper blend. Fill the 50 gallon drum approximately ¼ full with water and then gradually add adhesive as you fill the drum with remaining water.
- B. Mix only as directed on product label. Do not increase water ratio of adhesive mix, over-dilution will weaken the adhesive and cause bond failure.
- C. If you are going to leave diluted adhesive in the drum overnight, ensure that it is covered.
- D. If mixed adhesive is left in a drum overnight, be sure to thoroughly stir it prior to use as the solids will settle to the bottom. This is best accomplished using a drill and auger. You may need to scrape settled/ partially hardened adhesive from the bottom of mixing drum, and stir thoroughly until back into solution.

2.12 Start Up Procedure - Refer to Diagrams 1, 2, & 3 on Page 14.

- A. Set pump at 180-200 psi. Make sure both spray tips are installed so that spray fans are parallel to nozzle head.
- B. Monoglass® is a one pass application, layered spraying is not recommended. Ensure that correct thickness is achieved with initial application; up to 5" overhead or 7" on vertical surfaces. For thicknesses greater than this, mechanical support will be required. Contact Monoglass Inc. for more information.
- C. Using tap on nozzle, turn on adhesive. Pre-wet porous substrate areas with adhesive.
- D. Using remote control switch, turn on fiber feed.
- E. Adjust fiber supply, air bypass and machine speed as required.
- F. Distance of gun from substrate approximately 4 - 6 feet (1.22 - 2 meters).
- G. Angle of gun to substrate approximately 20° from sprayer.
- H. Make slow, even and tight side to side passes.
- I. Do not apply overhead horizontal applications in excess of 5" (125mm) without mechanical support.
- J. Do not apply vertical wall applications in excess of 7" (175mm) without mechanical support.

When each section is complete, always overspray the same area with adhesive to ensure a good crisp finish. If board tamping is required, **refer to section 2.15 for instructions.**

SECTION 2. Job Site Equipment, Preparation & Application (Continued)

2.13 Shut-Down Procedure

- A. Using remote control switch, turn off fiber feed.
- B. Using tap on nozzle, turn off adhesive.
- C. Shut down machine and liquid pump. At the end of the spraying day, flush lines and nozzle with clean water until water runs clear.

2.14 Coverage

Coverage and yield may vary depending on the condition and settings of the spray equipment as well as the technique of the sprayer. The table below reflects the expected coverage using recommended equipment.

| Product & Application | Adhesive required | Yield in board feet (12" x 12" x 1" thick) |
|--|---|--|
| Monoglass Insulation <ul style="list-style-type: none"> Overhead / Horizontal Walls / Vertical | 1 pail per 10-11 bales fiber 1 pail per 18 bales fiber | 150 board feet / 30 lb. bale fiber 180 board feet / 30 lb. bale fiber |
| Sonoglass Acoustic Insulation (all applications) | 1 pail per 7 bales fiber | 110 board feet / 30 lb. bale fiber |

2.15 Tamping

At the discretion of the Design Authority, tamping may be required. There are two methods by which Monoglass/Sonoglass can be tamped.

The products can be physically tamped with a board or can be spray tamped using a higher pressure application of the adhesive. While both methods can produce good results, the specified method is what must be adhered to.

- A. Board tamping: Allow some curing of Monoglass® and then **lightly** press the surface of the insulation with your tamping tool. It will spring back partially. At most, you will lose ¼" of application depth.

Board tamping can be done with a supported styrene board or stiff plywood for flat surfaces. In the case of a metal corrugated deck, we recommend tamping using the same type of decking to mirror the pattern of the deck to which the material has been applied. Once tamped, immediately overspray the application with adhesive mixture to obtain a crisp surface.

- B. Spray tamping: Spray tamping may also be acceptable. In this case, spray as normal and then over spray with adhesive only at a minimum of 220 psi. Ensure any loose material is either blown off or blown flat and well adhered to the application.

SECTION 3. Troubleshooting & Maintenance

3.1 Fiber Clog

- A. If a fiber clog occurs turn off the machine. Go to source (feeder), remove hose, close fiber supply and run machine. If this is clear, replace hose and repeat procedure at hose couplings and nozzle until the clog is located.
- B. Having cleared your lines, check air flow.

SECTION 3. Troubleshooting & Maintenance (Continued)

- C. Resume spraying, opening fiber supply slowly to required fiber flow, making sure there is adequate air flow to move the fiber through the system for the desired finish.

3.2 Reason for Clog

- A. Shredder not breaking up fiber properly.
- B. Low blower pressure or air leak in system – check hoses for cracks or holes. Also check the connections between hoses for air leaks.
- C. Worn seals causing loss of pressure – you will typically notice a blow back of fiber in the machine hopper when this is the case.
- D. Insufficient hose length – minimum length of hose is 100 feet.
- E. Use of a nozzle other than a Monoglass Nozzle.

3.3 Spray Tip Clogs

- A. If tip clog occurs turn off liquid tap on nozzle. Remove clogged tip and clean (see section 3.10).
- B. Clean filter on liquid pump intake line.
- C. Clean in-line filter on Monoglass Nozzle. Replacement filters are available from Monoglass Inc.
- D. Check adhesive mixture for excess particulates or debris in the barrel.
- E. If required, flush lines with clean water and resume spraying.

3.4 Overspray

Overspray should be a light dust coat of fiber on the floor. The approximate waste factor is 3% of the material being used. If there is excessive overspray your yield per bag will be dramatically reduced. In the case of excessive overspray:

- A. Check adhesive fan; if too small or weak, check glue pump pressure during the spraying process is 180-200 psi, and check if tips are worn and should be replaced (see 3.11).
- B. Check air flow. Too much air will cause fiber to bounce off substrate. Not enough air will cause the material to fall out of adhesive fan before it reaches the substrate.
- C. Ensure that the adhesive fans are parallel to the side of the nozzle and that it is combining with the fiber approximately 6"-8" from the end of the nozzle. If the adhesive is not combining with the fiber it will not adhere.
- D. Ensure the angle of application is correct – too shallow an angle will cause the material to bounce off the substrate, too steep an angle will cause dropouts.
- E. Refer to Section 4 for additional spraying techniques that may affect yield.

3.5 Adhesive: IF ADHESIVE FREEZES DO NOT USE.

Protect adhesive from freezing – always store in a warm location. The adhesive should always appear creamy and smooth; if it appears lumpy and coagulated, this is a likely indication that it has frozen and it is no longer usable. Please contact Monoglass Incorporated if you are unsure about using the adhesive. Mix only as directed on product label (see section 2.11). Do not increase water ratio of adhesive mix; over-dilution will weaken the adhesive and cause bond failure.

SECTION 3. Troubleshooting & Maintenance (Continued)

3.6 Spray Machine

Refer to machine manufacturer's operator's manual. All moving parts (bearings, gears and chains) should be greased regularly.

3.7 Pulley Belts

All belts should be sprayed with belt slip regularly.

3.8 Liquid Pump

Refer to machine manufacturer's operator's manual. Gear oil should be checked daily and changed as required.

3.9 After Shut-Down

- A. After each daily spraying operation rinse the nozzle in clean water to prevent adhesive build-up.
- B. If the nozzle will not be used for an extended period such as overnight, after finishing the spraying operation flush the entire liquid system, including hoses, nozzle and pump with plenty of clean water until the water coming through the system runs clear.

3.10 Spray Tip Maintenance

Do not use welding tip cleaners to clean a plugged spray tip. Use smooth wire with a smaller outside diameter (O.D.) than tip orifice.

3.11 Spray Tip Replacement

- A. When replacing tips ensure that the threads are wrapped with Teflon tape before installing. Replacement tips are available from Monoglass Inc.
- B. Be sure to install spray tips so that spray fans are parallel to nozzle head. Adhesive should combine with the fiber approximately 6 inches from the nozzle end.

3.12 Seals

If seals on the feeder are damaged or worn, air leakage results. This leakage causes bridging in the shredder area and reduces air pressure through the hose, affecting nodule size and formation, and rate of fiber feed. A sure sign of need for replacement is blow back of insulation at the feeder or shredder. Contact manufacturer for replacement seals.

3.13 Damaged or Out-of-Round Hoses

Exposed wire inside a damaged hose can cause plugging of the hose or balling of the insulation. Out-of-round or kinked hoses restrict the flow of air. Leaking hoses reduce air pressure and affect the flow of fiber, potentially causing fiber clogs, low yield and excess over spray.

Equipment knowledge and maintenance is your responsibility. If you are unsure of maintenance or repair requirements, contact the manufacturer of that equipment.

SECTION 4. Application Tips

Diagram 3 (next page) demonstrates correct and incorrect spray patterns. When applied correctly, your overspray and clean-up will be reduced and finish appearance improved.

For an overview of the spray process please visit www.monoglass.com to view a brief video. Please note that the Applicator Manual instructions supersede the video.

4.1 Application Tips

- A. Check glue tips for correct alignment to the gun body or for wear. Incorrect alignment will misdirect the liquid fan; materials may not be properly coated. Worn tips will have similar results, and will increase the amount of liquid mixed into the fibers.
- B. Each time you mix a new drum of adhesive rinse the filter on the glue intake hose.
- C. Surfaces should be properly prepared as required. Substrates that are contaminated may cause bond failure or leaching of unwanted color through to the finished surface of the insulation. Pressure wash, sand blast, clean and/or seal as required (see section 2.9).
- D. On porous surfaces, pre-wet with adhesive/water mix and block off sections of the spray surface (refer to Diagram 1 & 2, page 14). For wood surfaces refer to Surface Preparation Section 2.9. Blocking off at required thickness gives a border to spray up against, to leave a neat, invisible border to butt up against from the other side. Pre-wetting will ensure better adhesion of fibers to substrate.
- E. Correct gun angle is most important for a tighter finish surface. The problem of incorrect gun angles is compounded by overspray bouncing off the previously finished material (refer to "Spray Pattern" diagram 3, page 14).
- F. Set pump at 180-200 psi (this is the pressure during spraying) and pre-wet porous substrate areas with adhesive. Make sure both spray tips are installed so that spray fans are parallel to nozzle head. Pump pressure may vary depending on how open the valve is on the nozzle.
- G. Monoglass® is a one pass application, layer spraying is not advisable. Ensure that correct thickness is achieved with initial application.
- H. Maintain the proper spray angle – as you reach the end of the pass, do not angle your arms too far as this will cause lumps to build up at the end of each pass.
- I. Keep the nozzle between 4 - 6 feet (1.22 - 2.00 meters) from the substrate.
- J. Faster is not better: slow and steady passes will produce the best results.
- K. If you are getting too much overspray/waste or fallout, review the following:
 - Check spray technique and ensure the spray machine blowers and slide gate are set correctly
 - Check glue pump pressure is set between 180-200 psi
 - Check that you have good seals at all hose connections
 - Check to ensure there are no broken, cracked or clogged hoses
 - Check that there are no clogs in your liquid line
 - Check that spray tips are clean and correctly aligned
 - When using a Krendl Equipment machine, make sure the chains are set to Uni-Directional

Once a blocked section is finished, always overspray immediately with adhesive to knock off hangers and help seal surface. If tamping is required, refer to section 2.15 and tamp prior to overspraying with adhesive.

SECTION 4. Application Tips (Continued)

4.2 Spray Patterns

Typical Monoglass Spray Pattern

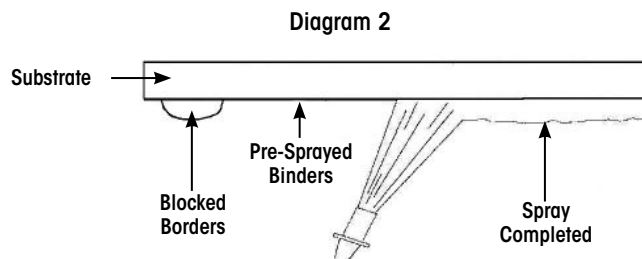
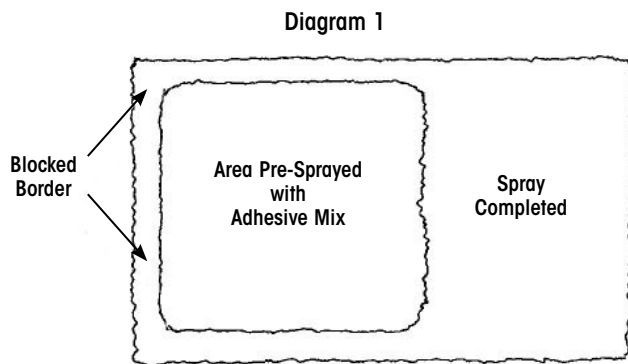
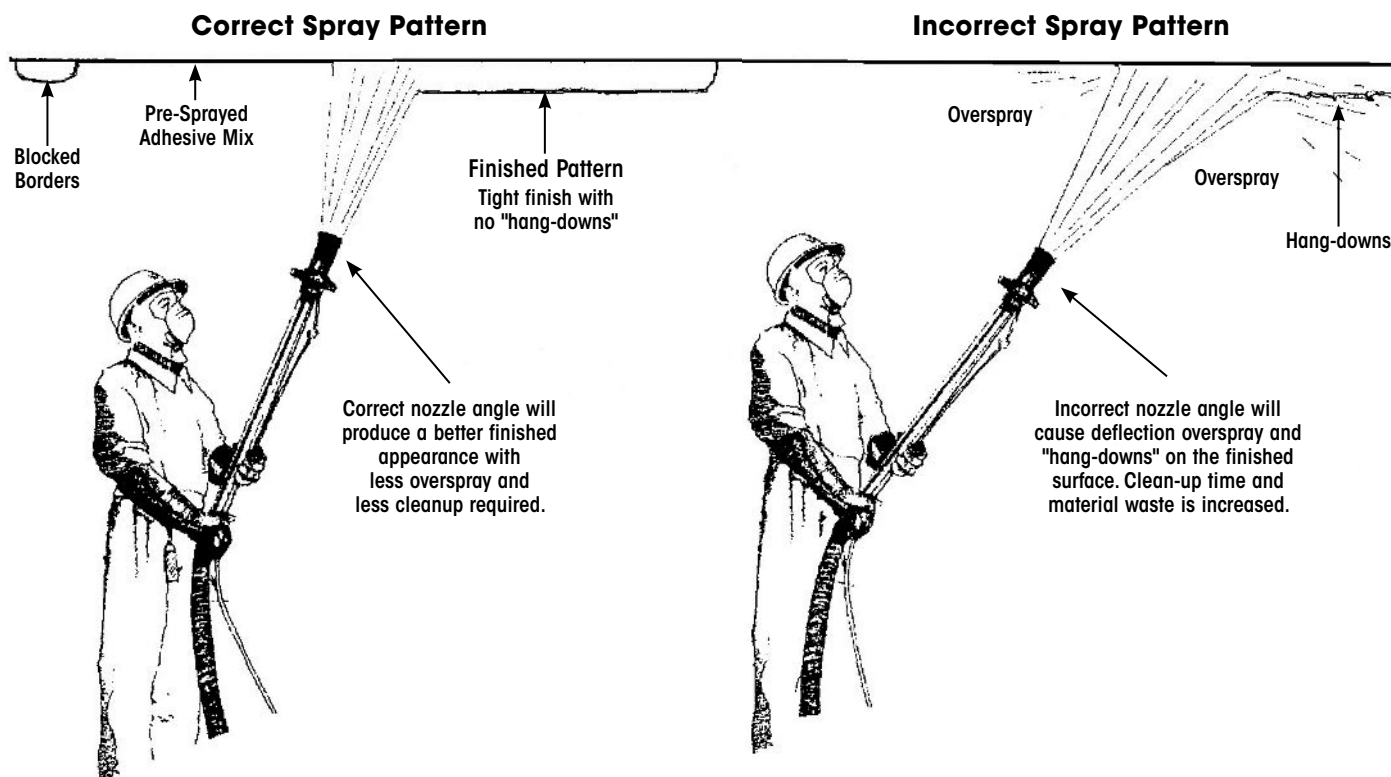


Diagram 3



SECTION 4. Application Tips (Continued)

4.3 Cold Weather Precautions

In cold & freezing weather, bond failure may occur unless the following precautions are taken.

- A. The temperature of ambient air, substrate, and at the interface of Monoglass® and substrate, cannot be at, or below 34°F (1°C) during application, and until the material has completely dried through to the substrate. Drying time will be prolonged in colder temperatures. Provisions must be made to maintain heat.
- B. Lack of adequate ventilation causes air to become saturated. The drying process stops until the saturated air is removed and replaced with fresh, warm, dry air. **A minimum of 3 complete air changes per hour must be provided to ensure proper drying.**
- C. Uncured / unsealed concrete or wood can absorb and retain moisture which will be subjected to freezing from outside temperatures and result in bond failure.

Generally, materials de-laminated by freezing will come clean off the substrate with few fibers left on the surface. Fallen materials will often be damp or wet, which indicates that they were either never cured before freezing, or penetrated by moisture after curing and frozen at the interface.

In consideration of this information please ensure that specifications for Monoglass applications are adhered to:

- Ambient and substrate temperatures shall not be lower than 34°F (1°C) during application and until the material has completely dried. This time will vary and depend on job conditions, air temperatures, ventilation and thickness of application.
- Provisions must be made to maintain heat and ventilation. Forced air circulation (dry heat only) must be provided, especially in areas lacking natural ventilation.
- Ensure that exteriors are sealed and waterproofed to eliminate the risk of moisture penetrating through substrate causing freezing at the interface.

REMINDER: Even though a building is heated from within, as soon as a substrate is insulated by applying Monoglass insulation, the amount of heat being transferred to that substrate is immediately reduced. Therefore, you can still have freezing temperatures at the substrate & bond failure, despite heating the interior of the building/space. Steps must be taken to ensure substrate temperature REMAINS above 34°F (1°C) until the Monoglass is completely dry, or bond failure may occur.

SECTION 5. Sonoglass Spray-Applied Acoustic Treatment

5.1 Application Guide

Sonoglass has been designed primarily as a "finished" acoustic product. Although Sonoglass provides a thermal value, this is not its primary purpose. In order to achieve the required NRC values and flatter appearance, as is expected of an exposed interior surface, Sonoglass is applied denser than a typical Monoglass Insulation application.

When compared to a Monoglass Insulation application, the following changes to the application process must be made:

- 1 pail of adhesive **must be used** for every 7 bags of fiber.
- If your spray equipment has speed controls for the agitators that are easily changed, the speed should be reduced by 10%.
- Nozzle angle remains the same. The nozzle should be no further than 4 feet from the substrate.
- **Tamping as specified by the design authority (spray or board) must be done** within 24 hours of application and while the product is still wet.
- When board tamping, the finished application **must be oversprayed** with adhesive following tamping.
- Maximum installed thickness for Sonoglass is 3 inches.
- Overall, the spray process should be slower, allowing a denser buildup of the product.
- Yield per bag is approximately 110 board feet (12" x 12" x 1" thick), net of waste.

Failure to follow recommended application settings will void the product warranty.

If you have any questions or concerns, please contact us at 1-888-777-2966.

SECTION 6. Tinting & Painting

6.1 Tinting with Color Spray Tints

Color Spray Tints are specially designed tints for quick and easy Monoglass® or Sonoglass® tinted applications.

General Directions:

Tarp off surrounding areas so that they are not damaged by overspray of colored adhesive. Unlike our normal adhesive, tinted adhesive will not dry clear. If the floors are to be left clean or if staining is a concern, you must tarp off the floors to prevent tinted adhesive from reaching them. Clean up any spills or overspray on walls/floors immediately.

Refer to the Color Spray Tint Mixing Instructions for complete mixing instructions.

Spray apply insulation to required areas as you would normally. The insulation will have a mottled color/white appearance at this stage.

Board tamp the application (refer to section 2.15 Tamping) and overspray with colored adhesive while still damp. Board tamping makes it much easier to get a more consistent colored finish. Apply second coat of overspray after first application has dried.

SECTION 6. Tinting & Painting (Continued)

6.1 Tinting with Color Spray Tints (Continued)

When bidding be sure to allow for:

- Additional preparation time / tarping.
- Additional adhesive for overspray layers; 1 pail of tinted adhesive will overspray approximately 2,000 square feet.
- Additional labor & time for tamping and second overspray layer.

Mixing Instructions

- Use one bottle of **Color Spray Tint** per 18.9 Liter / 5 US Gallon Pail of Monoglass® Bonding Adhesive. Thoroughly shake the tint container to ensure dispersion of colorant.
- After opening the 5-gallon pail of adhesive, you will find a 1-gallon container floating in the adhesive. Remove this container and rinse the surface of it into a 50-gallon drum.
- Fill the 50-gallon drum $\frac{1}{4}$ full with water, and then gradually add the bonding adhesive while filling the drum.
- As the drum fills with water, gradually empty the contents of the 1-gallon container into the same 50-gallon drum.
- Add the entire contents of 1 Color Spray Tint container to the 50-gallon drum.
- Rinse the adhesive pail and Color Spray Tint container with clean potable water into drum. These must be rinsed directly into the 50-gallon drum. Then continue to dilute with clean water until a total volume of 45 gallons has been created.
- As you are adding the water, stir the adhesive/water/tint mixture thoroughly to ensure even distribution of the tint, with no color streaking.
- During application, stir the mixture as required to ensure even color distribution.
- Once complete, the drum should contain: 1 pail of Monoglass Bonding Adhesive (including the 1-gallon container found within the 5-gallon pail), 1 container of Color Spray Tint and 40 gallons of clean potable water.

IMPORTANT: Entire contents of tint container and bonding adhesive pail must be added to mixture. Failure to do so may cause uneven color of finished application. Water dilution ratio must be exact to prevent variation in color from one mix to the next.

Spraying Technique - Tinted Applications:

- When spraying Monoglass with tinted adhesive it is important to adjust your settings and technique slightly. You want to create a tighter finish to create a better surface for tinting.
- Increase the glue pressure to 240 psi when spraying.
- Maintain the normal 20 degree angle but avoid flaring the nozzle at the end of the pass – maintain a straight spray arm as much as possible.

Color Spray Tints are available in grey and charcoal black. When other colors are specified, painting the application is required. Please refer to the following section for instructions.

SECTION 6. Tinting & Painting (Continued)

6.2 Painting Monoglass & Sonoglass

Monoglass and Sonoglass insulations can be painted with a non-bridging latex paint, oil based or dry-fall paint as follows:

- A. Mix and apply thermal insulation as usual. Tarp/mask off any adjacent surfaces. Apply insulation to the substrate as specified to sufficient thickness to achieve the required thermal / acoustic value.
- B. Allow insulation to dry partially, usually 1 day is enough. Board tamp the sprayed insulation surface flat and apply overspray with Monoglass adhesive (diluted at regular ratio of 8 parts water to 1 part adhesive) to help seal the tamped insulation surface.
- C. Allow insulation to dry completely through to substrate prior to painting. This may take several days depending on thickness of insulation, air changes, and temperature. As per our normal directions, make sure there are at least 3 complete air changes per hour as well as adequate heat to keep substrate and ambient air temperature above 34° Fahrenheit / 1° Celsius.
- D. Spray paint the insulation to desired color using non-bridging (flat not gloss) latex paint, oil based or dry-fall paint. One or two coats should be adequate. Apply only as much paint as is required to achieve the desired color.

We frequently recommend painting to our customers as a way of achieving the exact color required, and/or to color match the insulation with adjacent surfaces. This will have only a small (5-10%) reduction in the overall Noise Reduction Coefficient (NRC) of the product.

SECTION 7. INSULSEAL Protective Coating

7.1 Introduction & Coverage Guide

By varying the coverage rate, different levels of protection and durability can be achieved with INSULSEAL.

When budgeting, remember to allow for board tamping the insulation prior to application. You must always roll or board tamp flat the surface of the base material prior to applying INSULSEAL in order to create a more uniform finished appearance.

• Moderate Application:

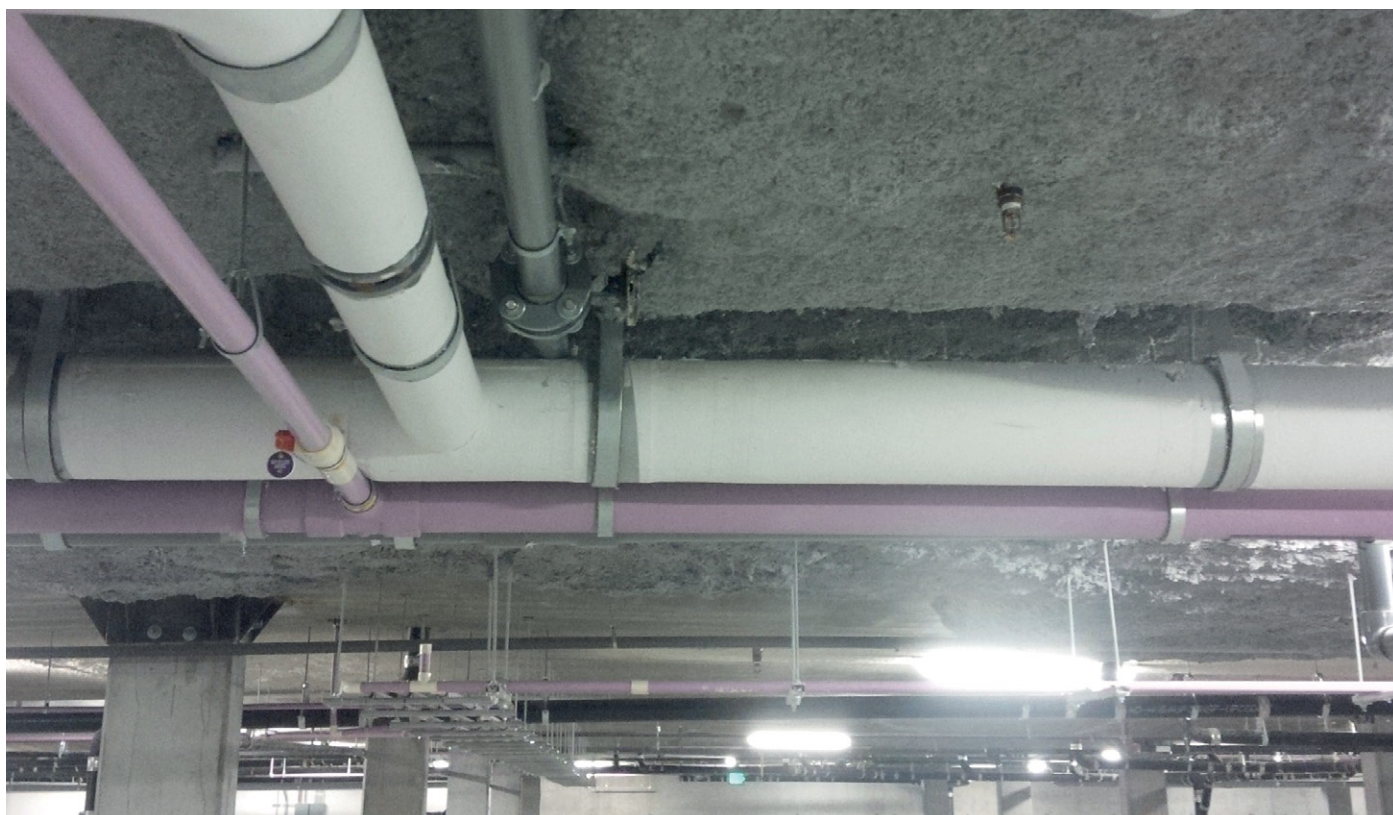
Apply INSULSEAL at a coverage rate of 75 ft² / U.S. gallon (1.8m²/liter). This coverage will bind the surface together and give a firmer protective coating.

• Heavy Application:

Apply INSULSEAL at a coverage rate of 38 ft² / U.S. gallon (0.92m²/liter) for wear and abrasion resistance. This application rate creates an almost continuous layer of INSULSEAL over the base material.

| Coverage Level | Imperial | Metric |
|----------------|--|---|
| Moderate | 75 ft ² / US Gallon (375 ft ² / 5 Gallon pail) | 1.8 m ² / Litre (34 m ² / 18.9 Litre pail) |
| Heavy | 38 ft ² / US Gallon (190 ft ² / 5 Gallon pail) | 0.92 m ² / Litre (19 m ² / 18.9 Litre pail) |

SECTION 7. INSULSEAL Protective Coating (Continued)



7.2 Application Guide

Pump Recommendations: Hydraulic airless piston type spray equipment with contractor grade airless spray gun. A variety of pumps may be used for different levels of production and project sizes. **Diaphragm pumps are not recommended for use with INSULSEAL.** Examples of suitable equipment are outlined in the table below:

Pump Type: GRACO Ultimate MX II 1595: 2.8 hp, 1.35 gal/minute or equivalent.
 Typically, attempts to spray this material with a smaller or less powerful pump will fail.

Max. Hose Length and I.D. 200 ft of 3/8" (60m of 10mm) I.D. with 3 ft of 1/4" (.6m of 6mm) I.D. whip.

Line Pressure: 3000 to 3300 psi.

Tip Size: .023" - .035" (0.58mm to 0.89).

Fan Width: 8 to 12 inches.

Coverage: Please refer to INSULSEAL coverage chart in section 7.1.

Spray Recommendations: STIR WELL BEFORE USING. May be diluted with water up to 10% to allow for ease of spraying.

Nozzle distance to substrate: 3 to 4 feet (approximately 1 meter).

Surface Preparation: For optimal coverage and appearance, the Monoglass® surface must be roll or board tamped smooth. Allow Monoglass® to dry completely prior to application of INSULSEAL.

SECTION 7. INSULSEAL Protective Coating (Continued)

7.2 Application Guide (Continued)

- Freezing:** **Do NOT let INSULSEAL freeze** during storage, application or during drying.
- Ventilation:** Provide good ventilation and a minimum of 4 complete air changes per hour to allow for proper drying and curing of the INSULSEAL.
- Cautions:**
- 1) **Keep INSULSEAL from freezing**
 - 2) Ambient and substrate temperatures must not be below 40° F / 4°C during application and until the material has completely dried. If necessary, provide enclosures and temporary heat to maintain temperatures.
 - 3) Mask all areas not to receive INSULSEAL.
 - 4) Do not allow INSULSEAL to sit in hoses for more than one hour. If longer down time is required, flush system clean with water.
 - 5) **ALWAYS STIR BEFORE USING** – this product will settle over time.
- Clean Up:**
- 1) At the end of the day flush all lines and guns with water.
 - 2) Clean all equipment while INSULSEAL is still wet. After drying, removal of INSULSEAL is more difficult and will require scrapers and wire brushes.

For M.S.D.S./S.D.S. or further information please contact us, or go to www.monoglass.com

SECTION 8. Inspections: Thickness & Density Testing

8.1 Scope and Procedure

The inspection procedure described herein provides a method by which field inspection of direct contact spray insulation can be performed for determination of thickness and density of application.

The inspection of direct contact spray applied fiber should be made by an independent testing laboratory or other authority acceptable to the owner or their representative.

8.2 Thickness Testing

- A. All testing shall be based on random sampling of areas pre-selected from project drawings prior to any visual inspection of areas to be sampled.
- B. Thickness of spray shall be determined by use of a depth gauge consisting of a 1" (25mm) diameter disk affixed to a measuring rule and penetrated by a needle affixed to the graduating scale of the measuring rule (available from Monoglass® Inc.).
- C. Select areas to be tested in accordance with item 8.2A (above) to provide two samples for an area of no less than 2,500 square feet of sprayed area.
- D. Select two 12" square areas from which a thickness measurement is taken at each corner, averaged and reported as a single measurement. State the location and recorded thickness of the measurement.

SECTION 8. Inspections: Thickness & Density Testing (Continued)

8.2 Thickness Testing (Continued)

- E. Thickness shall be determined with the needle gauge extended beyond the disk into the material until the point contacts the substrate. The rule is then moved until the disk contacts the material surface. Light pressure shall be exerted on the disk to compress the material surface to the average plane of the texture (average of crests and valleys). The gauge is then withdrawn to read the thickness in 1/16" increments as shown by the position of averaging measurements, any measurement 1/4" or more over the design thickness shall be recorded as the design thickness plus the overage.

8.3 Density Testing

- A. Density samples shall be one for each 10,000 square feet of pre-selected area, but no less than one for a contract area of less than 10,000 square feet. The average of all individual samples shall not be less than 10% plus or minus of the design density.
- B. Mark off the specimen size using a template of known length and width. The area shall be no less than 144 square inches.
- C. Establish the average thickness of the sample area from 20 measurements taken from the sample symmetrically. Cut perimeter of the test area cleanly to the substrate after thickness has been determined and recorded.
- D. Remove the specimen into a container without the loss of any material.
- E. The removed specimen material shall be dried at 120°F maximum to constant weight, usually 24 - 48 hours. A scale with an accuracy of 1 gram shall be used to determine the weight of the specimen material.
- F. Density will be calculated in accordance with the following formula:

$$\text{Density in lbs./cu.ft.} = (W * 1728) / (L * w * t)$$

W = weight of dry material in pounds

t = thickness of specimen in inches

w = width of specimen in inches

L = length of specimen in inches

Note: For conversion of grams to pounds, divide weight of sample by 453.6 to obtain pounds.

SECTION 9. Technical Bulletins

The following Technical bulletins represent only some of the conditions that may occur either prior to, during or after application of our products. It is the responsibility of the applicator and design authority to ensure the proper use and installation of the products.

9.1 Priming the Substrate

On occasion, there may be the need to prime the substrate. This could be due to potential stain bleed through or the inability to completely clean a surface.

In the event the surface is being primed for stain prevention, enough primer must be used to completely block the stains.

The following primer has been tested for adhesion and the prevention of color bleed-through on wood and drywall surfaces. This primer has been shown to prevent color transference from the substrate treated, when Monoglass insulation is subsequently applied over top of the cured primer.

Recommended Water-Based Primer:

ZINSSER Interior/Exterior Primer Sealer Stain Killer Product "Bulls Eye 1 2 3"

Manufacturer: Zinsser Co. Inc., 173 Belmont Drive, Somerset, NJ USA 08875

Tel: (732) 469-8100. Worldwide contact information: www.zinsser.com

Will bond to: Glossy paints, varnishes, PVC, glossy laminates, aluminum, steel, galvanized metal, ceramic tile with no scuff sanding required.

Adhesion / Drying Time: This product specifies a 7-day dry time for full adhesion and hardness.

Stain Killing: For stain bleed through, 2 coats are recommended – ensure that there is no evidence of bleed through prior to applying Monoglass.

Please note all primers MUST be applied and allowed to fully cure according to the manufacturer's instructions. Failure to follow these instructions may affect results. As with all Monoglass applications, the faster the material can dry, the less likely the chances of a color bleed through or bond failure.

In the event you choose another water-based primer, please carefully follow the manufacturer's recommendations to ensure it will perform as required.

Monoglass recommends the use of water-based primers for their ease of clean-up and low VOC content, however, we also have had good results with the oil based primers listed below:

| BRAND NAME: | TYPE: |
|--|----------|
| KILZ Original – Interior Primer | Oil base |
| BEHR Premium Plus Interior Primer and Sealer | Oil base |
| ZINSSER Primer/Sealer – Interior/Exterior | Oil base |

SECTION 9. Technical Bulletins (Continued)

9.2 Construction Roof Traffic

In order to maintain the required thermal value of a roof assembly, the bond of the spray applied insulation must not be weakened during or after the application. Unfortunately, there are too many cases where this does occur. By far, the predominant reason for delamination of insulation is Construction Roof Traffic; typically resulting from condensed or out of sequence work schedules.

"Construction Roof Traffic" refers to the activity of walking, installing, or working with equipment on the roof of a building. Roof traffic above areas where the insulation has already been applied, especially to a steel roof deck, is a major concern for manufacturers and Building Team Members. Impact forces and deflection often compromise the adhesion between the material and substrate, which may cause the spray applied insulation to delaminate or "bridge".

Bridged spray-applied insulation refers to material essentially separated from the substrate but held in place by adjacent material. Bridged insulation may fall off weeks, months, or even years after the initial damage. Delamination or bridging not only affect the permanence of the insulation installation, but can also delay the construction work schedule and increase overall costs.

The application of spray applied thermal/acoustic material to the underside of roof deck shall not commence until the roofing is completely installed and tight, all mechanical units have been placed, and after construction roof traffic has ceased.

Therefore, **all** roof work, including work on the perimeter and the installation of roofing membrane and ballast, should be completed prior to the spray-applied insulation application.

In addition to proper sequencing and coordination between trades, the following additional guidelines will help minimize the problem:

- 1) The design specifications for roof deck gauge and spans should be in accordance with the Steel Deck Institute recommendations for construction and maintenance loading.
- 2) When roof traffic is anticipated, as in the case of periodic maintenance, roofing pavers should be installed as a walkway to distribute loads.
- 3) Adequate heat and ventilation must be provided to ensure proper drying of the insulation, and ensure the ability of the insulation to adhere to the substrate.
- 4) Spray-applied insulation adhesives must be mixed and used at manufacturers recommended ratio of adhesive mix to insulation material, to ensure proper adhesion. Pre-wet substrate with adhesive mix prior to applying insulation. This will aid in adhering insulation to substrate.

Where roof traffic is unavoidable, the insulation may require mechanical fastening to structural steel decking in order to prevent future bond failure.

Following these guidelines will help to minimize the problems associated with spray-applied insulation delamination due to construction roof traffic. However, proper construction scheduling and coordination between trades cannot be overemphasized.



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