

GENERAL OVERVIEW

High performance polymer coatings or linings normally require specialized application techniques. These materials are normally heavier, more viscous, and typically have very stringent thickness requirements when compared to paint and other thin coatings. Because of varying physical characteristics, one polymer material may require a particular technique, while applying a different material in the same way could result in disaster. Always consult the material's Technical Data Sheet (TDS) for specific recommendations on the proper application technique for that product.

This guide is intended to communicate basic techniques for application by squeegee, roller, and brush. In general, this technique is employed when applying heavy coatings or linings with higher viscosity than normal paint. The applied film thickness of these coatings is normally greater than standard paint, so just 'painting it on' will not yield acceptable results. To simplify reading, 'coating or lining' will be referred to as 'coating'.

ADDITIONAL RESOURCES

Wolverine Coatings Corporation (WCC) has developed this bulletin along with other technical information to help all interested parties, from specifiers to applicators to owners, have a better understanding of the considerations, materials, and techniques required for proper installation. Consult all relevant information before using WCC materials.

WCC Technical Information Bulletins

TIB: Mixing Guide

TIB: Preparing Concrete to Receive Coatings or Linings

WCC Technical Detail Drawings

TDD: N/A

WCC Technical Data Sheets

TDS: N/A

WCC Safety Data Sheets

SDS: N/A

SAFETY

Prior to commencing work, carefully read and follow all SDS (formerly MSDS), Technical Data Sheets, and any Instruction Manuals for products and equipment used during installation. Following the safety regulations of jobsite, local, state, and federal authorities is the responsibility of the installation company, general contractor, and/or facility owner.

DISCLAIMER

This Document does not purport to address all applicability and safety concerns, if any, associated with its use. It is the responsibility of the user to determine applicability of the information and to establish appropriate safety practices.

DEFINITIONS

1. **Volume Solids Content** – Volume Solids Content is the measure of the amount of non-volatile material in a coating as a percentage of its total volume. It is normally specified as a percentage, such as 72% or 100%. Some materials contain volatile solvents as carriers, such as water, xylene, MEK, etc. Upon application, these solvents evaporate into the air leaving the non-volatile material to cure. Since the solvent is no longer in the material, there is less material left on the surface. As an example, 10 mils of wet, 100% solids material will yield 10 mils dry (10mils x 1.00). 10 mils of wet, 72% solids material will yield 7.2 mils dry (10mils x 0.72). In this example, 28% of the material is no longer on the surface, leaving a substantially thinner coating. Do not confuse with Weight Solids Content.
2. **Weight Solids Content** – Weight Solids Content is very similar to Volume Solids Content, except it is based on weight units rather than volume units. Weight Solids Content is normally not significant for application considerations, while Volume Solids Content is critical. Do not confuse the two.
3. **Mil** – Measurement of coating thickness. One mil is equal to one thousandth of an inch (0.001") or 25 microns. For reference, 24# copier paper is a little over 3 mils thick and ¼" is equal to 250mils.
4. **Wet Film Thickness (WFT)** – Thickness of an applied coating in its wet phase. Normally measured in mils with a Wet Film Thickness Gauge, average WFT may be calculated from actual or projected Application rate (see useful calculations following this section). WFT is roughly equal to Dry Film Thickness when the coating is 100% solids.
5. **Dry Film Thickness (DFT)** – Thickness of an applied coating in its cured phase. Normally measured in mils. DFT may be calculated by multiplying WFT by Volume Solids Content.
6. **Wet Film Thickness Gauge** – Stamped metal device used to indicate Wet Film Thickness of an applied coating. It normally has 'teeth' of varying length, with numbers indicating mil thickness on each 'tooth'. To use, dip the Wet Film Thickness Gauge into a wet coating and observe the last tooth the coating contacts. Wet Film Thickness will correspond with this last touched tooth.
7. **1604** – 1604 is a very useful number to remember for calculating Application Rate and related coating WFT as well as DFT. 1604 is the number of square feet a gallon of any liquid will cover at one mil thickness. See below for useful formulas using this number following this section.

DEFINITIONS (CONTINUED)

8. Application Rate – Estimated or average area coated per gallon of material, e.g. 160 sf/gal. See Application Rate in the calculations following this section.
9. Wastage – Extra material estimated and/or ordered to account for residue left in buckets and on application equipment. Normally expressed as a percentage (10% Equals 0.1). Wastage is typically higher on small projects, decreasing with the size of the project.
10. Holiday – Painting industry term used to indicate missed spots, thin areas, and/or otherwise off-spec application. Attention to detail, proper planning, and good application technique will greatly reduce the occurrence of holidays.
11. Cutting-In – Painting industry term used for coating around obstacles and against surfaces a paint roller can't reach or coat acceptably. Cutting-in is typically done with a brush or small roller.

USEFUL APPLICATION CALCULATIONS

Application Rate (sf/gal) =	1604/WFT
	Volume Solids Content x 1604/DFT
DFT (mils) =	Volume Solids Content x WFT
	Volume Solids Content x 1604/Application Rate
WFT (mils) =	1604/Application Rate
Amount of Material Required (gal) =	(1 + Wastage) x Area (sf)/Application Rate
	(1 + Wastage) x Area (sf) x DFT/Volume Solids Content/1604

EQUIPMENT

SQUEEGEES:

Heavy and/or viscous coatings can be difficult to move around with a roller alone. They are normally best applied by a squeegee and then smoothed or evened out with a roller. When choosing the proper squeegee, consider its ability to easily move the material, while metering out the correct amount of coating for required thickness. Since material viscosity, weight, desired thickness, substrate, temperature, and applicator experience vary wildly, experimenting with various squeegees is highly recommended before installation. Consult the material's TDS for specific or peculiar recommendations. There are many types of squeegees available. The following is a partial list with a brief discussion of their uses.

- Serrated or Notched Squeegees – These squeegees have teeth that allow material to flow between the teeth, leaving required thickness on the substrate. There are varying tooth sizes to fit the application. If the application speed and angle of these squeegees is consistent, a uniform thickness of material will be spread on the surface. Use a serrated squeegee when applying a heavy, high viscosity material. They are also advantageous when applying high WFT. The teeth will wear down with use, so the WFT thickness will decrease. Check coating thickness regularly with a Wet Film Thickness Gauge. Discard the worn out squeegee and use a new one when the thickness falls below minimum requirements.
- Gauge Rake – A Gauge Rake is similar to a serrated squeegee, but instead of teeth across its length, it has adjustable pins, cams, or skids on its edges to meter out the desired thickness. They are easily adjustable for a wide range of required thicknesses. As with serrated squeegees, regularly check coating thickness with a Wet Film Thickness Gauge to ensure consistent thickness. Also, thin spots are possible if a surface is not flat. The edge guides can straddle high spots and leave the coating thin in those areas. A Gauge Rake is especially suited for application of very thick mil coatings or slurry surfacers, typically 60mils and above.
- Flat Squeegee – A Flat Squeegee's characteristics are self explanatory. They can either be stiff or flexible. Since there are no guides or notches to meter out coating thickness, great care must be taken in order to apply a consistent coating thickness. Consistent, even down-force and speed are crucial for proper application. Check coating thickness often with a Wet Film Thickness Gauge.

EQUIPMENT (CONTINUED)

ROLLER COVERS AND FRAMES:

Use only the highest quality roller covers when installing coatings. They should be lint-free and solvent-resistant, with a durable core such as phendlic.

A roller's nap is its hairy or downy surface which holds material and leaves the surface evenly coated. Selection of the nap thickness is dependant upon the surface texture of the substrate as well as the viscosity of the coating. A good starting point in selecting nap size is 3/8" for standard polymer coatings. Rough and unlevel substrates require longer naps, typically above 1/2" for even application. Smooth surfaces and lower viscosity materials may require short nap rollers.

Standard width rollers are 9" and 18", with smaller sizes available for cutting in edges, getting under obstacles, painting lines, etc. There are also smaller diameter rollers available for getting in very tight places.

Sturdy roller frames are necessary when applying most polymer coatings. Choose high quality over flimsy.

BRUSHES:

Brushes need to be shed-resistant, but their quality is not as critical as that of the roller cover. An inexpensive 3" throw-away chip brush is adequate for cutting in around corners, walls, and tight areas on most coating projects.

SPIKED SHOES:

Used to walk on uncured material during application without significantly disturbing the coating. Spiked shoes are typically worn by the person backrolling. While it is possible to backroll from the uncoated area, spiked shoes give you the ability to walk into the uncured coating for better access.

'SQUEEGEE AND BACKROLL' TECHNIQUE

This TIB assumes material to be applied is properly staged, mixed, and ready to use. See TIB: Mixing Guide for more detailed instruction. It also assumes the substrate is properly prepared and environmental conditions are within allowable limits as indicated on the material's TDS. The goal is to have evenly applied coating with the correct thickness. The squeegee and backroll method is a popular application technique and is most advantageous on a horizontal surface, although it can be modified for use on vertical and other surfaces. Basically the technique involves evenly spreading material out at the desired thickness, then smoothing with a roller.

IMPORTANT

Before mixing material, give consideration to how the project will progress. The following is a partial list of considerations.

- Where will application begin?
- Where will it end?
- How will you 'work' your way out of the area?
- What amount of material should be mixed to minimize the chances of material setting up before it can be applied to the surface?
- If there are multiple rooms or areas, how will the areas be sequenced and how will they be tied together?
- If you have to tie multiple areas together, will the 'older' material still be in the fluid stage to allow it to be touched or 'rolled into' without damage?
- Are there areas that will require extensive cut-in, and how will this affect man-power, mix size, multi-area tie-ins, etc.?
- If the area is very wide, is it feasible to squeegee and backroll the entire width, or will the area need to be broken into smaller sections and where will those breaks occur?
- It is good practice to have milestones during application that indicate area amount coated so far and the amount of material required to get to that point. Strategically placed strips of painter's tape are great for marking milestones, but doorways, columns, and other landmarks will work just as well. Where will these milestones be located and how much material should have been used when the milestones are reached?

SQUEEGEE AND BACKROLL TECHNIQUE

1. Pour out a puddle or ribbon of material. Allow enough material for easy cut-in against walls and around obstacles. Pour the material closely to the area of application, but not so close as to pond against walls or obstacles or run into untreated cracks, joints, etc.

2. Cut-in against walls and around obstacles. Using an inexpensive, throw-away paint brush, evenly move the material to neatly coat up to walls and other obstacles. Check coating thickness often with a Wet Film Thickness Gauge. Have a clean rag handy to wipe off errant material.
3. Squeegee the material evenly from side-to-side. Before beginning, determine a minimum and maximum distance that can be backrolled easily. If the person backrolling has spiked shoes, this is less of a concern. Otherwise, material cannot be squeegeed farther than can be backrolled easily without stepping onto uncured material. Consider paint roller stick length, arm length, and preference. Pour additional material onto the surface if needed. Begin at one side of the area. Pull a puddle of material from side to side, working your way across the area. Keep the squeegee at a slight angle to move the puddle of material toward your feet until the predetermined backroll distance is reached. Pour more material in a ribbon across the area onto the edge of the newly applied coating when needed. Continue squeegeeing. Check coating thickness often with a Wet Film Thickness Gauge. Have a clean rag handy to wipe off errant material.
4. Uniformly backroll the material from front-to-back, perpendicular to the squeegee direction. Pre-wet the roller in a puddle of material. Start at one side of the area and methodically move across it. Place the roller into the material and roll forward and back across the squeegee lines until the coating has consistent thickness and appearance. Rolling with too much speed or with many passes can trap air in the coating which may or may not pop out. For consistency, roll into the previously backrolled area. Stop the roller at the same place every pass. Pick up the roller and place back into the coating for the next pass, ensuring a slight overlap.

Repeat these steps, working your way across the area until the project is complete.

TIB: Application of Polymer Coatings or Linings with a Squeegee, Roller, and Brush - Rev 191218

SAFETY

For your safety, all required personal protection equipment should be used when operating machinery or handling chemicals. Concrete dust is a source of silica particles and other hazardous materials that can cause silicosis and other illnesses. Proper safety equipment and methods are the responsibility of the installation company, general contractor, and/or facility owner.

WARRANTY

Wolverine Coatings Corporation warrants its products to be free from defects in material and workmanship. Wolverine Coatings Corporation's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at Wolverine Coatings option, to either replacement of products not conforming to this Warranty or credit to the Buyer's account in the invoiced amount of the nonconforming products. Any claim under this warranty must be made by the Buyer to Wolverine Coatings in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the ship date, whichever is earlier. Buyer's failure to notify Wolverine Coatings of such nonconformance as required herein shall bar Buyer from recovery under this warranty.

Wolverine Coatings makes no other warranties about the product. No other warranties, whether expressed, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply.

Any recommendation or suggestion relating to the use of the products made by Wolverine Coatings, whether in its technical literature, or in response to specific inquiry or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by Buyers having requisite skill and know-how in the industry, and therefore it is for the Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment, changes in procedure of use, or extrapolation of data may cause unsatisfactory results.

LIMITATION OF LIABILITY

Wolverine Coatings Corporation's liability on any claims based upon Wolverine Coatings Corporation's negligence or strict liability, for any loss or damage arising out of, connected with, or resulting from the use of the products, shall in no case exceed the purchase price allocable to the products or parts thereof which give rise to the claim. In no event shall Wolverine Coatings Corporation be liable for consequential or incidental damages.

LITERATURE REVISION

Published literature is subject to change without notice. Wolverine Coatings Corporation is constantly formulating innovative products, new technologies, and practices. Please check www.wolverinecoatings.com for the latest product data sheets.



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