

Exterior Paint Preparation and Application

Paints, stains and washes are sacrificial layers meant to protect the substrate and contribute stylistically to the building. Additionally, painted surfaces act as historic records showing how a building or structure has changed through time and that paint history should be preserved for future generations. With extreme temperatures, exposure to ultra violet rays and moisture, exterior paint periodically fails detracting aesthetically from the surface and exposing the substrate to conditions which will hasten deterioration. When applying a finish to any historic exterior surface, analysis of paint history, proper preparation, and appropriate applications should be utilized in order to create a long lasting finish which can be replicated in the future.

Guidelines for Exterior Paint Preparation and Application

General Site Conditions

- Take precautions to protect visitors, staff, the workers and the landscape from various dangers on site.
- Follow the manufacturers' standards for application of the finish, paying close attention to weather conditions and the moisture content in the surface.

Surface Preparation

- Evaluate substrate for potential repairs which would adversely impact the success of the project.
- Clean the surfaces of organic matter and other soiling.
- Remove failing paint layers from the surface until a sound layer or the substrate is reached. Most Historic New England painting projects will attempt to retain earlier layers of paint in order to retain the historical perspective of the paint chronology.
- The surface should be hand sanded and the edges feathered to provide a smooth transition from the layers of paint to the substrate.
- Evaluate if consolidant should be used to repair the wood substrate.
- If a wooden substrate is exposed and appears weathered, dry, or brittle it should be treated with a wood rejuvenator in an effort to reinvigorate the wood.

Priming and Finish Paint

- Follow the manufacturers' standards for the finish paying close attention to weather conditions, the moisture content in the surface, drying times of the finish and application standards for the finish.
- Determine the application method for the primer and paint finish.
- Apply at least one coat of primer by using a brush.
- Seal all joints or gaps around doors and windows and any vertical joints. Do not seal along horizontal clapboard laps.
- Prior to applying the finish coats, lightly sand the surface as areas may be rough or fuzzed.
- Apply the finish coats according to manufacturer's specifications always completing the job with a brush application.

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Technical Information for Exterior Paint Preparation and Application

General Site Conditions

Take precautions to protect visitors, staff, the workers and the landscape from various dangers on site.

- It should be assumed that most work on the historic houses will involve lead paint. Any surface preparation dealing with older paints should employ up to date EPA and OSHA guidelines.
- Follow all manufacturers' guidelines and instructions for material handling.
 - All material safety data sheets are to be available and copies kept on site until completion.
 - All personnel using materials are to be familiar with information contained within, and proper safety precautions are to be followed.
- Make certain that the painter contacts the power company and has any power lines coming into the building protected to avoid electrocution risks.
- All materials on site shall comply with fire safety standards. Take all necessary precautions to prevent fire and spread of fire.
- All waste products to be removed from the site daily and the site cleaned to original condition upon completion of project.
- The site shall be kept clean and free of debris, paint chips, and all equipment; the work area shall be cleaned in an orderly fashion before work completion daily.
- Protect the landscape with drop cloths and cover areas that should not receive paint.
- Every effort shall be made to accommodate the reasonable needs of the Historic New England site personnel in relation to scheduling.

Follow the manufacturers' standards for the finish paying close attention to weather conditions and the moisture content in the surface.

- Weather Conditions
 - The proper weather conditions are the key to a successful project as temperatures and humidity have a significant impact on paint.
 - Do not apply finishes when the temperature of surface and surrounding areas is below 50° Fahrenheit unless otherwise permitted by the manufacturer's instructions.
 - Do not apply finishes in snow, rain, fog or mist;
 - Do not apply when the relative humidity exceeds 85%;
 - Do not apply to damp or wet surfaces.
- Moisture content of the surface
 - Prior to painting, the moisture content should be tested in several areas on each of the surfaces to be painted and must be 13% or less.

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Surface Preparation

Clean the surfaces of organic matter and other soiling.

- If the area needs to be washed or have organic material removed, refer to the “Washing Exterior Structures” white paper.

Remove failing paint layers from the surface until a sound layer or the substrate is reached. Most Historic New England painting projects will attempt to retain earlier paint layers in order to retain the historical perspective of the paint chronology.

- Retain a section of the chromachronology intact in a predetermined area.
- Historic New England shall only approve the stripping to bare wood on buildings where paint adhesion is a proven issue and where paint analysis has been performed.
- Should a noticeably complete layering of paint history be discovered during work, care will be taken to document this discovery and collect samples if desired.
- The following should be considered when selecting a finish removal method:
 - Type of Material: Is this finish applied to wood, stone, brick, or another material?
 - Condition: Is the area brittle or damaged?
 - Prior Treatments: What has been done before and was it successful?
 - Whenever possible, paint should be removed by hand-scraping the surface.
- Paint should only be removed until the next sound layer is reached.¹
- Do not use abrasive blasting or power/pressure washing to remove paint from wood or masonry.

Mechanical

- Scrape with hand tools all other surfaces exhibiting areas of loose or peeling paint, and areas of adhesion failure

Heat

- If areas have been specified to be stripped bare of paint, this will be accomplished by use of an infrared heater or steam.
- Infrared heat will be used according to manufacturer’s instructions and with care never to overheat wood.
- No heat guns will be used on architecture in situ.
 - If a smaller architectural fragment has been detached from the structure and full paint removal has been deemed necessary, a heat gun may be used. Heat guns and infrared strippers should only be used with the utmost care.

Chemical

- On rare occasions when full paint removal is required on a detached element, a chemical stripper can be considered.
 - When stripping paint using this method, Historic New England typically avoids using methylene chloride because it is highly caustic and requires strong neutralization.
 - Preference should be given to an environmentally-friendly stripper,

¹ Kay D. Weeks & David W. Look, Preservation Briefs #10 *Exterior Paint Problems on Historic Woodwork*. The National Park Service: Washington, D.C., 1982. available at <<http://www.nps.gov/history/hps/tps/briefs/brief10.htm>>.

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- Always test the product on a small patch to see how it performs and determine if it will be the best removal method for the situation.
- Also determine the neutralization requirements of the stripper to ensure paint adhesion in the future.
- Proper ventilation is a necessity when using chemicals for removal.

The surface should be hand sanded and the edges feathered to provide a smooth transition from the layers of paint to the substrate.

- The preference is always hand sanding.
- Finish palm sanders or random orbital sanders are permitted when feathering edges and removing multiple layers of paint, but they must be used with extreme caution because they can easily mar the surface.
 - Plan on regular quality control inspections.
- If using a random orbital sander, it should be placed on the substrate, turned on, then remain in contact with the substrate during the process, turned off and removed from the substrate.
 - Turning the sander “on” or “off” prior to making contact with the wood or after removing it from the wood can result in circular marks.
 - Plan on regular quality control inspections.

If a wooden substrate is exposed and appears weathered, dry, or brittle it should be treated with a wood rejuvenator in an effort to reinvigorate the wood.

- For rotted and deteriorated areas:
 - Remove deteriorated material and retain as much original fabric as possible.
 - If wood consolidant must be applied use an Owner approved two-part, non-styrene epoxy system.
 - In areas to be filled and repaired use of a two-part, non-styrene epoxy system and fairing compound is preferred.
 - Patched areas are to be tooled to original appearance.
 - All holes, cracks, and penetrations where water might invade must be treated.
- If an application of wood treatment is deemed necessary prior to an application of paint, Historic New England will determine or approve the product to be used.
 - A boiled linseed oil based product is typically used and should be applied by flooding surface until saturation is reached, care should be taken to keep application off existing painted surfaces, or sanding of the product will be necessary before paint application. Excess should be wiped off the surface.
 - Surfaces must be allowed to dry a minimum of 24-48 hours.

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Priming & Finish Application

Follow the manufacturers' standards for the finish paying close attention to weather conditions, the moisture content in the surface, drying times and application standards for the finish.

- Weather Conditions
 - The proper weather conditions are the key to a successful project as temperatures and humidity have a significant impact on paint.
 - Do not apply finishes when the temperature of surface and surrounding areas is below 50° Fahrenheit unless otherwise permitted by the manufacturer's instructions.
 - Do not apply finishes in snow, rain, fog or mist;
 - Do not apply when the relative humidity exceeds 85%;
 - Do not apply to damp or wet surfaces.
- Moisture content of the surface
 - Prior to painting, the moisture content should be tested in several areas on each of the surfaces to be painted and must be 13% or less.
- Drying times of the finish
 - Wait at least 4-24 hours, or the length of time suggested by the manufacturer, after the primer coat is applied before proceeding with any additional paint application.
- Application Standards
 - When applying the primer, always apply at least one coat and ensure that it is applied at not less than the recommended spreading rate to provide the dry film millimeter thickness specified by the manufacturer for each coating.
 - Typically one coat of primer is sufficient, but more may be necessary to cover the substrate satisfactorily.
 - When installing new wood, it should be primed on all sides to increase its resistance to moisture damage. Some items can be purchased pre-primed on all sides.
 - Primer must be followed by finish paint within a period of 4-6 weeks or re-priming will be necessary.

Determine the application method for the primer and paint finish.

- Paint can be applied using the method best suited for the application: brush, roller, or spray but in order to achieve a historically appropriate look, and proper coverage, all paint should be finished with a brush, unless a more modern historically appropriate method is identified.

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Apply at least one coat of primer by using a brush.

- The entire surface should be primed using a brush or other historically appropriate method.
- New wood should be primed on all sides to protect it from moisture infiltration.
- Exposed nail heads to be spot primed with a rust inhibitor.
- Do not apply primer when the temperature and relative humidity are not ideal.
- All primer should be applied at not less than the recommended spreading rate to provide the dry film millimeter thickness specified by the manufacturer for each coating.
- Apply additional paint coating where undercoats, stains, or other conditions show through paint film, until uniform finish color is achieved.
- Wait at least 24 hours after the primer coat is applied before proceeding with any additional paint application.

Seal all joints or gaps around doors and windows and any vertical joints. DO NOT seal along horizontal clapboard laps.

- Use only a latex caulk for these purposes. Latex allows for a reversibility of the treatment.
- If the joint is larger than $\frac{1}{8}$ " , a repair may be necessary.
- Be mindful that caulk does fail and it can trap water behind it, accelerating rot.
- Under no circumstances should the caulk be used along horizontal clapboard laps as this space allows moisture to escape.

Prior to applying finish coats, lightly sand rough or fuzzed areas.

- Do not expose the substrate or re-priming will be necessary.
- Finish palm sanders or random orbital sanders are permitted when feathering edges and removing multiple layers of paint, but they must be used with extreme caution because they can easily mar the surface and can easily remove earlier layers of paint.

Apply the finish coats according to manufacturer's specifications always completing the job with a brush application.

- All paint is to be finished by brush application.
- Typically two finish coats are to be applied.
 - Apply each coat at not less than the recommended spreading rate to provide the dry film millimeter thickness specified by the manufacturers' instructions for each coating.
 - If undercoats, stains, or other conditions show through paint film, apply additional paint coats until uniform finish color is achieved.