

PART 1 **GENERAL****1.1** **RELATED SECTIONS**

- .1 Appendix 6 – Low Expanding Foam Sealant
- .2 Appendix 7 – Joint Sealants
- .3 Appendix 10 – Heritage Wood Window Restoration
- .4 Appendix 12– Heritage Painting

1.2 **DELIVERY, STORAGE AND HANDLING**

- .1 Handle and store materials and products according to the manufacturer's recommendations, and so as to prevent damage. Deliver and store packaged materials and products in original, undamaged containers with manufacturer's labels and seals intact.

1.3 **SITE CONDITIONS**

- .1 See Appendix 10- Heritage Wood Window Restoration for workshop / working conditions.
- .2 Proceed with glazing film installation when ambient and substrate temperature conditions are within limits permitted by manufacturer and when glass substrates are free from dirt or wetness arising from frost, condensation, or other causes detrimental to adhesion.
- .3 Temperature Range: Between 4 deg C and 38 deg C.

1.4 **WARRANTY**

- .1 For window film, provide manufacturer's warranty, against defects in materials and labour for the period of ten (10) years, commencing from the date of Substantial Performance of Work.

PART 2 **PRODUCTS****2.1** **MATERIALS**

- .1 Glass:
 - .1 Salvaged existing.
 - .2 Clear, single glazing, to CAN12.2-M78 or CAN12.7-M76 but thickness to match existing being replaced.
- .2 Glazing adhesive:

- .3 Glazing materials:
 - .1 Glazing putty
 - .2 Setting blocks and spacer shims to be neoprene, Shore "A" durometer hardness 40 - 50.
 - .3 Galvanized steel glazing points.
 - .4 Pumice.
- .4 All exposed fasteners shall be slot head, steel screws, appropriately sized for application.

2.2 CLEAR WINDOW FILM:

- .1 Physical Properties:
 - .1 Composition: Optically clear metallized polyester with pressure sensitive adhesive on one side and an abrasion resistant coating on the other.
 - .2 Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - .3 Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 - .4 Thickness: Nominal 3.5 mils (.089 mm) with no evidence of coating voids.
- .2 Performance – film applied to ¼” (6.4mm) thick clear glass:
 - .1 Visible Light Transmission (NFRC 100/200/304): 74 percent.
 - .2 Visible Reflection:
 - .1 Exterior (NFRC 100/200/304): 15 percent.
 - .2 Interior (NFRC 100/200/304): 12 percent.
 - .3 Ultraviolet Rejection (NFRC 100/200/304): 99.9 percent.
 - .4 Light to Solar Gain ratio: 1.4
 - .5 Solar Heat Gain Coefficient at 90 Degrees (Normal Incidence) (NFRC 100/200/304): 0.53.
 - .6 U value (NFRC 100/200/304): 0.62 BTU/hft².

PART 3 **EXECUTION**

3.1 REMOVAL OF GLASS

- .1 Note that ALL glass found to be in good condition is to be carefully removed, retained and reinstalled.
- .2 Soften putty by the use of steam.
- .3 Note that each piece of glass is of a unique size and must be labeled and returned to its original location.
- .4 Proceed with reglazing only when sash repair and preparation work as described in Appendix 10 - Heritage Wood Window Restoration is completed and accepted.

- .5 Clean rebate in glazing bars thoroughly and coordinate with Appendix 12 - Heritage Painting to prime / paint before reglazing.

3.2 PREPARATION FOR REPLACEMENT OF CRACKED OR MISSING PANES

- .1 Soften putty and remove without damaging glass or glazing bars.
- .2 Proceed with reglazing only when sash repair and preparation work as described in Appendix 10 - Heritage Wood Window Restoration is completed and accepted.
- .3 Clean rebate in glazing bars thoroughly and coordinate with Appendix 12 - Heritage Painting to prime before reglazing.

3.3 REPAIRS TO BROKEN GLASS

- .1 Clean the edges of the pieces to be joined with acetone.
- .2 Align the pieces over the light table and tape together on both sides with conservation tape.
- .3 Slit the tape on the upper side of the glass with a razor along the edge of the crack. Carefully infuse adhesive into the crack. Monitor the infusion over the light table to ensure that the crack is completely saturated.
- .4 Remove excess adhesive from all surfaces of the glass. Tape the glued piece further and immobilize until the glue sets.

3.4 INSTALLATION OF SINGLE GLASS PANES

- .1 Cut replacement glass to suit size of existing lights and to clearances recommended by glass manufacturer. Each pane of glass is to be undersized about 1/16" around the perimeter.
- .2 Glazing of sash windows.
- .3 See Appendix 12 - Heritage Painting for preparation for glazing.
- .4 Reglaze lights in traditional manner, using glazing putty.
 - .1 Empty the entire container of putty on a non-absorbent surface and knead until soft before use. This will be easier if the putty is warmed in microwave.
 - .2 Use putty at a temperature between 15° and 25° C. If the putty is too sticky, knead on a piece of cardboard to remove some of the oils. Do not add chalk to the putty, as this will cause separation of the product.
 - .3 If the putty is too hard, re-warm the putty.
 - .4 If possible use warmer softer putty for back puttying and harder putty for bevel putty.
 - .5 Apply back putty to the rebates about 1-2 mm. thick but with enough putty so that the glass is well seated and there are no gaps between the glass and the rebates.

- .5 Set replacement or existing glass on full bed of putty to proper frame tolerances.
- .6 Secure glass with glazing points, 50mm (2") from each corner in each direction and about 200mm – 250mm (8" to 10") on centre.
- .7 Apply glazing putty with bevel to suit the size of the glazing rebate in the window.
- .8 Tool putty to true, even lines, and free of creases, cavities, bubbles and other defects which will mar its appearance and performance.
- .9 Mitre corners evenly and neatly.
- .10 Cut the putty back such that the putty and the top coat of paint (which will overlap the margin of the putty 2 mm) will not be visible when looking through the window from the inside.
- .11 Apply ground pumice to each pane of glass, sequentially. Spread liberally with a soft brush, allowing the pumice to absorb any oil residue. Sweep the pumice off the glass. The glass should take on a nice shine, free of oily prints. The discarded pumice may be used again for subsequent panes.

3.5 REPAINTING OF WINDOWS

- .1 Coordinate painting of putty with Appendix 12 - Heritage Painting.
- .2 The intent is to paint the cured putty with the exterior finishing paint coats.
- .3 Schedule putty replacement to allow sufficient drying and curing time before painting begins.

3.6 INSTALLATION OF WINDOW FILM

- .1 Examination
 - .1 Verification of Conditions: Examine glazing and surrounding adjacent surfaces for conditions affecting installation.
 - .2 Verify that glass surfaces receiving new film is free from defects and imperfections, which will affect the final appearance.
 - .3 Proceed with installation after verification and correction of surface conditions acceptable to manufacturer.
- .2 Preparation
 - .1 Clean glass surfaces of substances that could impair glazing film bond including mildew, oil, grease, dirt and other foreign materials immediately before beginning installation of films.
 - .2 Prepare surfaces using methods recommended by the manufacturer for achieving best result for the substrate under the project conditions.
 - .3 Protect window frames and surrounding conditions from damage during installation.

.3 Installation

- .1 Install in accordance with the manufacturer's written instructions, plumb, true, and level over clean glazing.
 - .2 Install film continuously with no gaps or overlaps or seams.
 - .3 Cut film edges neatly and square at a uniform distance of up to 1.5mm from the window putty. Use new blade tips after 3 to 4 cuts.
 - .4 Do not remove release liner from film until just before each piece of film is ready for installation.
 - .5 Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
 - .6 Apply film to glass and lightly spray film with slip solution.
 - .7 Squeegee from top to bottom of window and remove air bubbles, wrinkles, blisters, and other defects.
 - .8 Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
 - .9 Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
 - .10 If completing an exterior application, check with the manufacturer as to whether edge sealing is required.
- .4 Touch-up, repair or replace damaged products.

3.7 CLEANING

- .1 Clean glass and adjacent work of deposits resulting from glazing work.
- .2 Mark glass after glazing and leave marks in place until completion of construction before cleaning off. Use non-etching markers.
- .3 Provide written instructions for owner how to maintain/clean the film.

END OF SECTION