

PART - 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Labour, Products, equipment and services necessary to complete the work of this Section.
 - .2 This Section includes glazing work not specified in other Sections. Refer to other Sections for other glazing.

.2 Related Requirements

- .1 Comply with Conditions of the Contract and Division 01 - General Requirements.

1.2 SUBMITTALS

.1 Shop drawings:

- .1 Submit shop drawings indicating manufacturing and installation details.

.2 Product Data: Submit manufacturer's product specifications, including the PVB interlayer products. Include documentation of compliance with specified requirements, referenced tests, and compatibility of all products in contact with glazing.

- .1 Provide Installer signed letter listing all products to be used, with signed letters from each glass, sealant, glazing tape, and blocking manufacturer certifying their compatibility.
- .2 Provide a sample warranty and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing material.

.3 Samples:

- .1 Submit samples for each type of glass and of glazing materials identifying quality and type of glass if required by the Consultant before commencing work.
- .2 Submit samples for each type of film.
- .3 Ensure samples are clearly labelled with manufacturer's name and type.

.4 Certificates:

- .1 Submit manufacturer's certification compatibility of glass and glazing materials.

.5 Test Results:

- .1 Provide test results in accordance with ASTM C1087 and ASTM C794 showing compatibility of applied sealants with accessories used in butt-joint glazing systems and also determine strength, ability of cured sealant to maintain a bond to substrate under severe conditions and characteristics of peel properties of a cured-in-place elastomeric joint sealants for use in butt-joint glazing. Provide a statement and test data confirming sealant used in design indicated to accommodate design load requirements without failure.

.6 Operations and Maintenance Manual: Information on cleaning, maintenance and replacement of all types of glass or glazing products shall be included in the Operations and Maintenance Manual.

1.3 QUALITY ASSURANCE

- .1 Installer Qualifications: Glazier shall have minimum five (5) years' experience in the successful installation of glazing products similar to those specified for this Project.

- .2 Glazing Installation Standard: Comply with recommendations of the GANA (Glass Association of North America), "Glazing Manual" and "Glazing Sealing Systems Manual" except where more stringent requirements are called for by manufacturers or these specifications. Refer to GANA for definitions of glass and glazing terms not otherwise defined.
- .3 Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with OBC, ANSI Z97.1, and requirements of CPSC 16 CFR Part 1201 for category II materials.
- .4 Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated, and for visually related areas.
- .5 Pre-installation Conference: at least two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Consultant of the date and time of the meeting.
- .6 Manufacturer's site inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.
- .7 Mock-Up: Provide a mock-up of film application for evaluation of surface preparation techniques, application workmanship, and to confirm pattern.
 - .1 Finish areas designated by the Consultant.
 - .2 Do not proceed with remaining work until workmanship is reviewed by the Consultant.

1.4 **DELIVERY, STORAGE AND HANDLING**

- .1 Handle and store materials and products in accordance with manufacturer's recommendations. Deliver and store packaged materials and products in original, undamaged containers with manufacturer's labels and seals intact.

1.5 **WARRANTY**

- .1 Laminated glass products: Provide written 5-year warranty from date of manufacture for laminated glass. Warranty shall cover deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to the glass manufacturer's published instructions. Warranty shall be manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units.
- .2 Double glazed units: Provide written 10-year warranty against defects in the insulating glass units and warrant them to be free from material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause, under design conditions, other than extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass faults.
- .3 Warrant mirrors against defects in materials and workmanship for a period of 5 years against silver deterioration and for a period of two years against loosening the metal frames or fastening, and against cracking of the mirrors.

PART - 2 PRODUCTS

2.1 **GENERAL**

- .1 Glass: Each unit bearing manufacturer's label indicating quality and thickness.

- .2 Thickness of glass: Glass thicknesses indicated or scheduled in the Contract Documents are minimums required. Exact thickness of glass to be engineered to account for size of glass and application, to satisfy building code requirements and requirements of authorities having jurisdiction.

2.2 **GLASS**

- .1 Float glass (GL-F): CAN/CGSB-12.3, glazing quality polished.
- .2 Tempered Safety Glass (GL-T):
 - .1 ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), and meeting requirements of ANSI Z97.1, tong and roller marks free, minimum thickness 6 mm.
 - .2 Ensure surface compression is equal to or greater than 68.9 MPa (10 000 psi)
 - .3 Tempered glass material to come from one tempering furnace and be tempered to minimize distortion variance.
 - .1 Roller-wave distortion not to exceed 0.127 mm (0.005") from peak to valley.
 - .2 Maximum peak to valley roller-wave 0.8 mm (0.003") in the central area and 0.20 mm (0.008") within 267 mm (10.5") of the leading and trailing edge.
 - .3 Maximum bow and warp 0.79 mm per lineal 305 mm (1/32" per lineal foot).
- .3 Fire-Rated Glass: laminated fire-rated and impact safety-rated to ANSI Z97.1, FireLite Plus Visually Clear by Technical Glass Products or approved equivalent.
- .4 Translucent film: Polycarbonate film, 3 mils thick, velvet texture finish, Crystal Matte by Convenience Group or other approved equivalents.

2.3 **GLAZING MATERIALS**

- .1 General - Glazing materials (fire-rated and non-fire-rated): Select glazing sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
- .2 Shims, spacers and setting blocks: 45, 70 and 90 Durometer A hardness plus/minus 5 respectively, neoprene rubber, resistant to oxidation and permanent deformation under load.
- .3 Glazing gaskets: Extruded neoprene or EPDM of approved profile. Tensile strength of 7300 kPa; Durometer A hardness of 50 plus/minus 5; 25% maximum permanent set; 300 % minimum elongation at break; and resistant to ozone, showing no cracks.
- .4 All glazing materials, products, primers and cleaning solvents: Mutually compatible.
- .5 Colours for glazing materials: As selected later and not necessarily standard colours. (*to match colour of entrance and screen frames*).

2.4 **FABRICATION**

- .1 Accurately size glass to fit openings allowing clearances recommended by the Flat Glass Marketing Association. Cut glass clean and free of nicks and damaged edges. Grind smooth and polish exposed glass edges. Do not cut or abrade tempered, heat treated, or coated glass.
- .2 Take field measurements and levels required to verify and supplement those shown on the Drawings for the proper layout and installation of the work. Co-ordinate dimensional tolerances in adjacent building elements and confirm prior to commencement of work.

PART - 3 EXECUTION

3.1 **INSPECTION**

- .1 Verify dimensions at the site before proceeding with fabrication or glazing units.
- .2 Ensure that openings are free from distortion, and that surfaces are free from protrusions that will obstruct face and edge clearances.
- .3 Ensure that wood is sealed; ferrous metals are painted or zinc coated; and that surfaces are suitable for adhesion of the glazing materials.
- .4 Ensure that movable units to be glazed are adjusted for proper operation.
- .5 Ensure that surfaces to receive mirrors are sealed.
- .6 Ensure that ambient and surface temperatures are above 5 degree C.

3.2 **PREPARATION**

- .1 Inspect hollow metal and other glass framing for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners, existence of minimum required face or edge clearances, and effective sealing of joinery.
- .2 Provide written report listing conditions detrimental to performance of glazing work.
- .3 Do not perform glazing work prior to correction of unsatisfactory conditions. Commencement of installation indicates Installer's acceptance of substrate.
- .4 Ensure rabbets, stops and glass edges are free of dust, dirt, moisture, oil and other foreign matter detrimental to, or, obstructing the glazing material.
- .5 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the manufacturer's instructions. Ensure surfaces are free of moisture and frost.
- .6 Immediately before glazing clean glazing channels and other framing members to receive glass.
 - .1 Remove coatings which are not firmly bonded to substrates.
 - .2 Promptly complete glazing both sides of a lite once started, to prevent re-entry of dust and dirt in glazing channels.
- .7 Clean surfaces thoroughly prior to installation of films. Prepare surfaces using the methods recommended by the film's manufacturer for achieving the best result for the substrate under the project conditions

3.3 **INSTALLATION - GENERAL**

- .1 Handle and install glass in accordance with manufacturer's directions. Prevent nicks, abrasions and other damage likely to develop stress on edges.
- .2 Remove and replace glazing stops in original locations, using original fasteners, securely set and undamaged.
- .3 Use setting blocks and spacers as required to properly support the glass, centred in place in the glazing space independent of the materials and to uniformly distribute its load.
- .4 Use a minimum of 2 setting blocks, located at the quarter points. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top and bottom.
- .5 Assess coloured glass units for colour uniformity and arrange to avoid abrupt variation in appearance.
- .6 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.
- .7 Leave labels on glass until it has been set and inspected and approved. Leave glass whole and without cracks, scratches or other defects and with setting in perfect condition at completion, to the approval of the Consultant.
- .8 Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with perfect materials. Units producing distorted vision will be rejected and replaced at the reasonable discretion of the Consultant.
- .9 Apply translucent film to glazing where indicated, free of wrinkles, air bubbles and other defects.

3.4 **INTERIOR GLAZING**

- .1 Unless otherwise specified, all interior glazing shall be dry glazing.
- .2 Provide glazing gasket around entire perimeter of glass. Make tight butt joint at corners of lights. Place setting blocks at sill and spacers at both jambs as required to centre the unit in the frame. Place the unit into the frames and apply the stops against the gaskets. Tighten the screws or clips to obtain positive uniform pressure avoiding excessive pressure.
- .3 Ensure rattle-free cushioning.
- .4 Install fire-rated glazing materials in accord with manufacturer's product data complying with specified fire testing standard. Use specified fire-rated glazing sealant for installation of fire tested glass materials.
- .5 Remove non-permanent labels promptly after installation and promptly clean adhesive and other residue from both surfaces of all glass.

3.5 **PROTECTION AND CLEANING**

- .1 Protect glass from contact with contaminating substances resulting from construction operations or cleaning of adjacent materials.
- .2 Remove and replace glass which is broken, chipped, cracked, abraded, scratched or damaged in other ways during the construction period, including natural causes, accidents and vandalism.
- .3 Clean glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of Substantial Performance in each area of project. Clean glass by method recommended by glass manufacturer.

- .4 Clean and make good to the approval of the Consultant, surfaces soiled or otherwise damaged in connection with the work of this Section. Pay the cost of replacing finishes or materials that cannot be satisfactorily cleaned.
- .5 Upon completion of the work, remove all debris, equipment and excess material resulting from the work of this Section from the site.

END OF SECTION