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- 1 General
- 1.1 **SECTION INCLUDES**
- .1 Labour, Products equipment and services necessary for the finish carpentry work in accordance with the Contract Documents.
- 1.2 **REFERENCES**
- .1 ANSI A208.1, Particleboard.
- .2 ANSI A208.2, Medium Density Fibreboard for Interior Use.
- .3 ANSI/NEMA LD 3, High-Pressure Decorative Laminates.
- .4 APA - The Engineered Wood Association.
- .5 ASTM F1667, Driven Fasteners: Nails, Spikes and Staples.
- .6 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
- .7 North American Architectural Woodwork Standards (NAAWS).
- .8 CAN/CSA O141, Softwood Lumber.
- .9 CSA O151-M, Canadian Softwood Plywood.
- .10 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress.
- .11 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.
- 1.3 **SUBMITTALS**
- .1 Shop drawings: Submit shop drawings of finish carpentry work in accordance with Section 01 10 10 indicating:
- .1 Materials, thicknesses, sizes, finishes, wood species, grades, profiles, connection attachments, shop jointing, field jointing, reinforcing, anchorage, fastener types and sizes, location of exposed fastenings, mechanical and electrical service routes, service outlets, cutout locations, and sizes.
- .2 Include erection drawings, plans, elevations, sections, and details as applicable.
- .2 Samples: Submit samples of the following in accordance with the requirements of Section 01 10 10:
- .1 Two representative pieces of each type of wood to receive a stained or natural finish.
- .2 Two representative pieces of each type of wood finished as specified.

- .3 Two of each colour, pattern, gloss, and texture of plastic laminate, in manufacturer's standard tag size.
- .4 Two samples of laminated plastic joints, edging, cutouts and postformed profiles.
- .5 Two of each solid surface, in 100 x 75 x 12 mm samples.
- .6 Two samples of melamine surfaced board, edging and postformed profiles.
- .7 One of each item of finish carpentry hardware.

- .3 Extended warranty: Submit extended warranty signed and registered by the manufacturer providing the warranty in the name of the Owner for the timeframe and coverage specified in this Section.

1.4 **QUALITY ASSURANCE**

- .1 Execute work of this Section by member of AWMAC, with 5 years experience in finish carpentry work of comparable complexity and scope. Submit proof of experience upon Consultant's request.
- .2 Fabricate finish carpentry work in accordance with NAAWS, Premium Quality materials and installation unless otherwise indicated. Perform work in accordance with the definition of Good Workmanship as defined in the NAAWS.
- .3 Remove and replace finish carpentry work which does not conform to the NAAWS or as amended by these Specifications.
- .4 Mock-ups:
 - .1 Refer to Section 01 43 00 for additional information regarding mock-ups pertaining to this Section.
 - .2 Typical: Shop fabricate one mock-up of a base cabinet, wall cabinet, and counter top for each type of surfacing specified, complete with hardware and shop applied finishes, installed in location acceptable to Consultant.
 - .3 Table: Construct a full-scale mock-up of a collaborative lecture hall table, demonstrating finishes, colours, installation and workmanship.
 - .4 Panels: Construct a 1200 mm long mock-up of wood wall slat panels, demonstrating finishes, installation and workmanship.
 - .5 Arrange for Consultant's review and acceptance, allow 48 hours after acceptance before proceeding with work.
 - .6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.

1.5 **DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle finish carpentry in accordance with the NAAWS. Control the temperature and humidity in accordance with the NAAWS recommendations, before, during, and after finish carpentry delivery, and also during storage and installation.

- .2 Cover finished plastic laminated work with heavy kraft paper or put in cartons during shipment. Protect installed surfaces by approved means. Do not remove until immediately before final inspection.

1.6 **EXTENDED WARRANTY**

- .1 Submit an extended warranty for plastic laminate work of this Section in accordance with General Conditions, except that warranty period is extended to 2 years from date of Substantial Performance.
 - .1 Warrant against defects in material and workmanship including but not limited to opening of joints, cracking, shrinkage, warpage, and delamination of plastic laminate.
 - .2 Coverage: Complete replacement including affected adjacent Work.

2 Products

2.1 **MATERIALS**

- .1 General:
 - .1 All materials under work of this Section, including but not limited to, adhesives and mastics, are to have low VOC content limits.
 - .2 Adhesives - Urea-formaldehyde-free glues.
 - .3 All exposed and concealed dimensional lumber, plywood and panels to be FSC certified.
- .2 Concealed framing lumber and plywood:
 - .1 Eastern Spruce, Balsam Fir, or Jack Pine, to CAN/CSA O141, NLGA, and NAAWS Custom Grade, S4S, average moisture content 7% +/- 2% at installation.
 - .2 Softwood plywood: CSA O151-M; 19 mm unless indicated otherwise, (G2S).
- .3 Hardwood lumber: Birch, unless otherwise indicated, conforming to NHLA and NAAWS Premium Grade, S4S, average moisture content 7% +/- 2% at installation.
- .4 Paint grade lumber: Conforming to NHLA and NAAWS Premium Grade, S4S, average moisture content 7% +/- 2% at installation.
- .5 Wood veneer (WD-3):
 - .1 Birch, unless otherwise indicated, conforming to ANSI/HPVA HP-1 having finishes and meeting grades as follows:
 - .1 Transparent finish, Grade AA.
 - .2 Face veneer cut: Quarter cut.
 - .3 Sizes, thickness, and shapes as indicated.
- .6 Softwood lumber:
 - .1 NLGA Standard Grading Rules for Canadian Lumber, western red cedar, tongue and groove, sizes as shown.
 - .2 Kiln dry planks to 15% maximum moisture content.

- .7 Veneer core plywood (substrate): APA plywood, Grade A-D, in sizes, thickness and shapes as indicated.
- .8 Medium Density Fibreboard (MDF), core or panel: ANSI A208.2; SCS and EPP certified, no-added formaldehyde, moisture resistant MDF panels engineered for interior high moisture areas, 'Medex' by Roseburg Forest Products or approved alternative by Flakeboard Company Limited; meeting the following minimum criteria:
 - .1 Density: 769 kg/m³.
 - .2 Internal bond: 1.38 N/mm².
 - .3 Modulus of rupture: 41.34 N/mm².
 - .4 Modulus of elasticity: 4134 N/mm².
 - .5 Moisture content: 4-6%.
- .9 Plastic laminate (PL): Provide plastic laminates conforming to ANSI/NEMA LD 3 as follows:
 - .1 Flatwork face sheet: 1.2 mm thick, heavy wear resistance.
 - .2 Vertical interior face sheets: 0.8 mm thick.
 - .3 Postformed face sheet: 0.8 mm thick.
 - .4 Backing sheet: thickness to match face sheet, high pressure laminate, manufactured by same manufacturer as face sheet.
 - .5 Plastic laminate: As manufactured by Arborite, Formica, Forbo, Nevamar, Pionite and Wilsonart.
 - .6 Colours: To the later selection of the Consultant from manufacturer's standard colour range.
- .10 Melamine surfaced particleboard (MEL): ANSI A208.1, Grade M2, contains 100% post-industrial wood fibres, no urea-formaldehyde. Edging to be done in 3 mm thick PVC to match melamine colour. 'Nu Green Particleboard' by Uniboard Canada Inc. or approved alternative, having the following minimum criteria:
 - .1 Density: 635 kg/m³.
 - .2 Modulus of rupture: 14.5 N/mm².
 - .3 Modulus of elasticity: 2, 250 N/mm².
 - .4 Internal bond: 0.45 N/mm².
 - .5 Hardness: 2,225 N.
 - .6 Linear expansion: < 35%.
 - .7 Formaldehyde emissions: 0.00-0.01 ppm.
 - .8 Melamine facing: 'Panval Melamine' by Uniboard Canada Inc. or approved alternative. Colours as follows:
 - .1 Interior millwork surfaces: White.
- .11 Solid surfacing (COR-1):
 - .1 12 mm thick sheet stock, provide with bullnose edge and all cutouts as required. 'Corian' solid surfacing by DuPont or approved alternative in colour 'Designer White'.
 - .2 Installation and seam adhesives to be as recommended by solid surfacing manufacturer, colour matched to solid surfacing.

- .12 Laminating adhesive: CSA O112 Series, water resistant type, low VOC content, selected by laminate manufacturer for intended end use.
- .13 Draw bolts and splines: Type as recommended by fabricator.
- .14 Nails and staples: Conforming to ASTM F1667; Size and type to suit application, galvanized for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .15 Bolts, nuts, washers, blind fasteners, lags and screws: Size and type to suit application. Stapling is not acceptable.
- .16 Adhesive and bituminous mastic: Selected by the millwork fabricator with low VOC content.
- .17 Miscellaneous metals: In accordance with Section 05 50 00.
- .18 Glass and glazing materials: In accordance with Section 08 80 00.
- .19 Finishing: In accordance with Section 09 91 00.

2.2 **HARDWARE**

- .1 The following hardware is the minimum quality standard for the work of this Section. Alternatives may be considered provided they are approved by Consultant prior to ordering of products.
- .2 Drawer slides: Full extension, 8400 Series by Knape & Vogt.
- .3 Pilasters: Clear anodized aluminum recessed shelf standards with 12 mm divisions, Model 233 by Knape & Vogt.
- .4 Clips: Bright zinc plated, adjustable height shelf supports, Model 256 by Knape & Vogt.
- .5 Cabinet hinges: Heavy duty, concealed, 100 degree, clip, self closing, Model MODUL by Blum.
- .6 Drawer and cabinet pulls: 10 mm dia. x 106 mm wide, stainless steel with matt finish, 115.61.601 by Hafele.
- .7 Magnetic catches: Model 918 by Knape & Vogt.
- .8 Locks: Cam locks/deadbolt locks complete with lock core by Hafele, type to suit application and installation.

- .9 Sliding glass showcase hardware: All components required for a complete sliding glass showcase system indicated on the drawings including but not limited to moldings, rails, tracks, wheels, caps, pulls and locks. Manufactured by Richelieu or approved alternative.

2.3 PLASTIC LAMINATE WORK

- .1 Perform plastic laminate work in accordance with NAAWS and ANSI/NEMA LD 3.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Laminate plastic laminates to veneer core plywood, unless otherwise specified or indicated, in accordance with manufacturer's instructions. Laminate postformed laminates to particle board core in accordance with manufacturer's instructions.
- .4 Fabricate core surfaces and profiles with continuous support and bond over entire surface to receive plastic laminate.
- .5 Apply plastic laminate backing sheets to balance shrinkage stresses induced by plastic laminate face sheets.
- .6 Joints:
 - .1 Install joints in accordance with reviewed shop drawings.
 - .2 Jointing shall be placed at logical locations in intended millwork item and shall meet the overall aesthetic intent of the Consultant.
 - .3 Minimize joints in plastic laminate work.
 - .4 Do not install joints in plastic laminate work in less than 2400 mm o.c.
 - .5 Locate joints minimum 610 mm from cut-outs.
 - .6 Offset core and plastic laminate facing joints.
- .7 Form shaped profiles and bends as indicated, using postformed grade laminate to laminate manufacturer's instructions.
- .8 Edging to be done using straight self-edging laminate strip to match adjacent colour, finish, gloss, and pattern to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .9 Apply laminated plastic liner sheet to interior of cabinetry and where indicated.
- .10 Fabricate units by solid surfacing manufacturer's certified or approved fabricator/installer. Fabricate built-up profiles as indicated.

2.4 FABRICATION

- .1 Finish carpentry work required by this Section is to include but not be limited to the following items:
 - .1 Cabinets.
 - .2 Countertops.

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- .3 Shelving.
 - .4 Window sills.
 - .5 Wood panels.
 - .6 Benches.
 - .7 Wood reveals.
 - .8 Cedar canopy trellis.
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- .2 Be responsible for methods of construction and for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other sections.
 - .3 Coordinate locations of concealed supports and blocking with other parts of work. Provide cutouts for outlet boxes and other fixtures.
 - .4 Fabricate work in a manner which will permit expansion and contraction of the materials without visible open joints. Conceal joints and connections in wherever possible.
 - .5 Set nails and countersink screws, apply wood filler to indentations, sand smooth and leave ready to receive finish.
 - .6 Mitre exposed corners, no end grain shall be visible in completed installation.
 - .7 Finish millwork in accordance with Section 09 91 00. Finished millwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects and shall be selected for uniformity of colour, grain and texture.
 - .8 Shelving to cabinetwork to be adjustable unless otherwise noted.
 - .9 Recess shelf standards, unless noted otherwise. Stagger recessed shelf standards on opposite sides of divider.
 - .10 Do not exceed maximum 760 mm unsupported span for 19 mm thick shelving. House fixed shelving into gables and divisions.
 - .11 Shop assemble finish carpentry to accommodate delivery and handling and to ensure passage through building openings.
 - .12 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
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- 3 Execution
- 3.1 **EXAMINATION**
 - .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.2 **INSTALLATION**

- .1 Install finish carpentry work in accordance with NAAWS and tolerances for architectural woodwork and reviewed shop drawings.
- .2 Set and secure finish carpentry in place, rigid, plumb, square, and level.
- .3 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate columns, fixtures, outlets, or other projecting, intersecting or penetrating objects leaving a 0.8 mm gap maximum.
- .4 Coordinate cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures, in finish carpentry. Round internal corners of cut-outs and seal exposed cores.
- .5 Form joints to conceal shrinkage.
- .6 Install draw bolts and splines in laminated plastic counter top joints at maximum spacing 450 mm o.c., and 75 mm from edge. Make joints flush, hairline butt joints.
- .7 Install finishing hardware accurately and securely in accordance with manufacturer's directions, adjust and clean.
- .8 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .9 Apply bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .10 Melamine panels: Assemble melamine millwork using dowelled/wafered-and-glue construction. Installed melamine panels shall not show any exposed fasteners on finished/exposed surfaces.
- .11 Solid surfacing:
 - .1 Install solid surfacing in accordance with manufacturer's instructions.
 - .2 Align work plumb and level.
 - .3 Seal perimeter of fabrication to adjacent construction in accordance with Section 07 92 00.
 - .4 Sills: Install window sills level, plumb and even in locations as indicated and ensure that sills are securely fastened.
- .12 Panels: Install panels in locations indicated on drawings. Ensure that panels are securely fastened in true vertical and horizontal manner.
- .13 Benches:
 - .1 Construct benches of sizes and details as noted.
 - .2 Anchor wood to supports in a concealed manner.
 - .3 Mitre joints at corners. Keep joints to a minimum.
 - .4 Round all corners, edges and ends.

- .5 Install bench brackets and supports supplied under work of Section 05 50 00.

- .14 Canopy trellis:
 - .1 Provide Cedar wood components for canopy trellis as shown on Contract Drawings.
 - .2 Ensure trellis components are installed straight, level and plumb, securely fastened in true vertical and horizontal manner.
 - .3 Remove and replace damaged, marked or stained wood components as required or as requested by the Consultant.

- .15 Fastening:
 - .1 Coordinate wall securement, anchorage, and blocking for finish carpentry items.
 - .2 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .3 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .4 Provide heavy duty fixture attachments for wall mounted cabinets.
 - .5 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.

- .16 Remove and replace damaged, marked, or stained finish carpentry.

END OF SECTION