

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 07 92 00 - Joint Sealants.
- .2 Section 08 71 00 - Door Hardware.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
  - .1 ASTM A653/A653M-11. Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM A924/A924M-13. Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-19.13-M87. Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .2 CGSB 41-GP-19Ma-84. Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International).
  - .1 CSA-G40.20-04/G40.21-04 (R2009). General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA-W59-03 (R2008). Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
  - .1 CSDMA. Recommended Specifications for Commercial Steel Door and Frame Products, 2009.
  - .2 CSDMA. Recommended Selection and Usage Guide for Commercial Steel Doors and Frame Products, 2009.
- .5 National Fire Protection Association (NFPA).
  - .1 NFPA 80-2013. Standard for Fire Doors and Other Opening Protectives.
  - .2 NFPA 252-2012. Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC).
  - .1 CAN/ULC-S104-10-EN. Standard Method for Fire Tests of Door Assemblies.
  - .2 CAN/ULC-S105-09-EN. Standard Specification For Fire Door Frames Meeting The Performance Required By Can/Ulc-S104.
  - .3 CAN/ULC-S704-11-EN. Standard For Thermal Insulation, Polyurethane And Polyisocyanurate, Boards, Faced.

**METAL DOORS AND FRAMES****1.3 DESIGN REQUIREMENTS**

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
- .2 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E152 and listed by nationally recognized agency having factory inspection services.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS****.1 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, insulation type and RSI value, mortises, reinforcements, location of exposed fasteners, openings, glazing, louvres, arrangement of hardware. Indicate fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing. Indicate fire rating and finishes. Indicate thermal break and method to insulate frames. Indicate specialized detailing for thermally broken frame components.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

**.2 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one 300 x 300 mm corner sample of each type door.
- .3 Submit one 300 x 300 mm corner sample of each type of frame. Show cutout for butt hinges, glazing stops. Provide a 300 mm long removable mullion connection. Submit anchors and clips.
- .4 Submit samples of thermally broken frame.

**1.5 REQUIREMENTS**

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN/ULC-S104M and NFPA 252 for ratings specified or indicated.
- .2 Provide fire labelled frames and doors for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN/ULC-S104, ASTM E152 or NFPA 252 and list by nationally recognized agency having factory inspection service. Construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Protect finished surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Apply

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additional temporary protection to all finished surfaces to protect from impact and shipping damage.

- .2 Leave protective coverings in place until final cleaning of building.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative. Divert unused wood materials from landfill to recycling facility approved by Departmental Representative.

**Part 2 Products****2.1 MATERIALS**

- .1 Sheet Steel: tension leveled steel to ASTM A924, hot dip galvanized to ASTM A653, Commercial Steel (CS), galvanized coating, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement: structural steel channel: to CSA-G40.20/G40.21, Type 44W, coating designation to ASTM A653M.

**2.2 DOOR CORE MATERIALS**

- .1 Interior doors: face sheets welded to perimeter framing and laminated to honeycomb construction: structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m<sup>3</sup> minimum sanded to required thickness.

**2.3 ACCESSORIES**

- .1 Adhesives:
  - .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
  - .2 Polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .2 Touch-up primer: by manufacturer.
- .3 Door silencers: single stud rubber/neoprene type.

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- .4 Cap: steel top and bottom caps. Install to all interior and exterior doors. Spot welded in place.
- .5 Thermal break: rigid polyvinyl chloride extrusion conforming to CGSB 41-GP-19Ma.
- .6 Metallic paste filler: to manufacturer's standard.
- .7 Fire labels: metal riveted.
- .8 Sealants: one part silicone to CAN/CGSB-19.13.

**2.4 DOOR FRAMES FABRICATION GENERAL**

- .1 Fabricate frames, transoms and sidelights in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Interior frames: 1.6 mm thick galvanised sheet steel. Welded type construction.
- .4 Provide fire labeled frames for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN/ULC-S104, or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures or Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware and electronic hardware. Use templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Prepare door frames as follows:
  - .1 ANSI strike.
  - .2 Reinforcing at head for door closer.
  - .3 Hole: for door contact.
  - .4 Heavy or standard weight template hinges, 1.5 or 2 pair.
  - .5 Auxiliary deadbolt.
  - .6 Guard boxes at strike and hinge locations.
  - .7 Power box at head.
  - .8 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.

**2.5 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.

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- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb. Securely attach floor anchors to inside of each jamb profile.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jamb and intermediate at 660 mm o.c. maximum.

**2.6 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA-W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Provide temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .6 Fabricate frame products for large openings in section as large as practical to suit site restrictions. Prepare joints in frames for field splicing and assembly.

**2.7 DOOR FABRICATION GENERAL**

- .1 Doors: swing type, flush, with provision for glass and louvered openings as indicated.
- .2 Fabricate interior doors from 1,6 mm thick sheet steel. Faces laminated under pressure to honeycomb core and spot welded to perimeter door framing.
- .3 Fabricate doors with longitudinal edges welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Blank, reinforce, drill doors and tap for mortised, templated hardware. Prepare for electronic hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware.
- .7 Provide inverted, recessed, flush, spot welded steel channel caps to top and bottom of interior doors.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN/ULC-S104, ASTM E152 and NFPA 252 and list by nationally recognized agency having factory

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inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

- .9 Manufacturer's nameplates on doors are not permitted.

**Part 3 Execution****3.1 INSTALLATION GENERAL**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.
- .2 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .3 Install doors and frames to CSDMA Installation Guide.
- .4 Maintain protection on doors and frames as required to prevent damage during construction.

**3.2 FRAME INSTALLATION**

- .1 Co-ordinate installation of door frames with Departmental Representative and other trades involved to ensure that erection schedule is maintained. Turn over frames to other trades for building into masonry or gypsum board partitions.
- .2 Set frames plumb, square, level and at correct elevation. Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.

**3.3 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor or thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor, top of carpet, sill or thresholds: 13 mm.

- .3 Adjust operable parts for correct function.

**3.4 FINISH REPAIRS**

- .1 Touch up where galvanized finishes were damaged during installation.
- .2 Repairs of any damage to doors and frames to be invisible in final assembly. Repairs are to the approval of the Departmental Representative.
- .3 Remove and replace any component where damage can not be repaired to approval of the Departmental Representative.
- .4 Doors or frames with visible repairs and/or visible defects will be removed from site and replaced.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 09 21 16 - Gypsum Board Assemblies.
- .2 Section 09 91 23 - Painting

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Shop Drawings. Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly.

**1.3 CLOSEOUT SUBMITTALS**

- .1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal, and with the Waste Reduction Workplan. Remove from site and dispose of all packaging materials at appropriate recycling facilities.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue. Leave protective covering in place until final cleaning of building.

**Part 2 Products****2.1 ACCESS DOORS**

- .1 Sizes: except as indicated otherwise, to be minimum sizes as follows:
  - .1 For body entry: 600 x 600 mm and 900 x 900mm.
  - .2 For hand entry: 300 x 300 mm.
- .2 Materials:
  - .1 Exterior: aluminum door and frame with stainless steel piano hinge, continuous closed cell neoprene gasket, and 50mm rigid insulation.
  - .2 Gypsum board assemblies: Sheet steel. Factory primed.

- .3 Fire Rated Access Doors: ULC listed for the fire rating of the wall, floor or ceiling,

## 2.2 FABRICATION

- .1 Interior:
  - .1 Fabricate frames and flanges of 1.5 mm thick steel. Rounded safety corners.
  - .2 Fabricate door panels of 1.8 mm thick single thickness steel sheet. Provide double sheet with integral non-combustible insulation filler for fire rated assemblies.
- .2 Exterior:
  - .1 Fabricate frames and flanges of 2.0mm thick aluminum.
  - .2 Fabricate door panels of 1.6mm thick aluminum
- .3 Weld, fill, and grind joints to ensure flush and square unit.
- .4 Hardware:
  - .1 Hinge: 175 degree stainless steel piano hinge. Concealed constant force closure spring type.
  - .2 Lock: screw driver slot for quarter turn cam lock. Provide cylinder lock with latch, two keys for each unit where indicated in the drawings.

## 2.3 FINISHES

- .1 Base metal protection: galvanized, wiped coat finish. Prime coat units with baked on primer. Finish: final paint finish as specified in Section 09 91 23 - Painting.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verify existing conditions before starting work. Verify that rough openings for door and frame are correctly sized and located.
- .2 Coordinate size and location on site to minimize requirements for access doors and to consolidate services such that a single door may serve multiple functions.

### 3.2 INSTALLATION

- .1 Install units to manufacturer instructions. Install frames plumb and level in opening. Secure rigidly in place.

ACCESS DOORS - MECHANICAL

- .2 Location: Ensure that equipment is within view and accessible for operating, inspecting, adjusting, servicing without using special tools. Position unit to provide convenient access to concealed work requiring access.
- .3 Install fire rated access doors as per manufacturers written instructions.

**END OF SECTION**

**DOOR HARDWARE****Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 08 11 00 - Metal Doors and Frames.

**1.2 REFERENCES**

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
  - .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames. 2007.
- .2 American National Standard Institute (ANSI), Builders Hardware Manufacturers Association (BHMA).
  - .1 ANSI/BHMA A156.1-2013. Butts and Hinges.
  - .2 ANSI/BHMA A156.4-2008. Door Controls- Closers.
  - .3 ANSI/BHMA A156.5-2010. Cylinders and Input Devices for Locks.
  - .4 ANSI/BHMA A156.6-2010. Architectural Door Trim.
  - .5 ANSI/BHMA A156.8-2010. Door Controls - Overhead Stops and Holders.
  - .6 ANSI/BHMA A156.10-2011, Power-operated Pedestrian Doors.
  - .7 ANSI/BHMA A156.13-2012. Mortise Locks & Latches, Series 1000.
  - .8 ANSI/BHMA A156.16-2008. Auxiliary Hardware.
  - .9 ANSI/BHMA A156.21-2009. American National Standard for Thresholds.
  - .10 ANSI/BHMA A156.22-2012. Door Gasketing and Edge Seal Systems.
  - .11 ANSI/BHMA A156.30-2007. American National Standard for High Security Cylinders.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  - .2 After approval samples will be returned for incorporation in the Work.
- .3 Submit 1 electronic copy of hardware list to Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures. Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information. Include complete cross-reference to information included in Door Schedule.
- .4 Submit manufacturer's installation instructions.
- .5 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**DOOR HARDWARE****1.4 QUALITY ASSURANCE**

- .1 Regulatory Requirements. All hardware for doors in fire separations and exit doors to be certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Provide product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .3 Store finishing hardware in locked, clean and dry area.

**1.6 WASTE DISPOSAL AND MANAGEMENT**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

**1.7 MAINTENANCE**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply two sets of wrenches for door closers, locksets and fire exit hardware.
- .3 Brief maintenance staff regarding proper care, cleaning, and general maintenance.

**Part 2 Products****2.1 HARDWARE ITEMS**

- .1 Use one manufacturer's products only for similar items.

**2.2 DOOR HARDWARE**

- .1 Use one manufacturer's products only for all similar items.

## DOOR HARDWARE

- .2 Butts and hinges: to ANSI/BHMA A156.1.
  - .1 Designated by letter A and numeral identifiers, followed by size and finish as listed in Hardware Schedule. Heavy weight 5 knuckle ball bearing type typical.
  - .2 Use non-removable pins (NRP) and safety Studs (SS) for all doors.
  - .3 Use non-ferrous material for all exterior locations and where indicated. Finish as indicated in Hardware Schedule.
- .3 Mortised locks and latches: to ANSI/BHMA A156.13.
  - .1 Series 1000 cylindrical lock grade 1, designed for function.
  - .2 Locksets to be supplied with high security cylinder unless specified otherwise.
  - .3 Door pulls: 457 mm chrome-plated tubular D-pull, 25 mm diameter.
  - .4 Roses: round plain design.
  - .5 Normal strikes: box type, lip projection not beyond jamb.
  - .6 Finish: as noted in the Hardware Schedule.
- .4 Door closers and Accessories: to ANSI/BHMA A156.4.
  - .1 Closers: to ANSI/BHMA A156.4. Designated by letter C and numeral identifiers listed in Hardware Schedule. Grade 1 complete with cast iron bodies, full rectangular cover plates, separate adjusting valves for sweep, latching and backcheck. Fully adjustable spring power. Closers are to have delayed action and built-in stop features where specified. Finish 689.
  - .2 Adjust closers to require no greater than 22 Newtons of force to open interior doors and no more than 34 Newtons of force to open exterior doors.
  - .3 Overhead holders: to ANSI/BHMA A156.8. Designated by letter C and numeral identifiers listed in Hardware Schedule. Finish 630.
- .5 Auxiliary locks and associated products: to ANSI/BHMA A156.5. Designated by letter E and numeral identifiers listed in Hardware Schedule. Finished as indicated in Hardware Schedule.
- .6 High Security Cylinders: to ANSI/BHMA A156.30.
  - .1 All keyed cylinders are to be compatible with the existing high security cylinders in the building and are to be keyed into an existing master key system.
  - .2 Finish 626.
- .7 Architectural door trim: to ANSI/BHMA A156.6. Designated by letter J and numeral identifiers listed in Hardware Schedule. Finished to 630.
  - .1 Door protection plates: size as noted, 1.27 mm thick, bevelled edges, brushed stainless steel, tape mounting and fire rated where applicable.
- .8 Auxiliary Hardware: to ANSI/BHMA A156.16.
  - .1 Floor stops shall be dome type, heavy-duty, cast bronze, low or high-rise as noted in schedule.

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- .2 Wall stops shall be heavy-duty, cast bronze c/w concave pad with no visible fasteners as noted in schedule.
- .9 Door Gasketing & Edge Seal Systems: to ANSI/BHMA A156.22.
  - .1 All gasketing must be fire rated type where used on fire rated openings.
  - .2 Weatherstripping: head and jamb seal. Heavy-duty neoprene in a 6mm thick solid aluminum extrusion designed to be continuous under exit device strikes and closer brackets.
  - .3 Automatic door bottoms: heavy-duty adjustable in rectangular aluminum extrusion with neoprene seal, clear anodized aluminum finish. Mortised installation.
- .10 Thresholds: to ANSI/BHMA A156.21.
  - .1 Thresholds to be extra wide by full width of opening.
  - .2 Extruded aluminum tapered threshold width to be selected to run from centerline of door to outside edge of corridor doorframe face as a minimum, further if indicated on drawings.
  - .3 Thresholds shall be cut to fit around frame jambs and all edges to be caulked.
  - .4 Use multi-component thermally broken extruded aluminum systems with incremental add-on extensions to meet required sectional threshold dimensions.
  - .5 Serrated surface, 6mm high.

**2.3 FASTENINGS**

- .1 Use only fasteners provided by manufacturer. Failure to comply may void manufacturer's warranties and applicable licensed labels. The use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices are to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

**2.5 KEYING**

- .1 Doors, padlocks and cabinet locks to be keyed differently. Prepare detailed keying schedule in conjunction with Departmental Representative.
- .2 Provide keys in duplicate for every lock.
- .3 Provide three masterkeys for each MK or GMK group.
- .4 Stamp keying code numbers on keys and cylinders.

**DOOR HARDWARE**

- .5 Provide construction cores.
- .6 Provide all permanent cores and keys to Departmental Representative.

**Part 3 Execution****3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

**3.2 INSTALLATION**

- .1 Unless noted otherwise install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- .2 Note specific mounting height for locks and exit devices shown in architectural door elevations. Centreline of locksets and exit devices to be 1000mm from finished floor.
- .3 Where doorstop contacts door pulls, mount stop to strike bottom of pull.
- .4 Do not modify finishing hardware without manufacturers written consent.
- .5 Door Closers:
  - .1 Confirm degree of swing for door closers.
  - .2 Ensure that all adjustments have been made to sweep, latching and backcheck cycles for each closer.
  - .3 Mount on room side of doors wherever possible.
- .6 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .7 Remove construction cores or locks when directed by Departmental Representative. Install permanent cores and check operation of locks.
- .8 Contractor is to patch and make good all holes in existing frames resulting from relocation of existing hardware and electronic components.

**DOOR HARDWARE****3.3 ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Adjust door closers to require no more than 22 Newtons of force to open interior doors and no more than 34 Newtons of force to open exterior doors.
- .3 Lubricate hardware, operating equipment and other moving parts.
- .4 Adjust door hardware to provide tight fit at contact points with frames.
- .5 Adjust hardware for proper installation and function.
- .6 Consult with Departmental Representative before changing the hand of any lockset.

**3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.5 DEMONSTRATION**

- .1 Brief maintenance staff regarding:
  - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
  - .2 Description, use, handling, and storage of keys.
  - .3 Use, application and storage of wrenches for door closers, locksets and fire exit hardware.
- .2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.6 HARDWARE SCHEDULE**

- .1 Refer to Drawing 8/A000 for Door and Hardware Schedules

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 06 40 00 - Architectural Woodwork.

**1.2 REFERENCES**

- .1 American National Standard Institute (ANSI), Builders Hardware Manufacturers Association (BHMA).
  - .1 ANSI/BHMA A156.9-2010. Cabinet Hardware.
  - .2 ANSI/BHMA A156.11-2010. Cabinet Locks.
  - .3 ANSI/BHMA A156.18-2012. Materials and Finishes.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's printed product literature, specifications and data sheet.
- .3 Submit samples. Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number. After approval, samples will be returned for incorporation in the Work.
- .4 Submit 5 copies of hardware list. Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information. Include complete cross reference to information included in Door Schedule and millwork details.
- .5 Submit manufacturer's installation instructions.
- .6 Provide closeout submittals including maintenance data, maintenance materials, parts list, and manufacturer's instructions for incorporation into maintenance manual specified in Section 01 78 00 - Closeout Submittals. Brief maintenance staff regarding proper care, cleaning, and general maintenance.

**1.4 QUALITY ASSURANCE**

- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

**SPECIAL FUNCTION HARDWARE**

- .3 Store cabinet hardware in locked, clean and dry area.

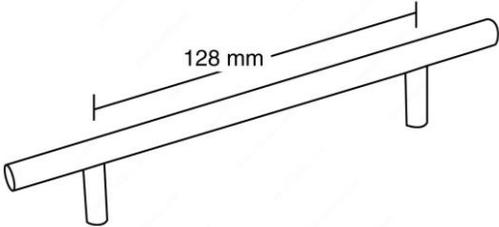
**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

**Part 2 Products****2.1 HARDWARE ITEMS**

- .1 Use one manufacturer's product for all similar items.

**2.2 CABINET HARDWARE**

- .1 Cabinet hardware: to ANSI/BHMA A156.9, designated by letter B and numeral identifiers as listed below.
  - .1 Hinges: concealed European style cup hinge. Minimum 90 degree swing. For full overlay cabinet doors. Satin chromium plated. Equipped with self closing adjustable soft close feature.
  - .2 Pulls: as illustrated below. Back mounted pull, 128 mm centres, 185 mm total length, 35 mm projection, 10 mm diameter pull. Solid stainless steel. Brushed finish.
  - .3 Piano hinge: type B81491. Continuous piano hinge, reversible, 30 mm x 0.76 mm thick. Holes at 50 mm OC. Screw size: No. 5 flat head. Stainless steel with satin finish.
  - .4 Catches: type B83291, friction type catch. Surface mounted. Adjustable holding force to 18 N. Style to approval of Departmental Representative. Finish 645, nickel plated. Roller type catch.
  - .5 Shelf rests: solid stainless steel, paddle style, shelf support pins. 7 mm diameter base. Installed in 7.5 mm sleeve in drilled holes.
  - .6 Drawer slides: type B05051. Bottom edge mounted, heavy duty, full extension, lift off rail. Zinc plated. Steel ball bearing rollers. Rated for 100 Kg per pair. Equipped with self closing feature.

**SPECIAL FUNCTION HARDWARE**

- .7 Track and guides for sliding panels: recessed mounted with anti-friction inserts.
- .8 Cabinet door or drawer locks: to ANSI/BHMA A156.11. Half mortised into back of door or drawer. Nickel plated. Key into keying system as approved.

**2.3 FASTENINGS**

- .1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .2 Exposed fastening devices to match finish of hardware.
- .3 Use fasteners compatible with material through which they pass.
- .4 Use only fasteners provided by manufacturer. The use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .5 Where pull is scheduled on doors or drawers, supply fastening devices, and install so pull can be secured through door from reverse side.
- .6 Provide stainless steel cup washers for all screws that are exposed in final assembly. Size for unit.

**2.4 FINISHES**

- .1 Finishes for all hardware to ANSI/BHMA A156.18.

**2.5 KEYING**

- .1 Cabinet locks to be keyed differently and master keyed as approved. Submit keying schedule for approval. Provide keys in duplicate for every lock.

**Part 3 Execution****3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

**3.2 INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with manufacturer's recommendations and to project design requirements.
- .2 Furnish millwork fabricator with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

**3.3 ADJUSTING**

- .1 Adjust cabinet hardware for optimum, smooth operating condition. Lubricate hardware and other moving parts. Adjust cabinet door hardware to provide tight fit at contact points with frames.

**3.4 CLEANING**

- .1 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions. Remove protective material from hardware items where present.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 08 87 53 – Glazing Films
- .2 Section 10 22 19 – Demountable Wall System

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM C542-05. Standard Specification for Lock-Strip Gaskets.
  - .2 ASTM C920-08. Standard Specification for Elastomeric Joint Sealants.
  - .3 ASTM C1281-03(2009). Standard Specification for Preformed Tape Sealants for Glazing Applications.
  - .4 ASTM D2240-05. Standard Test Method for Rubber Property - Durometer Hardness.
  - .5 ASTM E330-02. Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-12.1-M90. Tempered or Laminated Safety Glass.
  - .2 CAN/CGSB-12.3-M91. Flat, Clear Float Glass.
  - .3 CAN/CGSB-12.8-97(2001). Insulating Glass Units.
  - .4 CAN/CGSB-12.9-M91. Spandrel Glass.
- .3 Glass Association of North America (GANA).
  - .1 GANA Glazing Manual - 2008.

**1.3 SYSTEM DESCRIPTION**

- .1 Performance Requirements:
  - .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows: Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
  - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 22 kPa as measured in accordance with ASTM E330.
  - .3 Limit glass deflection to 1/200 with full recovery of glazing materials.

**1.4 SUBMITTALS**

- .1 Provide Submittals as specified in Section 013300 - Submittals.
- .2 Submit manufacturer's printed product literature, specifications and data sheet. Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for glazing materials during application and curing.

- .3 Submit shop drawings. Submit manufacturer's installation instructions.
- .4 Submit samples. Submit duplicate 300 x 300 mm size samples of glass and 300 mm lengths of glazing splines.
- .5 Closeout Submittals. Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

## 1.5 QUALITY ASSURANCE

- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties. Provide testing and analysis of glass under provisions of Section 01 45 00 - Quality Control. Provide shop inspection and testing for glass.
- .2 Provide product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

## 1.6 SITE CONDITIONS

- .1 Environmental Requirements: Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities. Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin for recycling in accordance with site Waste Management Plan.

## Part 2 Products

### 2.1 MATERIALS: FLAT GLASS

- .1 Safety glass: to CAN/CGSB-12.1. 6 mm thick. Transparent for interior glazing, tinted for glazing in exterior walls (windows and door entrance screens).
  - .1 Type 2 tempered. Provide tempered glass with tempered distortion parallel to floor in final installation. 6.0 mm thick.

### 2.2 MATERIALS

- .1 Plastic film: in accordance with Section 08 87 53 - Glazing Films.

- .2 Sealant: as specified in Section 07 92 00 - Joint Sealants.
  - .1 Cap bead: to ASTM C920. Commercial glazing. Single or multi-component, non-acid, neutral curing, medium modulus, silicone sealant.
  - .2 Heel and Toe bead: to ASTM C920. Commercial glazing. Single or multi-component, non-acid, neutral curing, medium modulus, silicone sealant.
  - .3 Perimeter Seals: to ASTM C920. Commercial glazing. Single or multi-component, non-acid, neutral curing, medium modulus, silicone sealant.
  - .4 Metal Expansion Seals: to ASTM C920. Single or multi-component, non-acid, neutral curing, low modulus, silicone sealant.
  - .5 Metal to Metal Joinery seals: to ASTM C920. Commercial glazing. Single or multi-component, non-acid, neutral curing, medium modulus, silicone sealant.
  - .6 Concealed Splice Sleeve: to ASTM C920. Single component, non-drying, non-skinning, synthetic rubber sealant.

### 2.3 ACCESSORIES

- .1 Setting blocks: Neoprene, EPDM or Silicone, 80-90 Shore A durometer hardness to ASTM D2240 to suit glazing method, weight of glass panel and surface area. Length of 25 mm for each square meter of glazing. Minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height.
- .2 Spacer shims: Neoprene or silicone. 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Balance blocks: EPDM or Neoprene, 50-60 Shore A durometer hardness to ASTM D2240. Continuous, thickness to suit application.
- .4 Glazing tapes:
  - .1 Compression: 100% solids, preformed macro-polyisobutylene / butyl rubber with integral synthetic rubber spacing rod. Coiled on release paper. Size as required for frame stop heights.
  - .2 Non-Compression: 100% solids, preformed butyl rubber to ASTM C1281. 66 Shore 00 durometer hardness to ASTM D2240. Coiled on release paper. Black colour. Size as required for frame stop heights.
  - .3 Bond breaker: pressure sensitive plastic tape. Formulated for non adhesion to sealants for installation where minimum specified depth of joint is not possible.
- .5 Glazing materials for Fire Rated Assemblies:
  - .1 Glazing tape: closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 %. Glass panels that exceed 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.
- .6 Glazing splines: for use in Glazed Aluminum Curtain Walls. Resilient polyvinyl chloride or silicone, extruded shape to suit glazing channel retaining slot, black colour. To approval of Departmental Representative.

- .7 Lock-strip gaskets: to ASTM C542. For use in Glazed Aluminum Curtain Walls. Extruded shape to suit glazing channel retaining slot, black colour. To approval of Manufacturer of Curtain Wall System.
- .8 Glazing clips: manufacturer's standard type.

### **Part 3 Execution**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

#### **3.2 EXAMINATION**

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

#### **3.3 PREPARATION**

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

#### **3.4 INSTALLATION: INTERIOR METAL DOORS - DRY METHOD (TAPE AND TAPE)**

- .1 Perform work in accordance with GANA Glazing Manual and door manufacturer's instructions.
- .2 Install clear glazing panels and seal into steel door and screen framing to meet performance criteria as specified. Perform work in accordance with Door and Frame manufacturer's recommendations and as specified in Section 10 22 19 – Demountable Wall System.
- .3 Install clear tempered glass units where indicated in the drawings.
- .4 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .5 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners. Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
- .6 Place glazing tape on free perimeter of glazing in same manner described.
- .7 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact. Knife trim protruding tape.

**3.5 INSTALLATION: PLASTIC FILM**

- .1 Install plastic film in accordance with film manufacturer's instructions and as specified in Section 08 87 53 - Glazing Films.
- .2 Place without air bubbles, creases or visible distortion. Fit tight to glass perimeter with razor cut edge.

**3.6 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Clean glass using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.7 PROTECTION OF FINISHED WORK**

- .1 After installation, mark light with an "X" by using removable plastic tape or paste.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 08 80 50 - Glazing.

**1.2 REFERENCES**

- .1 International Window Film Association (IWFA).
  - .1 IWFA Visual Quality Standard for Applied Window Film 1999.

**1.3 SUBMITTALS**

- .1 Provide all listed submittals to Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS - Material Data Sheets. Submit manufacturer's product data sheets.
- .3 Submit samples. Submit one 500 x 500 mm sample of film installed on 6 mm thick clear glass. Submit one 500 x 500 mm sample of film alone.
- .4 Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.

**1.4 QUALITY ASSURANCE**

- .1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Canada Labour Code.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with section 01 61 00 - Common Product Requirements. Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and with Waste Reduction Workplan.
  - .1 Place materials defined as hazardous or toxic waste in designated containers.
  - .2 Ensure emptied containers are sealed and stored safely for disposal.

**1.6 MAINTENANCE DATA**

- .1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit manufacturers written instructions for care and maintenance of window film. Submit information on the use of cleaning solution recommended by manufacturer for regularly scheduled cleaning of security film.

**GLAZING FILMS****Part 2 Products****2.1 MATERIALS**

- .1 Decorative Glazing Film: optically translucent, opaque, polyester - reinforced vinyl film. Abrasion resistant coating and release liner to the following properties:
  - .1 Selected by Departmental Representative to provide a frosted glass appearance where final application looks like etched glass.
    1. Ultraviolet Transmittance (ASTM E 903): 27 percent.
    2. Visible Light Transmittance (ASTM E 903, ASTM E308): 85 percent.
    3. Visible Light Reflectance (ASTM E 903): 79 percent.
    4. Solar Heat Transmittance: 76 percent.
    5. Solar Heat Reflectance: 7 percent.
    6. Shading Coefficient (Normal Incidence) (ASTM E 903): 0.93.
  - .2 Selected by Departmental Representative to provide a frosted glass appearance where final application looks like etched glass.
    1. Ultraviolet Transmittance (ASTM E 903): 20 percent.
    2. Visible Light Transmittance (ASTM E 903, ASTM E308): 72 percent.
    3. Visible Light Reflectance (ASTM E 903): 12 percent.
    4. Solar Heat Transmittance: 64 percent.
    5. Solar Heat Reflectance: 10 percent.
    6. Shading Coefficient (Normal Incidence) (ASTM E 903): 0.82.

**Part 3 Execution****3.1 PREPARATION**

- .1 Apply film to glass in accordance with manufacturer's written instructions. Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.
- .2 Before beginning Work, place absorbent material on window sill or at sash to absorb moisture accumulation generated by film application.
- .3 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.
- .4 Clean glass before beginning installation using neutral cleaning solution. Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.
- .5 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems. View glass from 2.0 m minimum. Report findings to Engineer.
- .6 Proceed with Work only after receipt of written approval from Engineer.

**GLAZING FILMS**

- .7 Install film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.

**3.2 INSTALLATION**

- .1 Field installation:
  - .1 Install film in the same manner as tested.
  - .2 Install glazing film to glass in windows, doors and millwork as indicated, ensuring no blisters, bubbles scratches or distortions.
- .2 Cut film edges straight and square. Cut edges a maximum of 3 mm from edge of glass and ensure edge of film is covered by glazing stop by a minimum of 12 mm or in accordance with manufacturers written instructions.
- .3 Splicing:
  - .1 Splice film only when glass is greater in width than film.
  - .2 Splice film only after receipt of written approval from Engineer.
  - .3 Use butt factory edges only.
- .4 Use only water and film slip solution on glass to facilitate positioning of film.
- .5 Ensure removal of excess water from between film and glass.
- .6 Remove left over material form work area and return work area to original condition.

**3.3 INSTALLER'S INSPECTION**

- .1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.
- .2 Remove and replace film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m minimum after 30 day period.

**3.4 FINAL CLEANING**

- .1 Wash interior and exterior of each glass panel and film using cleaning solution recommended by film manufacturer.

**3.5 SCHEDULE**

- .1 Install Decorative glazing film to glazing noted in Drawings

**END OF SECTION**