

PART - 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

- .1 Labour, Products, equipment and services necessary to complete the work of this Section.

1.2 SUBMITTALS

.1 Shop Drawings:

- .1 The hardware specialist shall prepare and submit shop drawings containing a completely itemized schedule of hardware for review. The schedule of hardware shall list all doors by number (in sequence) and location with complete details of the hardware to be supplied, including installation, location and mounting heights of each type of hardware, and special instructions. Format of schedule to be approved.
- .2 The schedule of hardware shall incorporate the catalogue numbers of hardware as specified.
- .3 The Contractor shall furnish copies of final reviewed shop drawings to the doors and frames fabricators and to the door and hardware installers.

.2 Product Data: Manufacturer's specifications and technical data including catalogue cut sheets on each item of hardware. Annotate manufacturer's model numbering systems to explain meaning.

.3 Wiring Diagrams: Include complete wiring diagrams indicating all component parts, disconnect switches, conduit, and voltage requirements provided under other Sections and required to operate assembly.

.4 Samples: The hardware specialist shall submit complete samples of hardware items for review.

.5 Templates: The hardware specialist promptly furnishes templates and information necessary for proper preparation of doors and frames and for the installation of hardware to the doors and frames fabricator and to the doors and hardware installer, in ample time to facilitate the progress of the work.

.6 Furnish manufacturers' instructions for proper installation of each hardware component.

.7 Closeout Submittals:

- .1 Warranty documents executed by manufacturers' authorized official.
- .2 Operation and Maintenance data: Prior to Date of Substantial Performance, hand over to the Owner, a manual containing a final "as built" hardware schedule, full instructions for the adjustment, maintenance, spare part list etc. of all hardware items, together with special keys, wrenches etc. required to carry out normal adjustments to hardware. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

.8 Certification: Prior to date of Substantial Performance, have the hardware specialist provide a letter which certifies that the hardware has been furnished and installed in accordance with hardware manufacturer's instructions and in accordance with requirements of Contract Documents.

1.3 **QUALITY ASSURANCE**

- .1 Conduct pre-installation meeting to verify project requirements, manufacture's installation instructions and manufacturer's warranty requirements.
- .2 Have the supervision, administration and servicing of the work of this Section performed by a hardware specialist certified as an Architectural Hardware Consultant (AHC).
- .3 Installer's Qualifications: Firm experienced in installation of systems similar in complexity to those required for this Project, plus the following.
 - .1 Not less than 3 years of experience with systems.
 - .2 Successfully completed not less than 5 comparable scale projects using this system.
- .4 Have the hardware installer fully cooperate with the hardware specialist to ensure doors and hardware are properly and securely installed and that the installed doors and hardware are functioning properly.

1.4 **INSPECTION AND SUPERVISION**

- .1 The hardware specialist shall examine the Drawings, Hardware Schedules and shop drawings to determine final dimensions, sizes and quantity of the hardware items required, ensure that the hardware listed shall fit and operate properly and make adjustments to the hardware at no extra cost to the Owner.
- .2 The hardware specialist shall obtain electrical characteristics of the security and fire alarm systems from the electrical Subcontractor and furnish electrically operated hardware which suits the electrical characteristics and wiring connection requirements at no extra cost to the Owner.
- .3 The hardware specialist shall obtain and examine shop drawings for doors and frames to ensure proper provisions and preparations for hardware are made.
- .4 The hardware specialist shall make periodic inspections of the hardware and door installations, report improper and unsatisfactory conditions and expedite the replacement or correction of faulty hardware.
- .5 The hardware specialist and the door and hardware installer shall attend job site meetings when so requested.

1.5 **LABELLING, PACKAGING, DELIVERY AND STORAGE**

- .1 Deliver and store each hardware item in the manufacturers' original containers. The containers shall be clearly labelled as to content and door on which the hardware is to be installed, in accordance with the shop drawing schedule of hardware.
- .2 The hardware specialist shall be responsible for ensuring the timely delivery of hardware so that all on site work progresses without delay and interruptions.
- .3 Store hardware in a locked storage room in the building. Lay out all hardware in an organized manner on shelves.
- .4 Stockpile items sufficiently in advance to ensure their availability and make all necessary deliveries in a timely manner to ensure orderly progress of the total Work.
- .5 Store items in such a manner to allow easy access to each hardware item/group as needed without significantly disrupting storage arrangement.
- .6 Review shipments at time of arrival on the site to ensure agreement with respect to items shipped and received, quantity, back ordered or short-shipped items, and adherence to hardware schedule.

1.6 **PROJECT CONDITIONS**

- .1 Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install product under environmental conditions outside manufacturer's absolute limits.

1.7 **EXTENDED WARRANTY**

- .1 Fully warrant exit devices, locksets, latchsets and door closers for a period of five (5) years from the date of Substantial Performance of the Project.
- .2 The warranty shall state expressly that all hardware will be replaced on the doors and frames at no cost to the Owner in the event of breakage or other defect occurring, willful damage excluded.

PART - 2 PRODUCTS

2.1 **HARDWARE SCHEDULE AND ALTERNATIVES**

- .1 The Hardware Contractor shall submit a complete physical sample of each hardware type for review prior to the preparation of shop drawings. All hardware delivered to the job sites shall be equal in all respects to the accepted sample.

2.2 **MATERIALS**

- .1 General:
 - .1 Hardware shall be as specified in the hardware schedule prepared under the direction of the Consultant and as specified in this Section.
 - .2 Installed hardware shall comply with applicable fire and building codes and requirements of local authorities having jurisdiction over doors and hardware.
 - .3 All hardware applied to metal doors and frames shall be made to template.
 - .4 Supply hardware complete with all necessary screws, bolts and other fastening of suitable size and type to anchor the hardware in position neatly and properly in accordance with the best practices and to the Consultant's approval.
 - .5 All fastenings shall harmonize with the hardware as to materials and finishes.
 - .6 Hardware for fire rated and labelled door and frame assemblies: ULC listed or as accepted by authorities having jurisdiction.
 - .7 Finish on all stainless steel items (C32D) shall be equal to No. 4 finish.
- .2 Hinges:
 - .1 Hinges for exterior doors shall be non-ferrous metal parts so that rust will not bleed from the bearing or other parts. Screws shall be provided in stainless steel.
 - .2 Where specified, provide hinges with non-removable pins or with safety stud feature to prevent doors being removed from frames even if pins are removed.
 - .3 Stamp hinge catalogue numbers on face of leaf of each hinge at factory to enable easy recognition of hinge material and manufacture after doors are hung.
 - .4 Where doors are required to swing to 180 degrees, furnish hinges of sufficient throw to clear trim.
 - .5 Furnish non-removable pins at out-swinging exterior doors.
 - .6 Supply concealed wired electric hinges with ULC label. Hinges to have 8 wires.
- .3 Locks and Latches:

- .1 Provide and install all locks and latches exactly as specified, complete with cylinders.
- .2 Strikes shall be ANSI standard size with curved lip strikes for latch bolts and no lip strikes for dead locks. Provide complete with wrought boxes finished to match strike.
- .4 Exit Devices:
 - .1 All exit devices installed on labelled fire doors shall bear the ULC Label.
 - .2 Through bolts complete with sleeves for mineral core doors.
 - .3 Coordinate exit devices with astragals, coordinators, carry open bars and thresholds for correct and safe operation.
- .5 Keying:
 - .1 All locks and exit devices with cylinder operation shall be keyed alike for construction. Provide 4 change keys for each lock.
 - .2 Permanent keying by Owner at project completion.
- .6 Closers:
 - .1 All door closers shall be hydraulically controlled and full rack and pinion in operation.
 - .2 Each closer shall have adjustable general speed, latch speed and back check control.
 - .3 The swing power of door closers shall be adjustable.
 - .4 Supply to the Owner special closer keys and wrenches as usually packed with closers.
 - .5 Install all necessary attaching brackets, mounting channels, cover plates, etc. where necessary for correct application of door closers.
 - .6 Closers to have parallel arms at out swinging exterior doors and at interior doors where specified.
 - .7 Coordinate closers with overhead holders.
 - .8 Through bolts complete with sleeves for mineral core doors.
- .7 Thresholds:
 - .1 Provide and install thresholds exactly as specified in required widths and lengths to suit door openings.
 - .2 The ends of the thresholds shall be cut to follow exactly the door frame profile.
 - .3 All thresholds shall be supplied in aluminum and installed complete with lead shields and stainless steel screws.
- .8 Push Plates and Kickplates
 - .1 Provide and install stainless steel plates in C32D finish and install secure with screw fastening.
 - .2 Length of kick plates shall be 40 mm less than door width for single doors and 19 mm less than door width for doors in pairs.
 - .3 All stainless steel plates are to be 1.3 mm thick, free of rough or sharp edges. Corners and edges to be slightly radiused. Install kick plates and armor plates on both sides of the door with 3M tape.

- .4 Engrave pushplates with pictographs as noted in hardware schedule.
- .9 Door Push/Pulls:
- .1 Where door pulls are scheduled on one side of door and push plates on other side issue installations instructions to ensure that the pull is secured through door from reverse side and countersunk flush with door installation of push plate. Locate push plate to cover fasteners for door pulls.
- .10 Door Stops:
- .1 Wall stops shall not be installed on drywall partitions.
- .2 Floor stops shall be installed so as not to create a tripping hazard and allows maximum opening of doors.
- .3 Furnish door stops of height to engage doors.
- .11 Door Seals:
- .1 Provide and install door seals, top door sweeps and astragals.
- .12 Electronic Hardware Items:
- .1 Ensure electrical characteristics are compatible with card readers and related security systems provided by other Sections.
- .2 Obtain electrical power and wiring characteristics from the Electrical Subcontractor and from the Electronic Security Subcontractor and provide the hardware to suit.
- .3 Power Door Operators: Install operators by skilled trade persons who have been specifically trained in the installation and operation of these devices by a manufacturer's factory representative.
- .4 All wiring shall be supplied and installed by Division 26 including conduit, boxes and other electrical appurtenances, including connection and termination.
- .5 Be responsible for ensuring that all wiring work is performed at appropriate times to coordinate with installation of frames, doors and finish hardware. It is also responsible for ensuring that all electrical work is done in accordance with electronic hardware manufacturer's wiring diagrams and directions and that boxes, cut-outs, connections etc. are installed properly.
- .6 Arrange for testing and commissioning of electronic finish hardware by manufacturer or system. Submit a copy of reports to Consultant.
- .13 Miscellaneous Accessories:
- .1 All other items, not specifically described but required for complete and proper installation of finish hardware, shall be as selected by Hardware Supplier subject to approval of the Consultant.
- .14 Hardware Finish Codes:
- | | BHMA | Canadian Code | US Code | Description |
|----|------|---------------|---------|--------------------------------|
| .1 | 600 | CP | USP | Primed for Paint |
| .2 | 602 | C2C | US2C | Cadmium Plated |
| .3 | 603 | C2G | US2G | Zinc Plated |
| .4 | 605 | C3 | US3 | Brightened Brass, Clear Coated |
| .5 | 606 | C4 | US4 | Satin Brass, Clear Coated |

.6	612	C10	US10B	Satin Bronze, Clear Coated
.7	613	C10B	US10B	Oxidized Satin Bronze Oil Rub
.8	619	C15	US15	Satin Nickel Plate, Clear Coat
.9	625	C26	US26	Bright Chromium Plated
.10	626	C26D	US26D	Satin Chromium Plated
.11	627	C27	US27	Satin Aluminum Clear Coated
.12	628	C28	US28	Satin Aluminum Clear Anodize
.13	629	C32	US32	Polished Stainless Steel
.14	630	C32D	US32D	Satin Stainless Steel
.15	671	AL		Black Anodized
.16	689	SBL, AL	US28	Aluminum Paint
.17	690	DBL, STAT	US20	Dark Bronze Paint
.18	691	ES, SB		Bronze Lacquer
.19	692	TAN		Tan Lacquer
.20	693	KPD, BLACK		Black Lacquer
.21	696	EAB, SB		Satin Brass Lacquer
.15	Keying symbol/codes:			
.1	GMK	Grand Master Keyed		
.2	MK	Master Keyed		
.3	KA	Keyed Alike		
.4	KD	Keyed Different		
.5	SK	Separate Key (no masters)		
.16	Hardware codes:			
.1	LH	Left Hand		
.2	RH	Right Hand		
.3	LHR	Left Hand Reverse		
.4	RHR	Right Hand Reverse		
.5	LHA	Left Hand Active		
.6	RHA	Right Hand Active		
.7	LHRA	Left Hand Reverse Active		
.8	RHRA	Right Hand Reverse Active		
.9	SGL,SGLE	Single		
.10	PR	Pair		
.11	D/A	Double Acting		
.12	O/S	Opposite Swing		
.13	D/E	Double Egress		

.14	DR	Door
.15	FR	Frame
.16	HM	Hollow Metal
.17	AL	Aluminum
.18	PS	Pressed Steel
.19	P/LAM	Plastic Laminate
.20	KAL	Kalamein
.21	HMD	Hollow Metal Door
.22	HMF	Hollow Metal Frame
.23	CIF	Channel Iron Frame
.24	PSF	Pressed Steel Frame
.25	WD	Wood
.26	WD/DR	Wood Door
.27	WD/FR	Wood Frame
.28	CYL	Cylinder
.29	H/O	Hold Open
.30	O/H	Overhead
.31	U/C	Undercut
.32	B/S	Back Set
.33	NRP	Not Removable Pin
.34	TB	Thru Bolts
.35	CTB	Countersunk Thru Bolts
.36	TMS	Template Machine Screws
.37	MS	Machine Screws
.38	STS	Self Tapping Screws
.39	WS/LS	Wood Screws & Lead Shields
.40	TRR	Labeled for Temperature Rise Rating.
.41	A Label, 3 Hour Label or 180MFR	Labeled for 180 minutes (3 hour) Fire Protection Rating.
.42	B Label, 1-1/2 Hour Label or 90 MFR	Labeled for 90 minutes (1-1/2hour) Fire Protection Rating.
.43	C Label, 3/4 Hour Label or 45 MFR	Labeled for 45 minutes (3/4 hour) Fire Protection Rating.
.44	20 MIN Label or 20 MFR	Labeled for 20 minutes Fire Protection Rating.

PART - 3 EXECUTION
3.1 **EXAMINATION**

- .1 Verification of Conditions: Examine doors, frames, related items and conditions under which work of this section is to be performed and identify conditions detrimental to proper and timely completion.

- .1 Do not proceed until unsatisfactory conditions have been corrected.

- .2 Confirm kickplate and threshold sizes before ordering.

3.2 **INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide to Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association, except as otherwise indicated in this Section and elsewhere in the Contract Document.

- .2 Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

- .3 Where door stop contacts door pulls, mount stop to strike bottom of pull.

- .4 Barrier Free Access: Mount all hardware in full conformity with authorities having jurisdiction. Confirm mounting heights with Consultant prior to commencement of frame and door preparation.

- .5 Install all miscellaneous hardware as shown on details and specified.

- .6 Do not use wall stops on gypsum board, demountable or moveable partitions.

- .7 Mineral core doors: Pre-drill 3 mm diameter pilot holes for all hardware items. Manually turn fasteners into pilot holes. If installer does not follow this method, it may void door manufacturer warranty.

- .8 Provide even margins between doors and jambs and doors and flooring and/or thresholds as follows:

- .1 Hinge side: 1.6 mm.

- .2 Latchside and head: 1.6 mm.

- .3 Flooring and/or thresholds: 12 mm.

- .4 Flooring, fire rated assemblies: 6 mm.

3.3 **HARDWARE MOUNTING HEIGHTS**

- .1 Install and mount hardware as follows:

- .1 Door knobs and lever: 965 mm centre line from finish floor

- .2 Deadlock cylinder: 1370 mm centre line from finish floor

- .3 Deadlatch cylinders: 1370 mm centre line from finish floor

- .4 Door pulls: 1069 mm centre line from finish floor

- .5 Push plates: 1090 mm centre line from finish floor

- .6 Push bars: 1069 mm centre line from finish floor

- .7 Top hinges: 125 mm down from top of door to top of hinge

- .8 Bottom hinges: 250 mm up from finish floor to bottom of hinge

- .9 Intermediate hinges: equally spaced between top and bottom hinges

- .10 Floor stops: maximum 150 mm from lock edge when door is in fully open position

- .11 Exit devices: to manufacturer's instructions
- .12 Kickplates: maximum 3 mm from bottom of door to bottom of kickplate

3.4 **ADJUSTING AND CLEANING**

- .1 Clean hardware with materials and methods as recommended by hardware manufacturer. Repair or replace defective hardware.
- .2 Remove protective material where present.
- .3 Adjust operable parts for correct function.
- .4 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION