

**FINISH HARDWARE**

**Part 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Door Hardware, including electric hardware.
2. Storefront and entrance door hardware.
3. Gate Hardware.
4. Card Access control system.
5. Hold-open closers with fire-alarm interface.
6. Wall or floor-mounted electromagnetic hold-open devices.
7. Power supplies for electric hardware.
8. Low energy door operators plus sensors and actuators.
9. Remote button release hardware.
10. Padlocks.
11. Cylinders for doors fabricated with locking hardware.
12. Wiring and riser diagrams for electric hardware.
13. Key cabinets.

**B. Related Sections:**

1. Section 06200 - Finish Carpentry: Finish Hardware Installation.
2. Section 07900 - Joint Sealers – exterior thresholds.
3. Section 08100 - Metal Doors and Frames.
4. Section 08200 - Wood and Plastic Doors.
5. Section 08300 - Special Doors.
6. Section 08400 - Entrances and Storefronts.
7. Section 08900 - Glazed Curtain Walls.
8. Section 10650 - Operable Partitions.
9. Section 16722 - Fire/Life-Safety System.
10. Section 16724 - Security Access Systems.

- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Folding partitions, except cylinders where detailed.
8. Sliding aluminum doors, except cylinders where detailed.
9. Access doors and panels, except cylinders where detailed.
10. Corner Guards.

1.2 REFERENCES:

- A. Use date of standard in effect as of Bid date.
- B. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- C. ICC/ANSI A117.1 – Specifications for making buildings and facilities usable by physically handicapped people.
- D. ADA – Americans with Disabilities Act
- E. BHMA – Builders Hardware Manufacturers Association
- F. DHI – Door and Hardware Institute
- G. NFPA – National Fire Protection Association
  1. NFPA 80 – Fire Doors and Windows
  2. NFPA 101 – Life Safety Code
  3. NFPA 105 – Smoke and Draft Control Door Assemblies
  4. NFPA 252 – Fire Tests of Door Assemblies
- H. UL – Underwriters Laboratories
  1. UL10B – Fire Tests of Door Assemblies as amended to incorporate positive pressure testing.
  2. UL 305 – Panic Hardware
- I. WHI – Warnock Hersey Incorporated
- J. Local applicable codes
- K. SDI – Steel Door Institute
- L. AWI – Architectural Woodwork Institute
- M. NAAMM – National Association of Architectural Metal Manufacturers

**1.3 SUBMITTALS & SUBSTITUTIONS**

- A. SUBMITTALS: Submit six copies of schedule per Division 1. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
1. Type, style, function, size, quantity and finish of hardware items. Use BHMA Finish codes per ANSI A156.18.
  2. Name, part number and manufacturer of each item.
  3. Fastenings and other pertinent information.
  4. Location of hardware set coordinated with floor plans and door schedule.
  5. Explanation of abbreviations, symbols, and codes contained in schedule.
  6. Mounting locations for hardware.
  7. Door and frame sizes, materials and degrees of swing.
  8. List of manufacturers used and their nearest representative with address and phone number.
  9. Catalog cuts.
  10. Manufacturer’s technical data and installation instructions for electronic hardware.
  11. Date of jobsite visit.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. Make substitution requests in accordance with Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
1. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- D. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring/riser diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

**1.4 QUALITY ASSURANCE:**

**A. Qualifications:**

1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course Work for project hardware consultation to Owner, Architect and Contractor.

- (1) Responsible for detailing, scheduling and ordering of finish hardware.

- B. Hardware:** New, free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

- C. Exit Doors:** Operable from inside with single motion without the use of a key or special knowledge or effort.

- D. Fire-Rated Openings:** NFPA 80 compliant. Hardware UL10C / UBC Standard 7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

1. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
2. See 2.6.E for added information regarding resilient and intumescent seals.

- E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.**

1. Where scheduled item is now obsolete, bid and furnish manufacturer's updated item at no additional cost to the project.

- F. Pre-Installation Meetings:** Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Include manufacturers' representatives of locks, panic hardware and door closers in the meetings. Convene at least one week prior to commencement of related work.

- 1.5 DELIVERY, STORAGE AND HANDLING:
- A. Delivery: coordinate delivery to appropriate locations (shop or field).
    - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
  - B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
  - C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.
- 1.6 PROJECT CONDITIONS:
- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical as the same operation and quality as type specified, subject to Architect's approval.
- 1.7 SEQUENCING AND COORDINATION:
- A. Coordinate with SHSU Access Control.
  - B. Reinforce walls for wall-mounted hardware, including wall stops and stainless steel guard rails.
  - C. Coordinate finish floor materials and floor-mounted hardware.
  - D. Conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
  - E. Furnish manufacturer templates to door and frame fabricators.
    - 1. Ensure proper reinforcement in metal doors and frames to support machine screws for panic hardware and door closers.
  - F. Use hardware consultant to check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

1. Confirm that wood door manufacturers furnish necessary UBC Standard 7-2 compliant seal packages.

**1.8 WARRANTY:**

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' warranties:
  1. Locksets: Seven years.
  2. Exit Devices: Three years mechanical, one year electrical.
  3. Closers: Ten years mechanical, two years electrical.
  4. Hinges: Two years.
  5. Other Hardware: Two years.

**1.9 COMMISSIONING:**

- A. Conduct these tests three weeks prior to request for certificate of substantial completion
- B. Test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
- C. Test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
- D. Test hardware interfaced with fire/life-safety system for proper operation and release.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS:**

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

| <u>ITEM:</u>        | <u>MANUFACTURER:</u> | <u>ACCEPTABLE SUB:</u> |
|---------------------|----------------------|------------------------|
| Hinges              | (IVE) Ives           | Hager, McKinney        |
| Continuous Hinges   | (HAG) Hager          | Pemko, Zero, Select    |
| Pivots              | (IVE) Ives           | Rixson                 |
| Key System          | (SCH) Schlage        | None Available         |
| Locks               | (SCH) Schlage        | None Available         |
| Exit Devices        | (VON) Von Duprin     | None Available         |
| Closers             | (LCN) LCN            | None Available         |
| Auto Operators      | (LCN) LCN            | None Available         |
| Auto Flush Bolts    | (IVE) Ives           | DCI                    |
| Coordinators        | (IVE) Ives           | Hager                  |
| Silencers           | (IVE) Ives           | Hager, Rockwood        |
| Push & Pull Plates  | (IVE) Ives           | Hager, Rockwood        |
| Kickplates          | (IVE) Ives           | Hager, Rockwood        |
| Stops & Holders –   | (IVE) Ives           | Hager, Rockwood        |
| Overhead Stops      | (GLY) Glynn-Johnson  | None available         |
| Thresholds          | (PEM) Pemko          | Zero, Reese            |
| Seals & Bottoms     | (PEM) Pemko          | Zero, Reese            |
| Key Cabinets        | (LUN) Lund           | TelKee                 |
| Aluminum Door Locks | (ADA) Adams Rite     | None                   |

**2.2 HINGING METHODS:**

- A. Note: All exterior doors shall use wide-throw continuous hinges.
- B. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening.
- C. Conventional Hinges: Stainless steel pins and concealed ball bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
1. Three hinges per leaf to 7 foot, 6 inch height. Add one for each additional 30 inches in height, or any fraction thereof.
  2. Extra heavy weight hinges on doors over 3 foot, 5 inches in width.

3. Extra-heavy weight hinges on doors with panic hardware or fire exit devices.
4. Outswinging exterior doors: Stainless steel with non-removable (NRP) pins.
5. Stainless steel material at doors subject to corrosive atmospheric conditions.
6. Provide shims and shimming instructions for proper door adjustment.
7. All hinges shall be stainless steel material.

**D. Continuous Hinges:**

1. Geared-type aluminum at exteriors.
  - a. Heavy-duty, extra-bearing units for doors over 3 foot, 5 inches in width.
  - b. Heavy-duty, extra-bearing units for doors with panic hardware or fire exit devices.
  - c. Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.

**E. Pivots: Are not allowed**

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled.
1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
  2. Locking Spindle: stainless steel, interlocking design.
  3. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
  4. Backset: 2-3/4" typically, more or less as needed to accommodate frame, door or other hardware.
  5. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
  6. Electric operation: Manufacturer-installed continuous duty solenoid.
  7. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
  8. Deadbolt: B660 JD
  9. Padlocks: American interchangeable core Padlocks or approved equal.
  10. Lock Series and Design: Schlage ND series, "Rhodes" design.
  11. Certifications:
    - a. ANSI A156.2, Series 4000, Grade 1.
    - b. UL listed for A label and lesser class single doors up to 4ft x 8ft.
  12. Accepted substitutions: Schlage – **No substitution.**

## 2.4 EXIT DEVICES / PANIC HARDWARE

### A. General features:

1. Independent lab-tested 1,000,000 cycles.
2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. 0.75-inch throw deadlocking latchbolts.
4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 15-lb. maximum operating force, and with 32 lb. maximum pressure under 250-lb. load to the door.
8. Flush end cap design as opposed to typical "bottle-cap" design end cap.
9. 33 series devices are not acceptable.

### B. Specific features:

1. Non-Fire Rated Devices: hex key dogging.
2. No dogging devices allowed on doors with electronic access control.
3. Lever Trim: Breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
4. **Vertical rod devices are not acceptable.**
5. Exterior doors: All exterior doors with panic hardware shall have Von Duprin 99 series devices.
6. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware".
7. Impact recessed devices: 1-1/4inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
8. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.

9. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
10. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.
11. Device Trim: all devices with trim shall be 996L
12. Accepted substitutions: Von Duprin no substitution
13. All exterior doors shall be active doors and shall be connected to the University access control system to comply with remote lockdown capability.

## 2.5 CLOSERS

### A. Surface Closers: [4041]

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Opening pressure: Exterior doors 5 lb., interior doors 5 lb., fire doors 15 lb.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors do not require seasonal adjustments in temperatures from 120 degrees F to –30 degrees F, furnish data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV): unsafe, not permitted.
13. All closers shall be provided with sex nuts and bolts standard.
14. Overhead concealed and floor closers are not acceptable unless no other option exists.
15. Accepted substitutions: LCN no substitution.

- A. Low-Energy Door Operators: Comply with ANSI/BHMA 156.19 Electric power-open, hydraulically checked spring power closing. Modular construction. Finished metal cover. Field-adjustable opening force, opening speed, time-open, closing and latching speeds. Door reopens and timing cycle restores if system reactivated during closing cycle. Breakaway clutch protection from forced closing. Door, frame, motor and drive train protected by attenuated initiation of opening cycle.
  - 1. Self-contained low-voltage power supply, terminal strip and sequencing for incorporation of electric hardware with system operation.
  - 2. LCN Senior Swing no substitution.

## 2.6 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design, "LBR" type where scheduled.
- B. Overhead Stops: Stainless steel (100 series). Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework or other hardware.
  - 1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
  - 2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Seals: Finished to match adjacent frame color. Resilient seal material: polypropylene, nylon brush, or solid high-grade neoprene. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability. Proposed substitutions: submit for approval.
  - 1. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
  - 2. Non-corroding fasteners at in-swinging exterior doors.
  - 3. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure

- that the door leafs have the necessary sealed-in-place STC ratings. Adhesive mounted components not acceptable. Fasten applied seals over bead of sealant.
4. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
  5. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required. Adhesive-applied intumescent strips are not acceptable, use concealed-in-door-edge type or kerfed-in-frame type.
- F Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- G. Thresholds: As scheduled and per details. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Exteriors: Seal perimeter to exclude water and vermin. Use butyl-rubber or polyisobutylene sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
  2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
  3. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
  3. Acoustic openings: Set units in full bed of Division-7-compliant butyl-rubber or polyisobutylene sealant, leave no air space between threshold and substrate.
  4. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

- H. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- J. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- K. Wall- & Floor-mounted electromagnetic door holders: LCN's SEM series or approved equivalent. Incorporate into U.L.-listed fire&life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware.

2.7 FINISH:

- A. Generally BHMA 626 Satin Chromium.
  - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

**2.8C KEYING REQUIREMENTS:**

- A. Key System: Schlage Everest D utility-patented keyway, interchangeable core. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. For estimate use factory GMK charge. Initiate and conduct meetings(s) with Owner and I-R Security & Safety Consultants representatives to determine system keyway(s), keybow styles, structure and degree of geographic exclusivity. Furnish Owner's written approval of the system. Supplier to contact University lock shop at (936) 294-2704 to determine the appropriate keyway.
  - 1. Existing factory registered master key system.
  - 2. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
  - 3. Furnish 10 construction keys.
  - 4. Furnish 2 construction control keys.
  - 5. All keyblanks are to be 35-015.
  - 6. All keyblanks are to be uncut and stamped "Do not duplicate"
  - 7. All keyblanks are to be unembossed.
  - 8. All cylinders are to be provided with three uncut keyblanks.
  - 9. Furnish 20 uncombined cores in addition to the cores required for the project.
- B. Key Cylinders: furnish utility patented, 6-pin solid brass construction.
- C. Cylinder cores: furnish keyed at factory of lock manufacturer where permanent records are maintained. Locks and cylinders same manufacturer.
- D. Permanent keys: use secured shipment direct from point of origination to Owner.
- E. Bitting List: use secured shipment direct from point of origination to Owner upon completion.

**PART 3 - EXECUTION**

**3.1 ACCEPTABLE INSTALLERS:**

- A. Experienced craftsperson with a resume of successful projects.

**3.2 PREPARATION:**

- A. Ensure that walls and frames are square and plumb before hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  - 1. Notify Architect of any code conflicts before ordering material.
  - 2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor.
  - 3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.
- D. Existing frames and doors scheduled to receive new hardware: carefully remove existing hardware, tag and bag, and turn over to Owner.
  - 1. Patch and fill wood frames and doors with solid wood dutchments before cutting for new hardware. Do not reuse existing screw holes - - fill with dowel plugs and re-pilot.
  - 2. Metal doors/frames: Weld or fasten with screws: filler pieces in existing hardware cut-outs and mortises not scheduled for re-use by new hardware. Leave surfaces smooth - - no applied patches.
  - 3. Remove unused existing floor closers, fill empty floor closer cavities with concrete.

### 3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
  - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.

2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
  3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
  4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more than 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- D. Drill pilot holes for fasteners in wood doors and/or frames.
- E. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

### 3.4 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
1. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.
  2. Adjust doors to fully latch with no more than 1 pound of pressure.
  3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
- B. Inspection: Use hardware supplier. Include supplier's report with closeout documents.
- C. Follow-up inspection: Installer to provide letter of agreement to Owner that approximately 6 months after substantial completion, installer will visit Project with representatives of the manufacturers of the locking devices and door closers to accomplish following:
1. Re-adjust hardware.
  2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
  3. Identify items that have deteriorated or failed.

4. Submit written report identifying problems and likely future problems.

3.5 DEMONSTRATION:

- A. Demonstrate electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.
- B. Manufacturers and their abbreviations used in this schedule:

|     |                               |
|-----|-------------------------------|
| ADA | Adams Rite                    |
| GLY | Glynn-Johnson Hardware        |
| HAG | Hager Hinge                   |
| HEN | Henderson                     |
| IVE | H. B. Ives                    |
| KEE | Keedex Manufacturing          |
| LCN | LCN Closers                   |
| LOC | Locknetics                    |
| LUN | Lund                          |
| MON | Monarch                       |
| PEM | Pemko                         |
| SBH | Specialized Builders Hardware |
| SCH | Schlage Lock Company          |
| TRI | Trimco Manufacturing          |
| VON | Von Duprin                    |
| ZER | Zero International            |

END OF SECTION 08710