

DIVISION 08 – OPENINGS

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DESIGN REQUIREMENTS

Any deviation from the following standards must be reviewed and approved by the Campus Lockshop, UCSC's Physical Security Systems Manager, and University Representative.

METAL DOORS AND FRAMES

08 11 00

Frames: Steel Door Institute (SDI) Extra Heavy Duty. Fully welded with mortar boxes for all hardware. Frames for all exterior openings and interior openings 4 feet wide or wider shall be 14 gauge steel. Frames for interior openings, except as noted above, shall be 16 gauge steel. All exterior frames shall be aluminum on campus and 316 stainless steel (SS) off campus such as at the Coastal Science Campus, 2300 Delaware (Westside Research Park facility), and Monterey Bay Education, Science, and Technology (MBEST) facility. All frames set in concrete block walls shall be grout filled and shall be coated with asphaltic paint on the inside of the frames and on all frame anchors. University Representative to consult with campus stakeholders when routing wires to door hardware through door frames.

Doors: Steel Door Institute (SDI) Type II, Heavy Duty.

Special requirements for research facilities shall be coordinated with the University Representative.

SPECIALTY DOORS AND FRAMES

08 30 00

FRP DOORS

Fiberglass reinforced polyester (FRP) doors are recommended for use in areas with excessive moisture or corrosives, such as in research facilities and wash down areas. Core shall be foam in place with urethane of 5 pounds per cubic foot density, completely free of chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC). Color shall be permanently bonded through the full thickness of the fiberglass door faces.

FRAMES

Door frames shall be fabricated of 304 stainless steel in areas with excessive moisture or corrosives,

such as near coastal environments, in research facilities, and wash down areas. University Representative to coordinate with campus stakeholders. See 08 11 00 for frame characteristics.

ACCESS DOORS

Access doors and panels shall be primed metal to receive field paint, except at wet areas where they shall be fabricated from 304 (or better) stainless steel. Applicable to mechanical, electrical, plumbing, and telecom access doors and panels.

ALUMINUM ENTRANCES, STOREFRONTS, CURTAIN WALL	08 40 00
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ALUMINUM DOORS

1. Aluminum and glass entrance doors shall be constructed with wide stiles and top rails. Narrow stiles and rails are not acceptable.
2. Minimum acceptable component dimensions:
 - a. Metal thickness: 3/16 inch
 - b. Head rail size: 6-1/2 by 1-3/4 inches
 - c. Stile size: 5-1/2 by 1-3/4 inches
 - d. Bottom rail size: 12-1/2 by 1-3/4 inches
 - e. Hardware reinforcement: 1/4 inch thick metal material
3. Door hardware shall match make and style as specified, submitted and approved for all doors in project scope. Provide from Aluminum Door supplier a hardware submittal for review by University's Representative.
4. Hinges shall be continuous geared type; manufacturers: Select Products, Roton, or equal.
5. Concealed head or floor type closers are not acceptable.
6. All doors and frames shall accommodate insulated glazing.

STOREFRONTS AND CURTAIN WALLS:

1. Finishes: Shall be selected from the manufacturer's standard and premium finishes. Consult the University's Representative prior to selecting custom colors or finishes with custom additives.
2. Warranty: Provide a full product ten year warranty from the date of substantial completion covering materials, installation, and workmanship for repair or replacement due to defects; warrant against air and water infiltration from any source; and with no dollar limit.

AUTOMATIC ENTRANCES	08 42 29
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Provide automatic doors at the main entries and entry floor level restrooms of every new major building on the UCSC campus. For security, maintenance and life cycle cost considerations, the preferred type of automatic door is the swinging as opposed to the sliding type. The door shall be activated by a hardwired interior and exterior 36-inch bar type actuator. Both upper body and foot control shall activate the door. The pads shall be located at the correct distance from the door for safe clearances and proper travel time.

For double doors, a removable center mullion shall be provided to allow for the use of rim panic hardware. In the case of double automatic swinging doors, only one leaf has to be activated by the push pads.

If security devices are included, coordination with Division 28 is required.

MANUFACTURERS

The manufacturer shall have a minimum of 5 years successful experience in the fabrication of automatic operators of the type required for the project. The standard of quality shall be LCN Senior Swing 9540-3454RF, Horton Automatics 7100 series, or equal.

DOOR OPERATOR

1. Automatic door operators are required to operate by hardwired push pads, card access or a combination of these. Electrified exit devices, locksets or strikes shall work in conjunction with door operators.
2. The door shall reverse when closing if an object stops the door. The master control unit shall provide immediate reversal of door motion without undue strain on the drive train by providing stepped voltage to the motor.
3. The opening and closing speed shall be between 4 to 6 seconds. The master control unit shall incorporate an adjustable closing time delay of 2 to 30 seconds. The pushbutton switch activates the door to open, and to close, after the time delay expires. Provide infinite adjustments to the opening and back check speeds.
4. The opening force shall be able to be adjusted without affecting the opening speed. The opening and closing force, measured 1-inch out from the lock stile or the door, shall not exceed 15 pounds in either direction.
5. The door shall have the ability to function as an automatic or manually operated door. When operated manually, with the power on or off, the operator shall not be damaged.
6. A keyed shut off switch keyed to the University master key system shall be provided to shunt power supply controlling electrified hardware and the outside push pads after normal hours of operation unless the door is equipped with CCURE access control. Handicap access to the building after normal hours shall be provided by either a hand held radio frequency remote control or card access system. A locked door motor protection circuit shall be supplied that will shut off current to the motor when the door is locked or otherwise prevented from opening.
7. Operators shall be surface mounted and enclosed in an extruded aluminum case extending the full width of the door frame or a minimum of 23-inches. Access to the operator shall be obtained by easily removing the casing.
8. All wiring for the Automatic Entrance components shall be concealed in the adjacent storefront, framing, or structural system. Exposed conduit, wire-mold, or electrical pathways are not acceptable.
9. ADA operators shall be powered locally and require a dedicated power circuit. Bollard mounted buttons shall be hardwired. Battery powered buttons in bollards shall not be permitted.

HARDWARE**08 70 00****GENERAL REQUIREMENTS**

Except for doors provided with exit devices, doors from rooms or closets shall have locks or latches of types which are operable at all times inside by merely turning a lever and not requiring any special knowledge or effort.

All doors, which open onto stairways, mechanical rooms, or other spaces where caution is required, shall have levers with tactile markings to alert a visually impaired person of such conditions.

Hardware, such as locks, latches, butts, door closers, coordinating devices and exit devices, etc., for

labeled openings shall be State Fire Marshal and Underwriters' Laboratories, Inc. (UL) listed and approved for opening classification noted or specified. Any specified hardware for such labeled openings not in compliance therewith shall be referred to University's Representative.

KNOX BOX

Provide Knox Box(s) at the main entrance(s) for all new buildings on the UC Santa Cruz Campus. University's Representative to coordinate locations to be determined by the Designated Campus Fire Marshal (DCFM) and UCSC Police Department. Two Knox boxes are required: one for the Fire Department and one for the Police Department. Recommended location is 4 to 5 feet above ground and no more than 2 feet from the door. Knox boxes must be located in a highly visible location. Knox boxes to be procured by the University. University Representative to coordinate with DCFM and UCSC Police Department.

It is the responsibility of the University Representative managing the project to have physical keys made and issued to the Lead Designated Campus Fire Marshal and UCSC Police Department representative for placement into the Knox Box before issuance of the Certificate of Occupancy. The Certificate of Occupancy will not be issued if keys are not completed and received by mentioned representatives. Both the Lead Designated Campus Fire Marshal and UCSC Police Department representative will require 4 sets per department.

LOCKS AND KEYING

University Representatives to coordinate with the University Lock Shop in development of a key schedule. Reference UCSC Key Policy.

All locks and keying shall adhere to the following guidelines:

New Construction:

1. All locksets shall be Schlage "L" Series. Lock functions and finishes shall be furnished as indicated in the hardware schedule, or equal. The contractor shall provide the specified locksets with temporary 6-pin construction cylinders and keys. Provide temporary cylinders only in locations where it is necessary to secure the project during the construction process. Also, provide 5 sets of construction keys to the University's Representative. Upon acceptance of the building or space, the University shall provide permanent keys and Medeco lock cylinders to replace the construction cylinders. The Contractor shall verify that all doors and locksets easily accept permanent cylinders with no extra effort or modification by University's Representative. Construction lock cylinders shall be returned to the contractor. When replacing existing locksets, the cylinders shall be tagged and returned to the University's Representative (then returned to University Lock Shop).
2. Each lockset shall be installed only after the door to which it is to be applied has received its final coat. If the lockset is installed prior to painting, it shall be removed to permit painting.
3. The lip of the strike shall be the proper length for jamb detail and shall be curved.
4. ANSI 4-7/8- inch strikes shall be used for all cylindrical and mortise locks. Locks, latches, and deadlocks shall have wrought boxes.
5. All locksets in wood doors shall be installed in mortise or holes prepared by using a mortising or boring jig.
6. Locksets shall be reversible without opening the lock case.
7. All locksets shall have lever handles, and shall operate in both the up and down directions.
8. All locksets shall have multiple functions within 1 case (9050, 9060, 9070, 9080).
9. All locksets shall be able to change lock function by changing the lock cylinder tailpiece.
10. Gender Neutral Restroom retrofits or new construction to use Schlage L9050P 17N 626 L283-722 or equal

Remodel Construction

1. All locksets shall match existing locksets in design. Lock functions and finishes shall be furnished as indicated in the hardware schedule. Classroom lock functions such as L9070 ANSI number FO5, D70 ANSI number F84 and the Entrance/Office function D50 ANSI number F82 are not acceptable. The Contractor shall provide the specified locksets with temporary 6-pin construction cylinders and keys. Provide temporary cylinders only in locations where it is necessary to secure the project during the construction process. Also, provide 5 sets of construction keys to the University's Representative. Upon acceptance of the building or space, the University shall provide permanent keys and Medeco lock cylinders to replace the construction cylinders. The Contractor shall verify that all doors and locksets easily accept permanent cylinders with no extra effort or modification by the University Representatives. Construction lock cylinders shall be returned to the Contractor. When replacing existing locksets, the cylinders shall be tagged and returned to the University's Representative (then returned to the University Lock Shop).
2. Each lockset shall be installed only after the door to which it is to be applied has received its final coat. If the lockset is installed prior to painting, it shall be removed to permit painting.
3. The lip of the strike shall be the proper length for jamb detail and shall be curved.
4. ANSI 4-7/8-inch strikes shall be used for all cylindrical and mortise locks. Locks, latches, and deadlocks shall have wrought boxes.
5. All locksets in wood doors shall be installed in mortise or holes prepared by using a mortising or boring jig.
6. If existing locksets are mortise design, refer to campus standard for Locks and Keying "New Construction."

STANDALONE ELECTRONIC ACCESS CONTROL LOCKSETS

1. Consult the University's Representative to determine if standalone electronic access control locksets are to be provided.
2. All lock hardware to be coordinated with Division 28 - Electronic Safety and Security. Locksets shall be reviewed and approved by Campus Lockshop and the Campus Physical Security Systems Manager.
3. ANSI/BHMA Grade 1 and UL 294 certified
4. All locksets shall be based on the design of Schlage ND- & L-Series mechanical locks
5. Locksets shall allow multiple ways to utilize credentials including normal, toggle, freeze, pass through, and one time use
6. Locksets shall be programmable for lock and unlock schedules for 16 time zones, 32 holiday schedules, and user rights to designated doors at specific times
7. Lockset shall have emergency mechanical key override utilizing standard 6 pin key in knob cylinder.
8. All locksets shall be equipped with tri-colored LED's and audible indicators.
9. Lockset shall have ability to communicate battery status
10. Locksets shall incorporate the following features:
 - a. Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.
 - b. Audible feedback that can be enabled or disabled.
 - c. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.
11. All locksets shall be equipped with an integrated 12 button, backlit keypad.

FASTENERS AND ANCHORS

Provide sex bolts for door closers attached to wood doors. Hardware fastened to concrete or masonry

shall be installed with machine screws and “Star” type double expansion shields, or for screw sizes less than 1/4 inch, fasten with wood screws and plastic anchors. Do not use lead shields or tampins.

Door hardware mounting heights throughout a project shall be uniform. Renovation and remodel project hardware placement shall match that of the existing doors throughout the building. This shall be field verified and approved by the University's Representative.

HINGES

1. The entire length of the hinge pin shall be circumferenced with a continuous machined surface on ball bearing hinges.
2. Swaging of the hinge leaf shall not be in contact with the hinge pin on a ball bearing hinge.
3. All hinges shall have five knuckles.
4. All ball bearings shall be completely concealed without the use of ferrules or sleeves.
5. All bearings and raceways shall be stainless steel.
6. All screws shall be stainless steel or silicone bronze.
7. Provide hinges with Non-Removable Pins (NRP).
8. Hinges on aluminum and glass type storefront doors and fiberglass reinforced polyester (FRP) doors shall be geared continuous hinges.
 - a. Manufactures: Select Products, Roton, or equal.

CLOSERS

LCN is the basis of design for door closers. An authorized factory representative shall inspect all installed closers to ensure proper adjustment, and operation shall inspect all closers after installation. Closers shall carry a manufacturer's thirty (30)-year warranty against manufacturing defects and workmanship.

Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts throughout the life of installation. All door closers shall be tested to American National Standards Institute (ANSI)/ Builders Hardware Manufacturers' Association (BHMA) A156.4 test requirements by BHMA certified testing laboratory. A written certificate showing successful completion of a minimum of 10,000,000 cycles shall be provided.

All closers shall be fully hydraulic and have full rack and pinion action. Closer shall utilize full complement bearing at shaft to provide greatest load carrying capabilities of the shaft. Pinion and pistons shall be hardened regardless of size, to provide durable wearing surfaces. For hydraulic regulation, the closer shall incorporate tamper resistant, non-critical screw valves of v-slot design to reduce possible clogging from particles inside the closer. Closers shall have separate and independent screw valve adjustments for latch speed, general speed and hydraulic back-check. Back-check shall be properly located so as to effectively slow the swing of the door at a minimum of ten degrees in advance of the dead stop location to protect the door frame and hardware from damage. Closers utilizing pressure relief valves are not acceptable.

All parallel arm closers shall incorporate one piece solid forged steel stud shoulder bolts and shall be incorporated in regular arms and hold open arms. All other closers shall have forged steel main arms for durability, esthetics, versatility, high strength, and long life. Built-in stop arms or heavy duty dead stop arms are not acceptable.

Closers shall be hand specific for each application. Concealed head, floor, and universal type closers are

not acceptable.

All closers shall be non-sized to provide a full range (1 to 4) closing power for all sizes, according to BHMA product standards (ANSI 156.4-1986, Table I) and shall be listed in BHMA Certified Products Directory to provide minimum closing force required to properly latch the doors as tested by an independent testing lab. For barrier-free applications, closer spring power shall be adjustable where desired, to provide less than 5 lbs. opening force for doors 36-inches to 48-inches wide.

All closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120 deg. F to -30 deg. F without requiring seasonal adjustment of closer speed to properly close the door.

EXIT DEVICES

1. Von Duprin Series 99, or equal is the standard of quality. All devices shall be ANSI A156.3, 2001, Grade 1 certified and have a 3-year manufacturer's warranty.
2. No vertical rod or concealed rod devices shall be accepted. Only rim devices with keyed removable mullions. Fire separation doors in path of travel (bisecting a corridor) shall be reviewed on a case by case basis by University's Representative.
3. Bronze or stainless steel, plated or finished as specified; aluminum or brass are not acceptable. Moving parts made of die-cast "pot" or "white" metals are also not acceptable.
4. All moving parts shall be easily removable for repair and maintenance; moving parts that are riveted or swaged in place are not acceptable.
5. All wide stile devices shall have dead latch bolts to ensure safe and secure opening.
6. All devices shall use durable compression spring design. Devices, latches, trim, or controls incorporating tension springs are not acceptable.
7. Lever trim shall be of wrought construction and designed with a breakaway feature, intended to minimize repair costs due to damage from vandalism.
8. All devices shall be inspected by a factory service technician at the completion of installation to ensure proper adjustment and operation. Service technicians shall submit a written report to the University's Representative, General Contractor, and hardware supplier upon completion of service inspection.
9. The entire length of the push bar shall act as one piece.
10. Exit devices shall be a Quiet Electric Latch Retraction (QEL) model and incorporate a dampener type mechanism to decelerate the push bar on its return stroke eliminating noise associated with the device's operation.
11. End cap shall have a three point attachment to the door.
12. Reference Division 28 – Electronic Safety and Security to coordinate requirements for Exit Devices.

PUSH AND PULL PLATES

1. Ives 8190 12 inch offset pull or equal is the standard of quality.
2. Plates shall be bronze or stainless steel – finished as specified.
3. There shall be a 1/16 inch minimum thickness for plates. Bevel 4 sides
4. Pull plates shall be without screw holes when used with pulls. Pulls shall be bolted through the door at the grip only.

SURFACE AND FLUSH BOLTS

1. Flush bolts shall have a lever arm that is not friction-operated.
2. Flush bolts shall have a lever arm that is connected to the bolt mechanism.

3. Face plates shall be shaped to match the door edge.
4. The operating mechanism for the bottom flush bolt shall not be more than 12-inches from the floor; the top flush bolt shall not be more than 72-inches from the floor.
5. All flush bolts shall have dust proof strikes where engaging the floor, threshold or curb.
6. Surface bolts shall have a dust proof strike or an easy-to-clean floor strike.
7. Lifting handles on surface bolts shall be mechanically fastened (not press fitted).
8. Flush bolts that require the top and bottom corners of wood doors to be mortised out are not acceptable. This type of flush bolt structurally weakens wood doors. Provide Ives FB458 or equal.

STOPS AND HOLDERS

1. Door stops shall be provided for each door leaf.
 - a. Floor Stop (first choice): Ives, Glynn Johnson, or equal. Ives FS436 Series for interior use and Ives FS444 for heavy duty use, or equal
 - b. Overhead Stop (second choice): Glynn Johnson 900 & 100 series, Hagar or equal. Use only where floor or wall stops are inadvisable. When used, use heavy duty hinges or continuous hinges. No hold open stops.
 - c. Wall Stop: Are not acceptable.
2. Ives, Glynn Johnson, or equal are the standard of quality. Stops/holders shall be floor or wall type. Overhead type stops and holders may be allowed upon University's Representative approval.
3. All stops and holders shall be solid or forged bronze; wrought is not acceptable.
4. All screws on wall-mounted stops shall be concealed.
5. All rubber bumpers shall be fastened by a pin or screw that goes through the rubber and seats into the metal on the opposite side. A rubber bumper that is screwed into the metal holder is acceptable.

THRESHOLDS

All thresholds shall have a reinforcing center leg. Single length for each opening; ends shall be cut to jamb profile.

SILENCERS

Provide silencers for all interior doors, except on weather stripped or smoke sealed doors.

1. Single doors: Three each on stop and at strike side of the frame.
2. Double doors: One per door leaf at frame head, plus three each on astragal.

SMOKE AND WEATHER DOOR SEALS

Where required, provide adhesive jamb weather-strip. Pemko S88, S44W, or equal is the standard of quality.

HARDWARE CAMPUS STANDARDS

Acceptable campus standards for the following devices:

1. Closers: LCN 4040XP or 4110 Series or equal.
2. Hinges:
 - a. Butt Hinges
 - i. Manufacturer: Hager, McKinney, or equal.
 - ii. Unless otherwise specified, conform to following sizes:
 1. Length: For Doors to 3 feet-0 inches wide: 4-1/2 inches.
 2. For Doors over 3 feet-0 inches to 4 feet-0 inches Wide: 5 inches.
 - iii. Width: Two times door thickness plus trim projection, but not less than 4- 1/2 inches unless otherwise specified.
 - b. Continuous Geared Hinges

- i. Manufacturer: Select Products, Roton, or equal
3. Locks and Latches: Schlage L series (new construction), Schlage ND series (remodel) or equal.
4. Escutcheons: If used, Schlage wrought rose, 2-1/8 inches or 2-9/16 inches diameter, or equal (no known equal). Schlage type L escutcheon may also be used, or equal (no known equal). Schlage type N escutcheons are not acceptable.
5. Handle Type: Lever type only. Schlage 06, Rhodes, 17, Sparta or equal.

FINISHES

All hardware finishes shall conform to BHMA product standards, materials and finishes. Campus standard is 626 Satin Chrome or 613 Oil Rubbed Bronze. Finishes for hardware in existing facilities shall be as listed above or to match existing.

RECOMMENDED LOCKSET FUNCTIONS

Room Type	Lockset**	ANSI	Function
Office	L9050	F04	Latch-bolt retracted by lever or knob from either side unless outside is made inoperative by key outside or by lever or knob inside. Outside lever or knob remains locked until thumb-turn is returned to vertical or by counter clockwise rotation of the key. Auxiliary latch deadlocks latch-bolt when the door is closed.
Office	ND53	F109	For matching
Labs, Classrooms, Entrances	L9060	F09	Latch-bolt retracted by lever or knob from either side unless outside is locked by key from inside. When locked, latch-bolt retracted by key outside or lever or knob inside. Auxiliary latch deadlocks when door is closed.
Labs, Classrooms, Entrances	ND60	F88	For matching
Storage & Mechanical Rooms	L9080	F07	Latch-bolt is retracted by key outside or by lever or knob inside. Outside lever or knob is always inoperative. Auxiliary latch deadlocks latch-bolt when the door is closed.
Storage & Mechanical Rooms	ND80	F86	For matching
Passage Latch – No Lock	L9010	F01	Latch-bolt retracted by lever or knob from either side at all times.
Passage Latch – No Lock	ND10S	F75	For matching

"Classroom Lock"	L9070	FO5	Do not use at any location.
Privacy with occupied indicator	L9496		Knob/lever retracts the latchbolt from either side. Deadbolt thrown or retracted by key outside (retraction by key required in the event of an emergency) or inside thumb-turn. Throwing deadbolt locks outside knob/lever and displays "Occupied" plate. Rotating inside knob/lever simultaneously retracts both deadbolt and latch bolt, and unlocks outside knob/lever. Inside lever is always free for immediate egress.
** Lockset model numbers are Schlage as the basis of design or equal.			

LOUVERS AND VENTS	08 90 00
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1. Exterior louvers shall be sized and their blade configuration selected as drainable to prevent excessive moisture from entering the outdoor air intake plenum.
2. Exterior louvers, serving as outdoor intakes or exhaust vent outlets, material shall be aluminum, stainless steel, or approved equal depending on installation location. Confirm material construction necessary during design development with University Representative.
3. Exterior louvers shall include interior bird screen.
4. Exterior Outdoor Intake Louvers: shall be sized with a minimum net free area to prevent exceedance of the manufacturer's maximum face velocity to prevent rainwater intrusion with a safety factor of 25%.
5. Exterior Outdoor Intake Louvers: total net face free area shall be greater or equal to the total net free area of the upstream filter bank. Exterior Outdoor Intake Louvers at Coastal Science Campus and Westside Research Park: Allow for sufficient downstream physical space to provide and remove mist eliminators downstream of the exterior outdoor intake louvers.
6. Exhaust Vent Louvers shall be sized to prevent excessive exterior noise and located such that they do not materially affect personages passing by.
7. Exhaust Vent Louvers serving Laundry Facilities shall be preceded by readily maintainable interior lint traps to prevent excessive lint discharge through the exterior vent louver.

