

Capitol Complex Construction Standards

Requirements for New Construction and Remodeling

November 25, 2015

General Requirements

- For projects involving phasing, building materials including plumbing, mechanical, electrical and life-safety must be consistent (identical manufacturer and model) throughout all phases, unless poor performance of a product is identified and Plant Management Division (PMD) requests a change order
- Any masonry or concrete core drilling, cutting, excavating, etc. must be preceded by x-ray or approved alternate method.
- Janitor closet/storage door sizes should be 4' wide minimum
- Require Draw downs and paint codes
- Zero VOC paint
- Utilize Existing Paint Standards Provided by PMD
- Janitor closets minimum size is 110 SqFT per floor or 1 closet per 50,000 SqFT of building area, near freight elevator
- Janitor storage of 500 SqFT – 60"x 80" clear opening
- Janitor equipment charging room required - 140 SqFT minimum - 60"x 80" clear opening – requires exhaust and outlets at 36" high every 24" around walls – adequate circuiting for loads being served plus 25% for expansion
- Janitorial Office 100 SqFT minimum

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- Janitor closet mop basins shall be floor type composite, Chicago faucet(chrome with vacuum breaker) with pail hook, wall support, and integral stops
- 3 - Wall mounted mop hangers above sink
- Shelving – adjustable metal standards and horizontal supports with composite wood shelving – for both Janitorial and Plant Maintenance Engineer (PME) storage spaces
- Personal lockers for janitorial staff
- Janitorial spaces such as equipment storage/charging, lockers, located adjacent to loading dock
- PME storage requirements should increase based on attic stock storage
- PME bench/work area minimum 150 SqFT - in the Penthouse -Work bench and room for plan desk and horizontal drawers - Shelf for spec books
- PME office 100 SqFT min, with Building Management Systems connections
- Penthouse requires belt storage rack, filter storage, and storage area for attic stock
- Room for recycling operations – baler, bins, hampers, circulation
- Panic hardware shall be Von Duprin
- Hardware to be consistent with building standard
- Door closers shall be LCN
- Interior wood doors should be staved or stranded core material
- Railings and bike racks to be galvanized. Unless Brass/Bronze as dictated by the building. No Powder coated rails
- Exterior door frames and hardware shall be stainless steel, brass, or bronze
- Aluminum shall be avoided on/near exterior doors and/or where salt usage may be expected
- Stainless steel, brass, or bronze screws used as fasteners at exterior doorways

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- Building entrance doors shall be hung on 4 heavy duty bearing butts – reinforcing top pivot shall be engineered for entrance doors – minimum ¼” thick hinge attachment plate required
- No continuous hinges allowed on exterior Doors
- Butt hinges required
- Wall protection required in service areas – corner guards and wall strips
- Service doors and doors serving high traffic cart usage areas shall have kick plates extending from the lock to the bottom of the door – these doors should also have wrap around metal edging on the latch and hinge edges. Frames must be 12 gauge, doors must be 14 gauge, and door skins must be welded.
- Single doors at service locations such as janitor closets should be extra wide (4’0”) to allow easy passage of carts and equipment
- Door closers should have cast iron bodies, heavy duty arms, adjustments for closing, latch speed, and closing force – all without having to remove the device from the door
- All hollow metal doors shall be internally ribbed with welded seams
- No exterior hollow metal doors shall have pockets to catch or retain moisture
- All exterior hollow metal doors and frames shall be hot dipped galvanized
- All doors must be properly beveled on the latch edge – hinge edges must be square
- Proper clearances must be designed into doors and frames to allow non-binding operation if smoke gasket, etc is installed
- Recessed trash and paper towel dispensers
- Solid surface counter tops
- No laminate countertops
- Drop in china lavatories
- Solid plastic toilet partitions, deck hung and floor mounted – heaviest duty hardware available

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- Coreless double roll dispensers
- Restrooms require plumbing chases with 3'0" clearance to a height of 7'0" for service
- Dock height = one for semi height and one for mail/box van
- Exterior dock canopies should be fire sprinkled with a dry system
- Dock levelers shall be pneumatic bladder type – Kelly is the manufacturer
- Cardboard bailer space and associated electrical/mechanical requirements
- Separate freight elevator available to service every floor in the building – minimum floor size of 6' x 10' with a minimum door opening of 5'
- Non proprietary operation system for all elevators similar to Motion Control Elevator – MCE is complex standard Class C1 for Freight Elevator
- Elevator Entrapment Phone system to dial Capitol Security direct
- Built up asphalt roof with double mopping and a different colored rock on walkways

Electrical Requirements

- In addition to the required life safety systems, the following equipment shall be incorporated into the generator power systems: access control systems, HW pumps, building automation panels, air compressors for building systems, kitchen refrigeration equipment, mechanical/electrical room outlets and lighting, elevators, garage doors, gates, and arms of parking facilities
- All field installed equipment shall have a local, lockable disconnect switch
- Hands free electrical hand dryers by World Dryer
- Fixtures and equipment must be accessible by normal ladders/lifts – no special scaffold or other specialized equipment/methods for access
- All electrical and equipment modifications requires incorporation into State of Minnesota Arc Flash Relay Coordination program
- All abandoned cables, wiring, conduit must be removed in the project

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- All motors should meet current energy efficiency standards
- All medium voltage, primary transformers shall be cast coil, copper wound type
- All conductors AWG 14 and larger shall be stranded copper
- The use of push wire connectors is not allowed
- The use of non-reversing cement anchors is not allowed
- GE, Square D, or Siemens panels are acceptable
- Panels shall be used for the voltage they are designed. The use of 480/277 volt panels on lesser voltages is not allowed unless approved by PMD
- All electrical equipment shall be de-energized and cleaned upon completion
- 25% future expansion for spaces and loading capabilities in panels
- VFD's by ABB or Dan Foss
- Primary selector switches shall be G&W
- Grounding conductors pulled into all conduits
- All feeder and branch circuit conductors pulled into conduit – no MC or AC cable
- No Multi-wire branch circuits unless approved by PMD
- 20 Amp Multi-wire branch circuits to have #10 AWG neutral conductor
- EMS and fire control by Honeywell
- Generator – 48 hour full load fuel tank minimum, Caterpillar or Cummins, 25% future expansion capacity for loading
- No floor set electrical outlets in hard surface floors
- Wall set outlets required
- Electrical rooms stacked and of single purpose – no other systems or storage allowed
- All perimeter, dock, and entrance HW pumps on generator power

- Any masonry core drilling must be preceded by x-ray of the core drilling area
- All wire and devices installed in ceiling plenums must be plenum rated.
- All wire must be self supporting and not tied off to other conduits or devices.
- All installations of equipment must be done in a workman like manor and per existing codes.
- Any alterations to a Crestron Lighting Control systems shall have the devices removed or added by a certified Crestron Technician
- All lighting controls shall be Crestron

Arc Flash and Relay Coordination Updates

- Update of arc flash and relay coordination studies and one-line riser drawings shall be completed on any electrical revision work on the three phase systems with nominal voltage levels of 120/208 and higher.

Exempt from this requirement are:

- DC Circuits
- Single phase circuit
- Individual Branch Circuits from 120/208Y VAC panel boards
- Motor Control Circuits downstream of their respective motor starters and over current protection
- Arc Flash Hazard Analysis on equipment below 240 Vac unless it involves at least one 125KVA or larger low impedance transformer in its immediate power supply.
- Arc Flash Hazard analysis on panel boards 240 VAC or less where the available bolted short circuit current is less than 10kA
- Individual motors less than 50 HP
- Updated /new electrical riser drawings for the building in AutoCAD .dwg format
- Plotted copies of the above drawings.
- Short circuit study results, including:

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- All input and output data Equipment comparison tables, which compare the calculated short circuit values to the equipment ratings.
- Analysis and recommendations analysis will be performed for all possible power source feeds.
- All updates will be completed using SKM Power Tools electrical engineering software. Data will be formatted, arranged and merged into the existing original documents in order to keep the study as accurate and user friendly as possible.
- Any deficiencies discovered will be identified in the completed study.

Coordination study results including:

- Time Current Coordination (TCC) curves.
- Recommended protective device settings table.

Arc Flash Study results, including:

- Arc flash exposure values and flash protection boundary in table format
- Personal Protective Equipment (PPE) requirements

Arc Flash and Shock Hazard labels provided and installed on equipment

- UL 969 compliant
- ANSI Z535.4 compliant
- Label includes shock protection per NFPA 70E in addition to arc flash hazard data.

Updated panel board and Motor Control Center (MCC) schedules

Mechanical Requirements

- Royal manually operated flush valves on all toilets, urinals, and lavatories Sloan
- Faucets to be double handled (paddle type or blade type) Chicago or single handed Delta
- Fixture manufacturer to be consistent throughout project
- Wall hung, code compliant Kohler, Crane, or American Standard required
- Tailpieces to be 1 ½" minimum size with grid strainer
- Caulk all fixtures to floor and/or wall with mildew resistant silicone caulk
- Hose bibb required at loading dock
- Tempered water for safety showers and eye wash stations per OSHA recommendations
- Dampers for exhaust, return, outdoor = Tamco Series 9000
- Cooling tower basin should be all welded stainless steel only
- AHU's will be equipped with provisions to safely and efficiently replace all major components including motors, fans, and shafts
- All domestic water piping to be flushed and sanitized prior to use
- All gas piping to be tested with nitrogen under pressure and purged to safe location outside after testing
- Frost proof wall hydrants installed at a minimum of every 100 feet on perimeter of building
- No instant hot water heaters – use centrally heated domestic hot water or small tank type heaters for remote sites
- Re-circulate hot water from extremities in building
- Valve manufacturer to be consistent throughout entire project
- Bell and Gossett Pumps required
- All waste drain piping to be 2" minimum

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- No interior insulation on duct work or air handlers
- Chilled Water Piping insulation shall be Knauf Permawick or Techlite
- Ball valve isolation valves for domestic and heating water at each floor level and at each fixture group
- Adjustable hand-wheel type isolation valves at each fixture
- Isolation valves to be full port, ball type on all piping 4" OR LESS
- Stand alone wall hung water cooling fountains – Elkay required
- Boilers – Scotch marine type by Burnham, Superior, Fire Iroman, or York Shipley
- Tube Sheets Shall be ¾" Steel
- Boiler burners by Industrial Combustion, Weishaupt, or Coen
- Air atomizer on each oil burning option
- Steam humidification DI water systems shall be welded stainless steel
- No "In Duct" in line humidifier wands
- Cold water DI feeds can be polypropylene continuously supported in try system
- Linear diffusers shall be fully adjustable, both directional and flow limiting – Anemestat required
- Air foil dampers preferred with only the highest quality linkage
- AHU's muse be constructed to provide adequate space for air mix and minimizing stratification
- AHU's must include sloped stainless steel cooling drain pans piped with a minimum one and one quarter inch drain piping, Pans Must extend under entire coil Including Elbows and Supply Lines
- Pre filters must be 24"x24"x2" pleated
- Primary filters shall be bag style 85% efficiency
- Cooling towers shall be BAC – Stainless Steel

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- Condenser water treatment system components to be compatible with current PMD chemical supplier (Freemont)
- Trane chillers required
- All abandoned mechanical equipment, wiring, controls and piping to be removed
- Project documents are best provided electronically
- Pipe chases which require access to reach isolation valves or other plumbing devices must be a full three feet wide inside and afford a clear walking path to a height of six feet
- Proper identification and/or labeling of piping and valves is required
- Minimum trap size on lavatories must be no smaller than one and one-half inch
- Minimum waste piping size for kitchen sink drains (especially employee lounges) must be no smaller than 2"
- All pipe penetrations must be properly sealed to meet fire rating
- All copper piping and fittings must be connected with soldered joints
- New domestic water piping must be chlorinated and flushed before use
- All roof drains must be piped independently of sanitary drains
- Isolation valves are very important and must be provided for all domestic water branch lines at the main (to isolate each toilet room group) and at each fixture. These valves must be readily accessible and clearly labeled
- Full-port ball valves (up to four-inch in size) must be used on all projects
- Valve labeling and a valve schedule must be provided at project end.
- Manual faucets and flushometers are preferred to sensor-type due to cost of maintenance
- Kohler urinals are not acceptable due to dimensions-American Standard or others with equivalent dimensions are acceptable
- Pop-up wastes on lavatories are not acceptable. Use grid strainers

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- Minimum trap size on lavatories must be one and one-half inch
- High spouts on lavatory faucets are not preferred due to potential splashing
- Minimum-flow aerators are recommended for lavatory faucets
- Water closet carriers must be self-supporting, independent of the finished wall
- Water closet rough-in plates must be used on new installations to permit proper tile installation and eliminate open wall penetrations
- Water closets must be set within an eighth of an inch to the wall
- Tile base in toilet rooms must be set flush with (as opposed to over-lapping) wall surface or base must be cut out to allow proper water closet installation
- Neoprene gaskets must be used on wall-set water closets and urinals
- Water resistant wall finish materials must be used from floor to height of faucets around janitorial sinks or basins
- Centralized soap systems for hand washing are not allowed
- Isolation valves are required for isolation of heating/cooling systems for each floor of a building and at each heating or cooling appurtenance
- Heating and cooling equipment and piping must be approved for use with District Energy heating and cooling systems guidelines
- Heating and cooling control valves must be installed with isolation valves and unions for future replacement
- Heating and cooling control valves must be installed within 45 degrees of a straight upright position
- Do not install 'first-generation' Honeywell heating control valves. These valves are prone to o-ring failure on the stems
- Heating/Cooling coil installations must incorporate two-inch winterization piping with proper valving tied to the air-stream of the air handling units
- Heating/Cooling coils must be constructed of .025 inch Copper

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- Heating/Cooling coils must be independently supported (to allow removal)
- Newly installed systems must be installed in accordance with all governing codes
- The issue of fire suppression in closets/elevator shafts must be reviewed and approved by both building inspector and fire code official
- Exterior fire sprinkler piping in ramps must be schedule 40 galvanized pipe
- Fire sprinkler heads and trim must be of current manufacture (Less than one year old)
- Fire pumps must be installed without a 'timer' feature (to meet local code)
- Proper chemical agent fire extinguishers must be provided with chemical agent
- Carriers must be self-supporting (independent of wall)
- Minimum 1-1/2" p-trap and tailpiece on lavatories
- Use grid strainer instead of pop-up drain assembly systems
- Josam Carriers
- Chilled Water Coils Shall be designed for 14°F Delta T

Lav Faucets-Chicago 895-317GN2FCCP

- Four-inch Deck-Mounted Sink Faucet
- Rigid/Swing Plain End Gooseneck Spout
- Laminar Flow Control Device in Spout
- 317-Wrist Blade Handle
- Quatern Operating Cartridge

Service Sink Faucet-Chicago 305VB

- Short spout with vacuum breaker
- 3/4" hose thread outlet
- Pail hook

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- H supply arms
- Adjustable from 4" to 8-3/8" centers
- 369 handles

Urinal Flushometer-Sloan Royal (Manual) Model 186-1

- Low Consumption (1.0 gpf/3.8Lpf)

Urinal-American Standard Washbrook 1.0

- Top Spud 6501.010
- Stainless Steel Strainer

Water Closet Flushometer-Sloan Royal (Manual) Model 111

- Low Consumption (1.6 gpf/6.0 Lpf)

Water Closet-American Standard Afwall EL 1.6

- Elongated flush valve water closet
- Top Spud 2257.103

Security and Access Controls/Equipment Preferences and Requirements

Control Panels

- Security/Card Reader Main Control Panels shall be manufactured by PCSC and be of the following models depending upon requirements:
- IQ-400 – Up to 4 readers.
- IQ-1200 – Up to 12 readers

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- Security Panels shall be ordered with Memory Expansion (20,000 cardholder capacity).
- Security Panels shall be installed in accordance with specifications set in the PCSC IQ-400 Installation Manual 33-10057-001 Rev B (or most recent edition), **NO exceptions.**

Power Supplies

- Two separate Power Supplies shall be provided for each Security Panel installation. The first Power Supply shall be rated 12VDC and will supply power to Security Panel and Card Readers only. The second Power Supply should be rated 24VDC and will supply power to the Electrified Locking Hardware. Altronix ALTV1224-DC

Card Readers

- Card Readers shall be manufactured by HID and shall be of the following models depending upon requirements:
- Wall mounted: Thinline II Proximity Card Reader
- Mullion mounted: Mini Prox Card Reader

Door Position Switches

- All Card Reader Doors shall have a door position switch installed and should be of the following models depending upon requirements:
- Concealed: Sentrol 1078 Series
- Surface Mounted: Sentrol 2500 Series
- Overhead Door: Sentrol 2200 Series

Request to Exit Devices (REX)

- All Card Reader Doors shall have an infrared motion sensor installed for detecting authorized exits. REX motion sensors shall be wired to the REX input of the Security Control Panel.

- For doors equipped with Electromagnetic Locks, activation of the REX shall release the lock and shunt the intrusion alarm input. For doors equipped with an electric door strike that are free exiting (IE, the door hardware allows for exit at all times) the REX shall only shunt the intrusion alarm input and shall not unlock the door.
- REX motion sensor shall be manufactured by Detection Systems, Model DS150 Series.

Electrified Locking Hardware

- Electrified Locking Hardware should be rated at 24VDC continuous duty. All hardware should provide failed-secure operation unless failed-safe operation is required by local fire codes.
- Hardware should be selected based on the following order of preference:
 - Electric Door Strike, Failed-Secure 24VDC continuous duty (Fail-safe if required)
 - Electromagnetic Door Lock (Mag Lock) w/one-touch request to exit in addition to the infrared motion detection request to exit (not to be use for fail-secure applications)
 - It is requested that the following hardware **not** be used unless absolutely necessary. If the following hardware is necessary, in-door wiring must use Von Duprin EPT-10 SP28 (or equivalent) Power Transfers **not** Electrified Door Hinge Transfers:
 1. Electric Latch Retractors (Panic Bars)
 2. Electrified Mortise Lock (Lever Hardware)
- All Electrified Locking Hardware shall have Noise Suppression Devices installed. Noise Suppression Devices shall consist of a Metal-Oxide-Resistor (MOV), Siemens S10K30 or equivalent and Diode (1N4004-1N4007) wired in parallel with the load (IE, the door strike). If this Noise Suppression is not installed, damage to the Control Panel can occur.

Duress Alarms – Desk Mount

- All desk mounted Duress Alarm hardware shall be Ademco model 269, no exceptions.