

# PLUMBING DESIGN CRITERIA

## TABLE OF CONTENTS

<b>I</b>	<b>GENERAL.....</b>	<b>2</b>
<b>II</b>	<b>CRITERIA .....</b>	<b>3</b>
	<b>A. PIPING SYSTEMS.....</b>	<b>3</b>
	1. DOMESTIC WATER SYSTEM .....	3
	2. SANITARY DRAINAGE SYSTEM .....	3
	3. FIRE PROTECTION SPRINKLER SYSTEM .....	3
	<b>B. PLUMBING COMPONENTS .....</b>	<b>3</b>
	1. LARGE DEMAND WATER HEATERS (KITCHENS AND GYMNASIUMS): .....	3
	2. SMALL DEMAND WATER HEATERS: .....	3
	3. HOSE BIBBS ON BUILDING EXTERIOR WALLS:.....	4
	4. HOSE BIBBS ON BUILDING INTERIOR .....	4
	5. SHUTOFF VALVE TO ISOLATE THE WATER SUPPLY: .....	4
	6. PIPE .....	4
	<b>C. SPECIFIC ROOMS .....</b>	<b>4</b>
	1. GROUP TOILET ROOM:.....	4
	2. SINGLE TOILET ROOMS:.....	4
	3. SINGLE BATHS AND SHOWERS: .....	5
	4. GROUP SHOWERS: .....	5
	5. KITCHENS: .....	5
	6. CUSTODIAL CLOSETS: .....	5
	7. CUSTODIAL ROOM/CENTRAL RECEIVING.....	5
	8. CHEMISTRY LABORATORY - GAS SYSTEM:.....	5
	9. CHEMISTRY LABORATORY - LABORATORY DRAIN SYSTEM: .....	5
	10. SCIENCE CHEMISTRY LABORATORY – EMERGENCY SHOWER/EYE WASH.....	6
	11. ADMINISTRATION:.....	6
	12. ART:.....	6
	13. PRE-KINDERGARTEN AND KINDERGARTEN: .....	6
	14. PRIMARY AND INTERMEDIATE CLASSROOMS: .....	6
	15. SKILLS DEVELOPMENT LABORATORY (SCIENCE): .....	7
	16. ROOMS CONTAINING CLOTHES WASHING MACHINES.....	7
	<b>D. MECHANICAL EQUIPMENT.....</b>	<b>7</b>
	1. AIR-COOLED CHILLER YARD:.....	7
	2. WATER-COOLED CHILLER PLANT:.....	7
	3. AIR HANDLER UNIT ROOMS: .....	7
	4. COOLING TOWER ENCLOSURE:.....	8

# PLUMBING DESIGN CRITERIA

## I GENERAL

- A. The Design Professional shall use this document in conjunction with the Educational Specifications and District Master Specifications (DMS) to develop the design and contract documents.
- B. Design the project to USGBC LEED for Schools Silver requirements; see USBGC LEED for Schools Recommendation List in the Architectural Criteria for point recommendations.
  - a. Coordinate with Architect – see Architectural Design Criteria for additional goals and documentation requirements.
  - b. The LEED Team shall exhibit to SDPBC PM that information specific to the section is represented accurately in the LEED for Schools certification process.
- C. The Design Professional is encouraged to utilize low water, energy equipment, and components when designing the plumbing system using the LEED for schools of Energy and Atmosphere Credits and Water Efficiency Credits.
- D. Goals: To present additional requirements for the design of a functional, efficient and code compliant plumbing system that promotes a safe and sanitary environment for the students, employees and visitors of School District of Palm Beach County Facilities.
- E. This division contains requirements for the following elements:
  - 1. Piping Systems
  - 2. Plumbing Components
  - 3. Specific Rooms
  - 4. Mechanical Equipment
- F. In this document, the term Engineer represents the professionally qualified Design Engineer of Record and/or Engineering Consultant, duly licensed in the State of Florida, that signs and seals project design documents.
- G. The Engineer is the person responsible for the design and development of all project documents.
- H. The Engineer must request, in advance and in writing, deviations from the Plumbing requirements in this document.
  - 1. The SDPBC shall review the requested deviations; based on good engineering practices and/or economics, and either approve or deny the request in writing.
  - 2. Any approved deviations are valid only for the specific request.
- I. This document presents design requirements for the School District of Palm Beach County that are either more stringent than or not present in the building codes. For items not presented in this document the requirements of the following codes shall apply:
  - 1. Florida Building Code, FBC
  - 2. National Fire Code, NFC
  - 3. Florida Administrative Code, FAC
  - 4. Americans with Disabilities Act Accessibility Guidelines, ADAAG
  - 5. Advanced Energy Design Guide for K12 School Buildings
- J. Submittal requirements as listed in procedure BD-001 – Submission for Project Documents
- K. The Criteria shall not limit or restrain the performance and liability of the Professional or Professionals responsible for the integrity and performance of the structure.
- L. The Criteria is applicable to new construction and to the remodeling and renovation of existing facilities.
- M. The use of the Criteria in this document does not exempt the Design Professionals from any federal or state code or standards controlling the design and construction of any Facility.

## II CRITERIA

### A. Piping Systems

1. Domestic Water System
  - a. Provide potable water stub outs for future portable classroom installation.
  - b. Schools designed as Enhanced Hurricane Protection Areas (EHPA):
    - 1) Provide a plumbing system capable of supplying water for the capacity of the EHPA.
    - 2) If pumps are required in the design, provide power from an emergency power source.
    - 3) System to have automatic and manual controls
  - c. Specify fixtures in keeping with all LEED for Schools Water Efficiency Prerequisite and Credit requirements.
  - d. When trap primers are required, connect to water closet supplies where feasible.
2. Sanitary Drainage System
  - a. Schools designed as (EHPA):
    - 1) Provide a plumbing system capable of collecting sanitary waste for the capacity of the EHPA.
    - 2) If pumps are required in the design, provide power from an emergency power source.
      - a) The design professional is encouraged to utilize passive storage capacity of EHPA system to reduce the power requirements on the emergency generator capacity.
        - (1) Increase lift station capacity
        - (2) Use of line capacity
        - (3) Combination of two
3. Fire Protection Sprinkler System
  - a. Occupancy Classification
    - 1) Classrooms and administration areas: light hazard
    - 2) Kitchen: ordinary hazard group 1
    - 3) Storage areas, wooden stages: ordinary hazard group 2
    - 4) Generator Room: extra hazard group 1
  - b. Extended Coverage Heads are allowable if designed in accordance with NFPA 13.
  - c. Design the fire main in accordance with the School District Civil Design Criteria.
  - d. System riser shall be in a location not accessible to students.

### B. Plumbing Components

1. Large Demand Water Heaters (Kitchens and Gymnasiums):
  - a. Locate water heater rooms (WHR) on exterior walls with exterior doors.
    - 1) Provide fire-rated WHR, coordinate with architect
  - b. The LEED Team shall provide evidence to SDPBC PM of the water heating equipment and controls evaluation for compliance with all appropriate LEED Prerequisites requirements and Credit opportunities.
  - c. Use natural gas water heaters, if natural gas is not available, use propane gas.
    - 1) Provide electronic ignition.
    - 2) Water heaters shall be ASME HLW stamped
  - d. To reduce standby energy losses, schedule the operation of the water heaters and their circulating pumps with the building automation system (BAS), coordinate with mechanical engineer and District's BAS contractor.
  - e. Provide a system in accordance with the results of the water heater life cycle cost analysis (LCCA) performed by the engineer of record.
  - f. Provide floor drain for the WHR.
2. Small Demand Water Heaters:

- a. Use electric water heaters.
  - b. Do not place these water heaters on the BAS.
  - c. Provide a floor drain for the WHR for water heaters larger than 40-gallon capacity.
3. Hose Bibbs on Building Exterior Walls:
- a. Provide hose bibbs at a maximum interval of 150' of exterior wall.
  - b. Provide hose bibbs with the following features: satin bronze finish, tamper proof vacuum breaker with hose end connection and control key operator.
  - c. Provide a shutoff valve to isolate the water supply for that hose bibb.
4. Hose Bibbs on Building Interior
- a. Provide hose bibbs in all group toilet rooms, art rooms and patios, kiln rooms, and mechanical equipment rooms.
  - b. Provide hose bibbs with the following features: satin bronze finish, tamper proof vacuum breaker with hose end connection and control key operator.
  - c. Provide a shutoff valve to isolate the water supply for that hose bibb.
5. Shutoff Valve to Isolate the Water Supply:
- 1) Locate the shutoff valve above a suspended grid ceiling in that area.
  - 2) If no suspended grid ceiling, provide a 24" x 24" hinged ceiling access panel.
  - 3) Place a 1/2" square green sticker with a "W" on the ceiling grid or access panel.
  - 4) Coordinate with architect.
6. Pipe
- a. Above and below grade piping within 5' of the building envelope shall be in accordance with Plumbing Master Specification 22 10 00 Plumbing Piping.
  - b. Above and below grade piping outside 5' of the building envelope shall be in accordance with Civil Master Specification: 33 11 00 Water Distribution Systems, 33 40 00 Storm Drainage Utilities, 33 30 00 Sanitary Sewer Utilities. (Also, see Civil Design Criteria).
  - c. Design grease traps in accordance with the School District Civil Design Criteria.
- C. Specific Rooms
1. Group Toilet Room:
- a. Refer to the group restroom prototype in the Ed Specs.
  - b. Provide one hose bibb in each group toilet room located under the lavatories 12" AFF.
    - 1) With satin chrome plated finish, tamper proof vacuum breaker with hose end connection and control key operation.
  - c. Provide wall-hung water closets, urinals, and lavatories with carrier.
    - 1) Construct lavatories of vandal resistant materials.
  - d. Provide 3" floor drain with trap primer installed on the water closet supply.
  - e. Provide a shutoff valve for each toilet group to isolate the water supply for that group.
  - f. Provide tempered water to lavatories.
  - g. Provide shock absorbers (not air chambers) in an accessible location.
    - 1) If not possible, provide a 24" x 24" hinged wall (ceiling) access panel.
    - 2) Coordinate with architect.
  - h. Provide super low flow urinals (One pint per flush).
2. Single Toilet Rooms:
- a. Provide floor mounted water closet and wall hung lavatory.
  - b. Floor drain is not required.
  - c. Provide a shutoff valve for each single toilet room to isolate the water supply for that room.
  - d. Provide tempered water to lavatory.

- e. Provide shock absorbers (not air chambers) in an accessible location.
  - 1) If not possible, provide a 24" x 24" hinged wall (ceiling) access panel.
  - 2) Coordinate with architect.
- 3. Single Baths and Showers:
  - a. Provide pressure and temperature control valves for tubs and showers.
  - b. Provide trap primer from water closet supply to tubs and showers.
- 4. Group Showers:
  - a. Locate the master shutoff valve and temperature control valve in the teacher planning room.
- 5. Kitchens:
  - a. Use natural gas for cooking if natural gas is not available use propane gas.
  - b. Size the gas water heater based on the thermostat set point of 140°F.
  - c. Provide an electric booster heater to the dishwasher to provide 180°F water.
  - d. Interlock the natural gas solenoid valve to the kitchen hood exhaust requiring the exhaust hood to be in operation before the gas will flow.
- 6. Custodial Closets:
  - a. Provide floor mounted service sink with CW and HW:
    - 1) 3" grid strainer and drain
  - b. Provide faucet with tamper proof vacuum breaker, pail hook, wall brace, ¾" hose thread outlet and integral stops.
  - c. Provide a floor drain for the WHR for water heaters larger than 40-gallon capacity.
- 7. Custodial Room/Central Receiving
  - a. Provide a Single toilet room with shower.
  - b. Provide floor drains with trap primers.
  - c. Provide an eyewash station/safety shower.
- 8. Chemistry Laboratory - Gas System:
  - a. Refer to the prototype Science Room in the Ed Specs for additional requirements and location.
  - b. The main supply line to the classroom shall have a 24 VDC, normally closed solenoid valve with manual reset.
    - 1) The solenoid valve shall close on a signal from the fire alarm system.
  - c. Provide a push-pull mushroom head emergency button at the classroom exit.
    - 1) When the emergency button is pushed, the solenoid valve shall close,
    - 2) Shut off the compressed air and electrical power to the classroom, and
    - 3) Start the emergency exhaust system.
  - d. Route the main supply line from the solenoid valve to the teacher demo table.
  - e. Route the main supply line from the teacher demo table, to the student stations.
    - 1) In a cabinet below the teacher demo table, provide a manual, quarter-turn master valve to control the gas supply to the student stations.
    - 2) The master valve shall be lockable in the closed position only.
  - f. Pipe terminations to the teacher demo table and to each student station shall have gas cocks.
  - g. Underground pipe shall be in a sleeve.
    - 1) Vent the sleeve to the outside atmosphere.
- 9. Chemistry Laboratory - Laboratory Drain System:
  - a. Drainpipes shall be acid and chemical resistant from the lab drain to a neutralizing tank.
    - 1) The LEED Team shall provide evidence to SDPBC PM that drain design considerations are recognized in LFS IEQ Credit 5 Indoor Chemical Source Control.
  - b. Neutralizing tank shall be clearly and accurately identified on the as built.

- c. The tank shall be accessible through a manhole with the cover clearly marked, and if under payment shall be accessible with out removing any payment.
10. Science Chemistry Laboratory – Emergency Shower/Eye Wash
- a. Refer to the prototype Science Room in the Ed Specs for additional requirements and location.
  - b. Locate near experimental tables but out of main student traffic flow out of classroom, coordinate with the Architect.
  - c. Provide manual override shutoff above ceiling, mark locating on ceiling grid.
  - d. Provide floor drain by the fixture.
  - e. Design the system or space to minimize the spread of water and prevent damage to the classroom or furnishings.
11. Administration:
- a. Production/Workroom:
    - 1) Stainless steel double sink, with CW and HW
  - b. Clinic – See Board approved layout:
    - 1) One toilet room for elementary and two toilet rooms for secondary with the following:
      - a) Wall mounted water closet, height appropriate for the school population.
      - b) Lavatory, wall mounted, with CW and HW
      - c) Accessible shower, with CW and HW
        - (1) Pressure and temperature compensating control valve
        - (2) 3" drain with satin finish nikaloy strainer and trap primer
        - (3) Fold down seat meeting accessibility requirements
    - 2) 22" x 22" Sink mounted in counter with gooseneck faucet, CW and HW.
      - a) Use counter mounted hand held eyewash connected to the sink water supply do not use Swing-a-way type eyewash.
      - b) Sink to meet accessibility requirements
  - c. Staff Toilet:
    - 1) Wall mounted water closet
    - 2) Lavatory, wall hung, CW
12. Art:
- a. Classroom:
    - 1) The LEED Team shall provide evidence to SDPBC PM that they considered the drain design considerations in LFS IEQ Credit 5 Indoor Chemical Source Control.
    - 2) Two double sinks, separate faucets and clay traps for each bowl, CW.
    - 3) Provide floor drain(s) with lift out sediment trap(s).
  - b. Kiln:
    - 1) Utility sink, 3" drain with clay trap, CW, HW
    - 2) Provide floor drain with lift out sediment trap
13. Pre-kindergarten and Kindergarten:
- a. See prototype classroom in Ed Specs.
  - b. Classroom:
    - 1) Single sink, faucet, grid strainer, and blubber, CW
  - c. Toilet:
    - 1) Wall mounted water closet
    - 2) Lavatory with a faucet, CW
14. Primary and Intermediate Classrooms:
- a. See prototype classroom in Ed Specs.

- b. Single sink, with faucet and water jet fountain, CW
- 15. Skills Development Laboratory (Science):
  - a. Student carrel with sink, faucet, CW
- 16. Rooms containing clothes washing machines
  - a. Provide floor drain
  - b. Provide HW and CW lines
- D. Mechanical Equipment
  - 1. Air-Cooled Chiller Yard:
    - a. Provide a hose bibb with the following features: satin bronze finish and tamper proof vacuum breaker with hose end connection.
    - b. Provide cold water supply to the chilled water make-up water system.
    - c. Coordinate with mechanical engineer.
  - 2. Water-Cooled Chiller Plant:
    - a. Provide a hose bibb with the following features: satin bronze finish and tamper proof vacuum breaker with hose end connection.
    - b. Provide cold water supply:
      - 1) To the chilled water make-up water system
      - 2) To the condenser water make-up water system
      - 3) Coordinate with mechanical engineer.
    - c. Provide 3" floor drains with trap primers and vents, connected to sanitary system.
      - 1) Coordinate with architect to slope the floor to the floor drains.
    - d. Provide 3" equipment drains with trap primers and vents connect to sanitary system, coordinate with mechanical engineer for proper location of the equipment drains next to the equipment.
  - 3. Air Handler Unit Rooms:
    - a. The LEED Team shall exhibit to SDPBC PM that their evaluations of condensate capture inclusion in achieving all of the LEED for Schools Water Efficiency Credits.
    - b. Provide a hose bibb with the following features: satin bronze finish and tamper proof vacuum breaker with hose end connection.
    - c. Provide 3" floor drains with basket strainers, trap primers and vents, connected to sanitary system, coordinate with architect to slope the floor to the floor drains.
    - d. Provide 3" condensate drain for each AHU with the following:
      - 1) Open hub drain with perforated stainless steel sediment basket.
      - 2) Install lip of condensate drain hub 1" above finished floor.
      - 3) Provide trap, but no trap vent or primer.
      - 4) Connect to storm water catch basin independent of the roof storm water system.
      - 5) If connected to roof storm water system, provide accessible backwater valve.
      - 6) Coordinate with mechanical engineer for proper location of condensate drain(s) next to AHU equipment pad(s).
    - e. Condensate drainpipes from the air handler refer to SDPBC AHU Condensate Drain Detail #38 available on building department web site under District CAD Details.
      - 1) Provide copper drainpipe full size of AHU connection.
      - 2) Provide a trap and a ¼" per foot pitch for positive gravity drainage; refer to DMS, Section 23 21 13.
      - 3) Coordinate height of AHU concrete pad to provide trap dimensions indicated in Detail #38 available on building department web site under District CAD Details.
      - 4) Provide a 1" air gap above the rim of an open hub drain for the AHU drainpipe.

4. Cooling Tower Enclosure:
  - a. Provide a hose bibb with the following features: satin bronze finish and tamper proof vacuum breaker with hose end connection.
  - b. Provide cold water supply to the condenser water make-up system.
    - 1) The LEED Team shall exhibit to SDPBC PM that condensate capture has been evaluated for its inclusion in achieving all of the LEED for Schools Water Efficiency Credits
  - c. Provide drain(s) for the cooling tower(s) emergency overflow(s) and drain valve(s).
  - d. Provide 4" open hub drain(s) with perforated stainless steel sediment basket(s), trap primer(s), and vent(s) connected to sanitary system.
    - 1) Install lip of drain(s) 12" AFG
    - 2) Provide 1" air gap between the cooling tower discharge lines and drain; refer to DMS, Section 23 21 13.

END OF SECTION