

Domestic hot and cold water pipe sizing shall be based on all fixtures operating simultaneously. Waste stacks, building waste drains, venting and lift stations shall be sized with consideration to the increased flow rates as well.

Domestic hot and cold water hose bibs shall be provided in laundry rooms and latrines for use in area cleanup/wash down.

Shower heads and lavatory faucets shall be water conserving type with a maximum rated flow rate of 2.0 gpm or less. Water closets shall be the siphon jet, flush valve type. All water closet and lavatory fixtures shall be hands free type operation.

3.6.1.2 Provide scrub room and boot wash drains with easily maintainable sand interceptors.

3.6.1.3 Laundry facilities shall be considered commercial laundries with respect to the International Plumbing Code (IPC) and shall be provided with easily maintainable solids interceptor(s) in accordance with the IPC.

3.6.1.4 Not Used

3.6.1.5 **Drain Water Heat Recovery System.** Gravity Film Heat Exchanger (GFX) is a vertical counter flow heat exchanger that extracts heat out of drain water and applies it to preheat the cold water and mixed with hot water to be used in the shower. The GFX consists of a 3 or 4 inch central copper pipe (that carries the warm waste water) with a ½-inch copper coils wound around the central pipe. Heat is transferred from the waste water passing through the large, central pipe to the cold water simultaneously moving upward through the coils on the outside of the pipe. **GFX shall be provided on all shower drains and laundry drains.**

3.6.2 Heating, Ventilating and Air-Conditioning (HVAC)

3.6.2.1 All HVAC air handling units shall be located in mechanical equipment rooms accessible through equipment room doors. Mechanical rooms shall be sized for ease of service and maintenance of equipment. Access for maintenance shall not require entry into the sleeping bays or classrooms. Air filters shall be located in duct or unit mounted filter boxes within the mechanical room. HVAC system selection shall be in accordance to ASHRAE 90.1. The HVAC system shall provide continuous outside air ventilation to each space and centralized exhaust systems with heat recovery between exhaust and the incoming outside air.

(a) Storage and laundry spaces may be served by single zone heating and ventilating fan coil and/or forced air systems, respectively. Laundry rooms must be provided with sufficient tempered makeup air either from transfer air via the air handling systems serving the sleeping bays or their own air handling systems. Storage and electrical spaces must be ventilated to limit summer interior temperatures and minimally heated (45 deg F). Communications spaces require separate cooling (24 hour cooling if required by the Installation Directorate of Information Management (DOIM) or similar organization).

(b) HVAC design loads must include plug loads of 6 watts/sf in classrooms and 1.5 watts/sf in sleeping bays. HVAC design loads must also account for surge population in sleeping bays and classrooms.

(c) Heating, mechanical ventilation and air-conditioning shall be in accordance with ASHRAE Standard 62; design supply air volumes in occupied spaces shall be not less than 0.8 cubic feet/minute/square foot (cfm/sq. ft). Heating and cooling load calculations shall allow for a minimum of 0.3 air changes per hour from incidental infiltration for all building spaces. For severe winter climatic areas incorporation of low intensity, gas-fired infrared heating systems may be considered for adjoining covered training or assembly areas.

### 3.7.11 Security Infrastructure (Security Equipment Not in Contract)

3.7.11.1 Not Used

3.7.11.2 Not Used

### 3.7.12 Door Status/Alarm Monitoring System

A door monitoring system consisting of a door status/alarm panel and door balanced magnetic switches shall be provided. The monitoring system shall provide door status/alarms on all doors leading into and within sleeping bays in order to accommodate gender segregation. System shall allow each door alarm to be individually activated or deactivated. A door status/alarm panel that monitors all doors shall be located in the reception area near the CQ workstation. In addition, each Drill Instructor office (four total) shall have a door status/alarm panel that monitors only those doors associated with the adjacent sleeping bay. Panel shall provide both an audio and visual signal when alarm is activated.

### 3.7.13 Audio/Visual System

3.7.13.1 Provide an empty 1" conduit (with pull wire) above the ceiling from each GFGI ceiling mounted projector location to a wall mounted outlet box at the front of each classroom.

3.7.13.2 Not Used

## 3.8 FIRE ALARM REQUIREMENTS

3.8.1 All software, software locks, special tools and any other proprietary equipment required to maintain, add devices to or delete devices from the system, or test the Fire Alarm system shall become property of the Government and be furnished to the Contracting Officer's Representative prior to final inspection of the system.

3.8.2 The fire alarm system shall be designed by a professional Fire Protection Engineer and installed by a National Institute for Certification of Engineering Technologies (NICET) 3 technician.

3.8.3 Smoke detectors shall be provided in all sleeping bays. Smoke detectors in bedrooms shall be monitored. Tampering with a smoke detector shall send a trouble signal. Trouble signals shall be transmitted to the fire department.

## 3.9 COMPLIANCE WITH THE ENERGY POLICY ACT OF 2005 (EPACT 2005)

### 3.9.1 EPACT 2005 Requirement

The building, including the building envelope, HVAC systems, service water heating, power, and lighting systems shall be designed to achieve an energy consumption that is at least 30% below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004 (see paragraph 5.9 Energy Conservation)

### 3.9.2 Target Energy Consumption Budget - B/COF

The target energy consumption budget (excluding plug loads) for B/COF facility located in Climate Zone 95 kBTU per ft<sup>2</sup> per year or less. The use of the Prescriptive Technology Solution Set, shown below, will result in an annual energy consumption less than or equal to the target energy budget figure.

### 3.9.3 Prescriptive Path (Use of Technology Solution Set)

The technology solution set shown in the table below achieves the above energy performance and life cycle cost effectiveness requirements for an BT/BCOF facility in the indicated DOE climatic zone.

**Climate Zone 4A, Prescriptive Technology Solution Table**

Item	Component	30% Solution
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<b>Roof</b>	Attic	R-40
	Surface reflectance	0.27
<b>Walls</b>	Light Weight Construction	R-20
<b>Exposed Floors</b>	Mass	R-10 c.i.
<b>Slabs</b>	Unheated	NR <sup>(2)</sup>
<b>Doors</b>	Swinging	U-0.70
	Non-Swinging	U-1.45
<b>Infiltration</b>		0.25 cfm/ft <sup>2</sup> @ 75 Pa <sup>(3)</sup>
<b>Vertical Glazing</b>	Window to Wall Ratio (WWR)	10% - 20%
	Thermal transmittance	U-0.45
	Solar heat gain coefficient (SHGC)	0.31
<b>Interior Lighting</b>	Lighting Power Density (LPD)	0.9 W/ft <sup>2</sup>
	Ballast	Electronic ballast
<b>HVAC</b>	Air Conditioner	4-Pipe Fan Coil with central chiller and boiler plus DOAS <sup>(4)</sup> with 14.0 SEER DX coil (3.52 COP) and HHW coil on central boiler SAT control 55°F – 62°F with OAT 75° – 54°F
	Gas Furnace	none
	ERV	70% - 75% sensible effectiveness
<b>Economizer</b>		NR
<b>Ventilation</b>	Outdoor Air Damper	Motorized control
	Demand Control	NR
	Laundry Room	Decoupled <sup>(5)</sup>
<b>Ducts</b>	Friction Rate	0.08 in. w.c./100 feet
	Sealing	Seal class B
	Location	Interior only
	Insulation level	R-6 <sup>(6)</sup>
<b>Service Water Heating</b>	Gas storage	90% E <sub>t</sub>
<b>Drain Water Heat Recovery</b>	None	Showers and washing machines drains only --30% efficient

## Notes for Prescriptive Solution Technology Table:

- (1) NOT USED
- (2) NR means there is no requirement or recommendation for a component in this climate.
- (3) Increased Building Air tightness. Building air leakage (measured in cfm/ft<sup>2</sup>) is the average volume of air (measured in cubic feet per minute) that passes through a unit area of the building envelope (measured in square feet) when the building is maintained at a specified internal pressure (measured in Pascals). Testing requirements are specified in Chapter 5..
- (4) Dedicated Outdoor Air System. A central dedicated outdoor air system (DOAS) providing the following:
- (a) Outside air for building indoor air quality and humidity control

