CHAPTER 6: APPLICATIONS

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6.1 GENERAL

This chapter includes the HVAC design criteria for the air-handling units (AHU) and the design data for the individual rooms, henceforth referred to as the Room Data Sheets (RDS) in Appendices 6-A and 6-B. Appendix 6-A contains the dedicated AHUs and associated Room Data Sheets. Appendix 6-B contains the common room and associated Room Data Sheets.

6.2 AHU CLASSIFICATION

The air-handling units are classified as dedicated air-handling units and common (or non-dedicated) air-handling units.

6.2.1 DEDICATED AIR-HANDLING UNITS

6.2.1.1 General

Based on VA experience, dedicated AHUs are provided to serve each unique functional area. The dedicated air-handling units serve only that specific medical functions and/or departments to maintain their functional and operational integrity. Zoning of the occupied spaces should be such that two patently different functions cannot be combined together. For example, an air-handling unit cannot serve both the surgical suite and the nursing wing, due to their different needs. Each dedicated air-handling unit has design and operating characteristics that may or may not match those of other dedicated air-handling units. A specific design project may or may not include any or all dedicated air-handling units.

6.2.1.2 List of Dedicated Air-Handling Units

For the new and/or replacement hospitals and major renovations where each medical function or department is a full-fledged unit with all support spaces, the design shall include dedicated air-handling units to serve the following:

- Animal Research and Holding Areas
- Atrium
- Auditoriums and Theaters
- Autopsy Suite
- BMT (Bone Marrow Transplant) Suite
- Computer Room Air Conditioning Unit
- Dental Clinic
- Dining (Dietetics)
- Emergency Care Unit
- Gymnasium
- Intensive Care Units and Recovery Rooms
- Kitchen (Dietetics)
- Laboratories
- Laundry (Central)
- Imaging Series – MRI Unit
- Medical Media Service
- MRI Unit
- Nuclear Medicine Service
- Nursing Wing (Primary Unit)
- Pharmacy Service
- Radiology Suite
- Spinal Cord Injury Unit
- Standalone Smoking Facility

- Supply Process Distribution (SPD)
- Surgical Suite
- Telephone Equipment Room
- Waiting and Patient Admitting Areas

6.2.1.3 Appendix 6-A

In the attached Appendix 6-A, HVAC design characteristics and criteria for all dedicated air-handling units are given as the AHU Data Sheets followed by the Room Data Sheets (RDS) of the core functional areas associated with the respective air-handling units. Each room data sheet includes the HVAC design criteria and requirements at the room level.

6.2.1.4 Appendix 6-B

Appendix 6-A does not include common rooms (corridors, offices, storage spaces, etc.) and support rooms (toilets, locker rooms, janitor's closets, etc.) generally associated with many health care and patient support activities. While the room-level HVAC characteristics of the common rooms and support rooms will remain the same regardless of their AHU affiliations, the minimum outside air and exhaust air requirements shall be based on the serving AHU.

Appendix 6-B includes the room data sheets of all such rooms and miscellaneous facility support rooms (elevator machine rooms, electrical rooms, mechanical rooms, etc.). All spaces in Appendix 6-B are arranged alphabetically.

6.2.2 COMMON (NON-DEDICATED) AIR-HANDLING UNITS

6.2.2.1 General

(a) The common or non-dedicated air-handling units are selected to serve the patient care spaces and functions not covered by the dedicated air-handling units. Such areas are generally found in the clinical additions, ambulatory care units, satellite or community based clinics, and special procedure and/or treatment rooms.

(b) The common or non-dedicated air-handling units can also serve the specialty rooms included in Appendix 6-A, provided the project-specific scope of work includes only a few such rooms and not the full-fledged functional department.

(c) While zoning the common or non-dedicated air-handling units, care must be taken to ensure that the functional integrity of the spaces is not compromised.

6.2.2.2 AHU Selection Criteria

Selection and design of a single air-handling unit or multiple common (non-dedicated) air-handling units shall be based on the following criteria:

(a) Project scope and size

(b) Space layout

(c) Capacity limitations of a single AHU (see Chapter 2)

(d) Matching (or differing) selection requirements, such as:

- Hours of Operation (24-hours or daytime only)
- Ventilation Air Volume - Outside Air (100% or minimum)
- Filtration Arrangement and Selection Criteria (MERV values)
- Supply Air Volume (Constant or Variable)
- Interlocked Exhaust (General or Special System)
- Inside Design Conditions (Temperature and Relative Humidity)
- Heat Recovery (Yes or No)

APPENDIX 6-A: DEDICATED AIR HANDLING UNITS

ANIMAL RESEARCH AND HOLDING AREAS – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1** ● **Note 2**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	Room Data Sheet
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	● Provide a dedicated chiller to serve the Animal Research and Holding Facility. ● Provide cross-connections with the central chilled water plant for emergency backup.
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Provide a general exhaust system for the spaces not covered by the special exhaust systems.
Special Exhaust System(s)	For fume hoods and Biological Safety Cabinets (BSC), provide special exhaust systems as outlined in Chapter 3.
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams.
Emergency Power	Required for the complete HVAC system serving the Animal Research Facility, including DDC controls
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of a desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

ANIMAL RESEARCH AND HOLDING AREAS – AIR HANDLING UNIT

Note 1: Provide central humidifier at the unit to maintain 50 F [10 C] dew-point. Provide terminal humidifiers where indicated in the Room Data Sheets.

Note 2: Incorporate the following special features in the design of the HVAC systems:

(a) Automatic Control Valves: Ensure that the automatic control valves serving the unit-mounted preheat and reheat coils and the terminal reheat coils are selected to close in fail-safe position, that is, assume normally closed position. This vital safety issue must be incorporated in the design. Past experience has shown that the inadequacy of the control system has created serious consequences to the well-being of the animals due to the possibility of overheating. With normally closed control valves, ways and means shall be included in the design to prevent the possibility of the coil(s) freezing. Additionally, provisions shall be made to prevent hot, humid air from entering the space. Chiller valve shall fail open. Provide high and low limits for the supply air fan to de-energize when the supply air temperature is above 65 F [18.3 C] and below 45 F [7.2 C].

(b) Acoustics: Animals are susceptible to low-frequency rambling noise. HVAC design shall address this sensitivity issue and include necessary measures, including the use of acoustic blankets or tiles to prevent noise transmission through floors or between cage washing and animal housing areas.

(c) Alarms: Provide a temperature and humidity sensor in each animal holding room, surgery room, laboratory, and any additional areas identified by the VA Authorities. Provide local alarm and remote alarm at ECC in the event space temperature and/or relative humidity exceeds high and low set points. One centrally located visible type (rotating red light) alarm shall be provided. ***Local alarm shall be visible type only since audible alarms disturb the animals***.

Provide a redundant temperature sensing system to shut down supply air in case the primary temperature alarm system fails. Primary alarm failures have been the cause of multiple overheating tragedies in animal facilities.

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Animal Holding Areas – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2** ● **Note 3**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Note 1: Provide terminal humidifier.

Note 2: Provide a special exhaust system for the animal holding areas. Discharge air at the highest level above the roof.

Note 3: Collect exhaust air 7 inches [175 mm] above the floor level. Exhaust grilles shall be equipped with 2 inch [50 mm] thick VA Grade A filters, and allow easy replacement of filters without the need to unscrew the grille from the duct assembly.

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Animal Operating Room – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1: Provide terminal humidifier.

Note 2: Provide a special exhaust system for the surgical suite and associated treatment areas. Incorporate the following in the exhaust system design:

(a) Provide welded stainless steel ductwork.

(b) Maintain entire ductwork under negative air pressure.

(c) Exhaust air shall pass through a set of pre-filters – VA Grade A and after-filters HEPA filter – VA Grade E. Locate filters closest to the fan intake connection.

(d) Provide an airflow control valve (AFCV) to measure and set air volume under varying static pressure drop through the filters. Locate AFCV downstream of filters.

(e) Discharge exhaust air 10 Feet [3.0 Meters] above the highest building point at 3,500 Feet/Minute [17.8 Meters/Second] discharge velocity.

(f) Provide local (visible) and remote alarm at the ECC control system to indicate system and air balance disruption.

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Animal Receiving – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide terminal humidifier. **Note 2:** Connect room exhaust to the general exhaust system.	

Animal Room With Ventilated Caging Exhausting Directly Out of the Room – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust lines from ventilated racks to (a) independent exhaust system to allow consistent differential pressure in concert with room exhaust, or (b) room exhaust and provide controls to automatically maintain negative relative pressure to hallway. If ventilated caging includes its own exhaust fans, this may be considered in the room change calculations. ***Some racks rely completely upon the exhaust ducting and do not have their own exhaust fans.***	

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Carcass and Wastage – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Double Negative (- -) ● **Note 3**
Note 1: Provide terminal humidifier. **Note 2:** Connect room exhaust to the general exhaust system. **Note 3:** Admit at least three air changes per hour as make-up air from the adjoining spaces.	

Clean Cage Storage – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust to the general exhaust system.	

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Containment Spaces – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust to the special exhaust system, for the surgical suite, described in the Animal Operating Room Data Sheet.	

Corridors – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 45% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide terminal humidifier. **Note 2:** Air supplied to the corridors is generally used as make-up air to maintain the intended air balance. Adjust supply air volume as required to meet this objective. Where not used as make-up air, connect corridor air to the general exhaust system.	

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Dirty Cage Washer – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Double Negative (- -)

Note 1: Provide terminal humidifier.

Note 2:

(a) Provide a special, wet exhaust system for the dirty cage-washer. Provide welded stainless steel ductwork, pitch the horizontal ducts, and provide drain at the low points to prevent condensate backwash into the washer.

(b) Wet exhaust can be collected through the Type A canopy hood or through the cage washer when the cage washer is in operation. Collect wet exhaust through the cage washer by installing a motorized damper in each duct. Coordinate exhaust air volume and air pressure drop through the washer with the equipment manufacturer. Provide airflow control valves to maintain exhaust airflows through each path.

(c) Provide several hookups to exhaust ductwork for attachment of dirty bedding dump stations. This is a safety feature to reduce exposure of personnel to gaseous pollutants and allergens in the room.

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Feed and Bed Storage – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide terminal humidifier. **Note 2:** Connect room exhaust to the general exhaust system.	

Laboratories – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust to the special exhaust system, for the surgical suite, described in the Animal Operating Room Data Sheet.	

ANIMAL RESEARCH AND HOLDING AREAS – ROOM DATA SHEETS

Necropsy – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust to the special exhaust system for the surgical suite, as described in the Animal Operating Room Data Sheet.	

Recovery Room – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 85 F [29.4 C] Dry-Bulb Temperature 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide terminal humidifier. **Note 2:** Connect exhaust to the special exhaust system for the surgical suite, as described in the Animal Operating Room Data Sheet.	

ATRIUM – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV or VAV ● **Note 1**
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Outside Air	● Normal Mode – Chapter 2 ● Smoke Evacuation Mode – 100%
Minimum Supply Air Changes per Hour	4 – in the occupied zone
Return Air	● Normal Mode – Permitted ● Smoke Evacuation Mode – 100% Exhaust
Economizer Cycle	● Normal Mode – ASHRAE Standard 90.1 – 2007 ● Smoke Evacuation Mode – 100% Outside Air
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	● Provide an engineered smoke-evacuation exhaust system. ● **Note 2**
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Required
Individual Room Temperature Control	Required
Room Air Balance	● Normal Mode – Neutral (0) ● Smoke Evacuation Mode – Negative (-)

ATRIUM – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet
Note 1: Closed atriums are used for dining/cafeteria and multipurpose applications that require a conventional, dedicated air-handling unit with minimum outside air and comfort conditions. **Note 2:** **(a) Emergency Smoke Evacuation Mode:** Estimate required exhaust air volume to remove smoke from the atrium space. Ensure compliance with the applicable section of the NFPA and/or UBC. A registered fire protection engineer shall affix seal to the calculations to be reviewed and approved by VA Authorities. **(b)** Provide a make-up air unit with fan, filters, and coil sections in the event that the required exhaust air volume is greater than the capacity of the dedicated air-handling unit. Use of make-up air from the adjoining HVAC systems shall be avoided to prevent any possibility of contamination. Heating section, required for locations with winter ambient air temperature below 41 F [5 C], shall be sized to deliver air at 55 F [12.8 C]. **(c)** Coordinate automatic activation of the smoke evacuation system with the fire protection design. Provide capability for manual activation as well. **(d)** During smoke evacuation mode, the dedicated air-handling unit shall operate in 100% outside air mode with appropriate damper actions. Ensure freeze protection for the heating coil. Size the coil to deliver air at 55 F [12.8 C]. Cooling coil need not be sized to handle 100% outside air.

AUDITORIUMS AND THEATERS – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV or VAV ● **Note 1**
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	6
Return Air	Required
Economizer Cycle	ASHRAE 90.1 – 2007
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high-pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for the unit-mounted preheat coils.
General Exhaust System(s)	Optional, required if connected with spaces requiring exhaust
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1: Evaluate and incorporate as feasible, the following features in the system design:

(a) Provide CO_2-actuated, demand-controlled ventilation. During start-up, admit only 7.5% outside air. Modulate minimum outside air damper to the design value when auditoriums are occupied and the CO_2 concentration rises above 400 PPM. Provide an airflow-measuring device with the minimum outside air damper and CO_2 sensor in the return air duct. Ensure accuracy of the airflow-measuring device at low air volumes.

(b) Provide high-humidity control for the summer cooling mode to limit the relative humidity to 60%.

(c) Provide individual room temperature control for spaces such as the stage, projector room, and entrance lobby.

(d) Maintain positive air balance with respect to the adjoining lobby and support areas.

AUTOPSY SUITE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	● NC 35 ● **Note 2**
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Room Data Sheets
Special Exhaust System(s)	Room Data Sheet
Heat Recovery System	Not permitted from the exhaust air stream
Emergency Power	Required for the entire HVAC system serving the Autopsy Suite, including DDC controls
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

Note 1: Autopsy Suite may not require a dedicated air-handling unit, if located close to laboratories also served by 100% outside air. Autopsy Suite requires 100% exhaust air to ensure odor control. Autopsy suite may remain in operation beyond normal working hours.

Note 2: Noise level lower than NC 35 is required, when audio/video recording is performed in the autopsy room.

AUTOPSY SUITE – ROOM DATA SHEETS

Main Autopsy Room – Room Data Sheet	
Inside Design Conditions	● Cooling 65 F [18.3 C] Dry-Bulb Temperature 60% Relative Humidity ● Heating 65 F [18.3 C] 40% Relative Humidity
Minimum Supply Air Changes per Hour	15
Return Air	Not Permitted
Exhaust Air	● 100% ● **Notes 1 and 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Double Negative (- -)

Note 1: Provide a special exhaust system for the autopsy suite with the following features:

(a) Provide welded stainless steel ductwork.

(b) Maintain entire ductwork under negative air pressure.

(c) Allow exhaust air to pass through a set of pre-filters – VA Grade A and after-filters HEPA – VA Grade E. Locate filters closest to the fan intake connection.

(d) Provide an airflow control valve (AFCV) to measure and set air volume under varying static pressure drop through the filters. Locate AFCV downstream of filters.

(e) Discharge exhaust air 10 Feet [3.0 Meters] above the highest building point at 3,500 Feet/Minute [17.8 Meters/Second] discharge velocity.

(f) Provide local (audible and visible) alarms and remote alarm at ECC to indicate system and air balance disruptions.

Note 2:

(a) Air distribution layout shall create directional airflow required to maintain negative air balance. Provide exhaust air collection at the ceiling and floor levels.

(b) Coordinate any additional exhaust needs with the autopsy table manufacturer.

(c) Collect exhaust over the sink counter area from the Gross Specimen Storage Room Mortuary Refrigerator. Exhaust 50 CFM [24 Liters/Second] from the mortuary refrigerator when the light is on. Provide a motorized damper (on/off type) in the exhaust air intake duct with an interlock to the room light.

AUTOPSY SUITE – ROOM DATA SHEETS

Support Areas (Circulation, Etc.) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 35% Relative Humidity
Minimum Supply Air Changes per Hour	8
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Double Negative (- -)
Note 1: Connect exhaust to the general exhaust system.	

BMT (BONE MARROW TRANSPLANT) SUITE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	Room Data Sheets
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C ● Final-Filters – VA Grade E ● **Note 2**
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high-pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for the unit-mounted preheat coils.
General Exhaust System(s)	100%
Special Exhaust System(s)	Not Required
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams.
Emergency Power	Required for HVAC equipment and controls
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of a desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

BMT (BONE MARROW TRANSPLANT) SUITE – AIR HANDLING UNIT

AHU Data Sheet

Note 1: A dedicated air-handling unit is required only when all BMT spaces are grouped together as a full-fledged department. BMT functions can also be found in special clinics or in an ambulatory department or clinical addition. BMT with limited size and scope can be grouped together with other similar functions and served by an air-handling unit other than a dedicated unit, provided that all innate HVAC requirements are not compromised.

Note 2:

(a) Locate the final filters (third bed) on the downstream side of the individual air terminal units serving the following rooms:

- Patient Areas
- Donor Rooms
- Recovery Rooms
- Medicine Preparation Rooms

(b) Terminal filters are not required for the support functions (Lounge, Nurse's Station, Circulation Spaces, and Conference Rooms, etc.).

(c) Oversize the terminal HEPA filters to reduce the system static pressure drop.

(d) Provide a variable speed drive for the supply air fan to ensure constant air delivery under varying resistance due to filter loading. Provide appropriate DDC control devices to operate the variable speed drive.

BMT (BONE MARROW TRANSPLANT) SUITE – ROOM DATA SHEETS

Room Data Sheets

- **Patient Rooms**
- **Donors Room**
- **Recovery Rooms**
- **Medication Preparation Room**

Inside Design Conditions	● Year Around Conditions: 70 F to 75 F [21 C to 24 C] 30% to 50% (Uncontrolled) ● **Note 1**
Minimum Supply Air Changes per Hour	8
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Double Positive (+ +) ● **Note 2**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2: Design air distribution system to maintain positive air pressure. Coordinate provision of anteroom with architectural discipline. Provide volumetric controls to demonstrate the air volume difference**.**

COMPUTER ROOM AIR-CONDITIONING UNITS (EQUIPMENT COOLING ONLY)

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	● 64 F [17.8 C] to 75 F [24 C] Dry-Bulb Temperature ● 30 to 55% Relative Humidity
Minimum Outside Air	Not Required
Minimum Supply Air Changes per Hour	Coordinate unit capacity with the equipment load
Return Air	100%
Economizer Cycle	Not Applicable
Filtration	As furnished with the computer room air conditioning units
Cooling Source	Chilled water from the central chilled water plant or dedicated chiller or DX units
Heating Source	Hot water using steam from the central boiler plant
General Exhaust System(s)	Not Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Applicable
Emergency Power	Required
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1:

(a) Provide multiple freestanding air conditioning units, also designated as CRACs (Computer Room Air Conditioning Units), specifically designed for the computer room. Provide N+1 units, where N = Number of units in operation and 1 unit is standby.

(b) Coordinate air distribution system with the raised floor.

(c) Provide reheat and humidification for each computer room air conditioning unit.

(d) Coordinate make-up water for humidification and cooling coil condensate drain line and trap with the plumbing discipline.

(e) Provide an automatic leak detection system for the under-floor space. Provide a local audible and remote alarm at the ECC in the event the under floor humidity rises above 65%. Provide interface between the CRAC units and the central DDC system.

(f) Admit conditioned air from the adjoining environmental AHU as the minimum outside air. For large installations, a dedicated make-up air unit may be required.

DENTAL CLINIC – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	CV
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Required
Economizer Cycle	ASHRAE 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required

DENTAL CLINIC – ROOM DATA SHEETS

Ceramic Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	● Not Permitted ● **Note 2**
Exhaust Air	Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Coordinate internal heat gain with the equipment supplier. **Note 2:** Locate exhaust air registers at or near the technicians' workbenches. Coordinate locations with the architectural discipline.	

Dental Treatment Operatory	
Inside Design Conditions	● Year Around Conditions: 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

DENTAL CLINIC – ROOM DATA SHEETS

General Laboratory	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Coordinate internal heat gain with the equipment supplier. **Note 2:** Coordinate the exhaust requirements for the prosthetic dental laboratories with the locations of the wall registers and canopy hood – if any.	

Oral Surgery Recovery Room	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

DENTAL CLINIC – ROOM DATA SHEETS

Oral Surgery Room	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	8
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Coordinate internal heat gain with the equipment supplier.	

DINING AREAS (DIETETICS) – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	VAV
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity Heating ● 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Outside Air	● Chapter 2 ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Permitted
Economizer Cycle	ASHRAE Standard 90.1-2007
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high-pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for the unit-mounted preheat coils.
General Exhaust System(s)	**Note 2**
Special Exhaust System(s)	**Note 2**
Heat Recovery System	Not Required
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) with respect to adjoining spaces ● Positive (+) with respect to the kitchen

Note 1: Estimate the make-up air requirement of the adjoining kitchen (if any) and adjust the minimum outside air volume accordingly.

Note 2: If a Dining Hall or Cafeteria is located next to the kitchen, a special exhaust system may not be required, as the room air can be transferred to the kitchen as make-up air for exhaust. With a standalone dining or cafeteria facility, provide a general exhaust system for the dining room. Collect exhaust air over a warmer located in the dining or kitchen through an integral or field-fabricated hood. Coordinate with the kitchen drawings, consultant, and equipment vendor to determine if there is a need for any additional exhaust within the dining hall or cafeteria, such as a range hood for a grill requiring a special exhaust system per NFPA 96.

EMERGENCY CARE UNIT (AMBULATORY CARE UNIT) – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Notes 1 and 2**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	● Normal Operation – Chapter 2 ● Emergency Operations – 100%
Minimum Supply Air Changes per Hour	6
Return Air	● Normal Operation – Required ● Emergency Mode – Not Permitted
Economizer Cycle	ASHRAE Standard 90.1 – 2004
Room Noise Levels	Room Data Sheets
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	● Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required

Note 1:

(a) Provide capability to operate this air-handling unit at 100% outside air during the emergency mode. Activate the emergency mode operation either by a manual selector switch or by DDC controls from a local control panel or remote ECC. Coordinate the location of the manual selector switch with VA Authorities.

(b) During emergency mode, return air fan shall operate as the exhaust air fan to relieve room air outdoors by automatic dampers, VAV air terminal units shall assume constant volume position to deliver the scheduled design air volume, and general exhaust (toilet etc.) system shall continue to operate. Do not assume any diversity while calculating supply air volume.

Note 2: Select cooling and heating capacities based on 100% outside air. Provide two control valves (1/3 and 2/3 capacities) for the cooling and preheat coils to operate in sequence to meet large load variation.

EMERGENCY CARE UNIT (AMBULATORY CARE UNIT) – ROOM DATA SHEETS

Emergency Waiting Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Life Support Unit – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

EMERGENCY CARE UNIT (AMBULATORY CARE UNIT) – ROOM DATA SHEETS

Observation and Treatment Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Security - Exam Room - Toilet – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Toilet Only
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0) – Exam Room Negative (-) – Toilet
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity	

GYMNASIUM – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	CV
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● **Notes 1 and 2**
Minimum Outside Air	● Chapter 2 ● **Note 3**
Minimum Supply Air Changes per Hour	6
Return Air	Required
Economizer Cycle	ASHRAE 90.1 – 2007
Room Noise Level	NC 45
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high-pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for the unit-mounted preheat coils.
General Exhaust System(s)	Optional, required if connected with spaces requiring exhaust
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1: Provide high-humidity control for the summer cooling mode to limit the space relative humidity to 60%.

Note 2: Where feasible, evaluate the use of a heating and ventilation unit without mechanical cooling.

Note 3: Provide a CO_2-actuated, demand-controlled ventilation control sequence to admit minimum design outside air only when the CO_2 concentration starts rising above 400 PPM. Provide an airflow-measuring device with the minimum outside air damper and CO_2 sensor in the return air duct. Ensure accuracy of the airflow-measuring device at low air volumes.

IMAGING SERIES – MRI UNIT – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Permitted
Economizer Cycle	ASHRAE Standard 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	● Chilled water from the central chilled water plant ● Room Data Sheets for the closed-loop dedicated chiller for the MRI System Component Room
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils
General Exhaust System(s)	Room Data Sheets
Special Exhaust System(s)	Room Data Sheets
Heat Recovery System	Not Required
Emergency Power	Required for: ● Components of the MRI Unit (coordinate with the MRI vendor) ● Emergency exhaust fan ● Associated controls

Note 1:

(a) The design A/E shall become familiar with the MRI Design Guide published by the Office of Construction & Facilities Management. This publication contains valuable information about the space layout, equipment list, exhaust system, and utility requirements. A design guide plate for each room shows tentative room dimensions and equipment layout.

(b) The capacity and configuration of the MRI (Magnetic Resonance Imaging) Unit varies from manufacturer to manufacturer. ***Coordination with the project-specific MRI vendor is critical.***

(c) The MRI Unit, a component of the Imaging Series, can be connected to any other dedicated air-handing unit such as the Radiology Unit, provided the HVAC design parameters are not compromised.

IMAGING SERIES – MRI UNIT – ROOM DATA SHEETS

MRI Control Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Permitted
Exhaust Air	Permitted
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 40% relative humidity. Coordinate relative humidity requirement with the MRI equipment vendor.	

MRI Scanning Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12
Return Air	Permitted during normal operation
Exhaust Air	**Notes 2 - 5**
Room Noise Level	NC 35
Emergency Power	AHU Data Sheet
Individual Room Temperature Control	● Required ● Locate room temperature sensor in the return air duct and outside the RF Shielding. ● Provide low and high temperature alarms (local and at the ECC).
Room Air Balance	Positive (+)

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 40% relative humidity. Coordinate the relative humidity requirement with the MRI equipment vendor.

Note 2: Emergency Exhaust Fan

(a) Provide a special automatic/manual emergency exhaust system to exhaust the scanning room in the event cryogen liquid spills in the room. Provide directly ducted connection between the exhaust air inlet and the fan, as shown in the sketch in the MRI Design Guide.

(b) Automatic operation of the exhaust system shall be tied to the vendor's automatic alarm

IMAGING SERIES – MRI UNIT – ROOM DATA SHEETS

system by an electric relay. Provide two manual switches (one located in the scanning room and other in the control room) under the custody of the designated operating personnel.

(c) Exhaust fan can discharge from the walls or roof if there are no operable windows or outside air intakes, or if regular/scheduled human traffic is within a 25 Foot [7.6 Meter] radius. Provide a motorized damper in the return air duct to stop return air pick-up.

(d) Provide a laser optical oxygen sensor, located 18 inches [450 mm] below the suspended architectural ceiling, to sound an audible and visible local alarm and an alarm at the ECC in the event the oxygen level drop.

Note 3: Cryogen (Quench) Vent Pipe

(a) Provide a vent pipe (size, location, and material to be coordinated with the MRI equipment supplier) from the RF shield to outdoors.

(b) Divide the scope of work such that the MRI vendor is responsible for the supply and installation of the vent pipe, including RF Shield fitting, from the magnet to the RF Shield Barrier.

(c) Spill can discharge from the walls or roof if there are no operable windows or outside air intakes, and no regular or scheduled human traffic within a 25 foot [7.60 Meter] radius. Terminate the vent pipe with a turndown weather head.

Note 4: Overpressure Relief

(a) Hatch in RF Shield Enclosure: MRI equipment vendor shall be responsible for the supply, installation, and testing of the pressure relief hatch (gravity-operated). The hatch shall be similar to a back-draft damper. Upon sensing a difference in pressure between the occupied space and the void between the suspended ceiling and the RF Shield enclosure, the hatch shall open to permit the cryogen gas to escape into the void between the RF Shield and the floor or roof above.

(b) Hatch in the Roof or Wall: The General Contractor (GC) shall supply and install an "explosion" hatch in the roof or wall, whichever is the closet, to relieve gas under pressure outdoors. The explosion hatch is pressure-actuated and can be connected to the quench alarm system. Coordinate the location, size, and design of the hatch with the MRI equipment vendor.

Note 5: Optional MRI Equipment Circulating Fan (Room Air Distribution)

(a) At the MRI vendor's option, room air can be circulated through the MRI equipment by a dedicated circulating fan and returned back to the system by an indirect (Thimble) connection. Coordinate the division in the scope of work between the MRI vendor and the general contractor.

(b) Arrange room air distribution to allow the conditioned air to flow over the MRI equipment with return and/or exhaust inlets located on the equipment back to facilitate MRI equipment cooling.

IMAGING SERIES – MRI UNIT – ROOM DATA SHEETS

MRI System Component Room – Room Data Sheet	
Inside Design Conditions	70 F [21.1 C] Dry-Bulb Temperature 40% to 60% Relative Humidity
Minimum Supply Air Changes per Hour	● 6 ● **Note 1**
Return Air	Permitted
Exhaust Air	Not Applicable
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1:

(a) Provide a dedicated AC unit to serve the System Component Room. Coordinate size and configuration with the equipment manufacturer.

- Coordinate AC unit air distribution with the raised floor.
- Provide water sensor alarm (local and at the ECC) in the event of any water leakage below the raised floor.

(b) Provide a closed-loop, dedicated, water chiller to cool the MRI equipment. Chiller shall be air-cooled and remotely located. Provide cross-connections with the central chilled water plant. Additional considerations are:

- Ensure that the water quality (pH value, hardness, and solid suspended contents) are in accordance with the equipment manufacturer's specifications.
- Piping shall meet "Radio Frequency Requirements." Provide clearly marked and identified access for the piping located in walls and chases.
- Coordinate chilled water flow requirement, chilled water temperature, and division in the scope of work (connection detail) at each chilled water connection.

IMAGING SERIES – MRI UNIT – ROOM DATA SHEETS

MRI Visiting Area – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12
Return Air	Not Permitted
Exhaust Air	100% **Note 2**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 40% relative humidity. Coordinate relative humidity requirement with the MRI equipment vendor. **Note 2**: Provide exhaust through the general exhaust system.	

INTENSIVE CARE UNITS AND RECOVERY ROOMS – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	● Chapter 2 ● **Note 2**
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Permitted
Economizer Cycle	ASHRAE Standard 90.1 – 2007
Inside Design Conditions	Room Data Sheets
Filtration	● Pre-Filters – VA Grade A ● After Filters – VA Grade C ● Final-Filters – VA Grade E ● **Note 3**
Cooling Source	● Dedicated chiller serving the surgical suite shall be the prime source of mechanical cooling for the ICU and recovery AHU. ● Provide cross-connections with the central chilled water plant for emergency backup.
Heating Source	● Use high-pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for the unit-mounted preheat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Required

Note 1:

(a) ICU and recovery rooms can be grouped together to form a dedicated unit if these spaces are situated in close proximity of each other and are not adjacent to the surgical suite.

(b) Provide a variable speed drive for the supply air fan to ensure constant air delivery under varying resistance due to filter loading. Provide the appropriate control sequence to operate the variable speed drive.

Note 2: Exhaust all supply air outdoors when the spaces are served by the surgical suite AHU.

Note 3: Locate final filters (third bed) on the downstream side of the supply air fan with a diffusion plate section between the filters and fan to ensure uniform air velocity and distribution.

INTENSIVE CARE UNITS AND RECOVERY ROOMS – ROOM DATA SHEETS

Intensive Care Unit – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Permitted
Exhaust Air	**Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2**: Provide exhaust through the adjoining toilet, if any.	

Recovery Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 73 F [22.8 C] to 77 F [25 C] Dry-Bulb Temperature 30% to 55% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Permitted
Exhaust Air	**Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 73 F [22.8 C] and 50% relative humidity. Heating load calculations shall be based on 77 F [25 C] and 30% relative humidity. **Note 2**: Provide exhaust through the adjoining toilet, if any. **Note 3:** Provide terminal HEPA filter if Recovery Room is served by surgical suite AHU.	

KITCHEN (DIETETICS) – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	CV
Inside Design Conditions	● Cooling 82 F [27.8 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature ● **Note 1**
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	● 10 ● **Notes 2 and 3**
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	NC 45
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	**Note 4**
Special Exhaust System(s)	**Note 5**
Heat Recovery System	Not Permitted
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Note 1: Provision of winter humidification (30% RH) is project specific.

Note 2: Compile and coordinate the kitchen equipment heat gain with the equipment supplier and consultants.

Note 3: Make-Up Air System

Perform a cost-benefit analysis to justify the need for a dedicated, filtered, and tampered air unit to meet the make-up air need of the grease hood exhaust system(s). Provide specific recommendations to enable the VA Authorities to decide the status of the make-up air system.

Note 4: General Exhaust System

(a) Occupied Mode: Provide a general exhaust system to exhaust the space and capture heat over the equipment such as refrigeration compressors, plate warmer, mixers, etc. Locate exhaust air inlets as far above the equipment as possible.

KITCHEN (DIETETICS) – AIR HANDLING UNIT

(b) Unoccupied Mode: Provide a two-speed fan to operate the system at half-speed during unoccupied hours and maintain negative air balance with respect to the adjoining spaces.

Note 5: Grease Hood Exhaust System

The requirements listed below are not applicable to the small kitchenettes or warm-up kitchens.

(a) Provide a special exhaust system for the grease producing equipment such as griddles, ovens, broilers, and deep fat fryers. The design and construction of the exhaust system shall be in compliance with NFPA 96. Do not install turning vanes in the exhaust duct.

(b) Do not install fire and volume dampers in the exhaust air ductwork.

(c) Avoid horizontal duct runs as much as possible. Provide access doors in the exhaust ducts to remove grease at each turn in direction. Do not install turning vanes in the exhaust duct.

(d) Do not locate the grease exhaust duct in the same shaft carrying the environmental ducts. See NFPA 90A.

(e) Exhaust air discharge shall be in accordance with the outcome of the dispersion analysis. Maintain at least 40 inches [1000 mm] between the roof and the exhaust air outlet of the up-blast exhaust fan.

(f) Provide automatic and manual wash-down cycle and fire protection features operable from the hood control panel.

(g) Do not attempt any heat recovery from the grease laden air.

Note 6: Hot Vapor Producing Equipment

Coordinate the supply and installation of the high velocity type hoods with the kitchen drawings and consultants. Provide a dedicated exhaust system to serve hot vapor producing equipment such as steam kettles, vegetable steamers, and high-pressure cookers. Provide welded stainless steel ductwork.

Note 7: Wet Exhaust

Provide a dedicated wet exhaust system to capture moist air over the pot/pan and dishwasher. Either provide canopy-type hoods or use the integral hoods furnished by the equipment manufacturers. Provide welded stainless steel ductwork. Do not attempt any heat recovery from the moist air.

LABORATORIES – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV or VAV ● **Note 1**
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 2**
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	**Note 3**
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	● NC 40 – Without Hoods ● NC 45 – With Hoods)
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils. ● Hot water using steam from the central boiler plant.
General Exhaust System(s)	● Required – Chapter 3 ● **Note 4** (Dry Laboratories)
Special Exhaust System(s)	Required – Chapter 3
Heat Recovery System	Do not attempt any heat recovery from the laboratory exhaust systems.
Emergency Power	Required for all exhaust systems serving fume hoods and biological safety cabinets, including DDC controls
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 5**

Note 1:

(a) The AHU system configuration shall be project-specific.

(b) For a small system involving a few laboratories and minimum (fewer than 4) fume hoods, provide a CV system.

(c) For large new and renovation projects, the system configuration shall be based on the dynamic interaction between the hoods’ operation, general exhaust system, and maintaining constant offset with the corridor and adjoining spaces. A VAV system is provided to meet this objective.

LABORATORIES – AIR HANDLING UNIT

Note 2: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 3:

(a) Listed below are laboratories with minimum 6 air changes per hour:

- Laboratory Bacteriology
- Laboratory Biochemistry
- Laboratory Cytology
- Laboratory Histology
- Laboratory Microbiology
- Laboratory Nuclear Medicine
- Laboratory Pathology
- Laboratory Serology
- Laboratory, Media Transfer

(b) Listed below are applications with minimum 10 air changes per hour:

- Laboratory Glass Washing
- Laboratory Sterilizing

(c) Coordinate the quantity and types of hoods with the project requirements and provide special exhaust systems accordingly.

Note 4: "Dry Laboratories" are laboratories without any fume hoods, biological safety cabinets, and use of chemicals or water. Generally used for the research activities, the dry laboratories contain electronic equipment. The HVAC design criteria shall be similar to the office spaces. While the room air can be returned back to the system, evaluate the cost-effectiveness of an additional return air system.

Note 5: Estimate the corridor supply air volume to provide make-up for spaces under negative air balance. Provide a dedicated air terminal unit.

LAUNDRY (CENTRAL) AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	● Cooling 84 F [28.0 C] Dry-Bulb Temperature 60% Relative Humidity ● Heating 68 F [20.0 C] Dry-Bulb Temperature Uncontrolled Relative Humidity ● **Note 2**
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	● 10 ● **Note 3**
Return Air	● Not Permitted ● **Note 4**
Economizer Cycle	Not Applicable
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams
Additional Energy Conservation Measure	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.
Emergency Power	Not Required
Individual Room Temperature Control	Required for each section (soiled and clean)
Room Air Balance	● Negative (-) – Soiled Area ● Positive (+) – Clean Linen Area

LAUNDRY (CENTRAL) AIR HANDLING UNIT

Note 1: Provide a dedicated air-handling unit to serve the soiled area and clean linen area. Evaluate the use of evaporative cooling and/or ventilation only for the locations, where mechanical cooling can be avoided.

Note 2: Provide a night set back cycle control sequence.

Note 3: Coordinate the laundry utilities needs and heat dissipation with the equipment manufacturers.

Note 4: Provide a line collector to clean and re-circulate the dryer exhaust air utilizing the dryer blower.

MAIN TELEPHONE EQUIPMENT ROOM AIR-CONDITIONING UNITS

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	● 64 F [17.8 C] to 75 F [24 C] Dry-Bulb Temperature ● 30 to 55% Relative Humidity
Minimum Outside Air	Not Required
Minimum Supply Air Changes per Hour	Coordinate unit capacity with the equipment load
Return Air	100%
Economizer Cycle	Not Applicable
Filtration	As furnished with the computer room air conditioning units
Cooling Source	Chilled water from the central chilled water plant or dedicated chiller or DX units
Heating Source	Hot water using steam from the central boiler plant
General Exhaust System(s)	Not Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Applicable
Emergency Power	Required
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1:

(a) Provide multiple freestanding air conditioning units, also designated as CRACs (Computer Room Air Conditioning Units), specifically designed for the computer room. Provide N+1 units, where N = Number of units in operation and 1 unit is standby.

(b) Coordinate air distribution system with the raised floor.

(c) Provide reheat and humidification for each computer room air conditioning unit.

(d) Coordinate make-up water for humidification and cooling coil condensate drain line and trap with the plumbing discipline.

(e) Provide an automatic leak detection system for the under-floor space. Provide a local audible and remote alarm at the ECC in the event the under floor humidity rises above 65%. Provide interface between the CRAC units and the central DDC system.

(f) Admit conditioned air from the adjoining environmental AHU as the minimum outside air. For large installations, a dedicated make-up air unit may be required.

MEDICAL MEDIA SERVICE (MMS) – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Permitted
Economizer Cycle	ASHRAE Standard 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required

Note 1:

(a) With the advent of the digital technology, equipment for the Medical Media Service has changed and the use of the chemicals for the film processing has been eliminated or minimized.

(b) A dedicated air-handling is required only if the Medical Media Service constitutes a full-fledged department with all or many spaces listed in the Room Data Sheets included in the scope of work.

MEDICAL MEDIA SERVICE (MMS) – ROOM DATA SHEETS

Audio Visual Equipment Storage/Checkout – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Camera Copy – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Client Review Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

MEDICAL MEDIA SERVICE (MMS) – ROOM DATA SHEETS

Computer Imaging System Network (CISN) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Darkroom and Darkroom (Printing and Enlarging) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Design parameters are based on the assumption that the darkroom procedures involve the use of the chemicals.	

Expanded Core – Illustration Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

MEDICAL MEDIA SERVICE (MMS) – ROOM DATA SHEETS

Expanded Core – Stat Camera – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Photo Finishing – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Design parameters are based on the assumption that the photo finishing procedures involve use of the chemicals.	

Photo Studio/A.V. Recording – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 30
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

MEDICAL MEDIA SERVICE (MMS) – ROOM DATA SHEETS

Photomicrography – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The above room data is based on the assumption that chemicals shall not be used in the space. If chemicals are used for the process, the VAV system shall be changed to a CV system and return shall be changed to exhaust.	

Video Editing CCTB Control Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

NUCLEAR MEDICINE SERVICE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Room Data Sheets
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	● Room Data Sheets ● **Note 2**
Economizer Cycle	ASHRAE 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	**Note 3**
Special Exhaust System(s)	**Note 4**
Heat Recovery System	Not Required
Emergency Power	Not Required

Note 1: The A/E shall become familiar with the Nuclear Medicine Design Guide and related design guides of the Imaging Series. See TIL.

Note 2: Return air is permitted from the support functions such as circulation spaces such as the Nurse’s Station, Lounge, and Conference Rooms, if cost-effective.

Note 3: Provide a general exhaust system interlocked with the Nuclear Medicine AHU.

Note 4: Provide special exhaust system(s) for the fume hoods and biological safety cabinets. Coordinate hood locations and sizes with the architectural discipline.

NUCLEAR MEDICINE SERVICE – ROOM DATA SHEETS

Bone Densitometry Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Nuclear Medicine Scanning Room (Patient Examination Room) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 2**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2:

(a) Provide volumetric controls to demonstrate negative air balance.

(b) Locate supply and exhaust air outlets to create a directional airflow and admit make-up air from the adjoining area.

(c) If Xenon gas is used in this room, coordinate with the local radiation safety officer for any additional measures.

NUCLEAR MEDICINE SERVICE – ROOM DATA SHEETS

Nuclear Pharmacy Laboratory (Hot Laboratory) – Room Data Sheet **Storage and Preparation Area – Room Data Sheet**	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2:

(a) This room is also known as Radiopharmacy Room. Coordinate quantity and type of fume hoods and/or biological safety cabinets and provide appropriate, dedicated exhaust system(s) to serve the hoods. See Chapter 3. If radioactive Xenon gas and/or radioactive Iodine are used in this space, coordinate with the local safety officer for additional measures necessary, if any. Provide a supplementary general exhaust system, if required per the room air balance.

(b) Provide volumetric controls to demonstrate negative air balance.

(c) Locate supply and exhaust air outlets to create a directional airflow and admit make-up air from the adjoining area.

NUCLEAR MEDICINE SERVICE – ROOM DATA SHEETS

Patient Dose Administration – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 2**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2:

(a) Provide volumetric controls to demonstrate negative air balance.

(b) Locate supply and exhaust air outlets to create a directional airflow and admit make-up air from the adjoining area.

PET/CT System Component Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	As required to meet the cooling demand
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 70 F [21 C] and 40% relative humidity.

Note 2: Provide a dedicated AC unit to serve the System Component Room. Coordinate size and configuration with the equipment manufacturer.

- Coordinate AC unit air distribution with the raised floor.
- Provide water sensor alarm (local and at the ECC) in the event of any water leakage below the raised floor.

NUCLEAR MEDICINE SERVICE – ROOM DATA SHEETS

PT/CT Control – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 70 F [21 C]and 40% relative humidity.	

PT/CT Scanning Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 2**
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 70 F [21 C] and 40% relative humidity. **Note 2:** **(a)** Provide volumetric controls to demonstrate negative air balance. **(b)** Locate supply and exhaust air outlets to create a directional airflow and admit make-up air from the adjoining area.	

NURSING WING – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	VAV
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Permitted
Economizer Cycle	ASHRAE 90.1-2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required

NURSING WING – ROOM DATA SHEETS

Nurses Station – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Patient Bedrooms – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 6 – VAV Permitted ● **Note 2**
Return Air	Permitted
Exhaust Air	Through the connecting toilet
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to the Toilet ● Neutral (0) with respect to the Corridor
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Per 2007 ASHRAE Handbook of Applications, minimum air changes per hour can be reduced to 4 when supplemental heating system is included in design.	

NURSING WING – ROOM DATA SHEETS

Patient Bedrooms (Psychiatric Ward) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 6 – VAV Permitted ● **Note 2**
Return Air	Permitted
Exhaust Air	Through the connecting toilet
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to the Toilet ● Neutral (0) with respect to the Corridor
Special Design Considerations	**Note 3**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2: Per 2007 ASHRAE Handbook of Applications, minimum air changes per hour can be reduced to 4 when supplemental heating system is included in design.

Note 3:

(a) Use of exposed and accessible HVAC equipment is prohibited in the psychiatric wing. Examples:

- Radiators
- Fan Coil Units
- Exposed Piping and Ductwork
- Accessible Room Temperature Sensor
- Convectors

(b) Suspended Ceiling: Do not use lay-in tile acoustical ceiling. Use hard ceiling or concealed snap in arrangement. Keep ceiling height as high as possible.

(c) Radiant Ceiling: Use security clips to retain the radiant ceiling panels in place.

(d) Air Outlets/Inlets: Do not use conventional air inlets and outlets. Use security type, preferably, wall-mounted and recessed air outlets and inlets.

NURSING WING (Emergency Mode Unit) – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● Normal Mode – VAV ● Emergency Mode – CV ● **Notes 1 and 2**
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 3**
Minimum Outside Air	● Chapter 2 – Normal Mode ● 100% – Emergency Mode
Minimum Supply Air Changes per Hour	8
Return Air	● Permitted – Normal Mode ● Not Permitted – Emergency Mode
Economizer Cycle	ASHRAE 90.1-2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	**Note 4**
Special Exhaust System(s)	**Note 5**
Heat Recovery System	Not Required
Emergency Power	Provide emergency electric power for the HVAC system and the controls serving the emergency wing.
Individual Room Temperature Control	Required
Room Air Balance	● Neutral (0) – Normal Mode ● Negative (-) – Emergency Mode
Additional Considerations	**Note 6**

Note 1:

(a) Design at least one air-handling unit from one patient wing to serve during an emergency epidemic situation requiring strict isolation and ventilation control, such as a breakout of pandemic flu. During normal mode of operation, the designated air-handling unit shall operate in a variable air volume (VAV) mode with minimum outside air.

(b) During emergency mode of operation the system shall operate in a constant volume mode with 100% outside air. Switchover from normal to emergency mode shall be accomplished manually by giving a command to the DDC system. Coordinate the location(s) and number of designated wings with VA Authorities and the architectural discipline. Top floor location, away from the general traffic, is preferred to reduce the risk of contamination. With the top floor location, contaminated exhaust can be exhausted outdoors through the roof without requiring a dedicated shaft.

NURSING WING (Emergency Mode Unit) – AIR HANDLING UNIT

(c) Provide a set of double doors for entry into the designated emergency ward. An entry vestibule is recommended but not mandatory.

Note 2:

(a) During emergency mode, each air terminal unit shall be programmed to deliver the design air volume in a constant volume mode. Capacity of the air-handling unit shall therefore be the sum of all individual peaks; that is, without the diversity inherent to the variable air volume system.

(b) Size the cooling and heating capacities to accommodate the larger air flow and outside air requirements.

Note 3: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 4:

(a) Provide a general exhaust system to ventilate the patient toilets, soiled utility room, housekeeping aide's closets, etc.

(b) During normal and emergency modes of operation, exhaust shall be discharged outdoors over the roof at 3,500 Feet/Minute [18.0 Meters/Second] through a stack at least 10 Feet [3.0 Meters] high. A taller stack may be required, if recommended per dispersion analysis.

(c) Create alternate exhaust paths, with a pair of automatic, on/off motorized dampers, to pass exhaust over the pre-filters – VA Grade A and HEPA filters – VA Grade E during the emergency mode and without the filters during the normal mode of operation. Provide a variable speed drive for the exhaust fan motor and an airflow-measuring device without a variable speed drive to ensure constant air volume in both modes of operation.

Note 5:

(a) During emergency mode, all room air shall be exhausted outdoors and 100% outdoor air shall be admitted. During emergency mode, return air fan shall act as an exhaust fan and all automatic dampers shall be programmed to assume their revised positions. Exhaust air shall be discharged outdoors over the roof at 3,500 Feet/Minute [18.0 Meters/Second] through a stack at least 10 Feet [3.0 Meters] high. A taller stack may be required, if recommended per dispersion analysis.

(b) Provide air exhaust fan motor and an airflow-measuring device without a variable speed drive to ensure constant air volume in both modes of operation.

Note 6:

(a) Provide two, automatic control valves (1/3 and 2/3 capacity) for each coil to ensure stable operation between the two modes.

NURSING WING (Emergency Mode Unit) – AIR HANDLING UNIT
(b) Design air distribution system to collect return (or exhaust) air over the patient without short-circuiting the supply air, facilitating inwards airflow in each patient room.

PHARMACY SERVICE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Room Data Sheets
Economizer Cycle	ASHRAE 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After Filters – VA Grade C ● Final-Filters – VA Grade E ● **Note 2**
Cooling Source	● Use chilled water from the central chiller plant ● **Note 3**
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Room Data Sheets
Heat Recovery System	ASHRAE 90.1 – 2007
Emergency Power	Required
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

Note 1: The HVAC system design criteria are based on the latest (December 3, 2007) publication of the USP (The United States Pharmacopeial Convention) Revised Bulletin <797> Pharmaceutical Sterile Preparations. A dedicated air-handling unit is not required to serve only the hazardous and/or non-hazardous clean rooms as long as any air-handling unit serving these rooms can meet all requirements outlined in the AHU Data Sheet and the Room Data Sheets.

Note 2: Locate the final filters (third bed) on the downstream side of the individual air terminal units serving hazardous and non-hazardous clean rooms. Oversize the final filters to minimize the pressure drop. For remaining rooms, terminal HEPA filters are not required.

Note 3: Dedicated chiller is required if chilled water is not available year around.

PHARMACY SERVICE – ROOM DATA SHEETS

Non-Hazardous Clean Room – Room Data Sheet

Description: The following introductory information is provided for the non-hazardous clean rooms. The room comprises three segments:

1. PEC (Primary Engineering Control) is a device or a space that provides an ISO Class 5 environment for compounding of drugs. ***Selection of the PEC shall be done by the VA Pharmacy Department.*** Generally a laminar airflow work bench (LAFW) is used as the PEC device. The room air need not be exhausted outdoors.

Note that USP <797> General Chapter allows the use of a CAI (Compounding Aseptic Isolator) or CACI (Compounding Aseptic Containment Isolator) for Low-Risk Level CSPs (Compounded Sterile Preparations) even without the use of Class 7 Clean Room, provided "non-hazardous and radiopharmaceutical CSPs pursuant to a physician's order for a specific patient may be prepared, and administration of such CSPs shall commence within 12 hours of preparation or as recommended by in the manufacturer's package insert whichever is less." See USP <797> for the Low-Risk Conditions.

2. Buffer area is the space in which the PEC is physically located. This is the clean room where activities such as preparation and staging of components used for drug preparation take place. Buffer area is maintained at ISO Class 7 by supplying HEPA filtered air unidirectionally from the suspended ceiling.

3. Anteroom is an ISO Class 8 or better area, which serves as a transient place to maintain the integrity of buffer area. This space also handles personnel hygiene and garbing of the personnel. Physical separation between the anteroom and the buffer area is a wall with doors. Only one set of doors can be opened at any given time to avoid disruption of the air pressure gradient.

4. See USP <797> for additional requirements for lighting and ceiling surfaces, caulking, etc.

5. See Figures 6A-1 and 6A-2 for air balance and air flow diagrams.

PHARMACY SERVICE – ROOM DATA SHEETS

PEC and Buffer Room (Non Hazardous Clean Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 68 F [20 C] Dry-Bulb Temperature (maximum) 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature (minimum) 40% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 30 – CV Required ● **Note 2**
Return Air	Permitted
Exhaust Air	Not required with 100% re-circulatory ISO Class 5
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to the anteroom ● **Note 3**
Note 1: Room level humidity control is not required. **Note 2:** Air changes listed above must be able to limit the concentration of airborne particles. Provide more air changer per hour, if required to maintain ISO Class 7 particulate count. **Note 3:** Provide outside air as required to maintain the specified pressure differential.	

Anteroom (Non Hazardous Clean Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 68 F [20 C] Dry-Bulb Temperature (maximum) 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature (minimum) 40% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 20 – CV Required ● **Note 2**
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to circulation space ● Negative (-) with respect to buffer room
Note 1: Room level humidity control is not required. **Note 2:** Air changes listed above must be able to limit the concentration of airborne particles. Provide more air changer per hour, if required, to maintain ISO Class 8 particulate count.	

PHARMACY SERVICE – ROOM DATA SHEETS

Hazardous Clean Room – Room Data Sheet

Description: The following introductory information is provided for the hazardous clean rooms. The room comprises three segments:

1. PEC (Primary Engineering Control) is a device or a space that provides an ISO Class 5 environment for compounding of drugs. ***Selection of the PEC shall be done by the VA Pharmacy Department.*** Generally, a Biological Safety Cabinet (BSC) Class II B2 is used as the PEC device through which the air is exhausted outdoors after passing over the duct-mounted HEPA filter. See Chapter 3.

2. Buffer area is the space in which the PEC is physically located. This is the clean room where activities such as preparation and staging of components used for drug preparation take place. Buffer area is maintained at ISO Class 7 by supplying HEPA filtered air and establishing unidirectional flow.

3. This room can also be used to store hazardous substances, provided that adequate storage space is available. Otherwise, a separate room is required to store hazardous substances. This room should be ventilated at 12 air changes per hour. Exhaust from this room should be connected to the special exhaust system serving the buffer room and anteroom.

4. Anteroom is an ISO Class 7 or better area, which serves as a transient place to maintain the integrity of buffer area. This space also handles personnel hygiene and garbing of the personnel. Physical separation between the anteroom and buffer area is a wall with doors. Only one set of doors can be opened at any given time to avoid disruption of the air pressure gradient.

5. See USP <797> for additional requirements for lighting and ceiling surfaces, caulking, etc.

6. See Figures 6A-1 and 6A-2 for air balance and air flow diagrams.

PEC and Buffer Room (Hazardous Clean Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 68 F [20 C] Dry-Bulb Temperature (maximum) 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature (minimum) 40% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 30 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-) with respect to the anteroom
Note 1: Room level humidity control is not required.	

PHARMACY SERVICE – ROOM DATA SHEETS

Anteroom (Hazardous Clean Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 68 F [20 C] Dry-Bulb Temperature (maximum) 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature (minimum) 40% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 30 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● See Buffer Room above
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to Hazardous Clean Room ● Positive (+) with respect to circulation space whose room pressure is assumed to be neutral (0)
Note 1: Room level humidity control is not required.	

Controlled Substance Vault and Secured Dispensing Receiving Area – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

PHARMACY SERVICE – ROOM DATA SHEETS

Dispensing, Pre-Packing, and EXTEMP – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 40% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

Drug Information Service – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

PHARMACY SERVICE – ROOM DATA SHEETS

EXTEMP Repacking and Compounding – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

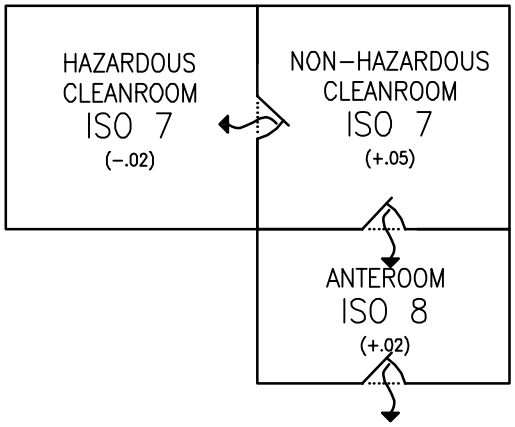
Medicine Assignment and Stat Counter – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

PHARMACY SERVICE – ROOM DATA SHEETS

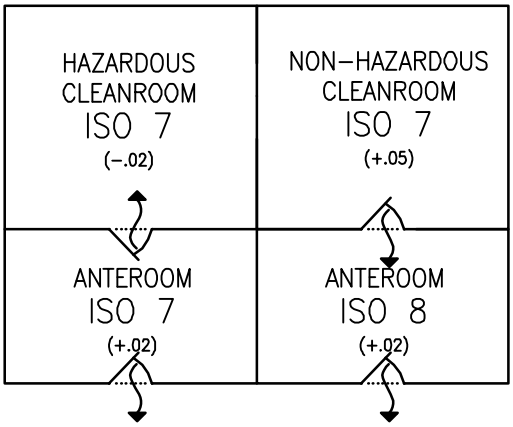
Prescription Receiving, Filling/Assembly – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

Unit Dose and Ward Stock – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature (maximum) 50% Relative Humidity ● Heating 75 F [24 C] Dry-Bulb Temperature (minimum) 35% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Room level humidity control is not required. **Note 2:** Room humidity shall be 40% if this room is served by the same AHU serving the clean rooms above.	

SKETCH A



SKETCH B



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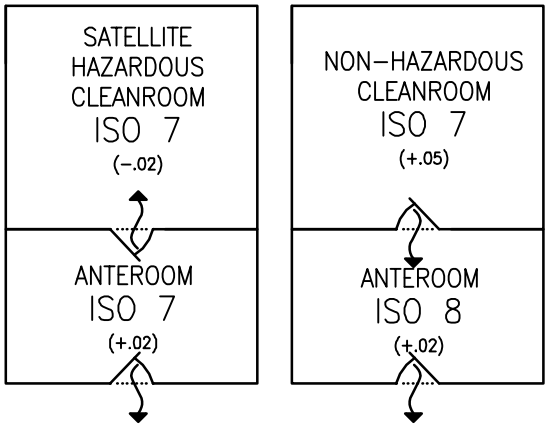
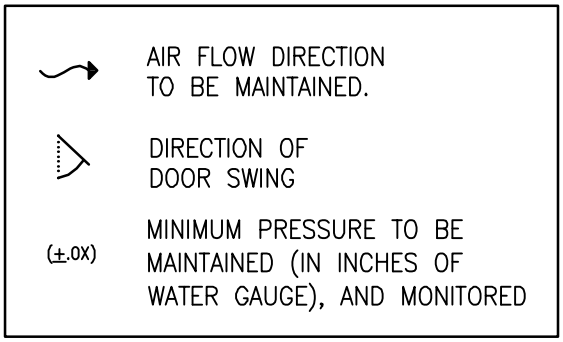
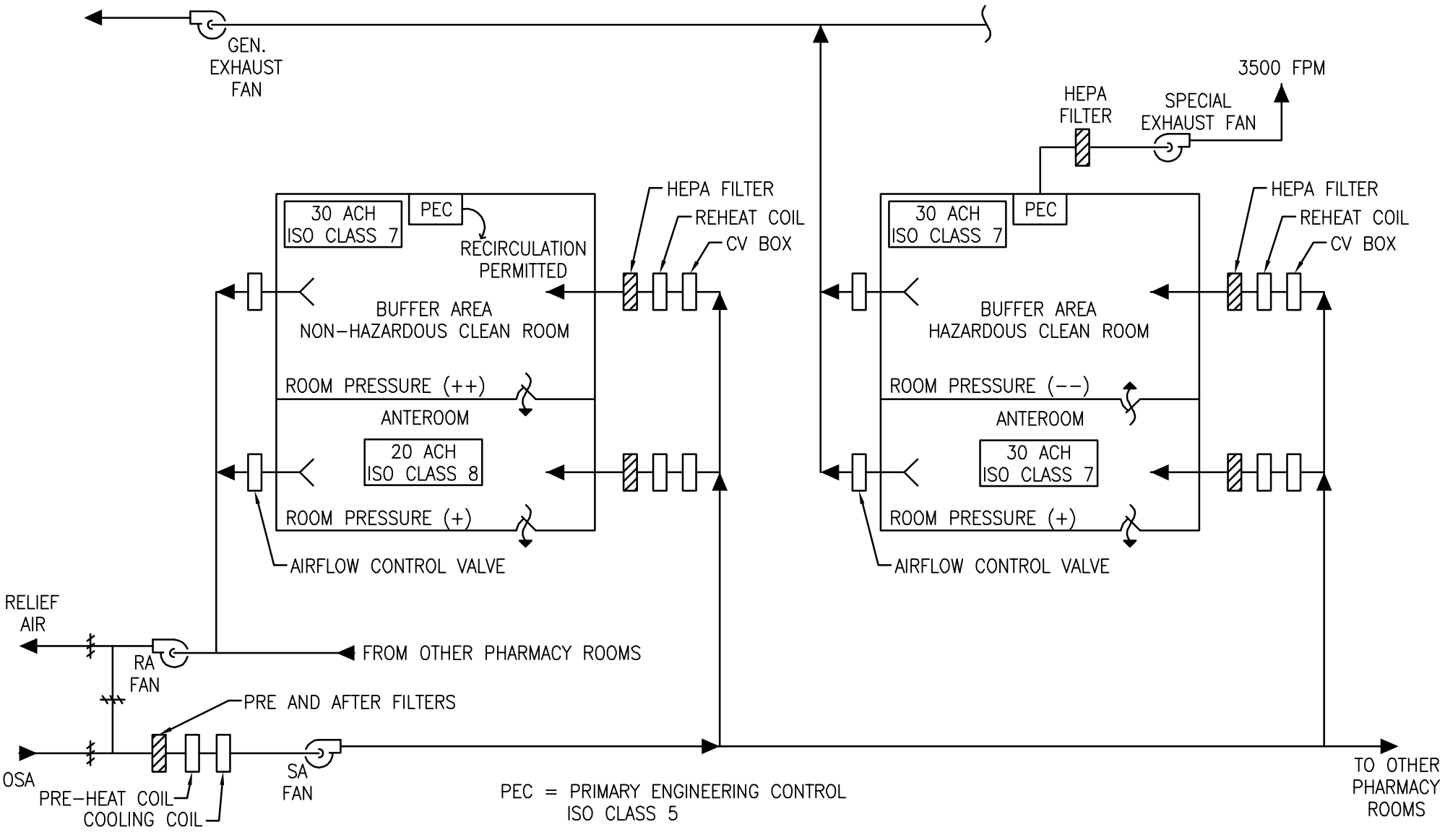


SWING DOORS SHOULD BE GASKETED AND HINGED TO OPEN AGAINST POSITIVE PRESSURE FOR PERSONEL SAFETY AND MAINTAINING PROPER PRESSURE RELATIONSHIPS.



PHARMACY COMPOUNDING AREAS

Not to Scale



HAZARDOUS / NON-HAZARDOUS ROOMS

Not to Scale

RADIOLOGY SUITE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2 and Room Data Sheets
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Permitted
Economizer Cycle	ASHRAE 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	● Chilled water from the central chilled water plant ● Refer to Room Data Sheet for the dedicated chiller requirements
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Required
Emergency Power	Not Required
Special Requirements	**Note 2**

Note 1:

A/E shall be familiar with the related publications of the Office of Construction & Facilities Management.

- Radiology Service Design Guide
- Radiation Therapy Service

These publications contain valuable information about the space layout, equipment list, and utilities requirements. A design guide plate for each room shows tentative room dimensions and the equipment layout.

Note 2: For HVAC ducts penetrating the lead-lined walls and ceiling, ensure coordination with the architectural discipline and provide treatment as specified by the equipment manufacturer.

RADIOLOGY SUITE – ROOM DATA SHEETS

Chest Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

CT Suite
General: This suite comprises two separate rooms: ● CT Control Room ● CT Scanning Room

CT Control Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

RADIOLOGY SUITE – ROOM DATA SHEETS

CT Scanning Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Verify with the equipment vendor the need for a dedicated chiller for this room and/or control room. Establish capacity, configuration, and layout of the chilled water system in consultation with the architectural discipline. Investigate the need for a back-up cooling arrangement.	

Film Library and Viewing – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	4 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

General Purpose Radiographic/Fluoroscopic Room w/Control – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

RADIOLOGY SUITE – ROOM DATA SHEETS

General Purpose X-Ray Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Interventional Radiology Suite
General: This suite comprises three separate rooms: ● Special Procedure Room ● Special Procedure Control Room ● Special Procedure System Component Room

Special Procedure Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	15 – VAV permitted
Return Air	● Permitted ● **Note 1**
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: Provide two return air pick-ups with high and low return air inlets at each pick-up. Locate the two pick-ups as far away as possible from each other.	

RADIOLOGY SUITE – ROOM DATA SHEETS

Special Procedure Control Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV terminal permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Special Procedure System Component Room – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead-Band ● **Note 1**
Minimum Supply Air Changes per Hour	● To meet cooling load requirements ● **Note 2**
Return Air	● Permitted ● **Note 3**
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Note 1: Provide a dedicated AC unit to serve the Special Procedure System Component Room. Coordinate unit capacity and configuration with the equipment manufacturer.

Note 2: Provide environmental air to meet ventilation requirement.

Note 3: Distribute air supply at or near the floor level and pick up return air at the ceiling level.

RADIOLOGY SUITE – ROOM DATA SHEETS

Mammography Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Radiographic Fluoroscopic Room with Control – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	6 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-) for the room and the adjoining toilet

Radiology Waiting Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	12 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

RADIOLOGY SUITE – ROOM DATA SHEETS

Ultrasound Room (with Connected Toilet) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 40% Relative Humidity ● 5 F [2.8 C] Dead-Band
Minimum Supply Air Changes per Hour	8 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+) – Ultrasound Room Negative – Toilet

SPINAL CORD INJURY UNIT – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Notes 1 and 2**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	Chapter 2
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Room Data Sheets
Economizer Cycle	ASHRAE 90.1 – 2007
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Not Applicable
Emergency Power	Not Required

Note 1:

A/E shall become familiar with the related publications of the Office of Construction & Facilities Management.

- Spinal Cord Injury/Disorders (SCI/D) Center Design Guide
- SCI/D Long Care

These publications contain valuable information about the space layout, equipment list, and utility requirements. A design guide plate for each room shows tentative room dimensions and the equipment layout.

Note 2: For rooms not covered in this appendix, refer to Appendix 6-B or the Spinal Cord Injury Design Guide.

SPINAL CORD INJURY UNIT – ROOM DATA SHEETS

Litter Storage – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature 30% Relative Humidity ● 9 F [12.7 C] Dead-Band
Minimum Supply Air Changes per Hour	4 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 1**
Note 1: Provide make-up air through door undercut or transfer grille.	

Patient Bedroom – (Spinal Cord Injury Unit) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 6 – VAV permitted ● **Note 2**
Return Air	Permitted
Exhaust Air	Through the connecting toilet
Room Noise Level	NC 35
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to toilet ● Negative (-) with respect to corridor
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity. **Note 2:** Per 2007 ASHRAE Handbook of Applications, minimum air changes per hour may be reduced to 4 when using a supplemental heating system.	

SPINAL CORD INJURY UNIT – ROOM DATA SHEETS

Private Litter Bath – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15 – CV required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 45
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity. **Note 2:** Connect room exhaust to the general exhaust system.	

Transfer Equipment Storage – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 68 F [20 C] Dry-Bulb Temperature 30% Relative Humidity ● 9 F [12.7 C] Dead-Band
Minimum Supply Air Changes per Hour	4 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 1**
Note 1: Provide make-up air through a door undercut or transfer grille.	

STANDALONE SMOKING FACILITY – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV ● **Notes 1 - 3**
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature Winter humidification Optional ● Night Unoccupied Mode 59 F [15.0 C] Dry-Bulb Temperature
Minimum Outside Air	● Occupied – 100% ● Night Unoccupied – 0%
Minimum Supply Air Changes per Hour	● 12 or 80 CFM [40 Liters/Second] per person
Return Air	● Permitted during unoccupied modes in day and night time ● **Note 4**
Economizer Cycle	Not Applicable
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Cooling Source	● Chilled water for the chilled water plant ● Dedicated DX unit (split system) or single unit
Heating Source	Select heating fuel (steam, hot water, hot water glycol, gas, or electricity) in consultation with the VA Authorities.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Applicable
Heat Recovery System	Not Required
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

STANDALONE SMOKING FACILITY – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet
Note 1: A dedicated, standalone (detached) smoking facility is required per VHA Directive 2003-035 dated July 1, 2003 (Expiration Date: July 31, 2008). Indoor smoking must not interfere with the safety of non-smokers. Per VHA Guidelines, smoking is permitted only for the long-term care patients and mental health program patients. **Note 2:** **Compliance** ● ASHRAE Standard 62.1 (Latest Edition) ● Joint Commission on Accreditation of Healthcare Organizations (JCAHO). **Note 3:** Evaluate and use one of the following three HVAC system selection options: **(a)** Use of the chilled water system with modulating control valve is the preferred option to ensure effective control of the space humidity in cooling mode. **(b)** With the option of the DX units, provide two refrigeration compressors to ensure effective dehumidification at part load. A single DX coil shall be of the intertwined configuration. **(c)** With the option of the chilled water or DX systems, control the supply air temperature leaving the cooling coil and use reheat to prevent overcooling during the build-up of space humidity cycle and activation of the high-humidity override mode. **Note 4:** Convert the HVAC system from 100% outside air to 100% re-circulatory mode – either manually with a selector switch or automatically with an occupancy sensor.

SUPPLY PROCESSING AND DISTRIBUTION – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	Room Data Sheets
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	Room Data Sheets
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Cooling Source	Chilled water from the central chilled water plant
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Provide a general exhaust system to serve the SPD area only.
Special Exhaust System(s)	Provide two special exhaust systems – one for Ethylene Oxide (ETO) Chamber and another for the Manual and Automatic Equipment Wash Area.
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams.
Emergency Power	Not Required
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

Note 1:

(a) Refer to Figure 6A-3 for an air flow diagram.

(b) Entry into SPD from decontamination side – negative (-) with respect to adjoining spaces.

(c) Entry into SPD from clean side – positive (+) with respect to adjoining spaces.

SUPPLY PROCESSING AND DISTRIBUTION – AIR HANDLING UNIT (Back Up Data)

Heat Dissipation:

- Information given below is based on installation of the recessed sterilizers using steam supplied by the central boiler plant.
- Determine the number of sterilizers and their sizes. Sterilizers are available in small, medium, and large sizes.
- Sterilizers are available as single door or double door type. While the single door sterilizers open only on the clean side, double door sterilizers open on both the soiled and clean sides. Heat is dissipated on each side with double door sterilizers. With single door sterilizers, heat is not dissipated on the dirty side.
- In addition to the heat dissipated by the sterilizers, there is a product load, which should be accounted for on the clean side where the sterilized products are removed. Add the product load to the radiated load to determine the total cooling requirements.
- In the matrix given below, the heat dissipation data is given.

Small Sterilizer – Single Door Up to 21 inches x 21 inches x 38 inches [525 mm x 525 mm x 950 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 0 BTUH
Remote End (Clean End)	● Radiated Load: 1,535 BTUH [450 Watts] ● Product Load: 1,750 BTUH [513 Watts] ● Total Load: 3,285 BTUH [963 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 4,295 BTUH [1,258 Watts]

Small Sterilizer – Double Door Up to 21 inches x 21 inches x 38 inches [525 mm x 525 mm x 950 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 1,535 BTUH [450 Watts]
Remote End (Clean End)	● Radiated Load: 1,535 BTUH [450 Watts] ● Product Load: 1,750 BTUH [513 Watts] ● Total Load: 3,285 BTUH [963 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 4,295 BTUH [1,258 Watts]

Medium Sterilizer – Single Door Up to 26.5 inches x 36 inches x 61 inches [663 mm x 900 mm x 525 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 0 BTUH
Remote End (Clean End)	● Radiated Load: 3,110 BTUH [911 Watts] ● Product Load: 3,500 [1,025 Watts] ● Total Load: 6,610 BTUH [1,936 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 9,770 BTUH [2,863 Watts]

Medium Sterilizer – Double Door Up to 26.5 inches x 36 inches x 61 inches [663 mm x 900 mm x 1525 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 3,110 BTUH [911 Watts]
Remote End (Clean End)	● Radiated Load: 3,110 BTUH [911 Watts] ● Product Load: 3,500 [1,025 Watts] ● Total Load: 6,610 BTUH [1,936 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 9,770 BTUH [2,863 Watts]

Large Sterilizer – Single Door Up to 26 inches x 62 inches x 76 inches [650 mm x 1550 mm x 1900 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 0 BTUH
Remote End (Clean End)	● Radiated Load: 6,235 BTUH [1,827 Watts] ● Product Load: 6,500 BTUH [1,904 Watts] ● Total Load: 12,735 BTUH [3,731 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 17,500 BTUH [5,127 Watts]

Large Sterilizer – Double Door Up to 26 inches x 62 inches x 76 inches [650 mm x 1550 mm x 1900 mm]	
Heat Dissipation:	
Control End (Dirty End)	Radiated Load: 6,235 BTUH [1,827 Watts]
Remote End (Clean End)	● Radiated Load: 6,235 BTUH [1,827 Watts] ● Product Load: 6,500 BTUH [1,904 Watts] ● Total Load: 12,735 BTUH [3,731 Watts]
Recessed Space (Between Clean and Dirty Sides)	Radiated Load: 17,500 BTUH [5,127 Watts]

SUPPLY PROCESSING AND DISTRIBUTION – ROOM DATA SHEETS

Decontamination Dressing Room – Room Data Sheet	
Inside Design Conditions	●Cooling 65 F [18.3 C] Dry-Bulb Temperature 80% Relative Humidity ●Heating 65 F [18.3 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	4
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) with respect to: - Soiled Receiving and Decontamination Area - Toilets ● Negative (-) with respect to: - Surrounding Area

SUPPLY PROCESSING AND DISTRIBUTION – ROOM DATA SHEETS

ETO Sterilizer/Aerator Room and ETO Tank Storage – Room Data Sheet	
Inside Design Conditions	Conditioned by transfer air
Minimum Exhaust Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 45
Individual Room Temperature Control	Not Required
Room Air Balance	Negative (-) with respect to the clean side

Note 1:

(a) Provide a dedicated exhaust system to serve ETO sterilizer, mechanical chase, ETO cylinder storage space, ETO aerator, ETO relief valve discharge pipe, and ETO sterilizer door area.

(b) Coordinate exhaust requirements with the equipment manufacturer.

(c) Exhaust fan shall operate 7 (days a week) x 24 (hours a day) even when the AHU is shutdown.

(d) Provide emergency power for the exhaust fan.

(e) Exhaust duct shall be continuously welded.

(f) Exhaust air shall be discharged from the highest point (minimum 10 Feet [3.0 Meters]) above the building in accordance with the recommendations of the dispersion analysis.

(g) Provide an airflow control valve in each exhaust branch duct to ensure exact balancing of all branch ducts with widely varying static pressure drops.

(h) Provide local and ECC alarm capabilities in the event of exhaust fan malfunction or failure.

(i) Do not attempt heat recovery from the exhaust air stream of the ETO exhaust system.

SUPPLY PROCESSING AND DISTRIBUTION – ROOM DATA SHEETS

Equipment Storage and Testing Room – Room Data Sheet **Clean/Sterile Storage – Room Data Sheet** **Case Cart – Room Data Sheet** **Dispatcher's Control Room – Room Data Sheet**	
Inside Design Conditions	●Cooling 73 F [23.0 C] Dry-Bulb Temperature 55% Relative Humidity ●Heating 68 F [20.0 C] Dry-Bulb Temperature 35% Relative Humidity
Minimum Supply Air Changes per Hour	4
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	Positive (+) with respect to: ● Automatic Equipment Wash ● Manual Equipment Washroom ● Toilets ● HAC ● Surrounding Area Negative (-) with respect to: ● Preparation, Assembly, and Sterilization Room

Manual and/or Automatic Equipment Wash Area – Room Data Sheet	
Inside Design Conditions	Conditioned by transfer air
Minimum Exhaust Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 45
Individual Room Temperature Control	Not Required
Room Air Balance	Negative (-) with respect to the clean side

Note 1:

(a) Provide a dedicated "wet exhaust" system to serve this space.

(b) Coordinate exhaust requirements with the equipment manufacturer.

(c) Provide emergency power for the spark-proof exhaust fan and explosion-proof motor.

(d) Exhaust duct shall be continuously welded, stainless steel.

(e) Do not attempt heat recovery from the wet exhaust.

SUPPLY PROCESSING AND DISTRIBUTION – ROOM DATA SHEETS

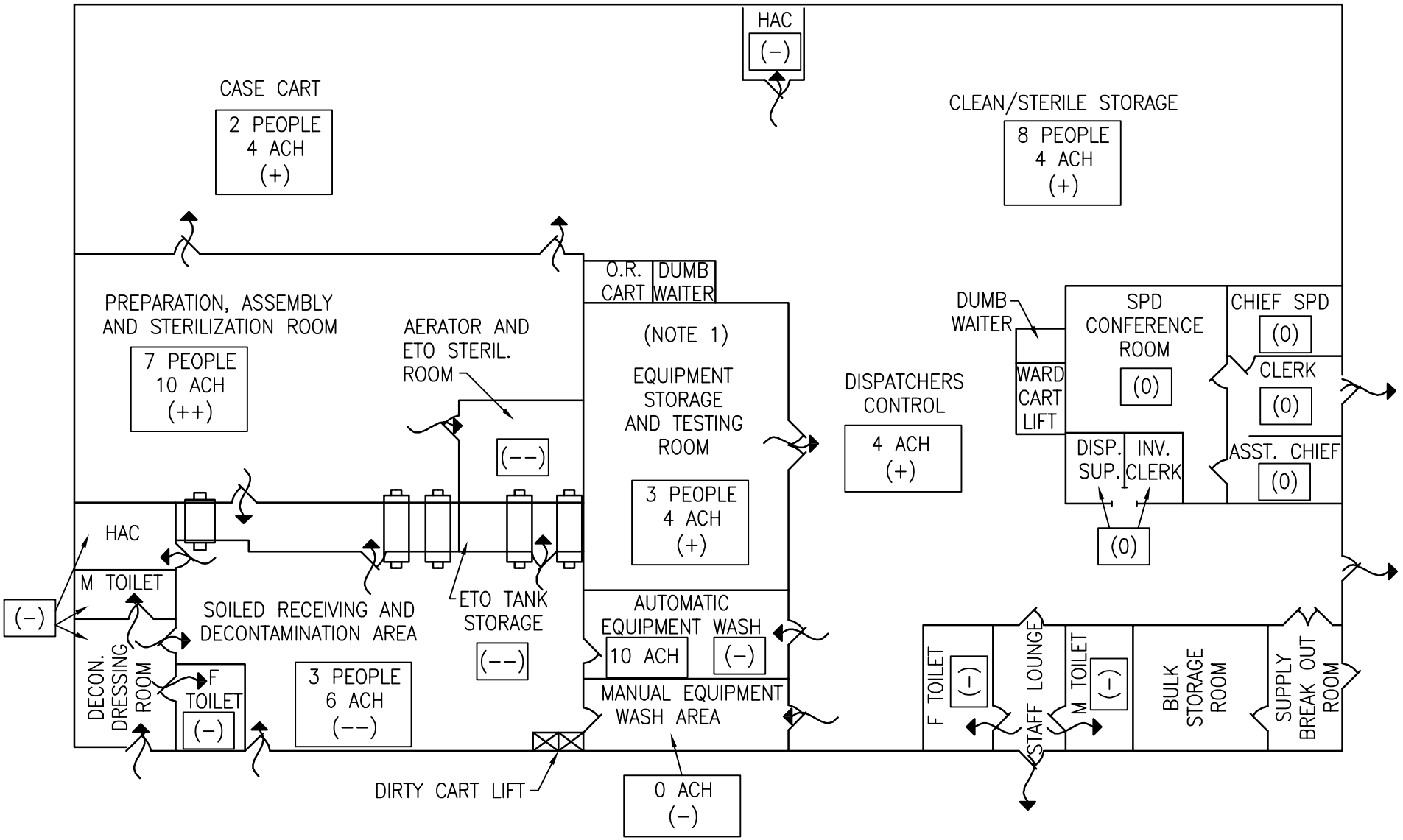
Preparation, Assembly, Packaging, and Sterilization – Room Data Sheet	
Inside Design Conditions	●Cooling 73 F [23.0 C] Dry-Bulb Temperature 55% Relative Humidity ●Heating 68 F [20.0 C] Dry-Bulb Temperature 35% Relative Humidity
Minimum Supply Air Changes per Hour	10
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 40
Individual Room Temperature Control	Required
Room Air Balance	● This is the cleanest space in the SPD Department. Maintain this space under double positive (+ +) air balance with respect to the adjoining spaces by retaining 30% air in the room, after making allowance for the make-up air needs of the ETO enclosure and sterilizer chamber. Air from other spaces shall not be allowed to enter into this room. Design air distribution layout accordingly. ● Provide an airflow control valve in the exhaust air duct leaving this room to demonstrate compliance. ● Provide positive pressure indicator between Preparation, Assembly, Packaging and Sterilization room and the case cart area.
Note 1: Provide continuous canopy hood over the sterilizers and draw exhaust air into the hood and over the sterilizers.	

SUPPLY PROCESSING AND DISTRIBUTION – ROOM DATA SHEETS

Soiled, Receiving, and Contamination Area – Room Data Sheet	
Inside Design Conditions	●Cooling 65 F [18.3 C] Dry-Bulb Temperature 80% Relative Humidity ●Heating 65 F [18.3 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 45
Individual Room Temperature Control	Required
Room Air Balance	● This is the most soiled space in the SPD Department. Maintain this space under double negative (- -) air balance with respect to the adjoining spaces by admitting at least 30% make-air in the room and ensuring that air from this room does not ex-filtrate into other spaces. Design air distribution layout accordingly. ● If required, provide an exhaust fan complete with ductwork to inject clean make-up air from the clean side.
Note 1: Provide continuous canopy hood over the sterilizers and draw exhaust air into the hood and over the sterilizers	

NOTE 1 : PARTITION WALLS ARE OPTIONAL
ACH : AIR CHANGES PER HOUR
→ : DIRECTION OF AIRFLOW

\+ : POSITIVE AIR BALANCE
\- : NEGATIVE AIR BALANCE
0 : NEUTRAL AIR BALANCE



SUPPLY PROCESSING AIR FLOW DIAGRAM

Not to Scale

SURGICAL SUITE – AIR HANDLING UNIT

AHU Data Sheet	
Air Handling Unit Type	● VAV ● **Notes 1-3**
Inside Design Conditions - Operating Rooms	● Room Data Sheet ● **Notes 4 and 5**
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	Room Data Sheet
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Filtration – Supply Air System	● Pre-Filters: VA Grade B ● After Filters: VA Grade C ● Final-Filters: VA Grade E ● **Note 6**
Filtration – Exhaust Air System	Provide VA Grade A filters in the exhaust air stream, when a heat recovery device is installed.
Cooling Source	Provide a dedicated, air-cooled chiller to serve the surgical suite, recovery rooms, and intensive care units. See Chapter 4 for the required interface between the central chilled water plant and the dedicated air-cooled chiller.
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	● Provide a general exhaust system to exhaust air from all spaces. ● Provide a pressure-independent, airflow control valve in each main exhaust duct takeoff (from each operating room), formed after connecting two or four exhaust branch duct takeoffs of each operating room. The airflow control valve shall track the supply air volume to maintain the required air balance under occupied/unoccupied mode. ● Group the remaining exhaust duct takeoffs from each non-operating room (space) to form a common exhaust main. Install a pressure-independent, airflow control valve in the common main duct to make the exhaust system pressure-independent. ● During unoccupied mode, all support areas shall continue to operate at the full design flow rates.
Special Exhaust System(s)	Not Required
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams
Emergency Power	Provide emergency power for all components of the HVAC systems, including DDC controls.

SURGICAL SUITE – AIR HANDLING UNIT

AHU Data Sheet	
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

Note 1:

(a) For each operating room, provide a two-position, pressure-independent air terminal unit to reduce the supply air volume to half during unoccupied mode.

(b) Provide a variable speed drive for the supply air fan to adjust the supply air volume in response to the reduced air volume during unoccupied mode and variation in the filter loading. Provide a variable speed drive for the general exhaust fan to track the supply air fan to maintain the required air balance. Provide airflow-measuring devices in the supply and exhaust air systems to measure and monitor the respective air volumes.

Note 2: Supply Air Ductwork

(a) Construct all supply air ductwork from the downstream side of the supply air fan discharge to the inlet of each air terminal unit from stainless steel. All joints (longitudinal and transverse) shall be watertight. Provide airtight access panels at each elbow and at 20 Foot [6 Meter] intervals in straight duct runs for cleaning and access. All ductwork shall be low-velocity type with maximum velocity through the main ducts not to exceed 1,800 Feet/Minute [9.0 Meters/Second]. Do not install any acoustic devices (sound attenuators – acoustic lining) in the supply air ductwork.

(b) Construct all air terminal units serving operating rooms, Cystoscopy Room, Clean Corridor, and Soiled Corridor from galvanized steel. Do not install any acoustic devices (sound attenuators – acoustic lining). All terminal reheat coils shall be equipped with copper tubes and copper fins.

(c) Construct all ductwork and air distribution system on the downstream side of the above terminal units from welded stainless steel. Use of flexible ductwork is ***not*** permitted for connecting air terminal units and air distribution devices. See Room Data Sheets.

(d) Construct all remaining air terminal units serving the support functions described in the room data sheets as standard, factory-fabricated units of conventional galvanized steel. Use of acoustic devices (sound attenuators – acoustic lining) is permitted.

(e) Construct all supply air ductwork on the downstream side of the remaining terminal units serving the support areas from galvanized steel. All joints (longitudinal and transverse) shall be watertight. All ductwork shall be low-velocity type with maximum velocity through the main ducts not to exceed 1,500 Feet/Minute [7.5 Meters/Second]. Do not install any acoustic devices (sound attenuators – acoustic lining) in the supply air ductwork. Supply air outlets shall be constructed from galvanized steel or aluminum.

Note 3: Provide high and low limit set points (> 60 F [15.6 C] and < 40F [4.4 C]) to shut down the AHU in the event the supply air temperature exceeds the above limits.

SURGICAL SUITE – AIR HANDLING UNIT

AHU Data Sheet

Note 4:

(a) Calculate the cooling capacity for the operating rooms based on 62 F [16.7 C] dry-bulb temperature, 60% relative humidity, and approximately 48 F [8.9 C] dew-point temperature. Optimize parameters such as cooling coil selection (rows deep, fins spacing, and coil face velocity) and chilled water temperature entering the cooling coil to obtain the required dew-point temperature for the conditioned air.

(b) Where lower than 60% relative humidity at 62 F [16.7 C] dry bulb temperature is required, lower the leaving chilled water from the dedicated chiller to the extent permitted by the chiller manufacturer for stable operation. See Chapter 4 for the arrangement requiring two cooling coils in series.

Note 5: Humidification

(a) Primary Humidification (up to 30% Relative Humidity at 80 F [26.7 C] Dry-Bulb Temperature): Provide a unit-mounted (alternate location – main supply air duct) primary humidifier to maintain 46 F [7.8 C] dew-point temperature. When located in the supply air duct, provide welded, stainless steel duct on the upstream and downstream sides of the humidifier as shown in the VA Standard Detail. Pitch the stainless steel duct to collect liquid steam at the lowest end. Provide a drain on the bottom face of the duct.

(b) Humidification (up to 45% Relative Humidity): Provide a duct-mounted, terminal humidifier for each operating room, Cystoscopy Room, Clean Corridor, and Soiled Corridor, to raise the air dew-point temperature from 46 F [7.8 C] to 57.8 F [14.3 C]. Provide individual room humidity control to maintain space relative humidity up to 45% at 80 F [26.7 C] dry-bulb temperature. ***Locate terminal air unit and terminal humidifier outside the operating room.***

(c) Locate terminal humidifier on the downstream side of the supply air terminal units. See VA Standard Detail. Select the type and location of the terminal humidifier to ensure that the moisture released by the terminal humidifier is fully absorbed into the supply air stream. Provide elbow between humidifier and final terminal filter. Provide drain area. This is critical to ensure the success of the secondary humidification.

Note 6:

(a) Locate pre-filters (first bed) and after-filters (second bed) in a common section (frame) on the upstream side of the supply air fan.

(b) Locate final filters (third bed) on the downstream side of each individual air terminal unit serving the surgical suite. See Room Data Sheet for details.

SURGICAL SUITE – ROOM DATA SHEETS

Anesthesia Workroom and Equipment – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Clean Corridor – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 68 F [20 C] to 75 F [24 C] Dry-Bulb Temperature 40% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade E (HEPA)
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 68 F [20 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 40% relative humidity.	

SURGICAL SUITE – ROOM DATA SHEETS

Controls and Communication Center – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

SURGICAL SUITE – ROOM DATA SHEETS

Cystoscopy Rooms – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 68 F [20 C] to 73 F [22.7 C] Dry-Bulb Temperature 30% to 60% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 20/10 Unoccupied ● **Note 2**
Return Air	Not Permitted
Exhaust Air	100%
Air Distribution	**Note 3**
Room Noise Level	NC 35
Terminal Filtration	VA Grade E (HEPA)
Individual Room Temperature Control	● Required ● **Note 4**
Room Air Balance	Positive (+) with respect to the adjoining corridor during both modes of operation

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 62 F [16.7 C] and 60% relative humidity. Heating load calculations shall be based on 80 F [26.7 C] and 30% relative humidity.

Note 2:

(a) Change from occupied to unoccupied mode shall be accomplished either by a manual selector switch or by a DDC electronic time clock. Location of the manual switch shall be decided in consultation with the local surgical service. During unoccupied mode, the supply air changes shall be reduced to half.

(b) Provide an airflow control valve in the exhaust air duct to adjust the exhaust air volume in unison with the supply air volume and to maintain the positive air balance during the occupied and unoccupied modes of operations.

(c) Turn off the terminal humidifier during unoccupied mode

Note 3: Air distribution for each Cystoscopy Room shall consist of stainless steel multiple slot panel diffusers positioned around the operating tables to discharge 60% supply air in a vertical air stream inclined at a 15 degree outward angle. Percentage distribution may vary with the manufacturer. The remaining 40% of air shall be delivered downward over the operating area using perforated face outlets. Provide a minimum of two exhaust registers in each O.R., located diagonally opposite each other, 7 inches [175 mm] above the finished floor. The exhaust air quantity shall be at least 15% less than the supply air to maintain positive air balance between the O.R. and the adjoining areas.

Note 4: Record and maintain the space temperature and humidity data at the ECC. Store the data in the form of Excel type spreadsheets.

SURGICAL SUITE – ROOM DATA SHEETS

Frozen Section Laboratories – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Gas Cylinder Storage Room – Room Data Sheet	
Inside Design Conditions	Conditioned by 100% Make-Up Air
Minimum Supply Air Changes per Hour	6
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)

Heart Lung Machine Preparation – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

SURGICAL SUITE – ROOM DATA SHEETS

Instrument Preparation and Storage Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Nerve Block Induction Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

SURGICAL SUITE – ROOM DATA SHEETS

Operating Rooms – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 62 F [16.7 C] to 80 F [26.7 C] Dry-Bulb Temperature 30% to 60% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	● 20/10 Unoccupied ● **Note 2**
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Terminal Filtration	VA Grade E (HEPA)
Air Distribution	**Note 3**
Individual Room Temperature Control	● Required ● **Note 4**
Room Air Balance	Positive (+) with respect to the adjoining corridor during both modes of operation

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 62 F [16.7 C] and 60% relative humidity. Heating load calculations shall be based on 80 F [26.7 C] and 30% relative humidity.

Note 2:

(a) Change from occupied to unoccupied mode shall be accomplished either by a manual selector switch or by a DDC electronic time clock. Location of the manual switch shall be decided in consultation with the local surgical service. During unoccupied mode, the supply air changes shall be reduced to half.

(b) Provide an airflow control valve in the exhaust air duct to adjust the exhaust air volume in unison with the supply air volume and to maintain the positive air balance during the occupied and unoccupied modes of operations.

(c) Turn off the terminal humidifier during unoccupied mode

Note 3: Air distribution for each operating room shall consist of stainless steel multiple slot panel diffusers positioned around the operating tables to discharge 60% supply air in a vertical air stream inclined at a 15 degree outward angle. Percentage distribution may vary with the manufacturer. The remaining 40% of air shall be delivered downward over the operating area using perforated face outlets. Provide a minimum of two exhaust registers in each O.R., located diagonally opposite each other, 7 inches [175 mm] above the finished floor. The exhaust air quantity shall be at least 15% less than the supply air to maintain positive air balance between the O.R. and the adjoining areas.

Note 4: Record and maintain the space temperature and humidity data at the ECC. Store the data in the form of Excel-type spreadsheets.

SURGICAL SUITE – ROOM DATA SHEETS

Plaster Splint Storage – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	4 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Radiographic Film Processing Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

SURGICAL SUITE – ROOM DATA SHEETS

Soiled Corridor – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	VA Grade E (HEPA)
Individual Room Temperature Control	Required
Room Air Balance	Negative (-) with respect to the Operating Rooms
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Soiled Holding/Disposal Room – Room Data Sheet	
Inside Design Conditions	Conditioned by 100% Make-Up Air
Minimum Supply Air Changes per Hour	10 – CV required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Terminal Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)

SURGICAL SUITE – ROOM DATA SHEETS

Sub-Sterile Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	Not Required – All make-up air from the adjoining spaces
Return Air	Not Permitted
Exhaust Air	● 100% ● **Notes 2 and 3**
Room Noise Level	NC 40
Terminal Filtration	VA Grade C
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2:

(a) Change from occupied to unoccupied mode shall be accomplished either by a manual selector switch or by a DDC electronic time clock. Location of the manual switch shall be determined in consultation with the local surgical service. During unoccupied mode the supply air changes shall be reduced to half.

(b) Provide an airflow control valve in the exhaust air duct to adjust the exhaust air volume in unison with the supply air volume and to maintain the positive air balance during the occupied and unoccupied modes of operations.

(c) Turn off the terminal humidifier during unoccupied mode.

Note 3: Room exhaust shall pass through the canopy hood serving the sterilizer.

Suggested Operating Guidelines

The following matrix is provided for the benefit of the Engineering Services at the VA Facilities as the suggested operating guidelines for the operation of the surgery suite system. The matrix establishes relationship between:

- Actual chilled water temperature entering the surgery air-handling unit
- Resulting inside temperature and humidity at varying chilled water temperatures
- Status of the cooling source (central plant or a dedicated chiller)

Use this matrix in conjunction with the notes written below and in consultation with the surgery department.

Surgical Suite Air – Handling Unit
Cooling Back-Up Data for System Operation
Inside Design Conditions – Chilled Water Temperature – System Availability

Inside Design Conditions			Discharge Air Dew-Point Degrees F	Required Chilled Water Temperature Degrees F	Can Use Central Plant? Yes/No	Require to Use Dedicated Chiller? Yes/No
Temperature Degrees F	Humidity % RH	Dew-Point Degrees F				
62	55		44.67	40.67 (41)	No	Yes
62	60	47.98	46.98	42.98 (43)	Yes	Yes
65	50	45.94	44.94	40.94 (41)	No	Yes
65	55	48.46	47.46	43.46 (43)	Yes	Yes
65	60	50.80	49.80	45.80 (46)	Yes	Yes
68	45	45.90	44.90	40.90 (41)	No	Yes
68	50	48.70	47.70	43.70 (44)	Yes	Yes
68	55	51.26	50.26	46.26 (46)	Yes	Yes
68	60	53.62	52.62	48.62 (49)	Yes	Yes

Notes

(1) It is assumed that the central chilled water plant shall be operated to deliver chilled water at 42 F. Dedicated chiller shall be required below 42 F.

(2) It is assumed that the discharge air dew-point temperature of the air leaving the cooling coil shall be 1 F lower than the maximum dew-point at 1.0 sensible heat factor.

(3) It is assumed that the cooling coil selection shall be optimized to obtain the required duty conditions. The coil selection shall evaluate the parameters such as coil face velocity, row depth, chilled water supply temperature, and fins per inch (limiting value = 11 fins per inch [433 fins per meter]) to obtain the required design conditions.

WAITING AND PATIENT ADMITTING AREAS – AIR HANDLING UNIT

AHU Data Sheet and Room Data Sheet	
Air Handling Unit Type	● CV ● **Note 1**
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity (Uncontrolled) ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity (Optional)
Minimum Outside Air	100%
Minimum Supply Air Changes per Hour	12
Return Air	Not Permitted
Economizer Cycle	Not Applicable
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Cooling Source	Chilled water from the central chilled water piping
Heating Source	● Use high pressure steam from the central boiler plant as the primary source for generating heating hot water and producing “clean steam” for winter humidification. ● Use medium pressure steam from the central boiler plant for unit mounted pre-heat coils.
General Exhaust System(s)	Required
Special Exhaust System(s)	Not Required
Heat Recovery System	Per ASHRAE Standard 90.1 – 2007, evaluate the use of a heat recovery system to transfer energy between the exhaust and incoming outside air streams.
Emergency Power	Not Required
Individual Room Temperature Control	Required
Room Air Balance	Negative (-) **Note 2**
Additional Energy Conservation Measures	To meet the mandated goal of 30% additional energy conservation above ASHRAE 90.1 – 2004, evaluate the use of desiccant dehumidification system to reduce the dew-point temperature of the incoming outside air.

WAITING AND PATIENT ADMITTING AREAS – AIR HANDLING UNIT
Note 1: **(a)** The feasibility of providing a dedicated air-handling unit primarily to serve the waiting and admission area shall be evaluated on a project-by-project basis. ASHRAE 2007 Application Handbook recommends the use a separate air-handling unit (100% outside air) and an exhaust system for such an application to minimize the possibility of transmitting airborne infectious diseases. **(b)** If the capacity of the AHU is less than 5000 CFM [2358.5 Liters/Second], consider serving this area from the adjoining environmental AHU. **Note 2:** To maintain negative air balance, exhaust air pick-up shall be located over the patient waiting area thereby allowing supply and make-up air to flow in the direction of seating and waiting areas.

APPENDIX 6-B: INDIVIDUAL ROOM DATA SHEETS

Acute Respiratory Patient Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Connect room exhaust to the general exhaust system.	

Attic Space – Room Data Sheet	
Inside Design Conditions	● Heating 50 F [10 C] ● Ventilation 95 F [35 C] – Adjustable (Ventilation System Activation Set Point) ● **Notes 1 – 3**
Minimum Exhaust Air Changes per Hour	10
Return Air	Not Applicable
Exhaust Air	100%
Room Noise Level	NC 45
Filtration	Not Applicable
Individual Room Temperature Control	● Required in Heating Mode ● Thermostatic Activation in Ventilation Mode
Room Air Balance	Neutral (0)

Note 1: Provide thermostatically controlled heating system comprising of terminal heating devices, such as, unit heaters. Provide multiple heaters, as required, to ensure uniform heat distribution. Provide local, non-DDC control loop.

Note 2:

(a) Provide thermostatically controlled exhaust ventilation system comprising of multiple, directly driven exhaust fans, as required, to cover the complete attic space. Use of direct drive fans is recommended to minimize maintenance. Exhaust fans shall be equipped with motorized dampers and exhaust louvers.

(b) Provide intake air louvers equipped with motorized dampers.

Note 3:

(a) Coordinate louver requirements with the architectural discipline.

(b) Coordinate access in and out of the attic space, with the architectural discipline, to deliver and maintain the heating and ventilation equipment.

(c) Coordinate roof insulation requirements with the architectural discipline. To avoid excessive heat build-up in summer and heat escape in winter, insulation should be installed on the underside of the slopping roof with vapor barrier, as required.

Audiology Instrument Calibration and Repair Shop – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Audiology Office/Therapy Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Audiometric – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	● 25 ● **Note 1**
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Coordinate the installation of the packaged sound booth and its HVAC system, if any. Take appropriate acoustic measures to maintain the design NC level.	

Barber Shop – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Required
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Battery Charging Rooms – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Note 1:

(a) Provide a special exhaust system for the Automatic Transport System (ATS) and Wheel Chair Charging Areas, where lead acid batteries are charged. Do not provide exhaust system for the spaces where Ni-Cad batteries are charged, as these batteries do not generate fumes.

(b) Coordinate the need, location, and size of a canopy hood, where required, with the architectural discipline, to exhaust space air through the hood. Assume 100 Feet/Minute [0.5 Meter/Second] face velocity over the hood face area.

(c) Provide a continuously operating special exhaust system with:

- Spark-proof construction fan and explosion-proof motor
- Welded stainless steel ductwork
- Emergency power for the fan and controls
- Status monitoring (DDC) with local and ECC alarm capabilities

Biomedical Instrument Repair Shop – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Note 1:

(a) Repair activities involving the use of chemicals, such as, mercury and xylene, may require a canopy or a general chemical fume hood (VA Type H7). Coordinate the need, location and size of the hood with the architectural discipline.

(b) Provide a special exhaust system with:

● Manual start/stop (locate the manual start/stop switch on the hood to start or stop the special system)
● Spark-proof construction fan and explosion-proof motor
● Welded stainless steel ductwork
● Status monitoring (DDC) with local and ECC alarm capabilities

(c) When the hood is not in use, return the room air back to the AHU unit providing the room supply air. Provide a motorized damper in the room return air duct takeoff. The damper shall close when the hood exhaust system is in operation and vice-versa.

Blood Draw Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Chapel – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 30
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	● Required ● **Note 1**
Room Air Balance	Neutral (0)
Note 1: For large chapels requiring 5,000 CFM [2,358.5 Liters/Second] supply air volume, provide a dedicated air-handling unit similar to the auditorium system described in Appendix 6-A.	

Class Rooms – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	● 6 – VAV Permitted ● **Note 1**
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Evaluate and incorporate the following control sequence to reduce the carbon-dioxide concentration at part load conditions. Install a CO_2 sensor in the branch return air duct serving the classroom. During part load condition with low sensible heat factor, should the space CO_2 level rise above the set point, the VAV box shall modulate to the open position to admit more supply air and along with more outside air to dilute the CO_2 level. Activate reheat as necessary to maintain the space temperature.	

Clean Utility Room/Storage Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	● Required ● **Note 1**
Room Air Balance	Positive (+)
Note 1: Evaluate combining this room with other rooms on a common thermostat.	

Computer Lab Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 75 F [24 C] Dry-Bulb Temperature (Maximum) 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	4 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 75 F [24 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Conference Rooms – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	● 6 – VAV Permitted ● **Note 1**
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Evaluate and incorporate the following control sequence to reduce the carbon-dioxide concentration at part load conditions. Install a CO_2 sensor in the branch return air duct serving the classroom. During part load condition with low sensible heat factor, should the space CO_2 level rise above the set point, the VAV box should modulate towards open position to admit more supply air and along with more outside air to dilute the CO_2 level. Activate reheat as necessary to maintain the space temperature.	

Corridors – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● 5 F [2.8 C] Dead Band ● **Note 1**
Minimum Supply Air Changes per Hour	● 4 – CV or VAV, as required ● **Note 2**
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	**Note 3**
Note 1: Dead-band is not applicable to constant volume systems. **Note 2:** Adjust corridor air supply to meet make-up air requirements of the adjoining spaces, such as, toilets, janitor closets, soiled storage/utility spaces etc. **Note 3:** Air supplied to the corridors is used to maintain required air balance in the adjoining occupied and unoccupied spaces.	

Crawl Space (Pipe Basement) – Room Data Sheet	
Inside Design Conditions	● Heating 50 F [10 C] ● Ventilation 95 F [35 C] ● **Notes 1 – 3**
Minimum Exhaust Air Changes per Hour	10
Return Air	Not Applicable
Exhaust Air	100%
Room Noise Level	NC 45
Filtration	Not Applicable
Individual Room Temperature Control	● Required in Heating Mode ● Thermostatic Activation in Ventilation Mode
Room Air Balance	Neutral (0)

Note 1:

(a) Provide thermostatically controlled heating system comprising of terminal heating devices, such as, unit heaters. Provide multiple heaters, as required, to ensure uniform heat distribution.

(b) To ensure cost control and simplified system operation, use of unit-mounted, local (non-DDC) thermostats is acceptable with fan on/off control, not requiring an automatic hot water or steam control valve.

Note 2:

(a) Provide a manually and/or thermostatically controlled exhaust ventilation system.

(b) Exhaust Fan(s): Provide multiple exhaust fans, as required, to ensure uniform ventilation to cover the entire crawl space. Provide direct-drive fans to minimize maintenance. Exhaust fan(s) shall be equipped with motorized dampers.

(c) Provide intake air louvers equipped with motorized dampers.

(d) Activate the exhaust fans when the crawl space temperature measured by a dedicated wall-mounted space thermostat exceeds 95 F [35 C]. The reverse shall occur upon fall in temperature. In high humid areas, exhaust system can be activated by a space humidistat upon increase in the space humidity above 65% RH (adjustable).

Note 3:

(a) Coordinate louver requirements with the architectural discipline.

(b) Design should address access to and from the crawl space to deliver and maintain the heating and ventilation equipment.

(c) Coordinate the need for an areaway(s) with the architectural discipline and the VA Authorities. Provide a floor drain in the areaway. Coordinate the access to clean the areaways and the floor drains.

Dressing Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	● Not Required ● **Note 1**
Room Air Balance	Neutral (0)
Note 1: Connect this room to a common air terminal unit serving identical spaces.	

Electrical Equipment Rooms – Room Data Sheet	
● Electrical Closets (Without Internal Heat Gain) – **Note 1** ● Electrical Closets/Rooms (With Internal Heat Gain) – **Note 2** ● Main Electrical Rooms and/or Transformer Vaults – **Note 3**	
Inside Design Conditions	● Cooling 86 F [30 C] Dry-Bulb Temperature ● Heating 50 F [10 C] Dry-Bulb Temperature ● **Note 4**
Minimum Supply Air Changes per Hour	● As required to maintain selected space temperature ● **Note 5**
Return Air	● Cooling Mode – Permitted ● Ventilation Mode – Not Permitted
Exhaust Air	● 100% Ventilation Mode ● **Note 6**
Room Noise Level	NC 40
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Note 1: Do not provide HVAC for the electrical closets without any heat gain.

Note 2: For electrical closets, or rooms, equipped with dry transformers for secondary (or tertiary) electrical distribution, use any one of the following HVAC solutions.

(a) Provide conditioned supply air (constant volume) from any nearby air-handling unit in service year around and 24-hours a day. Return the room air back to the system. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(b) Where an all-air system is not available, provide a dedicated, thermostatically controlled fan coil unit using year around chilled water from the central plant or a dedicated chiller. With the dedicated chiller, connect multiple rooms or closets. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(c) Provide a dedicated thermostatically controlled DX system (single package or closed-loop) to remove the heat gain and maintain the set point. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C]. Coordinate location of the outdoor section of the DX unit with the architectural discipline and the facility personal.

(d) Provide minimum outside air per ASHRAE 62.1 – 2007.

Note 3: Provide a dedicated all-air system with economizer cycle (do not use economizer cycle in high humidity areas) with mechanical cooling (chilled water from the central plant or dedicated DX system). Coordinate location of the outdoor DX unit with the architectural discipline and the VA Authorities. Filtration for the AHU shall be VA Grade A Pre-Filters and VA Grade B After-Filters per ASHRAE 62.1 – 2007.

Electrical Equipment Rooms – Room Data Sheet
● Electrical Closets (Without Internal Heat Gain) – **Note 1** ● Electrical Closets/Rooms (With Internal Heat Gain) – **Note 2** ● Main Electrical Rooms and/or Transformer Vaults – **Note 3**
Note 4: Maintain minimum space temperature at 50 F [10 C] in the winter season. Estimate net heat gain and loss at the winter design temperature. Provide an electric unit heater if the net heat gain is not sufficient to maintain 50 F [10 C] space temperature. **Note 5:** **(a)** Assume heat gain due to the transformers as 3% of the **anticipated actual peak demand** and NOT based on the rated nameplate capacity. Ensure coordination with the equipment manufacturer for the actual heat gain. **(b)** Coordinate locations of the intake and relief air louvers with the architectural discipline. Louvers shall meet the physical security requirements. **(c)** Do not locate fan coil units or indoor DX units inside the electrical rooms to avoid damage due to possible water leaks or overflow through the drain pans. **(d)** Avoid excessive runs of field-installed refrigerant piping associated with split DX systems and excessive horizontal runs of cooling coil condensate drain piping. **Note 6:** **(a)** Do not use the exhaust ventilation system, with 100% outside air, in high-humidity areas to avoid damage to the electrical and mechanical equipment. **(b)** Do not use the exhaust ventilation system, with 100% outside air, in dry areas, where the ambient design temperature (Chapter 7 – Column 1a – 0.4%) is in excess of 90 F [32 C] to avoid large air volume in circulation (higher fan motor horsepower) and build up of excessive space temperature, as high as 104 F [40 C].

Elevator Machine Rooms – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature ● **Note 1**
Minimum Supply Air Changes per Hour	● As required to maintain space temperature ● **Note 2**
Return Air	100%
Exhaust Air	Not Permitted
Room Noise Level	NC 45
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Note 1:

(a) Provide a thermostatically controlled, dedicated unit, capable of providing mechanical cooling year around.

(b) Use any one of the following system configurations, shown in the order of VA preference:

● Provide a take-off from an all-air system if available in the vicinity and in operation for 7 days a week, 24 hours a day, and year around. Provide a constant volume air terminal unit and return room air back to the unit.

● Provide a dedicated, thermostatically controlled, fan coil unit, if chilled water is available 7 days a week, 24 hours a day, and year around. Avoid excessive horizontal runs of the cooling coil condensate piping.

● Provide a dedicated, thermostatically controlled, DX unit either as a single package or as a split-system. Coordinate location of the outdoor unit with the architectural discipline and the VA Authorities. Avoid excessive runs of refrigerant piping and cooling coil condensate piping. The room thermostat for the DX system can be a local closed-loop type without any interface with the DDC controls.

● Provide a DDC temperature sensor to monitor the machine room temperature and provide ECC alarms in the event the space temperature exceeds 86 F [30 C].

● Provide emergency power for the HVAC systems and associated controls.

● Do not install HVAC components or piping inside the elevator machine room.

Note 2: Coordinate cooling capacity and heat dissipated by the equipment with the equipment manufacturer.

Engineering Control Center (ECC) Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature ● **Note 1**
Minimum Supply Air Changes per Hour	As required to meet the inside design conditions
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: Provide a dedicated cooling/heating terminal unit. Configuration of the terminal unit shall be project-specific. In the absence of an all-air system or chilled water for a fan coil unit, use of a through the wall air-conditioner, PTAC, or a heat pump is acceptable.	

Engineering Shops (Maintenance) – Room Data Sheet	
● **Carpentry** ● **Electrical** ● **Machine** ● **Paint** ● **Plumbing** ● **Welding**	
Inside Design Conditions	● Cooling 80 F [26.7 C] Dry-Bulb Temperature 60% Relative Humidity (Maximum) ● **Note 1** ● Heating 68 F [20 C] Dry-Bulb Temperature
Minimum Supply Air Changes per Hour	● 6 ● **Note 2**
Return Air	Permitted from clean areas
Exhaust Air	Note 3
Room Noise Level	NC 45
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Compliance	American Council of Governmental Industrial Hygienists (ACGIH)

Note 1:

(a) Provide mechanical cooling for the facilities. Evaluate the use of ventilation where feasible.

(b) Provide individual room temperature control for each shop, physically separated from other areas. Group control is permitted where multiple shops are located in one large common room.

(c) HVAC system configuration shall depend upon the size of the shop area and the type of shops. Evaluate the use of a dedicated air-handling unit for systems larger than 5,000 CFM (2,358.0 Liters/Second). Additional system configurations are:

● Provide a take-off from an all-air system if available in the vicinity. Provide a VAV air terminal unit.

● Provide a dedicated, thermostatically controlled, fan coil unit, if chilled water is available. Avoid excessive horizontal runs of the cooling coil condensate piping.

● Provide a dedicated, thermostatically controlled, DX unit either as a single package or as a split-system. Coordinate location of the outdoor unit with the architectural discipline and the VA Authorities. Avoid excessive runs of refrigerant piping and cooling coil condensate piping. The room thermostat for the DX system can be a local closed-loop type without any interface with the DDC controls.

Note 2: Coordinate cooling capacity and heat dissipated by the equipment with the shop equipment layout and the equipment manufacturer.

Engineering Shops (Maintenance) – Room Data Sheet
● **Carpentry** ● **Electrical** ● **Machine** ● **Paint** ● **Plumbing** ● **Welding**
Note 3: **(a)** Provide a dedicated exhaust system for welding exhaust. **(b)** Provide outside air, as required, in the paint shops and paint storage rooms to dilute the concentration of paints.

Examination Room (Eye Treatment Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Examination Room (Isolation) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● Note 3
Room Noise Level	NC 35
Filtration	Note 4
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) or Positive (+) ● An anteroom is required to protect the adjoining environment from the patients

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2: Refer to Isolation Room Positive (+) with anteroom in this appendix for requirements.

Note 3: Locate supply air outlets and exhaust air inlets to create the direction of airflow, required for air balance in conjunction with the anterooms. Use of the reverse isolation rooms is not permitted.

Note 4: When the isolation room is located in the Nursing Wing, VA Grade A Pre-Filters and VA Grade D After-Filters shall be used. When the isolation room is located in the ICU unit, VA Grade A Pre-Filters, VA Grade C After-filters, and VA Grade E Final Filters shall be used. See Appendix 6-A.

Examination Room (Multipurpose) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Chapter 2
Room Air Balance	Neutral (0)

Examination Room (Patient) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Chapter 2
Room Air Balance	Neutral (0)

Examination Room Women's Health (with Toilets) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	● 6 – Examination Room ● VAV Permitted
Return Air	Permitted (Examination Room Only)
Exhaust Air	● From Toilet only ● **Note 1**
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) Toilet Room ● Positive (+) Examination Room with respect to Toilet
Note 1: Transfer make-up air from the examination room into the toilet. Do not supply conditioned air under positive pressure to the toilet.	

Exterior Stairs – Room Data Sheets	
Inside Design Conditions	Heating Only 50 F [10 C]
Minimum Supply Air Changes per Hour	Not Applicable
Return Air	Not Applicable
Exhaust Air	Not Applicable
Room Noise Level	NC 45
Filtration	Not Applicable
Individual Room Temperature Control	● Required ● **Note 1**
Room Air Balance	Not Applicable
Note 1: Provide a thermostatically controlled, terminal heating unit (examples: cabinet heater, finned tube radiator, or convector). Provide local, closed-loop non-DDC control.	

Gift Shops (Retail Stores) – Room Data Sheets	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Housekeeping Aide Closet (HAC)/Janitor's Closet – Room Data Sheet	
Inside Design Conditions	Conditioned by make-up air
Minimum Supply Air Changes per Hour	Not Applicable
Return Air	Not Permitted
Exhaust Air	● 100% ● Highest of: - 10 air changes per hour - 1 CFM/SF [23.0 Liters/Second/Square Meter] - 50 CFM [24.0 Liters/Second]
Room Noise Level	NC 45
Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)

Hydrotherapy – Room Data Sheet	
Inside Design Conditions	● Cooling 70 F [21 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 82 F [27.8 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6 – CV required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide a dedicated wet exhaust system with aluminum ductwork. Wet exhaust from other similar spaces can be grouped together.	

Information Technology Closet – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature ● Heating 65 F [18.3 C] Dry-Bulb Temperature ● **Notes 1-3**
Minimum Supply Air Changes per Hour	As required to meet the inside design conditions
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Note 1: Use any one of the following HVAC solutions.

(a) Provide conditioned supply air (constant volume) from any nearby air-handling unit in service year around and 24-hours a day. Return the room air back to the system. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(b) Where an all-air system is not available, provide a dedicated, thermostatically controlled fan coil unit using year around chilled water from the central plant or a dedicated chiller. With the dedicated chiller, connect multiple rooms or closets. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(c) Provide a dedicated thermostatically controlled DX system (single package or closed-loop) to remove the heat gain and maintain the set point. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C]. Coordinate location of the outdoor section of the DX unit with the architectural discipline and the facility personal.

(d) Provide minimum outside air per ASHRAE 62.1 – 2007.

Note 2: Maintain minimum space temperature at 65 F [18.3 C] in the winter season. Estimate net heat gain and loss at the winter design temperature. Provide an electric unit heater if the net heat gain is not sufficient to maintain 65 F [18.3 C] space temperature.

Note 3: Surrounding rooms maintained at 30-50% relative humidity.

Isolation Rooms Negative (–) with Anteroom – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Notes 1 and 2**
Minimum Supply Air Changes per Hour	● 12 – CV Required ● **Note 3**
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 4**
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C ● Final Filters – VA Grade E
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 5**
TB Criteria	**Notes 6-10**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity.

Note 2: Provide a terminal HEPA filter – VA Grade E downstream of air terminal unit.

Note 3:

● Supply air in the anteroom at 10 air changes per hour, 60 CFM [28.3 Liters/Second] (minimum).

● Provide airflow control valve in each exhaust duct connection to ensure accurate air balance

Note 4: Provide a special exhaust system to serve the patient's bedroom, connecting toilet, and anteroom. The exhaust system shall be equipped as follows:

● Discharge above the highest roof using a 10 Feet [3.0 Meters] tall stack and the discharge velocity of 3,500 Feet/Minute [17.8 Meters/Second].

● Provide exhaust fan with emergency power.

● Maintain exhaust duct under negative air pressure over its entire run.

● Provide VA Grade A and E filters in the exhaust duct near the exhaust fan suction.

Note 5: Provide air flow control valves in the branch return air cuts from the anteroom and the patient room. Maintain negative pressure at 0.02 inch WG [5 Pascal] in the patient room.

Isolation Rooms Negative (–) with Anteroom – Room Data Sheet

Note 6: The health care authorities at the medical center and/or the health care planners shall be responsible for classifying the specific medical center as a high or low incidence area and shall be responsible for determining the location and quantity of specialized rooms which would be established for S/KI TB patients.

Note 7: The health care authorities at the medical center and/or the health care planners and Pathology shall be responsible for identifying BSL3 Clinical Mycobacterial Laboratories that require special architectural and engineering controls in accordance with BSL3 biosafety guidelines recommended by Center for Disease Control (CDC) and National Institutes of Health (NIH).

Note 8: Reference Documents:

(a) Center for Disease Control (CDC): "Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health-Care Facilities, 2005", MMWR Morbidity and Mortality Weekly Report, published by U.S. Department of Health and Human Services-Public Health Service.

(b) VA Publication, “Program and Facility Planning for Tuberculosis Programs”, August 18, 1995.

(c) CDC/NIH Publication "Biosafety in Microbiological and Biomedical Laboratories", 5th Edition, February 2007.

Note 9: Where the VA Design Criteria exceed the minimum requirements outlined in the CDC document, compliance with the VA Criteria is mandatory for all new facilities and major renovation projects. For existing facilities where compliance with the VA Criteria may not be feasible (or cost-effective) due to the limitations of the configuration of the HVAC system, the minimum requirements outlined in the CDC document shall suffice.

Note 10: The following areas are designated as "TB Treatment Rooms" for the purpose of this criteria. They typically are spaces where procedures are performed and/or treatments are administered to the S/KI TB patients. The requirements of the Room Data Sheets for the Isolation Rooms Negative (-) with Anteroom apply to these areas:

(a) Diagnostic Sputum Induction

(b) Administration of Aerosolized Pentamidine (AP) Drug. This also includes other aerosol treatments, cough-inducing procedures, or aerosol-generating procedures.

(c) Bronchoscopy

(d) S/KI TB Isolation Rooms

(e) TB Treatment Rooms

(f) TB Dental Operatory

(g) TB Dialysis Room

(h) TB Radiology Room

Isolation Rooms Negative (–) with Anteroom – Room Data Sheet
(i) Clinical Mycobacterial BSL3 Laboratories **(j)** In addition, all toilets, bathrooms, janitor closets, and locker rooms associated with S/KI TB Isolation Rooms or treatment rooms.

Isolation Rooms Positive (+) with Anteroom – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Notes 1 - 3**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C ● Final Filters – VA Grade E
Individual Room Temperature Control	Required
Room Air Balance	● Positive (+) ● **Note 4**
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity. **Note 2:** Do not provide air to anteroom. **Note 3:** Provide a terminal HEPA filter – VA Grade E downstream of air terminal unit. **Note 4:** Provide air flow control valves in the branch return air ducts from the anteroom and the patient room. Maintain positive pressure at 0.02 inch WG [5 Pascal] in the patient room.	

Kinesiotherapy Therapy – Treatment Clinic – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity.	

Kitchenettes – Room Data Sheet	
Inside Design Conditions	● Not Applicable ● **Note 1**
Minimum Supply Air Changes per Hour	6 – Make Up Air or Minimum 50 CFM [24.0 Liters/Second]
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)
Note 1: Kitchenettes are generally located as the adjoining spaces to the corridors, conference rooms, lounges, and such spaces. Required make-up air is drawn from such spaces. **Note 2:** Connect to the general exhaust system.	

Library – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 30
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Loading Dock – Room Data Sheet	
Inside Design Conditions	● Not Required ● Terminal air curtain with heating ● **Note 1**
Minimum Supply Air Changes per Hour	Not Applicable
Return Air	Not Applicable
Exhaust Air	Not Applicable
Room Noise Level	Not Required
Filtration	As furnished with the air curtain
Individual Room Temperature Control	Not Required
Room Air Balance	Not Required
Note 1: Provide an air curtain with a heating element. Interlock the air curtain start with the operating mechanism of the loading dock door. Heating element shall be activated only after the air curtain is in operation and the ambient temperature has dropped below 40 F [4.4 C], adjustable.	

Locker Rooms (with Toilets) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	10 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Locker Rooms (without Toilets) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Lounge (Employees) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	**Note 1**
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: When the lounge is equipped with food warming equipment, refrigerator, wash basin or vending machine etc., exhaust 50% of the supply air through the general exhaust system. Return remaining supply air. Return all supply air if the lounge does not include equipment described above.	

Maintenance Garages – Room Data Sheet	
Inside Design Conditions	● Heating and/or Ventilation Only ● Heating Only 60 F [15.6 C]
Minimum Supply Air Changes per Hour	●1.5 CFM/SF [7.6 Liters/Second/Sq Meter] ● **Note 1**
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 50
Filtration	Not Applicable
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Compliance	American Council of Governmental Industrial Hygienists (ACGIH)
Note 1: See 2007 ASHRAE Applications Handbook and NFPA 88B for additional requirements.	

Mechanical Equipment Rooms (MERs) – Room Data Sheets	
● MER (Air-Handling Unit Rooms) – **Note 1** ● MER (Heating Room – PRV, Heat Exchanger, Pumps) – **Note 2** ● MER (Refrigeration Equipment – Chillers) – **Note 3**	
Inside Design Conditions	● Cooling See applications below ● Heating 50 F [10 C] Dry-Bulb Temperature ● **Note 4**
Minimum Supply Air Changes per Hour	See applications below
Minimum Outside Air	0.5 CFM/Square Feet [2.5 Liters/Second/Square Meter] – Refrigeration Room
Return Air	Permitted – Cooling Mode Not Permitted – Ventilation System
Exhaust Air	100% – Ventilation Mode
Room Noise Level	NC 45-50
Filtration	See applications below
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

General: Numerous design options are available for the three mechanical room configurations outlined above. Select an appropriate design solution based on the actual project-specific conditions.

Note 1: Air-Handling Unit Rooms

(a) High-Humidity Areas – Mechanical Cooling and Heating
Using AHU operating 24 hours a day:

- Provide a dedicated, constant volume air terminal unit with reheat to maintain the space temperature between 50 F [10 C] and 82 F [26.7 C]
- Provide minimum 6 air changes per hour
- Return room air back to the system
- Filtration according to the serving AHU
- Provide thermostatically controlled unit heater to maintain 50 F [10 C] for the MER, where AHU shuts down during unoccupied hours

(b) All Other Areas – Heating
Provide a thermostatically-controlled unit heater to maintain 50 F [10 C].

Note 2: Heating Room – PRV, Heat Exchanger, Pumps

(a) Radiated heat due to the steam PRV, steam piping, and hot water heating system can result in substantially higher space temperature.

(b) First Stage: Provide a thermostatically-controlled exhaust system with minimum 20 air changes per hour. As an energy conservation measure, provide a two-speed motor. Upon rise in space temperature above an adjustable set point, operate the fan at high speed to maintain the set point.

Mechanical Equipment Rooms (MERs) – Room Data Sheets
● MER (Air-Handling Unit Rooms) – **Note 1** ● MER (Heating Room – PRV, Heat Exchanger, Pumps) – **Note 2** ● MER (Refrigeration Equipment – Chillers) – **Note 3**

(c) Second Stage: Provide a thermostatically-controlled cooling unit, such as a fan coil unit, to maintain the set point at 86 F [30 C], when the space temperature cannot be maintained by the exhaust ventilation system. Provide filtration as available with the cooling unit. During cooling mode, exhaust shall be de-energized.

(d) Do not use an exhaust system (100% outside air) for high humidity locations.

Note 3: Refrigeration Equipment – Chillers

(a) For mechanical rooms equipped with refrigeration equipment, the capacity of make-up air heating and cooling unit shall be based on the criteria given in ASHRAE Standard 15 - 2007 (Safety Standard for Refrigeration Systems) and reproduced below:

- 0.5 CFM/Square Feet [2.54 Liters/Second/Square Meter] of floor area during occupied mode
- 20 CFM [9.43 Liters/Second] per person (chiller rooms are mostly unoccupied)
- Ventilation air required for diluting the refrigerant spill as described in the ASHRAE Standard 15 – 2007 above

(b) First Stage: Provide a thermostatically-controlled exhaust system with minimum 20 air changes per hour. As an energy conservation measure, provide a two-speed motor. Upon rise in space temperature above an adjustable set point, operate the fan at high speed to maintain the set point.

(c) Second Stage: Provide a thermostatically-controlled cooling unit, such as a fan coil unit, to maintain the set point at 86 F [30 C], when the space temperature cannot be maintained by the exhaust ventilation system. Provide filtration as available with the cooling unit. During cooling mode, exhaust shall be de-energized.

(d) Do not use an exhaust system (100% outside air) for high humidity locations.

(e) Provide an emergency exhaust system to be activated by a refrigerant leak detection system. Provide the system (control panel) and sensors as recommended or furnished by the chiller manufacturer. Provide interface with the building DDC control system – locally and at ECC for audible – visible – and printed alarm messages upon leak detection and activation of the emergency exhaust system and make-up air unit. Provide emergency power for the exhaust system and make-up air unit. Design the exhaust duct layout and locations of the air inlets per ASHRAE Standard 15 – 2007 and manufacturer's recommendations.

Note 4: Design the mechanical cooling system based on hermetic chillers. Include a note on the drawings requiring the contractor to increase the cooling capacity to accommodate for open-centrifugal chillers.

Medical Records – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Medication Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)

Minor Operating Room or Trauma Room or Procedure Room (Class A Surgical) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15 – CV Required
Return Air	● Permitted ● **Note 2**
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Determine the type of procedures scheduled to take place in consultation with the VA Authorities. If the room is used for performing surgery, on a routine basis, design the HVAC system as a conventional operating room with special air distribution as described in Appendix 6-A. For this room, special air distribution configuration of a conventional operating room is not required for this room.	

Multipurpose Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	● Required ● **Note 1**
Room Air Balance	Neutral (0)
Note 1: For multipurpose rooms equipped with folding partition(s), provide individual room temperature control on either side of the partition.	

Nurse's Station (Communication) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Offices – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	● NC 35 – Private Offices ● NC 40 – General/Open Offices
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Chapter 2
Room Air Balance	Neutral (0)

Orthopedic Clinic (Cast Room) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

PACS Viewing Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Pharmacy Storage Space (Central Warehouse) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	4 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	Per selected cooling unit
Individual Room Temperature Control	● Required ● **Note 1**
Room Air Balance	Neutral (0)

Note 1:

(a) Mechanical cooling is required for the pharmacy storage space, even though the central warehouse in which it is located is generally not air-conditioned.

(b) Since the area of the pharmacy storage is relatively small (approximately 3,000 Square Feet [279.0 Square Meters]) and the intent is to keep the space cool, if the conventional VAV system, specified above is not available, it can be substituted by:

- Dedicated constant-volume air-conditioning unit
- Fan coil unit
- Dedicated DX system, if chilled water is not available

(c) Provide remote alarm at ECC for inside temperature.

Physical Therapy – Treatment Clinic – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity.

Pool Dressing/Male – Toilet and Shower – Room Data Sheet **Pool Dressing/Female – Toilet and Shower – Room Data Sheet**	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 55% Relative Humidity ● Heating 80 F [26.7 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	4 – CV required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	NC 45
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Connect room exhaust to the area general exhaust system or to the therapeutic exhaust system.	

Procedure Room (Aerosolized Pentamidine) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	● Negative (-) ● **Note 3**

Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.

Note 2: Provide a special exhaust system to discharge all room air outdoors from the highest point above the building roof. Provide 10 Feet [3.0 Meters] as the minimum stack height. Adjust stack height upwards, if required per dispersion analysis. Rooms with similar exhaust requirements can be combined together and served by a common exhaust fan.

(a) Maintain entire ductwork under negative air balance.

(b) Allow exhaust air to pass through a set of pre-filters (VA Grade A) and after-filters (VA Grade E – HEPA). Locate filters closest to the fan intake connection.

(c) Provide an airflow control valve to measure and set air volume under varying static pressure drops through the filters. Locate airflow control valve downstream of the filters.

(d) Provide emergency power for the fan and associated controls.

(e) Provide local (audible and visible) and ECC alarm to indicate system and/or air balance disruption.

Note 3: Locate supply and exhaust air outlets/inlets to create the direction of airflow required for negative air balance.

Procedure Room EGD (Gastric – Esophageal – Motility) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Exhaust can be connected to the general exhaust system.	

Procedure Room (General Purpose) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Pulmonary Exercise Room (with Patient Toilet and Shower) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10 – VAV Permitted
Return Air	Permitted (From exercise room only)
Exhaust Air	● 100% (From toilet and shower) ● Admit all make-up air from the exercise room through the door undercut
Room Noise Level	40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	● Exercise Room – Neutral (0) ● Toilet/Shower – Double Negative (- -)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Reagent Grade Water Treatment Room – Room Data Sheet	
General: These rooms, generally located near SPD (Supply, Processing, and Distribution) and/or laboratories, produce de-ionized water. 100% exhaust is required to remove corrosive chemicals used in the process of de-ionization. Coordinate with the architectural discipline and the project scope of work if any canopy type hood is required. Exhaust room air through the hood at 100 CFM/Square Feet [507 Liters/Second/Square Meter] of the hood face area.	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 1**
Room Noise Level	40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Provide a corrosion-resistant, special exhaust system to run continuously. **(a)** Provide welded stainless steel ductwork. **(b)** Maintain entire ductwork under negative air balance. **(c)** Provide emergency power. **(d)** Provide spark-resistant exhaust fan with explosion-proof motor. **(e)** Provide local and ECC alarms. **(f)** Provide fan status monitoring.	

Scope Cleaning and Clean Storage – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	● Scope Cleaning – Negative (-) ● Clean Storage – Positive (+)

Signal Closet – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature ● Heating 65 F [18.3 C] Dry-Bulb Temperature ● **Notes 1-3**
Minimum Supply Air Changes per Hour	As required to meet the inside design conditions
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 40
Filtration	As provided by the selected cooling unit
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Note 1: Use any one of the following HVAC solutions.

(a) Provide conditioned supply air (constant volume) from any nearby air-handling unit in service year around and 24-hours a day. Return the room air back to the system. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(b) Where an all-air system is not available, provide a dedicated, thermostatically controlled fan coil unit using year around chilled water from the central plant or a dedicated chiller. With the dedicated chiller, connect multiple rooms or closets. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C].

(c) Provide a dedicated thermostatically controlled DX system (single package or closed-loop) to remove the heat gain and maintain the set point. Provide a high-limit temperature sensor in the closet/room to alarm at the ECC in the event that space temperature exceeds 95 F [35 C]. Coordinate location of the outdoor section of the DX unit with the architectural discipline and the facility personal.

(d) Provide minimum outside air per ASHRAE 62.1 – 2007.

Note 2: Maintain minimum space temperature at 65 F [18.3 C] in the winter season. Estimate net heat gain and loss at the winter design temperature. Provide an electric unit heater if the net heat gain is not sufficient to maintain 65 F [18.3 C] space temperature.

Note 3: Surrounding rooms maintained at 30-50% relative humidity.

Soiled Utility Room and Soiled Holding/Disposal Room – Room Data Sheet	
Inside Design Conditions	Not Required
Minimum Supply Air Changes per Hour	10 – Make-Up Air
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 45
Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	● Double Negative (- -) ● **Note 1**
Note 1: Admit make-up air through the door undercut and transfer grille (if required) from the adjoining areas.	

Special Procedure Room (Bronchoscopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Cardiac Catheterization) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Colonoscopy – EGD) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Cystoscopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	15 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Positive (+)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Endoscopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Fluoroscopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Gastrointestinal – GI) Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Photocopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Special Procedure Room (Sigmoidoscopy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	8 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Standby Generator Room

Background Information: The Physical Security Design Manual requires all new Mission Critical Facilities (medical centers) be provided with full standby electrical power. Mission Critical Facilities are those required to continue operation during natural or man-made extreme events.

It is assumed the generator plant will be sized at 8 to 10 watts per gross building square foot. This will yield plants in the range of 6 to 12 MW.

Recognizing only 35 to 40% of the input energy into the prime mover is converted into usable electricity and the rest is rejected in the form of heat; it is paramount that the ventilation systems for the standby generator rooms be thoroughly addressed. See heat balance Figure 6B-1.

Submit a detailed analysis showing all options and systems selected to provide proper ventilation and cooling for the standby generator space. Numerous design considerations must be included in the analysis. Once the size of the generator plant has been determined and the number of units selected then various manufacturers need to be consulted to ascertain the range of heat rejection from the various components. See Figure 6B-1 for average heat rejection values. Assuming the prime movers are reciprocating diesel engines, consideration needs to be given to the required radiator flow rates when the unit is naturally aspirated, turbocharged or is a lean burn unit. Airflow rates required for unit mounted radiators can vary substantially from one type to another and manufacturer to manufacturer.

The analysis shall compare unit mounted radiators to remote radiators. The analysis shall include the cost of louvers and control devices. Louvers in areas prone to hurricanes or wind-debris hazards shall be certified by the manufacturer to meet the following Florida Building Code tests: Uniform Static Air Pressure Test, Cyclic Wind Pressure Test, Large Missile Impact Test, and Wind Driven Rain Resistance Test for dry areas, enclosed.

The remote radiator design and location shall meet the requirements of the Physical Security Design Manual for critical outdoor mechanical equipment. In areas designated as hurricane prone, the remote radiator design shall also meet the wind load and damage protection requirements for hurricane locations.

There are several options available: the electrical equipment including the generator and onboard or nearby electrical equipment can be specified for wet locations, or remote radiators can be used thereby drastically reducing the louver area requirement. A system with a mix of unit mounted radiators and remote units could be proposed. A separate detailed acoustic analysis shall be submitted for the final design of the standby generator facility.

Design considerations:

- The switchgear and control rooms shall be fully air-conditioned. If remote radiators are used and only minimal louvers required for combustion in ventilation consideration should be given to air conditioning the engine bay. The louvers would then be fitted with electrically controlled actuators to open as needed. No air conditioning during operation.

Standby Generator Room

- Additional factors required by the Physical Security Design manual shall be factored into the final design and analysis.
- If remote radiators are used glycol needs to be added for systems subject to freezing.
- A complete and detailed heat balance of the entire system shall be included in the analysis.
- Engine exhaust must be safely conveyed from the engine through the piping and any auxiliary equipment to the atmosphere within allowable pressure drops.
- Maintain a separate exhaust for each engine to reduce the possibility of condensation in the off engines.
- Provide individual silencers or mufflers for each exhaust system.
- For the exhaust system use welded tube turns with radius of at leased 4 pipe diameters.
- The air intakes and exhaust outlets shall be located so air does not short circuit. Air shall pass over the engine-generator set before it is exhausted. Additional ventilation shall be provided as required to reject the heat from the engine-generator set, muffler (if installed in room) and exhaust pipe. See VA Master Specification 26 32 13 (16208) ENGINE GENERATORS for the muffler and exhaust piping, which is to be covered with calcium silicate insulation.

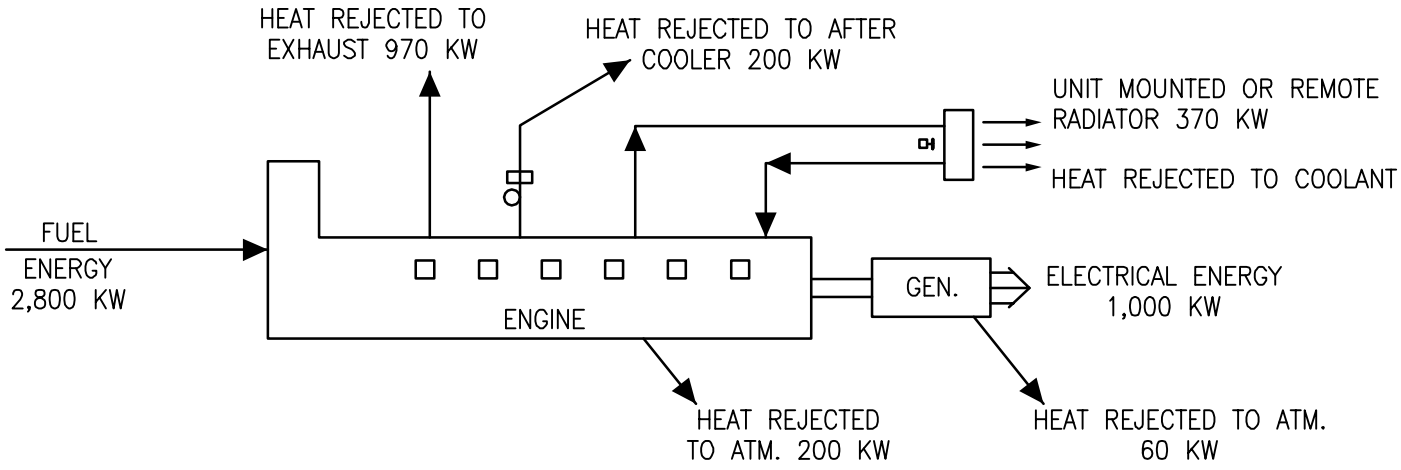
Inside Design Conditions	● Cooling 85 F [29.4 C] Dry-Bulb Temperature ● Heating 40 F [18.3 C] Dry-Bulb Temperature ● **Note 1**
Minimum Supply Air Changes per Hour	4 air changes per hour or greater if load requires – Engine Off
Return Air	Permitted – Engine Off
Exhaust Air	Required – During Operation
Room Noise Level	Not Applicable
Filtration	Pre-Filters – VA Grade A during operation
Individual Room Temperature Control	Required – Engine Off
Room Air Balance	Negative (-) – During Operation

Note 1: The following apply to stand-by or emergency generators:

(a) Provide motorized dampers for all louvers. Dampers shall fail-open on loss of power (spring to open).

(b) During operation, room temperature shall not exceed maximum ambient temperature recommended by engine generator manufacturer.

ENERGY BALANCE COMPRESSION IGNITION ENGINE



DIESEL – STAND BY GENERATOR CAPACITY DATA

1	60 HZ 1800 RPM 480 VOLTS	300 KW	500 KW	750 KW	1000 KW	1500 KW	2000 KW
2	FUEL CONSUMPTION FULL LOAD DIESEL GAL/HR	23	34	53	72	108	142
2.1	FUEL ENERGY INPUT, KW	880	1,320	2,020	2,700	4,080	5,400
3	AIR FLOW ACROSS RADIATOR, CFM	25,000	30,000	42,000	55,000	75,000	100,000
4	COMBUSTION AIR FULL LOAD, CFM	900	1,300	1,900	2,900	4,400	5,800
5	EXHAUST GAS FLOW RATE, FULL LOAD, CFM @ 950°F	2,500	3,700	5,400	7,900	12,100	16,100
6	HEAT REJECTION TO COOLANT, KW	200	200	340	370	700	820
7	HEAT REJECTION TO EXHAUST, KW	320	450	700	970	1,550	2,100
8	HEAT REJECTION TO AFTER COOLER, KW	N/A	N/A	110	230	350	420
9	HEAT REJECTION TO ATMOSPHERE FROM ENGINE, KW	70	100	160	200	240	280
10	HEAT REJECTION TO ATMOSPHERE FROM GENERATOR, KW	22	30	35	60	80	90
11	DELTA T ACROSS RADIATOR, °F (#6x3413)/(#3x1.08)	25	21	26	21	29	26
12	ROOM VENT RATE @ 15° F ROOM RISE, CFM (#10+#9)x3413)/(15x1.08)	19,382	27,388	41,082	54,777	67,417	77,951
AVERAGE, MID RANGE VALUES, VERIFY ALL QUANTITIES WITH AT LEAST (3) MANUFACTURERS							

STANDBY GENERATOR ROOM

Not to Scale

Therapeutic Pool – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 82 F [27.8 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	● 12 – CV required ● **Note 1**
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 45
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: Evaluate minimum air changes per hour with the expected evaporation losses and resultant space relative humidity. Increase the supply air volume to keep the relative humidity below 60%. **Note 2:** Provide a dedicated wet exhaust system with the following features: ● Welded stainless steel ductwork ● Coated fan to prevent corrosion ● Bearings outside the air stream	

Therapy Room (Occupational)	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Therapy Room (Physical) – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [23.9 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)

Toilets – Patients (Interior) – Room Data Sheet	
Inside Design Conditions	Conditioned by make-up air
Minimum Supply Air Changes per Hour	Not Applicable
Return Air	Not Permitted
Exhaust Air	Highest of: ● 10 air changes per hour ● 50 CFM [24.0 Liters/Second] ● Room air balance
Room Noise Level	NC 35
Filtration	Not Applicable
Individual Room Temperature Control	Not Required
Room Air Balance	Double Negative (- -)

Toilets – Patients (Perimeter) – Room Data Sheet	
Inside Design Conditions	● Heating 68 F [20 C] ● **Note 1**
Minimum Supply Air Changes per Hour	Not Applicable
Return Air	Not Permitted
Exhaust Air	Highest of: ● 10 air changes per hour ● 50 CFM [24.0 Liters/Second] ● Room air balance
Room Noise Level	NC 35
Filtration	Not Applicable
Individual Room Temperature Control	Required – Heating Mode
Room Air Balance	Double Negative (- -)
Note 1: Provide radiant ceiling panels.	

Toilets – Public (Interior) – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 50% Relative Humidity
Minimum Supply Air Changes per Hour	● 6 – CV Required ● **Note 1**
Return Air	Not Permitted
Exhaust Air	● 100% ● Highest of: – 10 air changes per hour – 70 CFM [33.0 Liters/Second] per each water closet and/or urinal – Room air balance ● **Note 2**
Room Noise Level	NC 40
Filtration	Not Applicable
Individual Room Temperature Control	Required
Room Air Balance	Double Negative (- -)
Note 1: For toilets with exhaust volumes greater than 300 CFM [141.6 Liters/Second], provide a thermostatically-controlled, dedicated constant volume air terminal unit. **Note 2:** Admit make-up air from the adjoining corridor via door undercut and transfer grille.	

Toilets Public (Perimeter) – Room Data Sheet	
Inside Design Conditions	● Cooling 77 F [25 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21.1 C] Dry-Bulb Temperature 30% Relative Humidity
Minimum Supply Air Changes per Hour	● 6 – CV Required ● **Notes 1 and 2**
Return Air	Not Permitted
Exhaust Air	● 100% ● Highest of: – 10 air changes per hour – 70 CFM [33.0 Liters/Second] per each water closet and/or urinal – Room air balance ● **Note 3**
Room Noise Level	NC 40
Filtration	Not Applicable
Individual Room Temperature Control	Required
Room Air Balance	Double Negative (- -)
Note 1: For toilets with exhaust volume greater than 300 CFM [141.6 Liters/Second], provide a thermostatically controlled, dedicated constant volume air terminal unit with reheat coil. **Note 2:** For toilets with exhaust volumes less than 300 CFM [141.6 Liters/Second], install thermostatically-controlled perimeter heat delivered by unit heaters, cabinet heaters, convectors, or baseboard radiators. **Note 3:** Admit make-up air from the adjoining corridor via door undercut and transfer grille.	

Trash Collection Room – Room Data Sheet	
Inside Design Conditions	Heating Only 50 F [10.0 C]
Minimum Supply Air Changes per Hour	● 15 – CV Required ● **Note 1**
Return Air	Not Permitted
Exhaust Air	● 20 Air Changes per Hour ● 100% ● **Note 2**
Room Noise Level	NC 45
Filtration	Pre-Filters – VA Grade A
Individual Room Temperature Control	Required – Heating Mode only
Room Air Balance	Double Negative (- -)
Note 1: If the required make-up air for exhaust is not available from the adjoining spaces, provide a dedicated HV unit (capacity – 15 air changes per hour). **Note 2:** Provide a dedicated exhaust fan. Fan shall run continuously. Allow the difference between the exhaust and supply air volume to enter via door undercut and transfer grille.	

Treatment Room (Chemotherapy) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10 – CV Required
Return Air	Not Permitted
Exhaust Air	100%
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Treatment Room (Dermatology) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Treatment Room (Phototherapy) and Shower Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	From Shower Room only
Room Noise Level	NC 35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	● Neutral (0) – Phototherapy Treatment ● Negative (-) – Shower Room
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity.	

Tub Room – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 82 F [27.8 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	10 – CV required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Note 2**
Room Noise Level	NC 40
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 82 F [27.8 C] and 30% relative humidity. **Note 2:** Connect room air exhaust to the general exhaust system.	

Ventilatory Test Room (Spirometry) – Room Data Sheet	
Inside Design Conditions	● Year Around Conditions 70 F [21 C] to 75 F [24 C] Dry-Bulb Temperature 30% to 50% Relative Humidity ● **Note 1**
Minimum Supply Air Changes per Hour	12 – CV Required
Return Air	Not Permitted
Exhaust Air	● 100% ● **Notes 2 and 3**
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade D
Individual Room Temperature Control	Required
Room Air Balance	Negative (-)
Note 1: The HVAC system shall be sized and selected to maintain any room temperature within the specified range. Cooling load calculations shall be based on 70 F [21 C] and 50% relative humidity. Heating load calculations shall be based on 75 F [24 C] and 30% relative humidity. **Note 2:** Provide low-level exhaust grilles 7 inches [175 mm] above finished floor. **Note 3:** Room air exhaust can be connected to the general exhaust system.	

Vestibules – Room Data Sheet	
Inside Design Conditions	● Heating Only 50 F [10 C] ● **Note 1**
Minimum Supply Air Changes per Hour	● 1.0 CFM/Square Foot [5.0 Liters/Second/Square Meter] ● **Note 2**
Return Air	Not Permitted
Exhaust Air	Not Required
Room Noise Level	NC 45
Filtration	As supplied with the cabinet heaters
Individual Room Temperature Control	Required
Room Air Balance	Positive (+) with respect to outdoors

Note 1: Provide a thermostatically controlled, ceiling or floor-mounted, terminal heater(s). Coordinate heater type, location, and access with the architectural discipline.

(a) Floor-Mounted Cabinet Heaters – Provide cabinet heaters in vertical configuration with top return and bottom horizontal supply configuration, discharging air at the floor level.

(b) Ceiling-Suspended Cabinet Heaters – Provide supply and return air ductwork with the ceiling-mounted cabinet heaters. Locate supply air outlet(s) and return air inlet(s) to ensure uniform air and heat distribution. For floor-to-ceiling glass entrance, provide wall-to-wall linear diffusers.

(c) Provide local, closed-loop thermostatic control, without interface with the building DDC controls system.

Note 2: Admit supply air at the rate of 1.0 CFM/Square Feet [5.0 Liters/Second/Square Meter] of vestibule area, under positive pressure, from the lobby air terminal unit. Allow the conditioned supply air to ex-filtrate outdoors.

Visual Fields Room and Photography Room – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Required
Room Air Balance	Neutral (0)

Vital Signs Station – Room Data Sheet	
Inside Design Conditions	● Cooling 75 F [24 C] Dry-Bulb Temperature 50% Relative Humidity ● Heating 70 F [21 C] Dry-Bulb Temperature 30% Relative Humidity ● 5 F [2.8 C] Dead Band
Minimum Supply Air Changes per Hour	6 – VAV Permitted
Return Air	Permitted
Exhaust Air	Not Required
Room Noise Level	35
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade C
Individual Room Temperature Control	Not Required
Room Air Balance	Neutral (0)

Walk-In Refrigerators and Freezers – Room Data Sheet	
Inside Design Conditions	**Notes 1 - 3**
Minimum Supply Air Changes per Hour	**Note 4**
Return Air	Not Applicable
Exhaust Air	Not Applicable
Room Noise Level	Not Applicable
Filtration	Not Applicable
Individual Room Temperature Control	Not Applicable
Room Air Balance	Neutral (0)

Note 1: Coordinate the equipment installation and design with the VA Master Specifications and Standard Details. The revised specifications are:

(a) Section 11 41 21 - Walk-In Coolers and Freezers

(b) Section 11 53 23 - Laboratory Refrigerators

(c) Section 11 78 13 - Mortuary Refrigerators

Exception to Note 1:
Constant temperature rooms, covered under the VA Master Specification Section 13 21 29, are used for laboratories and research facilities. Generally, the mechanical contractor does not furnish these items. Provide DDC temperature sensors for these rooms to sound local and remote alarms at the ECC.

Note 2: Make provision to prevent frost formation and subsequent floor heaving for the equipment mounted on grade or above the grade with fill. Provide heating cables in coordination with the electrical discipline to prevent freezing below the grade or concrete sub-floor. Evaluate the possibility of using waste heat for anti-frost system, to conserve energy.

Note 3: Provide emergency electrical power for the equipment and controls serving refrigerators and servers.

Note 4: Use ASHRAE recommendations about the heat gain factors, load calculations, and compressor running time while selecting the equipment to maintain the temperatures listed below:

(a) Dairy Freezers: -20 F [-28.9 C]

(b) Ice Cream Freezers: -20 F [-28.9 C]

(c) Meat Freezers: -12 F [-24.4 C]

(d) Fresh Meat Refrigeration: 32 F [0.0 C]

(e) Walk-In Refrigerators: 36 F [2.2 C]

(f) Autopsy (Mortuary) Cold Room: 36 F [2.2 C]

(g) Subsistence Storage (Supply Service): 36 F [2.2 C]

Warehouse (Central) – Room Data Sheet	
Inside Design Conditions	● Heating 68 F [20 C] – Occupied Mode 50 F [10 C] – Unoccupied Mode ● **Note 1**
Minimum Supply Air Changes per Hour	6 – CV Required
Return Air	● Permitted ● **Note 2**
Exhaust Air	● Up to 100% ● **Note 3**
Room Noise Level	45
Filtration	● Pre-Filters – VA Grade A ● After-Filters – VA Grade B
Individual Room Temperature Control	● Required ● Heating Mode Only
Room Air Balance	Positive (+)

Note 1: Central warehouse is generally provided with a heating and ventilation unit, complete with air distribution system, that is, supply, exhaust, outside, and return air ducts and inlets/outlets. Use of mechanical cooling shall be evaluated on a case-by-case basis, particularly in high humidity locations.

Note 2: During night setback and morning warm-up cycles, the HV unit shall operate in 100% re-circulatory mode with outside air dampers in closed position and return air damper in open position.

Note 3: Provide an exhaust system to relieve room air during summer ventilation mode.

CHAPTER 7: CLIMATIC DATA

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7.1 CLIMATIC CONDITIONS FOR VA MEDICAL CENTERS

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
ALABAMA													
Birmingham	Birmingham	33.57	630	95.2	75.6	18.6	92.7	75.2	23.0	78.5	77.6	98.1	10.2
Montgomery	Montgomery	32.28	203	95.9	76.4	23.7	93.6	76.0	27.2	79.6	78.4	98.7	15.5
Tuscaloosa	Tuscaloosa Municipal AP	33.22	167	96.1	76.4	20.1	99	77	24.7	79.7	78.6	99.2	11.2
Tuskegee*	Tuskegee AP	32	195	96	79	22	95	79	22	-	-	-	-
ALASKA													
Anchorage	Anchorage	61.17	115	40.6	58.4	-10.7	67.9	57.1	-5.8	60.1	58.6	76.4	-15.6
ARIZONA													
Phoenix	Phoenix	33.42	1112	110.2	70.0	37.2	108.1	69.9	40.1	76.0	75.1	114.5	32.8
Prescott	Prescott Love Field	34.65	5039	94.2	60.8	16.7	91.5	60.6	20.5	26.7	25.7	98.7	9.2
Tucson	Tucson	32.12	2556	105.3	66.0	31.6	102.9	65.6	34.4	72.3	71.4	109.1	26.3
ARKANSAS													
Fayetteville	Fayetteville Drake Field	36.00	1250	95.3	75.3	7.5	92.8	75.1	14.1	78.2	77.2	99.1	0.5
Little Rock	Little Rock AFB	34.92	338	99.3	77.2	15.2	96.4	77.3	20.4	80.9	79.8	101.7	7.9
N. Little Rock	North Little Rock	34.83	558	95.1	76.0	15.2	92.7	75.9	20.6	78.3	77.4	98.2	10.2

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
CALIFORNIA													
Fresno	Fresno	36.77	328	103.5	71.1	30.7	101.0	70.1	33.0	73.5	72.0	107.8	27.2
Livermore*	Livermore	37	545	100	71	24	97	70	24	-	-	-	-
Loma Linda	Riverside-March AFB	33	1539	101	68	34	98	68	36	72	71	107	29
Long Beach	Long Beach	33.82	56	91.5	68.0	40.8	87.7	67.3	43.1	72.2	70.8	101.8	35.8
Los Angeles	Los Angeles	33.92	105	84.2	64.2	43.9	80.4	64.5	46.1	70.0	68.9	95.2	39.2
Martinez*	Concord	38	195	100	7	24	97	70	24	-	-	-	-
Palo Alto	San Jose INTL AP	37.37	49	92.4	67.1	35.7	88.9	66.4	37.8	69.6	68.2	100.5	31.8
Menlo Park	San Jose INTL AP	37.37	49	92.4	67.1	35.7	88.9	66.4	37.8	69.6	68.2	100.5	31.8
San Diego	San Diego	32.72	30	84.7	67.7	44.8	81.5	67.7	46.9	72.8	71.3	92.8	41.0
San Francisco	San Francisco	37.62	16	83.0	62.9	40.0	78.2	62.0	40.0	65.1	63.5	94.5	34.4
Sepulveda	Burbank-Glendale-Pasadena	34.20	738	98.3	69.0	39.0	94.5	68.5	41.4	73.5	71.9	105.4	33.6
COLORADO													
Denver	Denver Stapleton INTL AR	39.77	5285	93.5	60.5	-4.0	90.8	60.0	3.3	64.6	63.5	98.9	-12.2
Ft. Lyon*	La Junta Municipal AP	38.05	4203	99.6	64.6	-1.5	97.0	64.2	6.1	68.5	67.6	104.5	-6.7
Grand Junction	Grand Junction	39.12	4839	96.6	61.5	3.4	94.4	60.7	8.9	65.3	64.2	100.6	-0.8
CONNECTICUT													
Newington	Hartford/ Brainard FD	41.73	20	90.5	N/A	7.0	87.8	N/A	11.5	N/A	N/A	N/A	N/A

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
West Haven*	West Haven AP	41	6	88	76	3	84	76	3	-	-	-	-
DELAWARE													
Wilmington	Wilmington	39.67	79	91.7	75.2	10.6	89.1	74.0	15.0	78.0	76.6	96.4	3.7
DISTRICT OF COLUMBIA													
Washington	National AP	38	66	95	76	15	92	76	20	79	78	99	8
FLORIDA													
Bay Pines	St. Petersburg	27.92	10	93.4	79.0	42.6	91.9	78.5	46.0	82.2	81.3	95.7	34.2
Coral Gables	Miami	25.78	7	91.6	77.5	46.3	90.4	77.4	50.5	80.0	79.3	94.5	40.0
Gainesville	Gainesville Regional AP	29.70	131	93.6	76.8	29.6	92.1	76.5	33.3	79.9	79.0	97.4	22.3
Lake City	Gainesville Regional AP	29.70	131	93.6	76.8	29.6	92.1	76.5	33.3	79.9	79.0	97.4	22.3
Miami	Miami	25.78	7	91.6	77.5	46.3	90.4	77.4	50.5	80.0	79.3	94.5	40.0
Orlando	Orlando Executive AP	28.55	105	93.9	76.3	6.8	92.6	76.1	7.2	80.1	79.1	96.6	32.2
Tampa	Tampa	27.97	10	92.5	77.5	36.6	91.4	77.5	40.6	80.5	79.9	94.9	29.9
GEORGIA													
Atlanta	Atlanta	33.65	1033	93.9	74.8	18.8	91.6	74.3	23.9	77.4	76.3	96.4	10.8
Augusta	Augusta	33.37	148	96.8	76.1	21.3	94.4	75.9	24.8	79.2	78.1	100.4	14.2
Dublin*	Dublin AP	32	215	96	79	21	93	78	21	-	-	-	-
Decatur	Atlanta	33.65	1033	93.9	74.8	18.8	91.6	74.3	23.9	77.4	76.3	96.4	10.8

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
HAWAII													
Honolulu	Honolulu	21.32	16	89.6	73.8	60.8	88.7	73.5	62.8	76.8	75.9	91.0	57.0
IDAHO													
Boise	Boise	43.57	2867	97.0	63.9	1.6	94.1	62.8	9.1	66.1	64.6	103.0	-2.3
ILLINOIS													
Chicago W. Side	W. Chicago/DU Page	41.92	758	90.5	75.2	-6.4	88.0	74.0	-0.2	78.4	76.6	95.4	-12.8
Chicago Lakeside	W. Chicago/DU Page	41.92	758	90.5	75.2	-6.4	88.0	74.0	-0.2	78.4	76.6	95.4	-12.8
Danville*	Danville	40	558	93	78	-3	90	77	-4	-	-	-	-
Downey*	Waukegan	42	680	92	78	-6	89	76	-6	-	-	-	-
Hines	Meigs Field	41	623	92	74	-3	89	73	3	77	76	97	-10
Marion*	Mt. Vernon (AWOS)	38.32	479	93.2	77.5	3.1	91.0	76.8	9.9	81.3	79.1	97.4	-8.1
INDIANA													
Ft Wayne	Ft. Wayne	41.00	827	90.9	74.3	-3.6	88.1	73.0	1.9	77.5	75.8	94.7	-10.4
Indianapolis	Indianapolis	39.72	807	91.1	75.8	-1.8	88.6	74.6	4.1	78.4	77.1	94.3	-9.2
Marion*	Marion	40	791	91	77	-4	90	75	-4	-	-	-	-
IOWA													
Des Moines	Des Moines	41.52	965	93.5	76.0	-7.8	90.3	74.8	-2.9	78.2	76.9	97.9	-14.2
Iowa City*	Iowa City	41	645	92	80	-11	89	78	-11	-	-	-	-
Knoxville	Des Moines	41.52	965	93.5	76.0	-7.8	90.3	74.8	-2.9	78.2	76.9	97.9	-14.2

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
KANSAS													
Leavenworth	Kansas City, MO AP	39	1024	96	75	-1	93	75	4	78	77	100	-7
Topeka	Topeka	39.07	886	96.5	75.8	-1.6	93.6	75.6	4.4	79.1	77.8	100.9	-8.0
Wichita	Wichita	37.65	1339	101.0	72.9	2.6	97.8	73.0	8.7	77.1	75.9	104.9	-2.4
KENTUCKY													
Lexington	Lexington	38.02	988	91.1	74.5	4.5	88.8	73.9	10.6	77.3	76.0	94.5	-2.8
Louisville	Louisville	38.17	489	93.1	76.4	6.7	90.9	75.7	12.5	78.9	77.6	96.3	0.3
LOUISIANA													
Alexandria	England AFB	31.32	89	96.7	77.8	26.0	93.9	77.6	29.6	80.9	80.0	98.9	19.7
New Orleans	New Orleans	29.98	10	93.8	78.8	30.6	92.1	78.3	34.4	81.3	80.4	96.4	24.6
Shreveport	Shreveport	32.47	259	97.5	76.8	22.7	95.1	76.8	26.7	79.5	78.8	99.8	16.8
MAINE													
Togus	Augusta Airport	44.32	348	87.1	70.4	-3.4	83.8	68.9	1.0	73.3	71.4	93.1	-10.4
MARYLAND													
Baltimore	Baltimore	39.17	154	93.6	75.0	12.3	90.9	74.3	16.7	78.1	76.9	97.8	4.8
Perry Point	Baltimore AP	39.17	154	93.6	75.0	12.3	90.9	74.3	16.7	78.1	76.9	97.8	4.8
MASSACHUSETTS													
Bedford	Boston	42.37	16	90.8	73.1	7.7	87.6	71.7	12.3	76.0	74.3	96.0	1.4
Boston	Boston	42.37	16	90.8	73.1	7.7	87.6	71.7	12.3	76.0	74.3	96.0	1.4
Brockton*	Taunton	41	20	89	75	5	86	74	5	-	-	-	-

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
North Hampton*	Springfield/Westover AFB	42	247	90	75	-5	87	73	-5	-	-	-	-
West Roxbury	Boston	42.37	16	90.8	73.1	7.7	87.6	71.7	12.3	76.0	74.3	96.0	1.4
MICHIGAN													
Ann Arbor*	Ypsilanti	42	777	92	75	1	89	74	1	-	-	-	-
Allen Park	Detroit Metro CAP	42	663	90	73	0	87	72	5	76	74	95	-7
Battle Creek*	Battle Creek AP	42	939	92	76	1	88	74	1	-	-	-	-
Detroit	Detroit Metro CAP	42	663	90	73	0	87	72	3	76	74	95	-7
Iron Mountain*	Escanaba	45.7545	614	81.8	67.9	-7.9	79.2	67.3	-2.9	72.3	70.1	87.6	-15.2
Saginaw	Saginaw AP	43	669	90	74	0	87	72	4	77	75	96	-6
MINNESOTA													
Minneapolis	Minneapolis/St. Paul	44.87	837	91.0	73.2	-14.9	87.8	71.8	-9.4	76.7	74.7	96.5	-20.8
St. Cloud	St. Cloud	45.55	1027	89.5	N/A	-20.4	86.2	N/A	-14.7	N/A	N/A	95.6	-27.6
MISSISSIPPI													
Jackson	Jackson	32.32	331	95.9	76.7	21.1	93.9	76.4	25.1	79.9	78.9	98.6	14.6
Biloxi	Keesler AFB	30.42	23	93.5	80.2	30.3	91.5	79.4	34.9	83.5	82.2	97.0	20.8
Gulfport	Keesler AFB	30.42	23	93.5	80.2	30.3	91.5	79.4	34.9	83.5	82.2	97.0	20.8
MISSOURI													
Columbia	Columbia	38.82	886	94.7	75.7	-0.3	91.7	75.6	5.4	78.9	77.5	99.0	-7.9
Kansas City	Kansas City	39.28	1.33	95.8	75.6	-2.1	92.6	75.4	3.5	79.1	77.7	100.2	-8.0
Poplar Bluff	Poplar Bluff	36.77	479	94.4	77.2	8.0	92.0	76.6	14.4	80.0	78.7	99.1	2.3

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
St. Louis (JBO)	St. Louis	38.75	564	95.5	76.7	2.0	93.0	76.1	8.0	79.4	78.1	99.3	-4.6
MONTANA													
Ft. Harrison	Helena	46.58	3898	91.0	61.0	-17.1	87.8	60.2	-9.8	63.9	62.2	96.7	-23.0
Miles City	Miles City Municipal ARPT	46.43	2628	98.2	65.8	-18.2	94.6	64.8	-11.7	69.7	68.0	103.1	-23.8
NEBRASKA													
Grand Island	Grand Island	40.97	1857	96.4	73.0	-7.3	93.1	72.5	-1.8	76.9	75.2	101.9	-13.6
Lincoln	Lincoln CO	40	1188	97	74	-7	94	74	-2	78	76	103	-11
Omaha	Eppley Airfield	41.32	981	94.6	76.4	-7.4	91.6	75.3	-1.5	79.2	77.5	99.3	-12.8
NEVADA													
Reno	Reno	39.50	4400	95.1	60.9	8.8	92.5	60.0	14.9	63.0	61.6	99.6	3.7
NEW HAMPSHIRE													
Manchester*	Grenier AFB	43	253	91	75	-8	88	74	-8	-	-	-	-
NEW JERSEY													
East Orange	Newark	40.70	30	93.4	74.9	10.3	90.4	73.3	14.8	77.4	76.1	98.2	4.6
Lyons*	New Brunswick	40	86	92	77	6	89	76	6	-	-	-	-
NEW MEXICO													
Albuquerque	Albuquerque	35.03	5315	96.0	60.2	15.9	93.5	60.1	19.9	65.3	64.4	100.1	8.7

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
NEW YORK													
Albany	Albany	42.75	292	88.5	72.8	-2.9	85.7	71.2	2.2	75.4	73.8	93.6	-11.7
Batavia*	Batavia	43	900	90	75	1	87	73	1	-	-	-	-
Bath*	Hornell	42	1325	88	74	-4	85	73	-4	-	-	-	-
Bronx	NYC/John F. Kennedy Int.	40.65	13	89.5	73.4	13.1	86.3	72.1	17.5	77.0	75.8	96.3	6.8
Brooklyn	NYC/ John F. Kennedy Int. AP	40.65	13	89.5	73.4	13.1	86.3	72.1	17.5	77.0	75.8	96.3	6.8
Buffalo	Buffalo	42.92	705	86.1	70.7	2.2	83.7	69.5	6.2	74.3	72.6	90.4	-4.7
Canandaigua*	Geneva	42	590	90	75	-3	87	73	-3	-	-	-	-
Castle Point	Poughkeepsie	41.63	154	91.3	74.0	0.6	88.5	72.6	6.2	76.7	75.1	96.3	-8.8
Montrose*	Newberg-Stewart AFB	41	460	90	76	-1	88	74	-1	-	-	-	-
New York City	NYC/John F. Kennedy Int. AP	40.65	13	89.5	73.4	13.1	86.3	72.1	17.5	77.0	75.8	96.3	6.8
Northport*	Suffolk Co. AFB	40	57	86	76	7	83	74	7	-	-	-	-
Syracuse	Syracuse	43.12	407	88.4	72.8	-2.7	85.6	71.0	2.9	75.4	73.6	92.5	-11.7
St. Albans	NYC/John F. Kennedy Int. AP	40.65	13	89.5	73.4	13.1	86.3	72.1	17.5	77.0	75.8	96.3	6.8

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
NORTH CAROLINA													
Durham	Durham	36	440	93	76	16	90	75	20	78	77	96	9
Fayetteville	Fort Bragg Simmons AAF	35.13	305	96.6	76.2	21.7	94.0	75.7	26.0	79.2	78.1	100.3	13.3
Asheville (Oteen)	Asheville	35.42	2169	88.2	72.1	12.2	85.8	71.3	16.9	74.7	73.4	91.8	3.8
Salisbury	Winston-Salem AP	36	971	92	74	18	89	74	23	77	76	96	8
NORTH DAKOTA													
Fargo	Fargo	46.90	899	91.1	71.6	-21.1	87.8	69.9	-16.5	75.3	73.2	97.3	-25.7
OHIO													
Brecksville	Cleveland	41.40	804	89.1	74.3	1.0	86.3	72.4	6.1	76.3	74.7	93.3	-5.6
Chillicothe*	Chillicothe	39	638	95	78	0	92	76	0	-	-	-	-
Cincinnati	Lunken Field	39	482	93	74	5	90	75	12	77	76	96	-3
Cleveland	Cleveland	41.40	804	89.1	74.3	1.0	86.3	72.4	6.1	76.3	74.7	93.3	-5.6
Dayton	Dayton	39.90	1004	90.5	74.3	-0.6	88.0	73.1	5.1	76.9	75.3	94.5	-7.6
OKLAHOMA													
Muskogee*	Muskogee	35	610	101	79	10	98	78	10	-	-	-	-
Oklahoma City	Oklahoma City	35.40	1302	99.5	74.2	10.3	96.7	73.9	15.7	77.4	76.4	102.7	4.7

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
OREGON													
Portland	Portland	45.58	39	90.8	67.5	21.9	86.6	66.2	27.0	69.2	67.6	98.8	19.2
Roseburg*	Roseburg AP	43	505	93	69	18	90	67	18	-	-	-	-
White City	Medford	42.37	1299	98.6	66.9	21.6	95.1	65.7	24.7	68.7	67.2	104.2	16.2
PENNSYLVANIA													
Altoona	Altoona CO	40	1503	89	72	5	86	70	10	74	72	92	-5
Butler*	Butler	40	1100	90	75	1	87	74	1	-	-	-	-
Coatesville*	New Castle	41	825	91	75	2	88	74	2	-	-	-	-
Erie	Erie	42.04	738	85.8	72.7	2.9	83.3	71.3	7.7	75.1	73.5	90.5	-3.1
Lebanon	Harrisburg AP	40	308	92	74	9	89	73	13	77	76	97	2
Philadelphia	Philadelphia	39.87	30	92.7	75.6	11.6	90.1	74.5	15.8	78.3	77.0	97.0	5.6
Pittsburgh	Pittsburgh	40.50	1224	89.1	72.5	1.8	86.2	70.9	7.5	74.9	73.3	92.6	-4.6
Wilkes-Barre	Wilkes-Barre/s	41.32	948	88.1	71.6	2.9	85.2	70.3	7.6	74.6	73.0	92.6	-3.9
PUERTO RICO													
San Juan	San Juan	18	62	92	77	69	90	78	69	81	80	94	56
RHODE ISLAND													
Providence	Providence	41.72	62	89.7	73.2	6.1	86.5	71.6	10.8	76.3	74.8	95.8	-0.7
SOUTH CAROLINA													
Charleston	Charleston	32.90	39	94.2	78.2	25.4	92.1	77.7	29.1	80.5	79.5	98.4	18.9
Columbia	Columbia	33.95	226	96.6	75.3	20.8	94.2	75.1	24.6	78.4	77.5	100.4	13.7

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
SOUTH DAKOTA													
Ft. Meade	Rapid City	44.03	3169	95.3	65.5	-11.0	91.5	65.4	-5.3	70.7	69.0	102.0	-17.3
Hot Springs	Rapid City	44.03	3169	95.3	65.5	-11.0	91.5	65.4	-5.3	70.7	69.0	102.0	-17.3
Sioux Falls	Sioux Falls	43.57	1427	93.5	73.4	-15.2	90.0	72.6	-10.1	77.1	75.3	99.3	-22.0
TENNESSEE													
Memphis	Memphis	35.03	285	96.2	77.6	16.8	94.1	77.2	21.4	80.3	79.4	98.7	10.5
Mountain Home	Bristol-Tri-City AP	36	1519	89	72	9	87	72	14	75	74	92	-1
Murfreesboro*	Murfreesboro AP	35	608	97	78	9	94	77	9	-	-	-	-
Nashville	Nashville	36.12	591	94.4	75.4	11.6	92.0	75.2	16.7	78.3	77.3	97.1	3.5
TEXAS													
Amarillo	Amarillo	35.22	3602	97.2	66.3	6.8	94.6	66.3	12.4	71.1	70.0	100.9	0.5
Big Spring*	Big Spring AP	32	2537	100	74	16	97	73	16	-	-	-	-
Bonham*	Sherman-Perrin AFB	33	763	100	78	15	98	77	15	-	-	-	-
Dallas	Dallas AP	32	597	100	74	17	98	74	24	78	77	103	14
Houston	Houston	29.97	108	96.9	76.8	27.7	94.9	76.8	31.5	80.1	79.3	99.7	22.4
Kerrville	San Antonio	29.52	794	98.1	73.6	26.7	96.4	73.7	30.7	78.2	77.4	100.7	20.3
Marlin	Waco	31.62	509	100.8	75.2	22.3	98.9	75.3	26.6	78.7	78.00	104.1	16.5
San Antonio	San Antonio	29.52	794	98.1	73.6	26.7	96.4	73.7	30.7	78.2	77.4	100.7	20.3
Temple*	Temple	31	675	100	78	22	99	77	22	-	-	-	-
Waco	Waco AP	31.62	509	100.8	75.2	22.3	98.9	75.3	26.6	78.7	78.00	104.1	16.5

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
UTAH													
Salt Lake City	Salt Lake City	40.77	4226	97.0	62.9	7.0	94.5	62.2	12.8	66.7	65.4	100.9	0.7
VERMONT													
White River Junction	Barre	44	1165	85	70	-10	83	68	-6	72	70	91	-18
VIRGINIA													
Hampton	Norfolk	36.90	30	93.7	76.7	20.4	91.2	75.9	24.4	78.7	77.8	97.8	14.6
Richmond	Richmond	37.50	164	94.7	76.4	14.7	92.1	75.5	19.3	78.9	77.7	98.2	6.9
Salem	Roanoke	37.32	1175	92.1	73.1	12.7	89.6	72.5	17.3	75.4	74.4	95.8	5.1
WASHINGTON													
American Lake	Olympia	46.97	200	87.0	66.4	18.0	82.9	64.8	23.2	67.8	65.9	94.8	10.2
Seattle	Seattle Int. AP	47	449	85	65	23	81	64	28	66	65	92	19
Spokane	Fairchild AFB	47.63	2438	91.1	62.2	3.6	88.0	61.5	9.9	64.8	63.3	96.2	-2.4
Vancouver	Portland Ore. CO	45	39	90	67	22	86	66	27	69	67	99	18
Walla Walla	Walla Walla	46.10	1165	98.9	66.9	6.4	94.9	65.6	14.6	69.0	67.1	104.9	4.7
WEST VIRGINIA													
Beckley*	Beckley	37	2330	83	73	-2	81	71	-2	-	-	-	-
Clarksburg*	Clarksburg	39	977	92	76	6	90	75	6	-	-	-	-
Huntington	Huntington	38.37	837	91.4	74.5	6.9	89.0	73.8	12.5	77.4	76.1	94.6	-1.3
Martinsburg	Martinsburg AP	39	558	94	74	8	91	73	14	77	75	99	-3

Table 7-1 Climatic Conditions for VA Medical Centers

Location	Weather Station	Latitude	Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%		
				Db	Wb	Db	Db	Wb	Db			Maximum	Minimum
WISCONSIN													
Madison	Madison	43.12	860	90.0	73.7	-10.3	87.0	72.2	-4.8	76.7	74.6	94.7	-16.6
Tomah	La Crosse	43.87	673	91.7	75.0	-13.7	88.5	73.2	-7.3	78.1	76.0	97.8	-18.6
Wood	Milwaukee	42.95	692	89.7	74.6	-5.2	86.2	72.4	0.1	76.9	75.0	95.3	-11.2
WYOMING													
Cheyenne	Warren AFB	41	6142	87	58	-7	85	57	0	62	61	92	-15
Sheridan	Sheridan	44.77	3967	94.2	63.3	-14.6	90.7	62.5	-7.8	67.1	65.3	99.2	-21.6

NOTES:

- The climatic conditions table data is based on the 2005 ASHRAE Handbook of Fundamentals and the Department of Defense Engineering Weather Data, an asterisk identifies 1978. Use column 1a and 1b for design of New Hospitals, NHCU, outpatient clinics, and other patient care buildings. Use column 2a and 2b for design of regional offices and laundry-type buildings.

*Not listed by ASHRAE.

APPENDIX 7-A: HIGH AND LOW HUMIDITY AREAS

Table 7-A1: HIGH HUMIDITY AREAS – DEW-POINT HOURS	
5-Year Averages	
Location	**=> 60°F**
San Juan	8474
Honolulu	7951
Miami	7020
West Palm Beach	6606
Viera	6025
Tampa	5788
Orlando	5703
Bay Pines	5406
Houston	5152
New Orleans	5104
Panama City	5037
Pensacola	4838
Gainesville	4774
Lake City	4774
Charleston	4368
Biloxi	4114

Table 7-A2: LOW HUMIDITY AREAS – DEW-POINT HOURS	
5-Year Averages	
Location	**<= 35°F**
Albuquerque	5211
Anchorage	4947
Cheyenne	5556
Denver	5115
Fargo	4099
Las Vegas	5083
Reno	5748
Tucson	4063

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