

Summary of Modifications/Changes in this Update

This Summary of Changes is for information only.
It is not a part of the referenced document, and should not be used for project documentation.

U.S. Department of Veterans Affairs ♦ Office of Construction & Facilities Management

DATE OF THIS VERSION:

November 1, 2023

TITLE OF DOCUMENT:

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

August 1, 2023

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. Chapters 2, 3, and 4 were revised to update references to ASHRAE Handbooks.
2. Paragraph 3.2.2.15 was deleted.
3. Section 3.3 revised to further clarify use of terminal cooling systems.
4. Paragraph 4.3.1 was revised to clarify the approval authority for usage of DX cooling systems.
5. Chapter 6 Room Data Sheets for Compounding Pharmacy areas revised to require ACH derived from HEPA filtered supply air for both positive and negative spaces.

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DATE OF THIS VERSION:

August 1, 2023

TITLE OF DOCUMENT:

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

May 1, 2023

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. Paragraph 3.2.1.4. was revised to clarify the prohibition of rooftop air handling units.
2. Paragraph 3.8 was revised to correct typographical error.
3. Paragraph 3.8.1.4 was revised to include MRI Exam Room Emergency Exhaust in the list of Special (Dry) Exhaust System Applications.
4. Paragraph 4.2.1.7 was revised to add detail to design coordination required.
5. AHU Systems Data Sheets and Room Data Sheets were revised to require a %RH MIN of 30% in lieu of 20%.
6. Table for Section 6 (Section 508 compliant) was updated to meet Section 6 data in the manual.

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DATE OF THIS VERSION:

May 1, 2023

TITLE OF DOCUMENT:

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

January 1, 2023

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. The HVAC Design Manual was updated to incorporate changes made during a recent update of the Research and Development (R&D) Design Guide. Section 3 and Section 6 received significant updates.
2. The HVAC Design Manual was updated to incorporate changes to achieve consistency with OIT document, Infrastructure Standard for Telecommunications Spaces. Section 1 was updated.
3. The HVAC Design Manual was updated to revise references to ASHRAE Standard 90.1. Version 90.1-2019 will be utilized as described throughout the manual. Sections 1, 2, 3, 4, 5 and 6 were updated.
4. Changes to the TOC reflect required page number changes.

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DATE OF THIS VERSION (new)

January 1, 2023

TITLE OF DOCUMENT (new title if applicable):

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

November 1, 2022

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. An update to the Emergency Department (ED) Design Guide has caused an update of HVAC Design Manual. Three additional pages have been added to HVAC Design Manual. ED Room Data Sheets: 6-65a, 6-65b, 6-65c were added due to additional rooms being added.
2. Chapter 6 has been updated as well to reflect the changes.

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DATE OF THIS VERSION (new)

November 1, 2022

TITLE OF DOCUMENT (new title if applicable):

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

October 1, 2022

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. Updated Page 4-15, 4.4.1.4 (b):
 - a. Removed as shown: "PRV station noise generation ~~shall~~ be less than ~~80~~ db and the turndown ratio shall be limited to 10:1."
 - b. Added as shown: "PRV station noise generation will be less than 85 db and the turndown ratio shall be limited to 10:1."
2. Updated Page 4-15, 4.4.1.4 (g):
 - a. Removed as shown: "Install a bypass loop with a globe valve designed for steam service and sized ~~for the flow of the largest valve in the~~ PRV station."
 - b. Added as shown: "Install a bypass loop with a globe valve designed for steam service and sized to meet the combined capacity of the two PRV's in the PRV station."
3. Updated Page 4-16, 4.4.1.4 (i):
 - a. Removed as shown: "Size the safety valve ~~to handle the maximum flow of the largest PRV or the bypass.~~"
 - b. Added as shown: "Size the safety valve to meet the combined capacity of the two PRV's or the bypass."
4. Updated Pharmacy Service pg 6-116 and 117

- a) Pharmacy Service pg 6-116 – Modified Air Flow Relationships and Legend.
 - i) “3: XXXX: Oncology Drug Preparation Area Air Lock (+)” was removed.
 - ii) “4: PHBS2: STORAGE AND CLEAN / STORAGE HAZARDOUS DRUGS (-)” replaced as “3: PHBS2: STORAGE AND CLEAN / STORAGE HAZARDOUS DRUGS (-)”.
- b) Pharmacy Service pg 6-117 – Modified Air Flow Relationships and Legend
 - i) “5: XXXX: Oncology Drug Preparation Area Air Lock (+)” was removed.
 - ii) “6: PHBS2: STORAGE AND CLEAN / STORAGE HAZARDOUS DRUGS (-)” was replaced as “5: PHBS2: STORAGE AND CLEAN / STORAGE HAZARDOUS DRUGS (-)”

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DATE OF THIS VERSION (new)

October 1, 2022

TITLE OF DOCUMENT (new title if applicable):

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

March 1, 2022

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

1. Updated Room Data Sheets:
 - a) Pharmacy Service pg 6-123 – Modified Note 2: Dual Purpose Anteroom.
 - i) “airlock” was removed.
 - ii) “anteroom” replaced “airlock”.
 - b) Pharmacy Service pg 6-124 – Modified
 - i) Title, “USP 800 Anteroom Lock for Oncology Buffer”
 - (1) “Air lock” was removed.
 - (2) “Anteroom” replaced “Air lock”.
 - ii) Note 2: General
 - (1) “air lock is placed between the ante space and the oncology buffer and it” was removed.
 - (2) “the Anteroom” replaced “air lock is placed between the ante space and the oncology buffer and it”.

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DATE OF THIS VERSION:

March 1, 2022

TITLE OF DOCUMENT:

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

November 1, 2021

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

PG-18-10 HVAC Design Manual

SUMMARY OF CHANGES IN THIS VERSION:

Chapter 2 – Changes:

2.3.1.2. Acoustic Mitigation Measures – HVAC Interior Systems, prohibited use of duct lining.

2.3.1.4 Unitary Equipment, prohibited use of duct lining.

Chapter 3 – Changes:

3.2.2.13 Filtration, Table 3-2 Filter Schedule, added After Filter.

3.7.1.6 Flexible Ducts, restricts the use of flexible ducts.

Chapter 6 – Changes:

AHU System Data Sheets:

- SURGICAL SUITE – Restricted use of acoustic sound lining, and modified supply air requirements.
- NON-PATIENT CARE AREAS – Modified prefilter requirements.

Room Data Sheets:

- NON-PATIENT ROOMS – Modified Note 2.
- STERILE PROCESSING SERVICE – Modified room names for SRS05 and SRS04.

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U.S. Department of Veterans Affairs ♦ Office of Construction & Facilities Management

DATE OF THIS VERSION:

November 1, 2021

TITLE OF DOCUMENT:

PG-18-10 HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

November 1, 2017

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

This update includes changes to various HVAC requirements in response to COVID-19 and similar pandemics. This version also includes other miscellaneous edits throughout the manual relating to dispersion analysis, rooftop air handling units, constant volume systems, fan coil units, energy recovery wheels, indoor design relative humidity, pressure differential, air balance/airflow relationship diagram, and room data sheets.

SUMMARY OF CHANGES IN THIS VERSION:

INTRODUCTION – Changes:

- Reworded the first paragraph to inform users of COVID-19 changes in the November 1, 2021 version of this manual.

Chapter 2 – Changes:

2.3.2.1

- Provided further clarification on “DISPERSION ANALYSIS” requirements, including CFD modeling and wind tunnel analysis.

Chapter 3 – Changes:

3.2.1.4

- Provided more restrictions on use of rooftop air handling units.
- Replaced “Hurricane areas” with “Hurricane-Prone Regions” and updated reference to Physical Security Manual.

3.2.3.2

- Delineated further between low pressure and medium pressure constant volume systems.

3.3.1.3

- Provided more restrictions on use of fan coil units.

3.6.2.1

- Prohibited use of energy recovery wheels.

Chapter 5 – Changes:

5.7.2.1 (m)

- Deleted “Sensible and Total Enthalpy Energy Recovery Wheels” from the list.

Chapter 6 – Changes:

6.2

- Added “Dental Clinic” and “Pharmacy Compounding Suite” to the list of dedicated air handling units.

6.4

- Defined Designated Emergency Epidemic Air Handling Units.

6.5.1

- Clarified the source for some of the indoor design conditions.

6.5.1.1

- Deleted the range for indoor design temperature.

6.5.1.1 (a), (c), and (d)

- Changed humidification “Set Point” to “Design Condition”.

6.5.1.1 (g)

- Provided sizing requirements for Humidifier Capacity.

6.5.2.1 (b)

- Clarified differential pressure designations, i.e., “0”, “-”, “- -”, “+”, and “++”.

6.5.2.1 (i)

- Included requirement to provide complete air balance/airflow relationship diagram(s).

AHU System Data Sheets:

- Referenced paragraph 6.5.1.1 for Humidifier Capacity.
- AUTOPSY SUITE – Clarified the requirement for serving the area from a 100% OA AHU.
- Enhanced After-Filter filtration during emergency epidemic mode from MERV 14 to MERV 16A for the areas indicated below. Provided notes on configuring and sizing AHU components to accommodate the enhanced filtration.
 - CARDIOVASCULAR LAB SERVICE
 - ELECTROENCEPHALOGRAPHY LABORATORY (EEG) SPACES
 - EYE CLINIC SPACES
 - MENTAL HEALTH REHABILITATION TREATMENT PROGRAM FACILITY
 - NURSING WING (Enhanced filtration applicable to AHUs without 100% OA capability. See note for AHU quantities with 100% OA capability.)
 - OUTPATIENT MENTAL HEALTH SERVICES
 - PATIENT CARE AREAS
 - PHARMACY SERVICE
 - POLYTRAUMA OUTPATIENT UNIT
- Required use of air handling units capable of delivering 100% OA during emergency epidemic for the areas indicated below. Also, referred to new paragraph 6.4 DESIGNATED EMERGENCY EPIDEMIC AIR-HANDLING UNITS for detailed requirements such as AHU operation, sizing, utilities, return/relief fan(s) location, isolation dampers, and cleaning and disinfection.
 - COMMUNITY LIVING CENTER
 - DENTAL CLINIC SPACES
 - DIALYSIS TREATMENT SPACES
 - DIGESTIVE DISEASES ENDOSCOPY SUITE
 - DOMICILIARY
 - EMERGENCY CARE UNIT
 - IMAGING SERIES
 - INFECTIOUS ISOLATION ROOMS / PROTECTIVE ENVIRONMENTS
 - KITCHEN (FOOD PRODUCTION)
 - MAIN ENTRANCE LOBBY
 - INPATIENT MENTAL HEALTH UNIT
 - NURSING WING (See note for AHU quantities with 100% OA capability.)
 - POLYTRAUMA REHABILITATION CENTER INPATIENT NURSING UNIT
 - SPINAL CORD INJURY/DISORDERS CENTER
 - SURGICAL SUITE
- For the following areas, required use of dedicated AHU if the non-dedicated AHU is not capable of operating at 100% OA during emergency epidemic mode, or if the AHU does not meet the requirements of the hours of operation and filtration:
 - COMMUNITY LIVING CENTER
 - DIALYSIS TREATMENT SPACES
 - DIGESTIVE DISEASES ENDOSCOPY SUITE
 - DOMICILIARY
 - INFECTIOUS ISOLATION ROOMS / PROTECTIVE ENVIRONMENTS
 - INPATIENT MENTAL HEALTH UNIT
- DENTAL CLINIC SPACES – Required dedicated AHU.
- NURSING WING - Recommended use of a set of double doors as entry vestibule at each entry into the designated Emergency Epidemic Nursing Unit. Provided requirements for vestibule air pressurization, airflow rate, and pressure monitoring devices.

- SURGICAL SUITE – Required four return air inlets in lieu of two in operating rooms and cystoscopy rooms. Also, referenced paragraph 6.5.2 AIR BALANCE for space pressure differential control.
- NON-PATIENT CARE AREAS – Enhanced AHU filtration by requiring MERV 14 in lieu of MERV 11 for PF-2 filter.

Room Data Sheets:

- Raised minimum indoor relative humidity level to 30% everywhere previously indicated as 20%.
- AUTOPSY SUITE:
 - Autopsy Room - Changed MIN OA ACH from 2 to 12.
 - Gross Specimen Storage Room - Changed MIN OA ACH from 2 to 6.
- DENTAL CLINIC:
 - Sterile Instrument Storage - Changed cooling and heating indoor temperatures from 70 F and 70 F to 66 F and 72 F, respectively.
- STERILE PROCESSING SERVICE:
 - Sterile Durables Storage & Sterile Storage - Changed cooling and heating indoor temperatures from 70 F and 70 F to 66 F and 72 F, respectively.

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DATE OF THIS VERSION:

March 1, 2020

TITLE OF DOCUMENT:

VA HVAC Design Manual

DATE OF VERSION BEING SUPERSEDED (old):

November 1, 2017

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

This update includes minor edits throughout the manual.

SUMMARY OF CHANGES IN THIS VERSION:

Table of Contents – Changes:

3.6

- Updated the title of this section.

Chapter 2 – Changes:

2.2.4.3

- Replaced “VAV box” with “air terminal boxes”.

Chapter 3 – Changes:

Chapter 3: Table of Contents:

- 3.6 – Replaced “HEAT” with “ENERGY”.
- 3.6.4 - Replaced “HEAT” with “ENERGY”.

3.1

- Replaced “Heat” with “Energy”.

3.2.3.2

- Clarified the required components for medium pressure constant volume systems.

3.5.1

- Replaced “heat” with “energy”.

3.6.2.2

- Added fixed membrane heat exchanger as allowable sensible and latent heat transfer device.

3.6

- Replaced “HEAT” and “heat” with “ENERGY” and “energy”, respectively.

3.6.1.1

- Reworded “Runaround” to “Run-around”.

3.6.2.1

- Replaced “heat” with “energy”.

3.6.3

- Replaced “heat” with “energy”.

3.6.4

- Replaced “HEAT” and “heat” with “ENERGY” and “energy”, respectively.
- Replaced “not permitted” with “prohibited”.
- Added Sterile Processing Service (SPS) and Pharmacy Department Exhausts to the list of systems for which use of energy recovery systems are prohibited.
- Further clarified application of energy recovery systems.

3.7.1.2

- Provided further clarification on ductwork and equipment in surgery and pharmacy applications.

3.10.4.2 (I)

- Replaced “Heat” with “Energy”.

Chapter 4 – Changes:

4.2.1.2 (a)

- Replace “heat” with “energy”.

APPENDIX 4-A:

4-A.1

- Reword “wrap around loop heat recovery” to “run-around energy recovery”.

4-A.1.1 (d)

- Reword “Wrap Around Loop” and “Heat Recovery” to “Run-around Loop” and “Energy Recovery”, respectively.

Chapter 5 – Changes:

5.7.2.1 (m)

- Replace “Heat” and “heat” with “Energy” and “energy”, respectively.

5.8

- Replace “heat” with “energy”.

Chapter 6 – Changes:

Chapter 6 Table of Contents:

- 6.4.4 - Change the title to “ROOM DATA SHEET CLARIFICATIONS”.

6.2

- Replace “Heat” with “Energy”.
- Added a paragraph to relax of the requirements for dedicated air handling units in smaller facilities.

6.4.2.1 b

- Provided further clarification on the design intent.

6.4.2.1 h

- Corrected a minor typo.

6.4.2.2 e

- Removed the last sentence and provided a new sentence to clarify the requirements for CV terminal units.

6.4.4

- Replaced the entire paragraph to include all the room air designations used in the room data sheets.
- Provided clarification on Minimum Outside Air.
- Provided clarification on the use of Differential Pressure Monitoring Devices.

DEDICATED AHU SYSTEM DATA SHEETS AND ROOM DATA SHEETS:

- Provided minor update to all AHU Data Sheets.
- Provided minor updates to the Room Data Sheets for the following medical departments:
 - CENTRAL LAUNDRY FACILITY
 - DIGESTIVE DISEASES ENDOSCOPY SUITE
 - INFECTIOUS ISOLATION AND PROTECTIVE ENVIRONMENT
 - NURSING WING

- PATIENT EXAMINATION, TREATMENT, AND PROCEDURE ROOMS
- PHARMACY SERVICE
- PULMONARY MEDICINE SERVICE
- SPINAL CORD INJURY/DISORDERS CENTER
- STERILE PROCESSING SERVICE
- SURGICAL SUITE

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U.S. Department of Veterans Affairs ♦ Office of Construction & Facilities Management

DATE OF THIS REVISION

May 1, 2019

TITLE OF DOCUMENT (new title if applicable):

VA HVAC Design Manual

DATE OF VERSION BEING REVISED:

November 1, 2017

DESCRIPTION OF DOCUMENT (previous title, number, other identifying data):

This is a minor update of the 2017 HVAC Design Manual to correct errata.

SUMMARY OF CHANGES IN THIS VERSION:

1. Page 7-4 was updated to correct the summer wet bulb temperature in Washington DC.