## - ANSWERS MARKED IN BLUE -

**Project Delivery Method:**

- Design-Build (D-B)
- Integrated Project Delivery (IPD)
- Construction Management @ Risk (CM) with Guaranteed Maximum Price (GMP)
- Performance Contract (PC)

**Owner Team:**

- Museum Administration
- Capital Project Manager
- Facility Manager
- Asset Management Committee

**Project Delivery Team:**

- Owner Representative (consultant)
- IPD Project Manager
- PC's Project Manager and Physician
- Third-Party IAQ Consultant

**HVAC Project Team:**

- Building Automation System (BAS) Technician (in-house staff)
- BAS Technician (out-source staff)
- O&M (operation & maintenance) Technician (in-house staff)
- Third-Party Commissioning Consultant (CxC)

**Application:**

- Places of Assembly, Chapter 5
- Healthcare Facilities, Chapter 9
- Museum, Chapter 24
- Clean Spaces, Chapter 19

**Project Type:**

- Renovation
- Shell & Core
- Infrastructure
- Tenant Fit-Out
- Facility Audit and Capital Project Master Planning

**References:**

- 2017 ASHRAE Handbook – Fundamentals
- 2018 ASHRAE Handbook – Refrigeration
- 2019 ASHRAE Handbook – HVAC Applications
- 2020 ASHRAE Handbook – HVAC Systems and Equipment
- Refer to the Codes and Standards in the Back of Each ASHRAE Handbook for Additional Information

**Other References:**

- ASHRAE Epidemic Task Force
- Technical Committee 9.8
- ASHRAE TC 2.10, Resilience & Security
- ASHRAE Humidity Control Design Guide for Commercial and Institutional Buildings
- ASHRAE Guide for Buildings in Hot & Humid Climates
- ASHRAE Indoor-Air Quality Guide: Best Practice for Design, Construction, & Commissioning

- ASHRAE Design Guide for Dedicated Outdoor Air Systems
- ASHRAE Standard 170, Ventilation of Healthcare Facilities

## DESIGN INTENT DOCUMENT (DID)

- As a Result of the COVID-19 Pandemic in 2019, a Major Museum Located in the Midwest Part of the U.S. has put together a PC project delivery (PD) Team to Update the Policy and Procedure (P&P) with Lessons Learned Over the Past 18 months. Part of this Update Is the Section on HVAC
- The PC Team Followed the Aforementioned References as They Pertain to Material Management Space, Occupational Health and IAQ
- Museum Key Considerations Include International Standards
- Owner Environmental Health and Safety (EH&S) Program Goals and Additional Goals
- Existing Conditions: Central Air Heating System(s) Supply Air and/or Return Air CFM, General and Toilet Exhaust; Heating Systems; and Air Conditioning Systems
- Air Filters: Pre-Filter, Final Filter, After-Filter, HEPA Filter, Fan-Power HEPA Filter Unit, and Charcoal Filters Based on Recommended Humidifiers and MERV Rating per the HVAC System Application.
- Automatic Controls Shall Include Temperature Controls, Equipment Furnished Controls, BACnet Interface, Internet Interface, Existing BAS Interface, and Existing Computerized Maintenance Management Software (CMMS) System Interface
- PC Project Goals: Budget Goals and Operating Cost as well as Construction Timeline

## DESIGN CRITERIA DOCUMENT

- The HVAC Design Criteria shall Be in Sync with the Project Delivery Method and Owner's Project Requirements
- The Design Criteria Shall Be Based on ASHRAE 90.1 and State Energy Code Compliance for Outdoor Air Temperature Compliance
- ASHRAE Guidelines for Humidity Control and Buildings in Hot and Humid Climates
- ASHRAE Indoor-Air Quality Guide: Best Practice for Design, Construction, and Commissioning
- Enhance Existing Utilities (gas, oil, and electricity)
- Retrofit the Existing Central Air-Handling Systems with the Addition of Humidifiers and Enhanced Filter MERV Ratings to Exceed Minimum Filter Guidelines
- The PC Team will Produce Schematic Phase and Final Phase P&P documents
- The In-House BAS Technician will Update Existing Safeties and Alarms Associated with Occupant Health Along with Accommodating the New Monitoring and Reporting System Working with the PC Team, Third-Party CxC, and Third-Party TAB Technician
- The Facility Manager Shall Have the BAS Technicians and O&M Technicians Trained to Accommodate P&P Changes as they Affect the Building Management and HVAC System
- Third-Party Commissioning Consultant (CxC) and Third-Party TAB Technician Shall Retro-Commission the Central Air-Handling Systems to Assure the New P&P Compliance