ASHRAE Design Guide for Dedicated Outdoor-Air Systems

1712-RP
PROJECT UPDATE
Outline

• About Sustainable Engineering Group

• ASHRAE DOAS Design Guide Project Update
  o Definition of DOAS
  o Current Project Schedule
  o Table of Contents
  o Proposed Layout
  o Site Visits
Energy Engineering
Sustainable Design
Retro-commissioning
LEED Consultancy
Commissioning
Energy Modeling
Research
Definition of DOAS

A dedicated outdoor air system (DOAS) uses separate equipment to condition all of the outdoor air brought into a building for ventilation and delivers it to each occupied space, either directly or in conjunction with local or central HVAC units serving those same spaces. The local or central HVAC units are used to maintain space temperature."
DOAS Design Guide
Project Update

CURRENT PROJECT SCHEDULE
Project Schedule (cont.)

1.1 Literature Search
1.2 Draft TOC
1.3 Draft Document Layout
1.4 Conduct Site Visits
1.5 Engage DOAS Experts
2 Chapter Development
3.1 Chapter Revisions
3.2 Final Guide Submission
4 Guide Integration
5.1 Draft Handbook Chapter
5.2 Paper Submission / Synopsis

Table of Contents

• Based on RFP “Proposed Detailed Outline”
• Rearranged to enhance focus on practical design
• Currently includes high level headings / subheadings
Table of Contents

1. Preface
   a. Purpose of the Guide
   b. Target Audience
   c. Organization of Guide
   d. How to Use

2. Overview of Dedicated Outdoor Air Systems
   a. Description
   b. Advantages and Limitations
   c. Applications
   d. Energy Simulation
   e. Green Building and LEED

3. Outside Air and Load Requirements (Including Codes/Standards)
   a. Outdoor Air Requirements (Ventilation, Exhaust, Load Driven)
   b. Dehumidification Loads
   c. Cooling Loads
   d. Heating Loads
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4. System Selection
   a. HVAC Systems and DOAS (Air Distribution, Heating/Cooling System)
   b. DOAS Equipment Configurations (Dehumidification, Cooling, Heating, Filtration, Energy Recovery)
   c. Additional Selection Considerations (Climate, Application Type, New/Retrofit, Energy Considerations, Codes/Standards, Cost, Zone Air Distribution, Supply Air Conditions)

5. Detailed Design Considerations
   a. Air Distribution (Duct Considerations, Locating Outdoor Air Inlets, Return Air Paths, etc.)
   b. Dehumidification
   c. Cooling
   d. Heating
   e. Economizing
   f. Filtration
   g. Energy Recovery
   h. Freeze Protection
   i. Specific System Considerations (Radiant Cooling/Heating, GSHP, etc.)
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6. Controls
   a. Hardware (Temp/Humidity/Airflow/Pressure Sensors, VFD, Actuators, Fan Scheduling)
   b. Software (Interfacing with BAS)

7. Construction Considerations
   a. Airtight
   b. Accessibility
   c. Quality Process/Commissioning

8. Operations and Maintenance
   a. Training
   b. Documentation
   c. Preventative Maintenance
Table of Contents

- APPENDICES (specific supplemental information; e.g., building types, climate, sample configurations)

- Additional Navigational Tables:
  - TABLES
  - FIGURES
  - CASE STUDIES
  - TIPS & TRAPS
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PROPOSED LAYOUT
Layout Criteria

• Accessibility
  o Wide gutter format
  o Single column for easy electronic conversion

• Readability
  o Clearly delineated case studies, figures, tables etc. (called out in text)
  o Focus on core material - supplementary information provided in appendices

• Navigability
  o Color-coded chapter tabs (possibly tables, case studies)
  o Table of Contents for Figures and Tables
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SITE VISITS
Site Visits

- Procedure developed to guide process / extract most useful information
- Summaries completed for site visits that have already been conducted
- Significant hands-on experience with DOAS
- DOAS Project Database constructed to use as resource during content development
Clint Border Patrol Station Project Summary

The Border Patrol Station at Clint, TX is located on a 30-acre site approximately 5 miles west of the existing Fabens Border Patrol Station. The new Border Patrol Station is being constructed to help alleviate the demands on the current, over-utilized facilities.

The Border Patrol Station at Clint, TX is planned to support a staff of 375 agents, and will operate 24 hours a day, seven days a week. All facilities at the station are designed to last 25 years, with specific features included to accommodate future layout changes and facility expansion. The design of the administration building, vehicle maintenance facility, fuel, pre-wash, and wash are based upon the design for the Lordsburg Border Patrol Station with modifications as dictated by user needs.

The energy recovery units run continuously and supply ventilation air directly to diffusers in the spaces.

Lessons Learned

- The building smoke alarm initially did not shut down DOAS. This was corrected when it was identified during commissioning.

- The DOAS initially did not take advantage of free cooling when OAT dropped below 55F. This was identified and corrected during commissioning.
DOAS Project Database

- Approximately 70 projects using DOAS
- In WI, FL, SC, MI, SD, ND, TX
- Some already have photos, design documents, schematics
- Expanding database with recommendations from interviewees, PMS