

SHELBY COUNTY JAIL VENTILATION REPORT

PROJECT: Shelby County Jail Ventilation Study PROJECT NO.: 2119
 CLIENT: Busby vs Bonner DATE: 12/22/2021
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Objective:

Show the ventilation and air quality within the Jail is safe as it relates to COVID-19.

Executive Summary:

The Shelby County Jail does not meet the minimum requirements of the “Core Recommendations for Reducing Airborne Infectious Aerosol Exposure” published by the ASHRAE Epidemic Task Force dated 10-19-2021, attached. This Task Force document is recognized as the current guide to ensuring a safe environment with our current knowledge of COVID-19 and related variants.

In addition, while analyzing the Shelby County Jail’s air quality in accordance with accepted ANSI/ASHRAE Standard 62.1 it appears that about 35% of the Shelby County Jail’s air handling units (AHUs) do not meet the standards.

Our conclusion is the Shelby County Jail’s HVAC system does not meet all of the minimum requirements of paragraph two of the “Core Recommendations for Reducing Infectious Aerosol Exposure” Task Force recommendations.

Report:

The *ASHRAE Epidemic Task Force* was formed to address COVID-19 best practice recommendations. Paragraph two of this task force document addresses ventilation, filtration, air cleaning, and fresh air control options which is the focus of our study (*see page three for the complete list of core recommendations*). Below is a table which includes a summary of the Task Force’s four recommendations for improvement of the air systems located at the Shelby County Jail, as well as a summary of our assessments of the current conditions of those air systems.

CORE RECOMMENDATIONS FOR REDUCING AIRBORNE INFECTIOUS AEROSOL EXPOSURE PER ASHRAE EPIDEMIC TASK FORCE (OCTOBER 19, 2021)	
Ventilation, Filtration, Air Cleaning Recommendations	Shelby County Jail Air Systems
Provide minimum outdoor airflow rates per codes and standards.	Approximately 30 of 73 systems do not meet this recommendation.
Use filters, air cleaners, to achieve MERV 13 filtration or better for recirculated air systems.	Few of the 73 systems meet this recommendation. Only 1 of the 10 units surveyed by ET&B had MERV-13. The remainder were less efficient.
Use air cleaners for which evidence of effectiveness and safety is clear.	Data suggests the air cleaner installed (GPS) does not have recognized independent third-party testing to meet this recommendation.

Select control options that provide desired exposure reduction.	Most of the air systems predate this control technology and do not meet this recommendation.
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Current practice recommends meeting the core recommendations mentioned in the table above. Most of the research data indicates GPS BP type technology is inconclusive. Therefore, our recommendation is to use only independently confirmed technology to meet the core recommendations until additional research and testing can confirm the effectiveness of this technology (2.3).

The Jail has installed GPS BPs on all air handlers. GPS BPs were added to the Jail AHUs with few other changes to the systems it appears, i.e., no adjustment of outside air amounts (2.1), no adjustments to filter efficiency (2.2), and no ventilation control changes or modernizations (2.4).

Based on our findings, further study, and development of air ionization technology by the industry is suggested before it is incorporated for disinfection in response to global pandemics caused by respiratory viruses such as SARS-CoV-2. Standardized test methods for antimicrobial effectiveness are recommended and do not exist. Independent tests have provided mixed results. There is minimal peer reviewed research on ionization technology in comparison to other traditional disinfection technologies.

Are the existing AHUs safe as it relates to COVID-19? Our study, findings, and calculations indicate most of the AHUs do not meet the “Core Recommendations for Reducing Airborne Infectious Aerosol Exposure.”

- 1) In some cases, the ASHRAE 62.1 Ventilation Rates are not maintained as per paragraph 2.1 requirements.
- 2) In most cases, the MERV-13 minimum recommended efficiency filter is not installed as per paragraph 2.2.
- 3) The air cleaners used are not independently certified and no standards for these cleaners exist as recommended as per paragraph 2.3.
- 4) Control methods to modulate outside air and confirm air quality, are not installed as the Jail predates most of this technology and it has not been subsequently added as per paragraph 2.4.

We recommend the ASHRAE “Core Recommendations for Reducing Airborne Infectious Aerosol Exposure” document be followed.

Acronyms, and Abbreviations:

- AHU represents the words “air handling units” which supply filtered and conditioned air to the Jail. The bipolar ionization units discussed are inside of these AHUs along with filters, coils, and fans.
- ANSI is the American National Standards Institute.
- ASHRAE is the American Society of Heating, Refrigerating, and Air Conditioning Engineers.
- IAQ is Indoor Air Quality.
- OA is Outside Air.
- GPS BP stands for the manufacturer “Global Plasma Solutions” the maker of a specific brand of bipolar ionization products that were installed in the Shelby County Jail.



ASHRAE EPIDEMIC TASK FORCE

Core Recommendations for Reducing Airborne Infectious Aerosol Exposure

The following recommendations are the basis for the detailed guidance issued by ASHRAE Epidemic Task Force. They are based on the concept that within limits ventilation, filtration, and air cleaners can be deployed flexibly to achieve exposure reduction goals subject to constraints that may include comfort, energy use, and costs. This is done by setting targets for equivalent clean air supply rate and expressing the performance of filters, air cleaners, and other removal mechanisms in these terms.

1. *1. Public Health Guidance* – Follow all current regulatory and statutory requirements and recommendations, including vaccination, wearing of masks and other personal protective equipment, social distancing, administrative measures, circulation of occupants, hygiene, and sanitation.
2. *Ventilation, Filtration, Air Cleaning*
 - 2.1 Provide and maintain at least required minimum outdoor airflow rates for ventilation as specified by applicable codes and standards.
 - 2.2 Use combinations of filters and air cleaners that achieve MERV 13 or better levels of performance for air recirculated by HVAC systems.
 - 2.3 Only use air cleaners for which evidence of effectiveness and safety is clear.
 - 2.4 Select control options, including standalone filters and air cleaners, that provide desired exposure reduction while minimizing associated energy penalties.
3. *Air Distribution* - Where directional airflow is not specifically required, or not recommended as the result of a risk assessment, promote mixing of space air without causing strong air currents that increase direct transmission from person-to-person.
4. *HVAC System Operation*
 - 4.1 Maintain temperature and humidity design set points.
 - 4.2 Maintain equivalent clean air supply required for design occupancy whenever anyone is present in the space served by a system.
 - 4.3 When necessary to flush spaces between occupied periods, operate systems for a time required to achieve three air changes of equivalent clean air supply.
 - 4.4 Limit re-entry of contaminated air that may re-enter the building from energy recovery devices, outdoor air, and other sources to acceptable levels.
5. *System Commissioning* – Verify that HVAC systems are functioning as designed.

October 19, 2021