



# **TOWN OF BERLIN SCHOOL REOPENING FINAL REPORT**

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## Executive Summary

Sustainable Engineering Solutions, LLC (SES) was retained by the Town of Berlin to provide facility reopening services due to the COVID-19 pandemic. Through a focused retro-commissioning process, SES helped the Town assess and adjust the various HVAC systems throughout the school district based on the requirements defined in *Guidance for School Systems for the Operation of Central and non-Central Ventilation Systems during the COVID-19 Pandemic*, issued by the State of Connecticut, herein referred to as *Guidance for School Systems*.

## Project Approach

In total, SES reviewed and assessed the HVAC systems in all five public school buildings: Berlin High School, McGee Middle School, Griswold Elementary School, Hubbard Elementary School & Willard Elementary School. During the review of each school, SES conducted the following:

- Reviewed available O&M documentation and as-built drawings for the air handling systems to identify the heating and cool coil performance capacities, design conditions and sequence of operations.
- Physically verified existing air handling system filtration for condition, effectiveness, leakage or bypassing. SES also recorded existing filter MERV rating and assessed the option of installing higher MERV rated filtration and the effects on supply fan performance and heating and cooling.
- Verified proper operation and calibration of control devices including but not limited to:
  - outside air dampers
  - exhaust air dampers
  - return air dampers
  - low limit temperature controllers (freezestats)
  - controlling discharge air temperature sensor for heating and cooling
  - heating valve or stages of heating
  - cooling valves or stages of cooling
- Visually examined the condition of heating and cooling coils for maximum heat transfer needed for increased ventilation airflow conditioning.
- Verified proper operation of safety shutdown sequences associated with low limit devices (freezestats) and alarming, which are critical in systems with higher ventilation airflow rates.
- Verified chilled water supply temperature and heating hot water supply temperature and setpoints, where applicable, for proper performance of cooling and heating coils needed for elevated ventilation rates.
- Verified each systems ventilation airflow rate (minimum outside air) and adjusted to the maximum rate permissible per the performance of the heating and cooling coils capabilities. This effort was performed with the services of a Test, Adjust and Balancing contractor (TAB) hired by the Town of Berlin.
- Evaluated each air handling systems capability to bring in more ventilation air during shoulder seasons for greater space dilution, relief air control and control strategies needed to accomplish this.
- Verified demand control ventilation functions have been disabled per the reopening guidelines.
- Evaluated building pressure effects of increased ventilation for adverse effects and mitigation strategies.
- Examined energy recovery ventilation systems for possible contamination of supply air streams by exhaust air streams and provide recommendations to remedy.

- Confirmed that required system operating schedules have been set per the reopening guidelines prior to schools opening, during the week and after occupancy.
- Verified toilet exhaust fan schedules have been adjusted per the reopening guidelines.

Throughout the testing process, SES maintained and continuously updated a deficiency log that was shared with the Town of Berlin on a weekly basis. During this time, the Town of Berlin actively addressed the issues discovered and made repairs with a hired automated temperature controls contractor as needed to ensure the HVAC systems were fully operational. A complete list of issues found by both SES and the testing, adjusting and balancing contractor can be found in Appendix A of this report.

## Ventilation Rate Analysis

As recommended by the *Guidance for School Systems*, issued by the State of Connecticut, a testing, adjusting and balancing (TAB) contractor hired by the Town of Berlin measured the airflow rates and space volume in the classrooms spaces and calculated the number of air changes per hour in the spaces. For a complete record of the air changes in each space, see the TAB reports located in Appendix B.. While the majority of spaces were observed to achieve four or more air changes per hour, there are some spaces in the report that appear to be lower. The lower air changes are a function of the size of the space and local codes at the time of construction. Often times, air change rates may be lowered to satisfy energy standards, or may not have been a requirement due to the nature of the space. If low air change rates in a space is a concern, mobile filtration or other retrofits may be good candidates for improving indoor air quality if increasing ventilation is not possible.

## Schedule Changes

In accordance with the *Guidance for School Systems*, issued by the State of Connecticut, the building automation system building schedule was modified for all schools to operate 2 hours prior to building occupancy and 1 hour post occupancy. Additionally, bathroom exhaust fans were modified to operate all day long (24/7) in accordance with the guidelines. These modifications were completed by an automated temperature controls contractor hired by the Town of Berlin.

## Filter Analysis

As recommended by the *Guidance for School Systems*, SES reviewed the current level of filtration installed on each air handling system and analyzed the feasibility of increasing the filter ratings to MERV 13. Since the school facility staff already installs MERV 11 filters throughout the district, an increase to MERV 13 filters will have a minimal impact on the performance of a system. Though minimal, the increased efficiency of higher rated filters may negatively impact fan performance by increasing the static pressure induced on a fan resulting in slightly lower airflow. At the time of completing the retro-commissioning investigation, the Town of Berlin was nearly complete with installing MERV 13 filters in the units.

MERV efficiency clarification: MERV-A vs. MERV rating

*Some filters have a static electrical charge applied to the media to increase particle removal. Since the efficiency of these filters often drops off over months of initial use, a MERV-A value, if available, will reflect the actual minimum*

*efficiency better than a standard MERV value. As such any reference made in this report is with regards to a MERV-A rating vs. standard MERV rating alone (e.g., MERV-A 13, vs. MERV 13).*

## **Building Analysis**

Through the retro-commissioning process Berlin High School, McGee Middle School, Griswold Elementary School, Hubbard Elementary School & Willard Elementary School were all evaluated and assessed against the CT reopening guidelines. Overall, the school's varied widely in age in condition. As a result, specific evaluations and recommendations have been outlined below for each school.

### **Berlin High School**

Berlin High School is the newest of the Berlin Schools and was recently renovated in 2012. Ventilation air is provided into the building through highly efficient dedicated outside air units and air handling units. In the spaces, temperature control is achieved with chilled beams and variable-air-volume boxes. Overall, the equipment has been well maintained and remains in excellent condition. The high school is unique in that all classrooms are served by 100% outside air, which results in a much higher air quality than spaces relying on recirculating air.

### **McGee Middle School**

Recently renovated in 2010, McGee Middle School is served by a variety of roof top units and energy recovery units. In the classroom spaces, ceiling and closet mounted fan coil units provide all space heating and cooling. Ventilation air is introduced into the return ductwork of the fan coil units by the energy recovery units. Overall, the fan coil units and energy recovery units appear in excellent condition. In addition to the fan coil units and energy recovery units, there are various rooftop units controlled via packaged controls. These rooftop units varied in age and condition; and any operational deficiencies were captured in the deficiency list in Appendix A.

### **Griswold, Hubbard and Willard Elementary Schools**

All three elementary schools are similar in size and condition. Packaged rooftop units serve the larger common areas such as the gymnasium, auditorium and libraries. The classrooms are all equipped with older unit ventilators (over 20 years old), many which are inoperable and in need of replacement. Due to the age of the equipment, many of the replacement parts have been discontinued, and maintaining the units have proven to be expensive and difficult. Additionally, the unit ventilators are often noisy, and provide a poor level of temperature control. As a result, teachers often turn off the unit ventilators when teaching, which also disables the source of ventilation in the room.

## Recommendations

1. As intended, the retro-commissioning process and testing, adjusting and balancing work identified numerous operational deficiencies related to the HVAC equipment serving the various schools. It is recommended that the Town of Berlin review and address all deficiencies included in the list. Understanding that future renovations may be planned, the cost effectiveness of repairing and replacing parts should be considered.
2. Following the CT guidelines, the Town of Berlin has increased the level of filtration from MERV 11 to MERV 13 filters. Due to the increased level of filtration, filter changes will be required at a higher frequency than previously as particulate build up will occur at a faster rate. The Town of Berlin should be prepared to assess filter conditions more frequently and replace filters once excessive build up is observed.
3. During the investigation, it was noticed that many of the elementary school unit ventilators were found to switched to the "off" position. It was also noted that many of the unit ventilators were disable due to operational issues or noise complaints. Where possible, it is recommended that the unit ventilators be left "on" during occupied hours to provide ventilation to the spaces. These classrooms may also be good candidates for mobile filtration units, in lieu of making the expensive and required repairs to the unit ventilators. Overall, it is recommended that the elementary school's HVAC systems be renovated soon to bring the facility up to date with standard industry and needs of the facilities.
4. To accommodate the CT guidelines, modifications have been made to the building automation system to increase ventilation rates. After the pandemic, SES recommends the following modifications are removed to decrease energy consumption of the systems:
  - a. Currently, the building schedules have been set to operate two (2) hours prior to occupancy and run one (1) hour after occupancy. Recommend that the schedules be reverted to reflect actual occupied hours, and an optimal start programming is implemented.
  - b. Currently the bathroom exhaust fans have been set to operate 24/7. Recommend that the exhaust fans be reverted to normal method of control to reduce the fan run hours.
  - c. In Berlin High School, the DOAS and AHU supply fan speed commands have been locked to the maximum fan speed setpoints to increase ventilation rates in the school. Recommend that the fan speed setpoint override be released to allow for fan modulation and single zone variable air volume control.
  - d. At McGee Middle School, the demand control ventilation of the fan coil units has been disabled to force the outside air dampers to maximum damper position, allowing for an increased level of ventilation in the spaces. Recommend that the demand control ventilation override be released to allow the outside air dampers to revert back down to minimum position.

## Conclusion & Other Recommendations

As the intent of this reopening effort was to provide immediate mitigating impacts to the operation of the HVAC systems serving these facilities, it is important to consider the temporary nature of the current pandemic and the long-term impact these adjustments will have. The most immediate negative impact these adjustments will have is on the energy consumption for these buildings as a result of the increased filtration and run-hours, with the former having the greatest affect. This increase in energy consumption was not evaluated in this undertaking and was beyond the scope of the effort.

Hopefully in the near future these adjustments can be reversed when the pandemic is over and thereby returning the buildings to pre-pandemic energy consumption levels. However, there is significant activity in the HVAC industry regarding future of design standards and much discussion about preparing for the next pandemic as a matter of when (and not if) it occurs. To that end, there has been a flurry of new and old technologies in the marketplace that could be employed to address the needs of the future. These technologies include:

- Electronic air filters
- UV-C inactivation
- Bipolar Ionization/Corona Discharge / Needlepoint Ionization and Other Ion or Reactive Oxygen Air Cleaners
- Portable room filters (in all of the above technologies)

In the older elementary schools, some of the above technologies could be considered for future preparedness. However, such applications should be weighed along with any future renovation or new construction projects for the greatest overall benefit.



## Appendix A: List of Deficiencies



School	Issued By	Tag	Description	Recommendation
Berlin High School	SES	AHU-1 (phase 1)	The energy recovery wheel failed to enabled when commanded "on" by the BMS.	Issue should be further reviewed by ATC contractor.
Berlin High School	SES	AHU-1 (phase 1)	The hot water valve failed to modulate open when commanded. Appears to be stuck closed.	Either repair/replace valve actuator.
Berlin High School	SES	AHU-2 (phase 1)	The energy recovery wheel failed to enabled when commanded "on" by the BMS.	Issue should be further reviewed by ATC contractor.
Berlin High School	SES	AHU-3 (phase 1)	The energy recovery wheel failed to enabled when commanded "on" by the BMS.	Issue should be further reviewed by ATC contractor.
Berlin High School	SES	AHU-2 (phase 2)	The CO2 sensor for this unit is only reading 12.8 ppm	Issue should be further reviewed by ATC contractor.
Berlin High School	SES	AHU-9	The low limit device (freeze stat) could not be tripped due to location.	Operation should be confirmed to protect coil. This can be done by adjusting the trip temperature higher on a cold day.
Berlin High School	SES	DOAS-3	Many of the fins on the chilled water coil have been folded over.	Fins should be combed out.
Berlin High School	SES	DOAS-2	Mold observed on the chilled water insulation jacket within the unit	Recommend removing moldy insulation. If insulation must be re-installed, PVC jacketing should be used.
Berlin High School	SES	DOAS-2	Small areas of the chilled water coil fins are pushed in	Fins should be combed out for best efficiency
Berlin High School	SES	DOAS-2	Energy recovery wheel is starting to get dirty	Media should be cleaned to maintain efficiency
Berlin High School	SES	DOAS-2	the CO2 sensor is 114 ppm out of calibration.	Device should be calibrated
Berlin High School	SES	AHU-10	The pre-filter screens are dirty and damaged	Screens should be fixed and washed
Berlin High School	SES	AHU-10	Hot water coil has small areas where dust is collecting in the fins (top corner)	Coil should be cleaned
Berlin High School	SES	AHU-10	The energy recovery wheel is very dirty on this unit	Media should be cleaned to maintain efficiency
Berlin High School	SES	AHU-10	The RA CO2 sensor is reading -491 ppm	Device should be calibrated or replaced
Berlin High School	SES	AHU-10	The energy recovery wheel LAT sensor measured 3 degrees below SES measurement	Device should be calibrated
Berlin High School	SES	AHU-1	There is no pre-filter installed	Pre-filters should be installed to extend the life of the final filters
Berlin High School	SES	AHU-1	The final filters are MERV 8.	A MERV 13 or higher should be installed on the units
Berlin High School	SES	AHU-1	The hot water coil is dirty at the lower portion	The coil should be cleaned
Berlin High School	SES	AHU-1	the CO2 sensor is 200 ppm out of calibration.	Device should be calibrated
Berlin High School	SES	AHU-1	OA flow station reading -15000. Should be checked by TAB	Device should be calibrated
Berlin High School	SES	AHU-1	The high static safety switch is not piped (the pneumatic tube has been removed)	Safety devices should be properly connected
Berlin High School	SES	DOAS-1	Mold observed on the chilled water insulation jacket within the unit	Recommend removing moldy insulation. If insulation must be re-installed, PVC jacketing should be used.
Berlin High School	SES	DOAS-1	The face dampers do not close all the way (remain about 5% open when commanded closed)	Damper should be adjusted to provide proper closure
Berlin High School	SES	DOAS-1	The hot water control valve did not modulate open when the freeze stat button was pushed.	ATC should review to make sure the HW valve opens upon a freeze condition
Berlin High School	SES	AHU-5	The pre-filter screens are very dirty	Screens should be cleaned when filter changes are completed.
Berlin High School	SES	AHU-5	The RA filters are damaged and not filtering properly	Replace damaged filters to assure proper filtration
Berlin High School	SES	AHU-5	The energy wheel is very dirty due to damaged RA filter media, and loose insulation found in the RA cabinet	Remove loose insulation from cabinet and clean recovery wheel media to maintain efficiency
Berlin High School	SES	AHU-5	The RA CO2 sensor is reading 10.4 ppm	Device should be replaced
Berlin High School	SES	AHU-5	The EA compartment door is frozen shut and was extremely difficult to open.	Recommend adjusting door for proper operation.
Berlin High School	SES	AHU-6	The blocking plate at the OA final filter is missing	Install blocking plate to assure proper filtration
Berlin High School	SES	AHU-6	The pre-filter was MER 10, and the final filter only MERV 8.	Recommend minimum filtration level to be MERV 13
Berlin High School	SES	AHU-6	The hot water coil is very dirty	The coil should be cleaned
Berlin High School	SES	AHU-6	The hot water coil has small areas where the fins are pushed in	Coil should be combed
Berlin High School	SES	DOAS-7	Mold observed on the chilled water insulation jacket within the unit	Recommend removing moldy insulation. If insulation must be re-installed, PVC jacketing should be used.
Berlin High School	SES	DOAS-7	The chilled water coil has areas where the fins are pushed in	Coil should be combed
Berlin High School	SES	DOAS-7	The face dampers do not close all the way (remain about 5% open when commanded closed)	Dampers should be adjusted

School	Issued By	Tag	Description	Recommendation
Berlin High School	SES	DOAS-7	The chilled water actuator is in alarm at the BAS. It appears that this is because the actuator feedback does not match the commanded value. The value displayed was 23.6% when the valve was fully closed	Chilled actuator should be reviewed by ATC
Berlin High School	SES	DOAS-8	Mold observed on the chilled water insulation jacket within the unit	Recommend removing moldy insulation. If insulation must be re-installed, PVC jacketing should be used.
Berlin High School	SES	DOAS-8	The OA pre-filters appear to have been wet at some point since replacement (warped/bowed). Additionally, there is old water stains at the cabinet floor and some debris built up downstream of the final filters.	The OA cabinet should be reviewed for the potential of water/moisture intrusion after a heavy rain. Damaged filters should be replaced
Berlin High School	SES	DOAS-8	The chilled water coil has areas where the fins are pushed in	Coil should be combed
Berlin High School	SES	DOAS-8	The SA RH% sensor was 8% lower then SES reading.	Device should be calibrated.
Berlin High School	SES	DOAS-8	The face dampers do not close all the way (remain about 5% open when commanded closed)	Dampers should be adjusted
Berlin High School	SES	DOAS-8	One of the supply fans is making noise and should be reviewed. The noise can be heard at lower speeds (bearings)	Fan should be reviewed for potential repair
Berlin High School	SES	DOAS-9	The units chilled water coil has multiple areas where the fins are pushed in	The fins should be combed out
Berlin High School	SES	AHU-8	The units OA filters are dirty	The filters should be replaced
Berlin High School	SES	AHU-8	Some scale has built up on the units HW coil	The HW coil should be cleaned
Berlin High School	SES	AHU-8	With the energy wheel running the BAS was indicating that the bypass damper was fully closed. The damper was actually found to be approximately 90% open. The damper is not controllable through the BAS.	The actuator should be reviewed by ATC
Berlin High School	SES	AHU-8	The HW valve did not stroke 100% open when the freezestat reset button was pressed.	Suggest ATC review freeze protection programming
Berlin High School	SES	DOAS-4	The units OA filters are dirty	The filters should be replaced
Berlin High School	SES	AHU-4	The mixed and return air humidity sensors were both 13% less than SES reading	Devices should be calibrated
Berlin High School	SES	AHU-7	The wheel bypass damper position is incorrect at the BAS- with the damper 50% open, the BAS is indicating the damper is closed. The damper is not controllable though the BAS	The actuator should be reviewed by ATC
Berlin High School	SES	DOAS-6	The units OA filters are dirty	The filters should be replaced
Berlin High School	SES	DOAS-6	The units chilled water coil has multiple areas where the fins are pushed in	The fins should be combed out
Berlin High School	SES	DOAS-6	The return air damper does not appear operable and while it is not commendable through the BAS, when the freezestat was tripped, the damper did not stroke open	The actuator should be reviewed by ATC
Berlin High School	SES	AHU-3	The exhaust filter rack has shifted so that the filters are no longer accessible without removing the entire rack. The metal rack, where the filters sit, has moved off of its mounting point.	The filter rack should be repaired.
Griswold School	SES	UV-CE-1	The OA damper did not modulate open when commanded on the control board inside the unit.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-CE-1	The HW valve did not modulate open when the heating setpoint was raised at the internal controller.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-CE-1	The unit failed to enable mechanical cooling when the space temperature setpoint was adjusted to 60°F.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-1	The OA damper did not modulate open when commanded on the control board inside the unit.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-1	The HW valve did not modulate open when the heating setpoint was raised at the internal controller.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-1	The unit failed to enable mechanical cooling when the space temperature setpoint was adjusted to 60°F.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-2	The unit was not operational at the time of testing.	Recommend having mechanical contractor investigate issue.

School	Issued By	Tag	Description	Recommendation
Griswold School	SES	UV-E-3	The unit was not operational at the time of testing.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-4	The OA damper did not modulate open when commanded on the control board inside the unit.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-4	The unit failed to enable mechanical cooling when the space temperature setpoint was adjusted to 60°F.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-5	The unit was not operational at the time of testing.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-6	The OA damper did not modulate open when commanded on the control board inside the unit.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	UV-E-6	The unit failed to enable mechanical cooling when the space temperature setpoint was adjusted to 60°F.	Recommend having mechanical contractor investigate issue.
Griswold School	SES	RTU-4	The units Dx coil contains some scale and lint buildup	Recommend cleaning the coil
Griswold School	SES	RTU-4	When approached for testing, the unit was found not running while it was in an occupied state and receiving a run command from the BAS. No alarm was indicated at the BAS. After resetting the unit (flipping the disconnect) the unit did start and run as expected.	Information only
Griswold School	SES	RTU-2	The units Dx coil contains some lint buildup	Recommend cleaning the coil
Griswold School	SES	RTU-1	There are no filters installed in this unit	Recommend installing filters for unit protection.
Griswold School	SES	RTU-1	The units coil contains dirty buildup	Recommend cleaning the coil
Griswold School	SES	RTU-1	When the units supply fan was commanded off and confirmed to be off, the BAS was indicating that the fan was still on (flow status reading)	Recommend calibrating airflow detection device
Griswold School	SES	RTU-1	The damper actuator does not appear to be tight to the linkage shaft, when commanded open/closed, no action was seen from the damper.	Recommend troubleshooting damper
Griswold School	SES	RTU-1	The BAS damper feedback was incorrectly reading between -46% and -116%.	Recommend having ATC contractor review programming/graphics
Griswold School	SES	RTU-Main Office	The OA/RA damper is stuck in the full return position. When commanded open/closed no action was seen from the device.	Recommend troubleshooting damper
Griswold School	SES	RTUs General	The 5 packaged RTU's on the main section of the building are equipped with a HW coil that is in the ductwork below the roof, downstream of the unit. SES could not verify the condition of these coils. It is also assumed that a low limit freezestat is associated with them, which could not be viewed or tested due to their location and occupied building.	Recommend Berlin staff assess downstream hot water coil conditions and clean/service as needed.
Griswold School	SES	Portable RTU-1	The units Dx cooling coil is dirty	Recommend cleaning the coil
Griswold School	SES	Portable RTU-2	DX cooling operation could not be tested due to low ambient lock out.	Recommend Berlin staff test cooling operation during warmer temperatures.
Griswold School	SES	Portable RTU-3	The units filters are dirty and one was found installed backwards	Recommend replacing filters
Griswold School	SES	Portable RTU-3	The interior of unit is very dirty.	Recommend cleaning the unit
Griswold School	SES	Portable RTU-3	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	Portable RTU-3	The Return air temperature sensor is incorrectly reporting. The BAS was indicating a 95F return air temp, SES measured a RAT of 74F	Recommend recalibrating/replacing the return air temperature sensor
Griswold School	SES	Portable RTU-4	The units Dx Coil is very dirty	Recommend cleaning the coil
Griswold School	SES	Portable RTU-4	The space Co2 sensor was reporting a value of OPPM	Recommend recalibrating/replacing the sensor
Griswold School	SES	Portable RTU-4	The units OA/RA damper was unresponsive to BAS commands	Recommend troubleshooting damper
Griswold School	SES	AHU-3	The units HW coil contains dirt, dust and scale buildup	Recommend cleaning the coil
Griswold School	SES	UV's General	The UV tags used are actual classroom nomenclature as opposed to BAS nomenclature	Information only
Griswold School	SES	UV-K-1	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-K-1	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-K-2	The fan/unit was not operational at the time of testing.	Recommend troubleshooting unit
Griswold School	SES	UV-K-2	The units HW valve was found failed open, proper operation of the valve and damper could not be confirmed as the unit was not running	Information only
Griswold School	SES	UV-K-3	The units Dx coil is dirty	Recommend cleaning the coil

School	Issued By	Tag	Description	Recommendation
Griswold School	SES	UV-K-3	The damper linkage is loose, the actuator is modulating correctly but no action is seen from the damper	Recommend adjusting damper linkages.
Griswold School	SES	UV-K-4	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-K-4	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-K-5	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-K-5	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-W-3	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-W-3	There is heavy lint buildup on either end of the Dx coil.	Recommend removing lint
Griswold School	SES	UV-W-3	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-W-3	When the setpoint knob was adjusted, the canister type HW valve actuator did not appear to modulate and discharge air temperature did not rise above 68	Recommend troubleshooting actuator
Griswold School	SES	UV-CW-1	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-CW-1	The Dx coil is plugged almost completely with debris	Recommend cleaning the coil
Griswold School	SES	UV-CW-1	The damper linkage has been disconnected from the actuator. The actuator does not appear to be stroking.	Recommend troubleshooting damper
Griswold School	SES	UV-W-4	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-W-4	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-4	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-W-5	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-5	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-W-5	The units HW valve appears to be stuck open at all times, was discharging 105F+ degree air with the setpoint knob at 65F	Recommend troubleshooting actuator
Griswold School	SES	UV-W-5	Unit was found off when approached for testing, likely due to HW valve condition. Unit left in off position after testing	Information only
Griswold School	SES	UV-W-6	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-W-6	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-6	The damper actuator does stroke when command. Linkage is loose and will not drive the dampers.	Recommend adjusting linkage
Griswold School	SES	UV-CW-2	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-CW-2	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-CW-3	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-CW-3	The damper actuator is completely missing from the unit	Recommend replacing the actuator
Griswold School	SES	UV-W-7A	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-7A	The units/fan is not operable, would not run	Recommend troubleshooting unit
Griswold School	SES	UV-W-7A	The units HW valve was found failed open, proper operation of the valve and damper could not be confirmed as the unit was not running	Information only
Griswold School	SES	UV-W-7B	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-W-7B	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-7B	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-W-7B	The HW valve appears to be stuck open, valve did not close when setpoint knob was adjusted to 65F	Recommend troubleshooting actuator
Griswold School	SES	UV-W-8	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-W-8	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV-W-8	The units dampers failed to modulate when commanded open from the internal control panel	Recommend troubleshooting actuator
Griswold School	SES	UV-CE-4	The units/fan is not operable, would not run	Recommend troubleshooting unit

School	Issued By	Tag	Description	Recommendation
Griswold School	SES	UV-CE-4	The units HW valve was found failed open, proper operation of the valve and damper could not be confirmed as the unit was not running	Information only
Griswold School	SES	UV-CE-4	The canister type damper actuator is missing from the unit	Recommend replacing the actuator
Griswold School	SES	UV-E-7	The unit was found off at the time of testing. After testing, the unit was turned back off	Information only
Griswold School	SES	UV-CE-3	The unit was found off at the time of testing. After testing, the unit was turned back off	Information only
Griswold School	SES	UV-CE-2	The installed filter is dirty	Recommend replacing filters
Griswold School	SES	UV-CE-2	The units Dx coil is dirty	Recommend cleaning the coil
Griswold School	SES	UV's General	The unit ventilators were found to have selectable command states by zone for 'On', 'Off' and 'Scheduled'. All zones were commanded On, meaning they will run 24/7	Information only
Griswold School	SES	UV's General	The OA/RA damper linkage appears to have intentional slop, the OA damper will drive immediately when commanded, and once the rivet catches either end of the slide the RA damper will be driven	Information only
Griswold School	SES	AHU-1	Although the unit could not be accessed due to installation height, damper conditions were tested by observing the mixed air temperature reading. When the outside air damper was commanded 100% open, the mixed air temperature remained at 70F with an outside air temperature of 35F.	Damper actuator has either failed or the linkage has switched. Recommend servicing.
Hubbard School	SES	RTU-1	The fan status does not drop out when the fan and unit are off.	Recommend having ATC contractor investigate
Hubbard School	SES	RTU-2	The dampers do not respond to commands through the BMS	Recommend having ATC contractor investigate
Hubbard School	SES	RTU-4	The OA damper does not stay at minimum position as commanded by the BMS.	Recommend having ATC contractor investigate
Hubbard School	SES	RTU-5	Both HW valves operate correctly but one does not indicate open/closed position accurately. The supply air temp was 91°F but the valve showed fully closed.	Recommend having ATC contractor investigate
Hubbard School	SES	UVs	In general, many of the unit ventilators were very dirty inside.	Recommend cleaning interior of units and entering air side of heating coils for better heat transfer.
Hubbard School	SES	UVs	In general, the cooling operation of the units could not be tested due to the low ambient conditions while onsite.	Recommend testing cooling operation of units during the cooling season.
Hubbard School	SES	UV-S1	The mechanical linkage between the outside air damper actuator and damper blade is broken.	Recommend repairing damper linkage.
Hubbard School	SES	UV-S2	Unit appears to be abandoned in place. There is no controller, on/off switch nor actuators installed.	Recommend installing controller and devices.
Hubbard School	SES	UV-S5	When the unit was turned on, the outside air damper went fully open. Unit appears to be ignoring inputs from controller.	Recommend replacing controller.
Hubbard School	SES	UV-S5	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-S8	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-W1	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-W2	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-W3	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-W4	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-W4	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-W5	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-W5	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-A1	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-A1	Hot water valve actuator has become disconnected from valve stem.	Recommend replacing/retightening actuator.
Hubbard School	SES	UV-A2	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.

School	Issued By	Tag	Description	Recommendation
Hubbard School	SES	UV-A2	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-A7	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-A7	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-A8	The hot water valve actuator has been removed from the unit.	Recommend installing valve actuator.
Hubbard School	SES	UV-N1	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-N2	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-N3	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-N3	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-N7	The outside air damper actuator failed to modulate open when set to 100% on the unit controller.	Recommend replacing actuator.
Hubbard School	SES	UV-N7	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Hubbard School	SES	UV-N8	The UV located on the left side of the room failed to enable when switched "on". Controls and actuators could not be tested as a result.	Recommend servicing unit ventilator to verify operation.
Hubbard School	SES	UV Staff Lounge	The UV serving the staff and teacher's lounge failed to enable when switched "on". Controls and actuators could not be tested as a result.	Recommend servicing unit ventilator to verify operation.
McGee Middle School	SES	Freeze pumps	In general, none of the freeze pumps have status monitored by the BMS to verify operation. Due to being located above the ceiling in occupied spaces, the operation of these pumps could not be verified.	Recommend installing current transducers or similar devices to monitor pump status and verify pump is operable.
McGee Middle School	SES	HVAC-1	The fan is emitting a loud rattling noise	Suggest checking fan belts, shaft, bearings, etc.
McGee Middle School	SES / ABS (TAB)	HVAC-1	The unit's exhaust air dampers failed to modulate open when the outside air dampers were commanded fully open as expected.	The actuator and damper operation should be reviewed by ATC
McGee Middle School	SES	RTU-3, 11, 12 & 13	The units heating coil is located in the ductwork below the unit/roof and could not be inspected.	Recommend Berlin staff assess coil condition once accessible.
McGee Middle School	SES	RTU-13	The aluminum mesh insect screen/filter in the OA intake is damaged	The filters should be replaced
McGee Middle School	SES	HVAC-3	SES could not manipulate the units Dx cooling to enable due to the ambient conditions of 50F.	Information only
McGee Middle School	SES	HVAC-3	Functionality of the freezestat could not be confirmed as it is located close to and behind the units supply fan	Information only
McGee Middle School	SES	RTU-1	Unit filters are dirty and should be replaced soon	Consider cleaning inside the unit and replacing filters
McGee Middle School	SES	RTU-1	The commands for all five zone damper appears to be reversed; with all zone space setpoints set at 85F, the dampers all modulated to full cold deck. When commanded fully open, the hot deck dampers only modulated to 25% open.	The damper programming and actuators should be reviewed by ATC
McGee Middle School	SES	RTU-1	When the freezestat was adjusted to 90F, the OA damper did close but no other action was seen from the unit- fan remained running and HW valve went fully closed. No alarm was generated	This should be investigated by the ATC contractor. Fan should disable and hot water valve should fully open during freezestat condition.
McGee Middle School	SES	MAU-1	The units filters are dirty	The filters should be replaced
McGee Middle School	SES	MAU-1	The units HW coil is almost completely plugged with dirt on the entering air side.	The coil should be cleaned
McGee Middle School	SES	MAU-1	The units chilled water coil is very dirty	The coil should be cleaned
McGee Middle School	SES	MAU-1	When the supply air temperature setpoint was lowered to 50°F, the CHW valve failed to modulate open.	Suggest ATC review CHW valve actuator and programming
McGee Middle School	SES	ERU-1	The energy wheel is dirty.	The energy wheel should be cleaned.
McGee Middle School	SES	ERU-2	The OA damper did not close when the freezestat was tripped as expected.	This should be investigated by the ATC contractor.
McGee Middle School	SES	ERU-2	The unit shut down when the freezestat was tripped but it was not registered by the BMS.	Recommend programming a freezestat alarm to the BMS to alert occupants when freeze conditions occur.
McGee Middle School	SES	RTU-10	The zone heating coils are currently not displayed on the graphics.	Recommend displaying zone heating coils and associated devices on the graphics for troubleshooting purposes.
McGee Middle School	SES	RTU-14	Unable to verify freezestat since it's located in an occupied space.	Freezestat operation should be confirmed by facility staff.

School	Issued By	Tag	Description	Recommendation
McGee Middle School	SES	RTU-2	When the unit was commanded "OFF" on the BMS graphics page, the heating valve opened 100%, the outside air dampers went to 100% open and the exhaust fan continued to operate (economizer mode). This fan was not controlled nor monitored on the BMS.	This should be investigated by the ATC contractor.
McGee Middle School	SES	Freeze pumps	In general, none of the freeze pumps have status monitored by the BMS to verify operation.	Recommend installing current transducers or similar devices to monitor pump status and verify pump is operable.
McGee Middle School	SES	RTU-2	When all zones were placed into heating mode, the unit closed the hot deck dampers and opened the cold deck dampers. It would be expected that the opposite would occur.	This should be investigated by the ATC contractor.
McGee Middle School	SES	RTU-2	With the heating valve commanded fully closed, the hot deck supply air temperature was 79F, signifying water leakage across the valve body. Recommend correcting.	This should be investigated by the ATC contractor.
McGee Middle School	SES	RTU-2	With an outside air temperature of 45F and a DX enable setpoint of 66F, the DX cooling was continuing to operate instead of shutting off. Unclear why, however this is most likely due to packaged controls.	This should be investigated by the ATC contractor.
McGee Middle School	SES	RTU-2	When the freezestat was adjusted to 90F, the OA damper did close but no other action was seen from the unit- fan remained running and HW valve went fully closed. No alarm was generated	This should be investigated by the ATC contractor. Fan should disable and hot water valve should fully open during freezestat condition.
McGee Middle School	SES	RTU-4	The outside air dampers are physically damaged and do not fully seat when commanded close.	Recommend repairing damper linkages.
McGee Middle School	SES	RTU-4	When the freezestat was tripped, the hot water valve was not commanded fully open as would be expected.	This should be investigated by the ATC contractor. Fan should disable and hot water valve should fully open during freezestat condition.
McGee Middle School	SES	RTU-5	The outside air dampers do not fully seat when commanded close	Recommend adjusting damper linkages.
McGee Middle School	SES	RTU-5	When the freezestat was tripped, the hot water valve was not commanded fully open as would be expected.	This should be investigated by the ATC contractor. Fan should disable and hot water valve should fully open during freezestat condition.
McGee Middle School	SES	ERU-3	The outside air bird screens are clogged.	Recommend cleaning.
McGee Middle School	SES	ERU-3	ERU-3's mixed air and supply air temperature sensors were reading 60°F versus the field measured values of 66°F.	Recommend recalibrating both sensors.
McGee Middle School	SES	HVAC-2	Return air CO2 sensor was reading 220 PPM versus field measured value of 450 PPM.	Recommend recalibrating or replacing sensor.
McGee Middle School	SES	ERU-6	ERU-6 does not have filters or a filter bank installed on the return and outside entering air sides of the energy recovery wheel. As a result, the wheel and interior of unit are very dirty.	Install filters upstream of energy wheel plenums to allow for air filtration prior to wheel.
McGee Middle School	SES	ERU-6	The energy recovery wheel of ERU-6 is extremely dirty and covered in debris.	Energy wheel should be cleaned, however wheel may need replacing due to extent of damage. Recommend assessing performance of wheel after cleaning.
McGee Middle School	SES	ERU-6	The outside air intake bird screen is dirty and damaged.	Recommend replacing bird screen.
McGee Middle School	SES	ERU-6	The energy recovery wheel failed to enable when commanded "on" by the BMS.	Recommend further investigating and correcting issue.
McGee Middle School	SES	ERU-6	The outside air damper does not fully close when commanded. Only one damper blade is connected to the other actuators, the other's remain open.	Recommend repairing damper linkage.
McGee Middle School	SES	ERU-6	The return air was reading 53F at the BMS versus the actual return air temperature of 68F.	Recommend confirming the correct sensor is being displayed on the BMS graphic. If so, sensor should be recalibrated or replaced.
McGee Middle School	SES	RTU-6	The supply air temperature failed to rise when the heating valve was commanded 100% open. The valve could not be physically inspected due to location.	Recommend reviewing actuator operation further.
McGee Middle School	SES	RTU-7	The access door to the unit's filter section has been removed and appears broken.	Recommend repairing door.
McGee Middle School	SES	RTU-7	The unit's condensate trap has been disconnected from the unit.	Recommend repairing condensate trap.



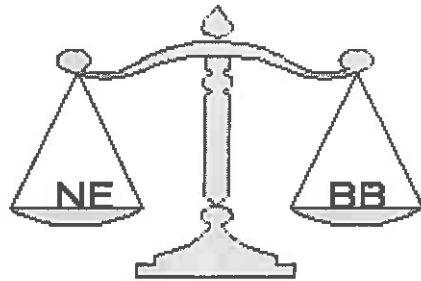
School	Issued By	Tag	Description	Recommendation
McGee Middle School	SES	RTU-7	The outside air damper failed to physically open when commanded to 100%.	Recommend replacing outside air damper actuator.
McGee Middle School	SES	RTU-7	The supply air temperature failed to rise when the heating valve was commanded 100% open. The valve could not be physically inspected due to location.	Recommend reviewing actuator operation further.
McGee Middle School	SES	RTU-9	The supply air temperature failed to rise when the heating valve was commanded 100% open. The valve could not be physically inspected due to location.	Recommend reviewing actuator operation further.
McGee Middle School	SES	MAU-2	The entering air side of the heating coil is heavily covered with dust and debris.	Recommend cleaning coil.
McGee Middle School	SES	MAU-2	The heating valve appears to have failed 100% open.	Recommend replacing actuator.
McGee Middle School	SES	Cooling Operation	In general, the cooling operation of the units could not be tested due to the low ambient conditions while onsite.	Recommend testing cooling operation of units during the cooling season.
McGee Middle School	SES	FCU Operation	In general, all of the fan coil units have minimum and maximum outside air damper command setpoints that will modulate based on space CO2 levels.	Recommend modifying the demand control ventilation setpoints so that the fan coil units will operate at maximum damper command at all times. This will increase ventilation rates in the spaces.
McGee Middle School	SES	FCU-109	The unit failed to disable when placed into either lock-out or unoccupied mode.	Recommend reviewing programming and correcting.
McGee Middle School	SES	FCU-104	The unit serves Rm 104 and is located in a closet within room 102. The return grille for the unit is in room 102, next to the return grille for FCU-102. There is no return grille for FCU-104 in Rm 104.	Information only
McGee Middle School	SES	FCU-231	When the OA damper was commanded to 90% open, the damper failed to modulate and remained closed.	Recommend having ATC contractor review functionality.
McGee Middle School	SES	HVAC-4	The hot water coil is located upstream of the unit in the outside air duct. A filter bank for 1" filters is in place, however the filter has collapsed and the entering air side of the coil is filthy.	Recommend cleaning coil and installing filters.
McGee Middle School	SES / ABS (TAB)	HVAC-4	The outside air actuator has been loosened and is not connected to the shaft. However, the heating coil is only located in the outside air duct. As a result, the only way to provide heat is to operate the unit at 100% outside air mode.	Recommend retightening damper actuator and moving heating coil to a location downstream of supply fan if possible.
Willard School	SES	RTU-1	The supply air temperature failed to rise when the heating valve was commanded 100% open. The valve could not be physically inspected due to location.	Recommend having ATC contractor investigate HW valve function
Willard School	SES	RTU-7	Unit was found to be forced into "night mode" but was left in "scheduled mode"	Information only
Willard School	SES	RTUs General	In general, many of the units would not operate in cooling mode due to low ambient temperatures.	Recommend Berlin staff assess cooling operation during warmer temperatures.
Willard School	SES	UV-E3	The outside air damper failed to modulate when placed into cooling mode.	Recommend replacing damper actuator.
Willard School	SES	UV-E4	The outside air damper failed to modulate when placed into cooling mode.	Recommend replacing damper actuator.
Willard School	SES	UV-E5	The outside air damper actuator has been removed from unit.	Recommend installing a damper actuator and repairing controls as needed.
Willard School	SES	UV-E7	UV-E7 is a newer unit ventilator controlled by a MicroTech II controller. SES was unable to manipulate controller setpoints to test unit.	Information only
Willard School	SES	UV-E8	The outside air damper actuator has been removed from unit.	Recommend installing a damper actuator and repairing controls as needed.
Willard School	SES	UV-E8	The hot water valve actuator appears to be failed open.	Recommend replacing actuator.
Willard School	SES	UV-E9	Unit failed to enable when switched "on". Controls and actuators could not be tested as a result.	Recommend servicing unit ventilator to verify operation.
Willard School	SES	UV-E12	The outside air damper actuator has been removed from unit.	Recommend installing a damper actuator and repairing controls as needed.



School	Issued By	Tag	Description	Recommendation
Willard School	SES	UV-E15	The outside air damper failed to modulate when placed into cooling mode.	Recommend replacing actuator.
Willard School	SES	UV-E15	The hot water valve actuators appears to be failed open.	Recommend replacing actuator.
Willard School	SES	UV-N1	The outside air damper actuator has been removed from unit.	Recommend installing a damper actuator and repairing controls as needed.
Willard School	SES	UV-N11	The unit ventilator located on the right side of the room is not operable. Thermostat has failed.	Recommend replacing thermostat.
Willard School	SES	UV-S2	The outside air damper actuator located in the unit ventilator located on the left side of the room failed to modulate open when placed into cooling mode.	Recommend replacing actuator.
Willard School	SES	UV-S2	The outside air damper actuator located in the unit ventilator located on the right side of the room failed to modulate open when placed into cooling mode.	Recommend replacing actuator.
Willard School	SES	UV-S2	The hot water valve actuator located in the unit ventilator located on the right side of the room failed to modulate open when placed into heating mode.	Recommend replacing actuator.
Willard School	SES	UV-S5	The hot water valve located in the unit ventilator located on the left side of the room appears to failed open.	Recommend replacing actuator.
Willard School	SES	UV-S5	The outside air damper actuator located in the unit ventilator located on the right side of the room failed to modulate open when placed into cooling mode.	Recommend replacing actuator.
Willard School	SES	UV-S5	The hot water valve actuator located in the unit ventilator located on the right side has been physically disconnected from the valve stem and is not operable.	Recommend replacing actuator.
Willard School	SES	UV-W3	The damper linkage has been physically disconnected. Actuator fails to modulate dampers.	Recommend replacing damper actuator and repairing damper linkage.
Willard School	SES	UV-W5	The hot water valve is leaking, causing severe corrosion in the piping.	Recommend replacing valve and actuator and repairing piping.
Willard School	SES	UV-W6	The outside air damper actuator failed to modulate when placed into cooling mode.	Recommend replacing damper actuator
Willard School	SES	UV-W7	The hot water valve is leaking, causing severe corrosion in the piping.	Recommend replacing valve and actuator and repairing piping.
Willard School	SES	UV-W11	The outside air damper actuator failed to modulate when placed into cooling mode.	Recommend replacing damper actuator
Willard School	SES	UV-W12	The outside air damper actuator failed to modulate when placed into cooling mode.	Recommend replacing damper actuator
Willard School	SES	UV-W13	No outside air damper actuator is installed.	Recommend installing damper actuator.
Willard School	SES	UV-W13	The hot water valve is stuck closed.	Recommend replacing actuator and/or valve body.
Willard School	SES	UV-W15	The outside air damper actuator failed to modulate when placed into cooling mode.	Recommend replacing damper actuator
Berlin High School	ABS (TAB)	MAU-2	Outdoor air mode 100% closed. Could not get actual reading.	Further coordinate issue with ATC and TAB contractor
Berlin High School	ABS (TAB)	Auto Shop Room 1606	Return damper is 100% closed and will not open	Service return air damper
Berlin High School	ABS (TAB)	AHU-5	Outdoor air intake filter needs to be cleaned.	Clean filter
Berlin High School	ABS (TAB)	DOAS-4	Because of the change to lower the exhaust side of the DOAS units, the bathroom exhaust airflows dropped below the supply airflows causing the bathrooms to become positively pressurized.	Recommend lowering the supply below the exhaust levels to make room negative.
McGee Middle School	ABS (TAB)	RTU-1	The power exhaust motorized dampers are stuck open.	Recommend service damper.
McGee Middle School	ABS (TAB)	FCU-104	The return grill for FCU-104 is installed in room 102.	Relocate return grill to room 104.



## Appendix B: Testing, Adjusting and Balancing Reports



## **CERTIFIED TEST, ADJUST AND BALANCE REPORT**

**REPORT DATE: 01-06-21**

**PROJECT:       BERLIN SCHOOL DISTRICT  
                  VENTILATION AIRFLOW INVESTIGATION**

**ADDRESS:       BERLIN, CT**

**CUSTOMER:     BERLIN BOARD OF EDUCATION**

**NEBB TAB CONTRACTOR: AIR BALANCING SERVICE CO.  
                              16 PROGRESS CIRCLE UNIT 1A  
                              NEWINGTON, CT 06111**

**PHONE NUMBER: (860) 500-5008  
FAX NUMBER:   (860) 500-5010  
WEBSITE:       WWW.AIRBAL.COM**

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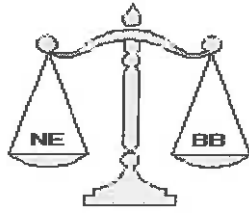
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**PROJECT: BERLIN HIGH SCHOOL**

**REPORT DATE: 01-06-21**

**SUBMITTED BY: AIR BALANCING SERVICE CO.      NEBB CERTIFIED #2453**

**CODE: 20240T**



## CERTIFICATION

**PROJECT:** BERLIN HIGH SCHOOL  
**VENTILATION AIRFLOW INVESTIGATION**  
**ADDRESS:** BERLIN, CT  
**REPORT DATE:** 01-06-21

THE DATA PRESENTED IN THIS REPORT IS AN EXACT RECORD OF SYSTEM PERFORMANCE AND WAS OBTAINED IN ACCORDANCE WITH NEBB STANDARD PROCEDURES. ANY VARIANCES FROM DESIGN QUANTITIES WHICH EXCEED NEBB TOLERANCES ARE NOTED THROUGHOUT THIS REPORT.

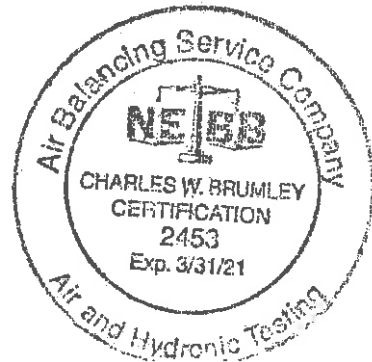
THE AIR DISTRIBUTION SYSTEMS HAVE BEEN TESTED AND BALANCED AND FINAL ADJUSTMENTS HAVE BEEN MADE IN ACCORDANCE WITH NEBB "PROCEDURAL STANDARDS FOR TESTING - ADJUSTING - BALANCING OF ENVIRONMENTAL SYSTEMS" AND THE PROJECT SPECIFICATIONS.

### SUBMITTED AND CERTIFIED BY:

**NEBB TAB FIRM:** AIR BALANCING SERVICE CO.  
**TAB SUPERVISOR:** CHARLES W. BRUMLEY  
**REG. NO:** 2453

**SIGNATURE:**

**TAB CERTIFIED TAB TECHNICIAN:** PAUL R BOICE  
**TECHNICIAN CERTIFICATION NO:** BB914941T



**\*\* AIR INSTRUMENT CALIBRATION REPORT \*\***

<b>INSTRUMENT SERIAL NUMBER</b>	<b>APPLICATION</b>	<b>CALIBRATION</b>
EXTECH PHOTO TACH SERIAL NO. 151117272	MOTOR AND FAN RPM'S	8/13/2020
ALNOR INSTRUMENTS SERIAL NO. A03813	AIRFLOW VELOCITY	7/21/2020
SHORTRIDGE AIRDATA MULTIMETER ADM-860C SERIAL NO. M93531	MULTIMETER USED IN VELOCITY, STATIC PRESSURES, FLOWHOOD READINGS, DIFFERENTIAL PRESSURES, TEMPERATURE	4/20/2020
FLUKE AMMETER 323 SERIAL NO. 37642839WS	VOLTAGE AND AMPERAGE	8/13/2020

PROJECT: BERLIN HIGH SCHOOL  
REPORT DATE: 01-06-21  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240CALI

NEBB CERTIFIED #2453

**ABBREVIATION / MEANING**

**ABBREVIATION / MEANING**

AC	AIR CONDITIONER	MUA	MAKE-UP AIR
AHU	AIR HANDLING UNIT	N/A	NOT APPLICABLE/NOT AVAILABLE
AK	AREA FACTOR	NO.	NUMBER
AMP	AMPERAGE	OA	OUTSIDE AIR
CEF	CEILING EXHAUST FAN	OA%	PERCENT OF OUTSIDE AIR
CFM	CUBIC FEET PER MINUTE	OD	OUTSIDE DIAMETER
CNTRL	CONTROL	OED	OPEN END DUCT
CU FT	CUBIC FEET	PERF	PERFORATED DIFFUSER
CV	CONSTANT VOLUME	POS	POSITION
DD	DIRECT DRIVE	PRESS	PRESSURE
DEL	ACTUAL DELIVERED	PRIM	PRIMARY
DES	DESIGN	RA	RETURN AIR
DIFF	DIFFERENTIAL	RA%	PERCENT OF RETURN AIR
EF	EXHAUST FAN	RHC	REHEAT COIL
ESP	EXTERNAL STATIC PRESSURE (" WG)	RPM	REVOLUTIONS PER MINUTE
FPM	FEET PER MINUTE	RTU	ROOF TOP UNIT
FT	FEET	SA	SUPPLY AIR
H	HEIGHT	SF	SERVICE FACTOR
HP	HORSE POWER	SL	SLOT
HR	HOUR	SN	SERIAL NUMBER
HTG	HEATING	SP	STATIC PRESSURE (" WG)
L	LENGTH	SQ FT	SQUARE FEET
LD	LINEAR DIFFUSER	TEMP	TEMPERATURE
LFD	LAMINAR FLOW DIFFUSER	TF	THERMAFUSER
LR	LIGHT RETURN	TSP	TOTAL STATIC PRESSURE (" WG)
LT	LIGHT TROEFFER	VAV	VARIABLE AIR VOLUME
MA	MIXED AIR	VEL	VELOCITY IN FEET PER MINUTE
MAU	MAKE-UP AIR UNIT	VFD	VARIABLE FREQUENCY DRIVE
MAX	MAXIMUM	W	WIDTH
MD	MOTORIZED DAMPER	WEF	WALL EXHAUST FAN
MER	MECHANICAL EQUIPMENT ROOM	WG	WATER GAUGE
MFR	MANUFACTURER	W/	WITH
MIN	MINIMUM		

**PROJECT: BERLIN HIGH SCHOOL**

**PROJECT DESCRIPTION:** Balance air systems as requested

**COMMENT:**

MAU-2 - Consumer Science

Outdoor air mode 100% closed. We could not get actual reading.

Phase I - Auto Shop Room 1606 Auto Shop & Auto Staff

The return damper is 100% closed and will not open.

AHU-5 – Serving Women's Locker Room

Outdoor air intake filter needs to be cleaned.

**DOAS-4**

Room D136 Men's

Original Supply = 607 / Current Supply = 541

Original Exhaust = 646 / Current Exhaust = 473

Room D135 Women's

Original Supply = 601 / Current Supply = 558

Original Exhaust = 549 / Current Exhaust = 573

Because of the change to lower the exhaust sides of the DOAS units, dropped the exhaust below the supply in the toilets. Recommend lowering the supply to get below the exhaust to make room negative. At current 473, the AC's would be 10.40 (10 required).

One DOAS-4, because of Room D118 Business Computer (2) exhaust grills being opened to 100%, caused the DOAS-4 exhaust to drop on all other inlets.



**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		REQUIRED AIR CHANGES/HR	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RETURN CFM			
1601	ELECTRONICS	22377	1393	1150		3.74	NO
1602	GRAPHICS & PRINTING	21835	2097	3236		8.89	NO
1603	METAL SHOP	24723	2014	2730		6.63	NO
	FINISHING ROOM	1156	190	1876		97.37	NO
1604	WOOD SHOP	27890	4125	3852		8.87	NO
1605	DRIVERS ED	4807	1333	0		16.64	NO
1606	AUTO SHOP	24022	0	0		0.00	NO
	AUTO STAFF	1600	0	0		0.00	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-1

NEBB CERTIFIED #2453

SHEET NO. 1

# AHU

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
1601	ELECTRONICS		1	16" DIA	1.395	998	1392	AHU-1 (NOTE)
1602	GRAPHICS & PRINTING		2	14" DIA	N/A	N/A	2097	AHU-1 (NOTE)
1603	METAL SHOP		3	19" DIA	1.967	1024	2014	AHU-3
	FINISHING ROOM		4	2408	N/A	N/A	190	AHU-3
1604	WOOD SHOP		5	24" DIA	3.14	1312	4120	AHU-4
1605	DRIVERS ED		6	12X12	N/A	N/A	325	AHU-5
1605	DRIVERS ED		7	12X12	N/A	N/A	345	AHU-5
1605	DRIVERS ED		8	12X12	N/A	N/A	333	AHU-5
1605	DRIVERS ED		9	12X12	N/A	N/A	330	AHU-5
1606	AUTO SHOP BRANCH		10	22X21	N/A	N/A	0	AHU-2 (SEE COMMENT SHEET)
TOTAL CFM								

NOTE: CFM DETERMINES BY CROSS REFERENCING THE VAV INLET.  
DIFFERENTIAL PRESSURE OT THE VAV CHART.

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE:20240-2

NEBB CERTIFIED #2453

SHEET NO. 2

# AHU

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	RETURN							
1601	ELECTRONICS		1	28X40	7.77	148	1150	AHU-1
1602	GRAPHICS & PRINTING		2	34X34	8.03	403	3236	AHU-1
1603	METAL SHOP		3	32X14	2.5	1092	2730	AHU-3
1604	WOOD SHOP		4	36X22	5.5	643	3537	AHU-1
1604	WOOD SHOP		5	16X8	.89	355	316	AHU-1
1605	AUTO SHOP		6	N/A	N/A	N/A	0	AHU-2
	EXHAUST							
	FINISHING ROOM		1	20X40	5.55	338	1876	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-3

NEBB CERTIFIED #2453

SHEET NO. 3

# AHU-1

## \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO ROOM 1601 ELECTRONICS

CONDITION: VAV NORMAL OPERATION

TEMPERATURE (°F): 71

DUCT SP (" WG): +1.67

DUCT SIZE (" DIA): 16

DUCT AREA (SQ FT): 1.396

INTERNAL DUCT LINING ("): 0.500

TOTAL FPM: 19968

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		1393
FPM:	N/A		998

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 4

# AHU-3

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED RETURNED BY FAN FROM METAL SHOP  
CONDITION: NORMAL OPERATION  
TEMPERATURE (°F): 68  
DUCT SP (" WG): -.26  
  
DUCT WIDTH ("): 30  
DUCT HEIGHT ("): 12  
DUCT AREA (SQ FT): 2.500  
INTERNAL DUCT LINING ("): 1  
TOTAL FPM: 21841  
NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		2730
FPM:	N/A		1092

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-4

NEBB CERTIFIED #2453

SHEET NO. 5

# AHU-1

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	MEDIA CENTER & UPPER LEVEL MEZZANINE	128834	7433	6198	4005	3.46	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-7

NEBB CERTIFIED #2453

SHEET NO. 6

# AHU-1

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: MEDIA CENTER B210

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6900	5861
OA CFM:	2500	2433
TOTAL SP (" WG):	4.1	1.64
EXT SP (" WG):	2.1	.21
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	N/A
AMPS T1/T2/T3:	12.4	5.9/6.2/6.2

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	VHC72 SO 024329
MOTOR MANUFACTURER:	WEG
MOTOR HP:	10
MOTOR SF:	1.15
MOTOR FRAME:	213/5T
VFD SETTING:	57.40 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	32X68	15.11	2500	165	161	2433	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-8

NEBB CERTIFIED #2453

SHEET NO. 7

# AHU-1

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO MEDIA CENTER

CONDITION: 100% FAN SPEED, 60 HZ @ 15% OA COMMAND

TEMPERATURE (°F): 83

DUCT SP (" WG): +.23

DUCT WIDTH ("): 40

DUCT HEIGHT ("): 20

DUCT AREA (SQ FT): 5.550

INTERNAL DUCT LINING ("): 2

TOTAL FPM: 29555

NUMBER OF POINTS: 28

	DESIGN		ACTUAL
CFM:	6900		5861
FPM:	1243		1056

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-9

NEBB CERTIFIED #2453

SHEET NO. 8



# AHU-1

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B210	MEDIA CENTER		1	32X8	1.170	625	534	N/A	N/A	1
B210	MEDIA CENTER		2	32X8	1.170	625	534	N/A	N/A	1
B210	MEDIA CENTER		3	32X8	1.092	625	572	N/A	N/A	1
B210	MEDIA CENTER		4	32X8	1.092	625	572	N/A	N/A	1
B210	MEDIA CENTER		5	32X10	1.495	880	589	N/A	N/A	1
B210	MEDIA CENTER		6	32X10	1.495	880	589	N/A	N/A	1
B210	MEDIA CENTER		7	32X10	1.495	880	589	N/A	N/A	1
B210	MEDIA CENTER		8	32X10	1.495	880	589	N/A	N/A	1
B210	MEDIA CENTER		9	32X10	1.495	880	589	N/A	N/A	1
TOTAL CFM						6900				5861

NOTE: DUCT TRAVERSE FOR TOTAL CFM TAKEN ON ROOF

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-10

NEBB CERTIFIED #2453

SHEET NO. 9

# AHU-1

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: MEDIA CENTER

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6900	4651
SUCTION SP (" WG):	N/A	.80
DISCHARGE SP (" WG):	N/A	.02
TOTAL SP (" WG):	2.4	.82
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	481/481/481
AMPS T1/T2/T3:	9.2	3.9/4.1/4.1

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	VHC72 SO024329
MOTOR MANUFACTURER:	WEG
MOTOR HP:	7 1/2
MOTOR SF:	1.15
MOTOR FRAME:	213 / 5T
VFD SETTING:	21.00 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-11

NEBB CERTIFIED #2453

SHEET NO. 10

# AHU-1

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN FROM MEDIA CENTER  
CONDITION: 44% FAN SPEED, 37.18 HZ  
TEMPERATURE (°F): 70  
DUCT SP (" WG): -.12  
  
DUCT WIDTH ("): 40  
DUCT HEIGHT ("): 20  
DUCT AREA (SQ FT): 5.550  
INTERNAL DUCT LINING ("): 2  
TOTAL FPM: 23468  
NUMBER OF POINTS: 28

	DESIGN		ACTUAL
CFM:	6900		4651
FPM:	1243		838

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-12

NEBB CERTIFIED #2453

SHEET NO. 11

# AHU-1

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B210	MEDIA CENTER		1	21X21	3.063	1150	375	N/A	N/A	1
B210	MEDIA CENTER		2	21X21	3.063	1150	375	N/A	N/A	1
B210	MEDIA CENTER		3	21X21	3.063	1150	375	N/A	N/A	1
B210	MEDIA CENTER		4	21X21	3.063	1150	375	N/A	N/A	1
B210	MEDIA CENTER		5	21X21	3.063	1150	375	N/A	N/A	1
B210	MEDIA CENTER		6	21X21	3.063	1150	375	N/A	N/A	1
TOTAL CFM						6900				4651

NOTE: DUCT TRAVERSE FOR TOTAL CFM TAKEN ON ROOF

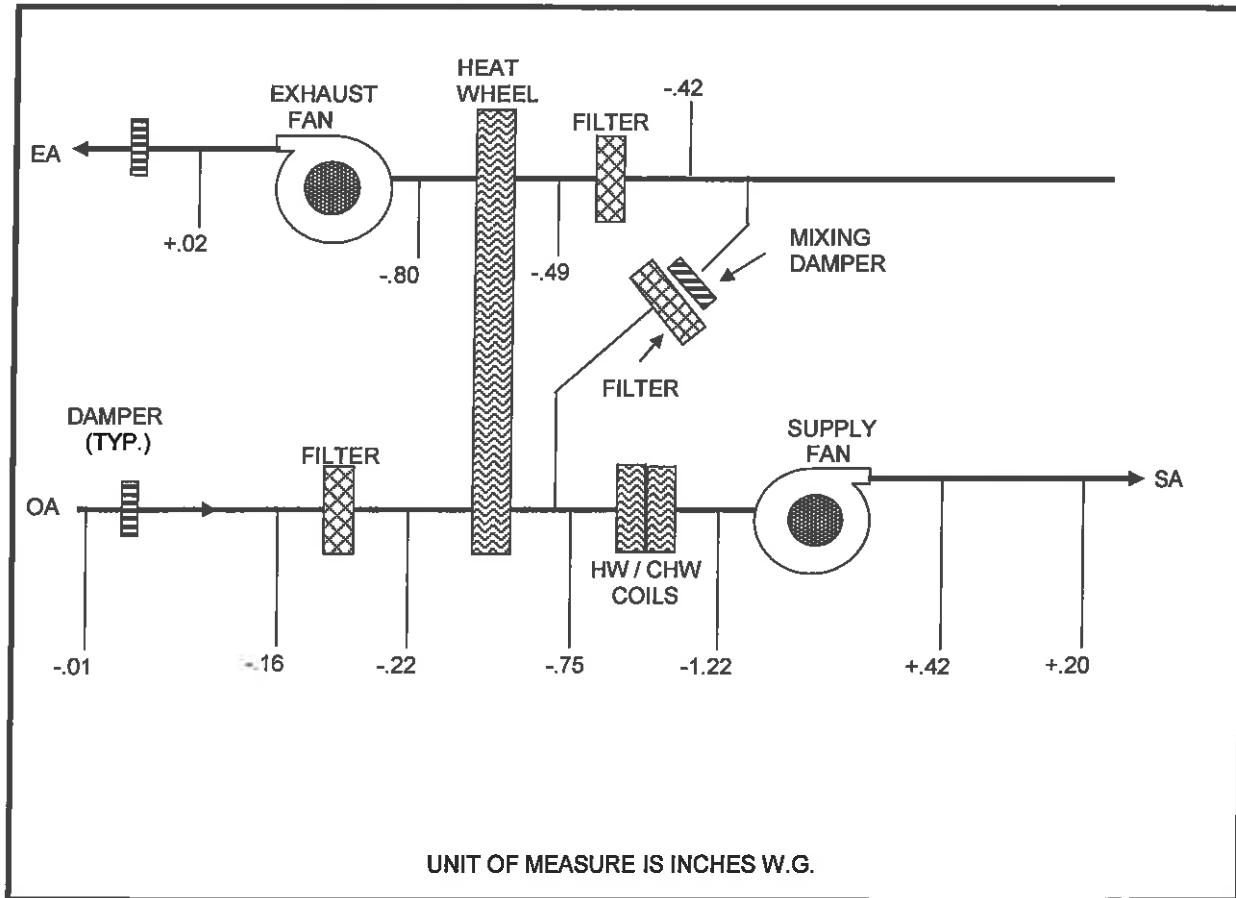
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-13

NEBB CERTIFIED #2453

SHEET NO. 12

# AHU-1

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-14

NEBB CERTIFIED #2453

SHEET NO. 13

# AHU-2

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	A GYM	326136	12969	14428	9347	2.65	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-21

NEBB CERTIFIED #2453

SHEET NO. 14

# AHU-2

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: A GYM

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	19000	12969
OA CFM:	14700	9347
TOTAL SP (" WG):	4.3	1.31
EXT SP (" WG):	2.4	.30
FAN RPM:	1392	1007
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	481/482/481
AMPS T1/T2/T3:	29.5	13.5/13.7/13.8

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	ENERGY PACK-W-2-19E-PP-HW-CW-X-C
MOTOR MANUFACTURER:	WEG
MOTOR HP:	25
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	284T
MOTOR SHEAVE BORE X OD:	1 7/8 X 2B5V86
FAN SHEAVE BORE X OD:	1 11/16 X 2B5V110
BELT NO/SIZE:	2 / BX97
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	34,+2,-2
VFD SETTING:	43.3 HZ

OUTSIDE AIR DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE UPPER		1	70X41	19.93	7350	369	231	4604	
	OA INTAKE LOWER		1	70X41	19.93	7350	369	238	4743	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-22

NEBB CERTIFIED #2453

SHEET NO. 15

## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO NORTH BRANCH DUCT (VP-1)  
CONDITION: NORMAL OPERATION (OUR OUTLET #S 1-8)  
TEMPERATURE (°F): 73  
DUCT SP (" WG): +.037  
  
DUCT WIDTH ("): 40  
DUCT HEIGHT ("): 28  
DUCT AREA (SQ FT): 7.780  
INTERNAL DUCT LINING ("): 2  
TOTAL FPM: 28189  
NUMBER OF POINTS: 35

	DESIGN		ACTUAL
CFM:	9520		6263
FPM:	1224		805

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED BY FAN EQUALS VP-1 CFM + VP-2 CFM =  
6263 CFM + 6706 CFM= 12969 CFM

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-23

NEBB CERTIFIED #2453

SHEET NO. 10



## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO SOUTH BRANCH DUCT (VP-2)  
CONDITION: NORMAL OPERATION (OUR OUTLET #S 9-16)  
TEMPERATURE (°F): 73  
DUCT SP (" WG): +0.09  
  
DUCT WIDTH ("): 52  
DUCT HEIGHT ("): 30  
DUCT AREA (SQ FT): 10.833  
INTERNAL DUCT LINING ("): 2  
TOTAL FPM: 27868  
NUMBER OF POINTS: 45

	DESIGN		ACTUAL
CFM:	9520		6706
FPM:	879		619

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED BY FAN EQUALS VP-1 CFM + VP-2 CFM =  
6263 CFM + 6706 CFM = 12969 CFM

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-24

NEBB CERTIFIED #2453

SHEET NO. 17

## AHU-2

### \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	GYM		1	48X12	2.47	1190	482	N/A	N/A	1
	GYM		2	48X12	2.47	1190	482	N/A	N/A	1
	GYM		3	48X12	2.47	1190	482	N/A	N/A	1
	GYM		4	48X12	2.47	1190	482	N/A	N/A	1
	GYM		5	48X12	2.47	1190	482	N/A	N/A	1
	GYM		6	48X12	2.47	1190	482	N/A	N/A	1
	GYM		7	48X12	2.47	1190	482	N/A	N/A	1
	GYM		8	48X12	2.47	1190	482	N/A	N/A	1
	GYM		9	48X12	2.47	1190	482	N/A	N/A	1
	GYM		10	48X12	2.47	1190	482	N/A	N/A	1
	GYM		11	48X12	2.47	1190	482	N/A	N/A	1
	GYM		12	48X12	2.47	1190	482	N/A	N/A	1
	GYM		13	48X12	2.47	1190	482	N/A	N/A	1
	GYM		14	48X12	2.47	1190	482	N/A	N/A	1
	GYM		15	48X12	2.47	1190	482	N/A	N/A	1
	GYM		16	48X12	2.47	1190	482	N/A	N/A	1
TOTAL CFM						19040				12969

NOTE: DUCT TRAVERSE FOR TOTAL CFM TAKEN ON ROOF

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-25

NEBB CERTIFIED #2453

SHEET NO. 18

# AHU-2

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: GYM  
FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	19380	14428
SUCTION SP (" WG):	N/A	-1.17
DISCHARGE SP (" WG):	2	+.03
TOTAL SP (" WG):	2.5	1.20
FAN RPM:	1292	801
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	481/482/481
AMPS T1/T2/T3:	24.1	11.5/11.8/11.7

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	W-2-19E-PP-HW-CW-X-C
MOTOR MANUFACTURER:	WEG
MOTOR HP:	20.0
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	254/6T
MOTOR SHEAVE BORE X OD:	1 5/8 X 2B5V66
FAN SHEAVE BORE X OD:	1 11/16 X 2B5V90
BELT NO/SIZE:	2 / BX889
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	33, +2, -2
VFD SETTING:	36.8 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-26

NEBB CERTIFIED #2453

SHEET NO. 19

## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN FROM BRANCH 2 (VP-1)

CONDITION: 100% OUTSIDE AIR, 100% EXHAUST AIR

TEMPERATURE (°F): 70

DUCT SP (" WG): -.12

DUCT WIDTH ("): 40

DUCT HEIGHT ("): 28

DUCT AREA (SQ FT): 7.778

INTERNAL DUCT LINING ("): 2

TOTAL FPM: 32729

NUMBER OF POINTS: 35

	DESIGN		ACTUAL
CFM:	9500		7272
FPM:	1221		935

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$7272 \text{ CFM} + 7156 \text{ CFM} = 14428 \text{ CFM}$$

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-27

NEBB CERTIFIED #2453

SHEET NO. 20

## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN FROM BRANCH 1 (VP-2)  
CONDITION: 100% OUTSIDE AIR, 100% EXHAUST AIR  
TEMPERATURE (°F): 70  
DUCT SP (" WG): -.12  
  
DUCT WIDTH ("): 40  
DUCT HEIGHT ("): 28  
DUCT AREA (SQ FT): 7.778  
INTERNAL DUCT LINING ("): 2  
TOTAL FPM: 32200  
NUMBER OF POINTS: 35

	DESIGN		ACTUAL
CFM:	9500		7156
FPM:	1221		920

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: TOTAL AIR EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$7272 \text{ CFM} + 7156 \text{ CFM} = 14428 \text{ CFM}$$

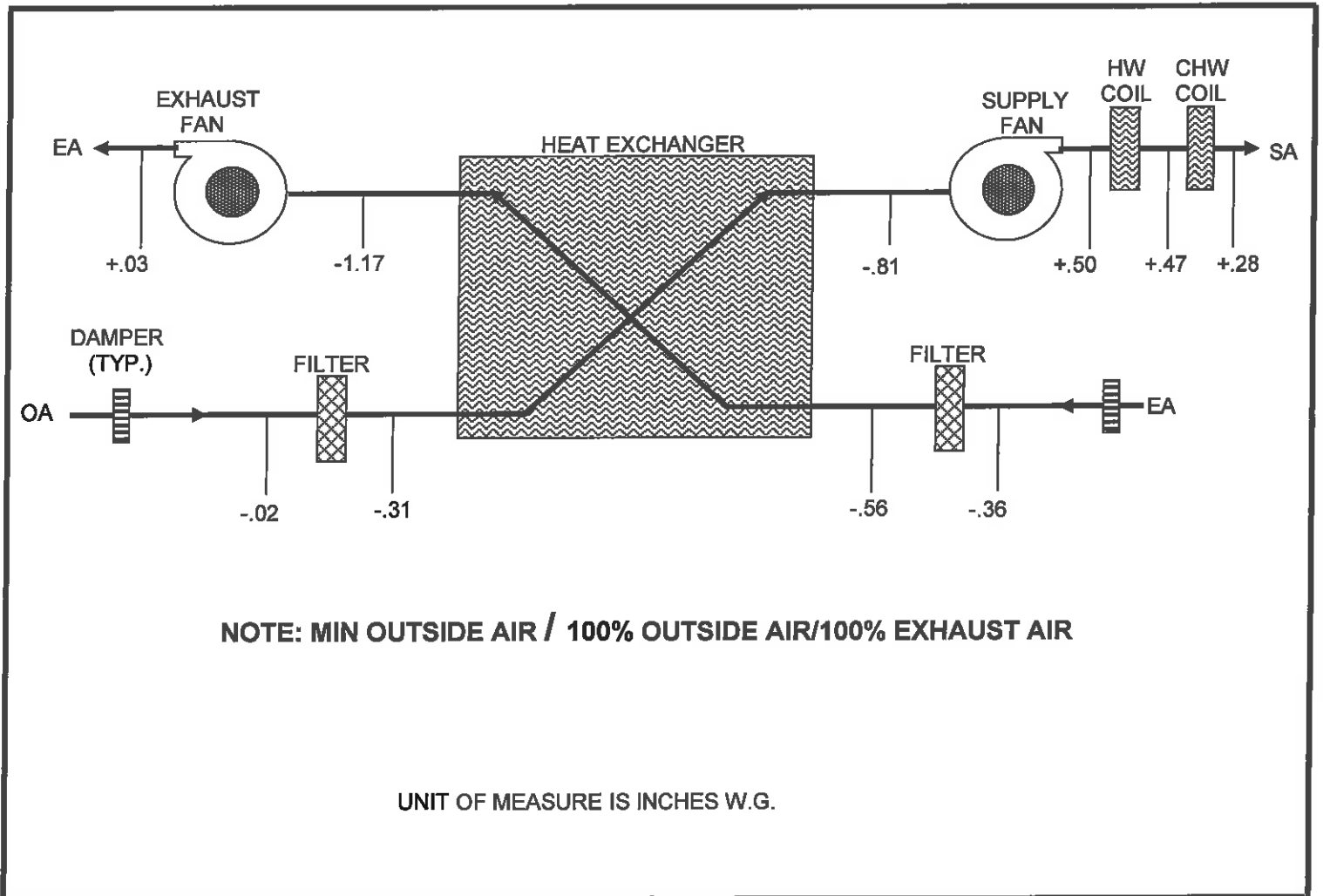
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-28

NEBB CERTIFIED #2453

SHEET NO. 21

# AHU-2

## \*\* STATIC PRESSURE PROFILE \*\*



# AHU-3

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	GYM LOBBY	23545	6019	6560	803	16.72	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-15

NEBB CERTIFIED #2453

SHEET NO. 23

# AHU-3

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: GYM LOBBY

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	7200 / 7270 (NOTE)	6019
OA CFM:	727	803
TOTAL SP (" WG):	4.3	1.78
EXT SP (" WG):	2.2	.67
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	483/484/487
AMPS T1/T2/T3:	18.60	9.8/10.7/9.9

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VHC72
MOTOR MANUFACTURER:	WEG
MOTOR HP:	15
MOTOR SF:	1.15
MOTOR FRAME:	254/6T
VFD SETTING:	56.35 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	68X31.5	14.87	727	49	54	803	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-16

NEBB CERTIFIED #2453

SHEET NO. 24



## AHU-3

### \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B229	GYM LOBBY		1	2414	720	587	
B229	GYM LOBBY		2	2414	720	579	
B229	GYM LOBBY		3	2414	720	620	
B229	GYM LOBBY		4	2414	720	578	
B229	GYM LOBBY		5	2414	720	554	
B229	GYM LOBBY		6	2414	720	634	
B229	GYM LOBBY		7	2414	720	564	
B229	GYM LOBBY		8	2414	720	627	
B229	GYM LOBBY		9	2414	720	596	
B229	GYM LOBBY		10	2414	720	618	
B228	TR1		11	2406	25	23	
B225	GYM STORAGE		12	2406	25	22	
B222	GYM STORAGE		13	2406	20	17	
TOTAL CFM					7270	6019	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-17

NEBB CERTIFIED #2453

SHEET NO. 25

# AHU-3

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: GYM LOBBY

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6485 / 6480 (NOTE)	6560
SUCTION SP (" WG):	N/A	-.86
DISCHARGE SP (" WG):	N/A	+.01
TOTAL SP (" WG):	2.4	.87
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	483 / 484 / 487
AMPS T1/T2/T3:	9.03	2.5 / 2.4 / 2.5

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VHC72
MOTOR MANUFACTURER:	WEG
MOTOR HP:	7.5
MOTOR SF:	1.15
MOTOR FRAME:	213 / 5T
VFD SETTING:	24.4 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-18

NEBB CERTIFIED #2453

SHEET NO. 26

## AHU-3

### \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B229	GYM LOBBY		1	16X16	585	600	
B229	GYM LOBBY		2	16X16	585	594	
B229	GYM LOBBY		3	16X16	585	533	
B229	GYM LOBBY		4	16X16	585	575	
B229	GYM LOBBY		5	16X16	585	589	
B229	GYM LOBBY		6	16X16	585	572	
B229	GYM LOBBY		7	16X16	585	599	
B229	GYM LOBBY		8	16X16	585	622	
B229	GYM LOBBY		9	16X16	585	605	
B229	GYM LOBBY		10	16X16	585	581	
B229	GYM LOBBY		11	16X16	585	588	
B225	GYM STORAGE		12	6X6	25	40	1
B222	GYM STORAGE		13	6X6	20	62	1
TOTAL CFM					6480	6560	

NOTE 1: AIRFLOW MEASURED WITH RVA USING A .139 AK FACTOR

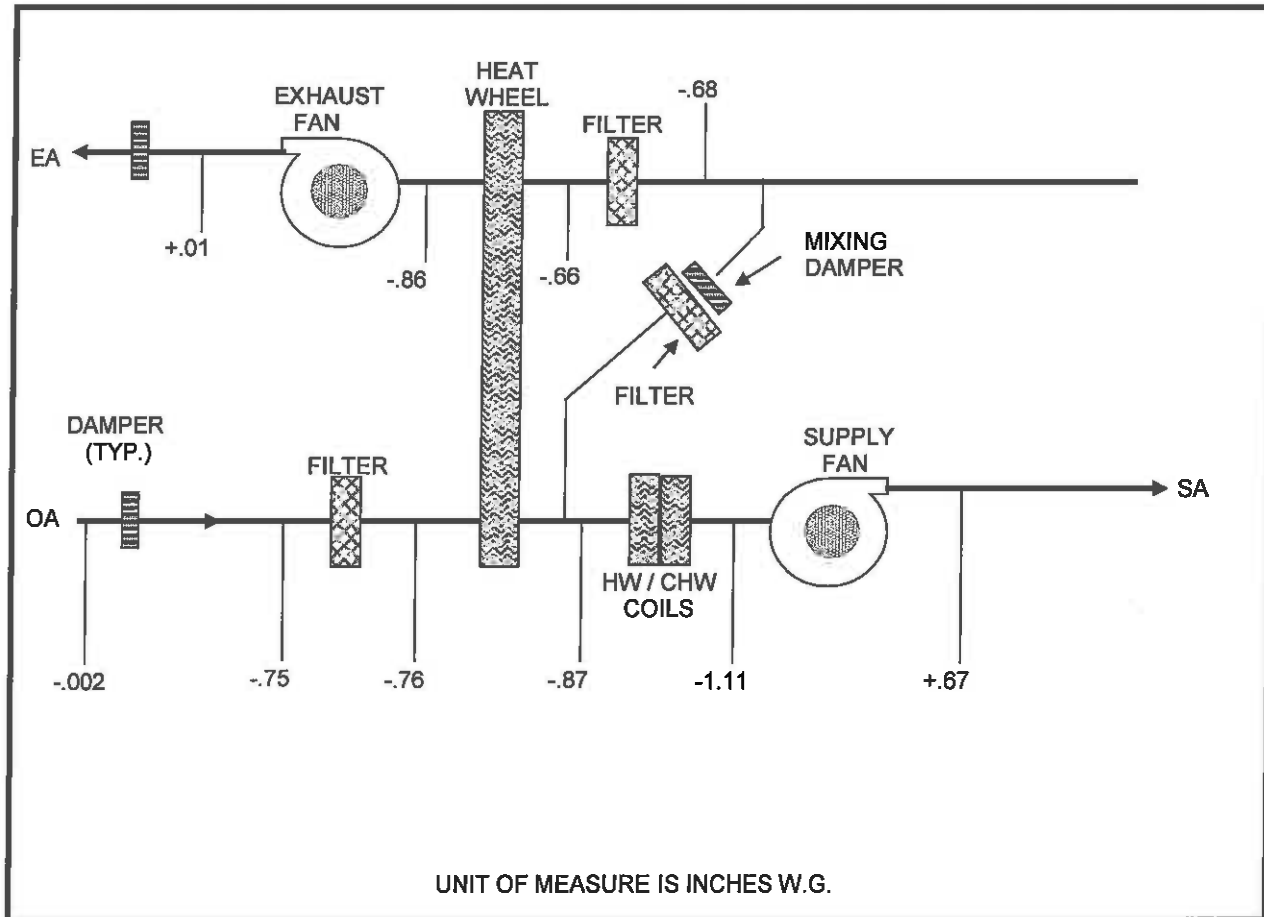
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-19

NEBB CERTIFIED #2453

SHEET NO. 27

# AHU-3

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-20

NEBB CERTIFIED #2453

SHEET NO. 28

# AHU-4

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM		
	B GYM	143680	7458	7632	3.19	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-30

NEBB CERTIFIED #2453

SHEET NO. 29

# AHU-4

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: GYMNASIUM B

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	8400	7458
OA CFM:	4400	3087
TOTAL SP (" WG):	4.1	1.35
EXT SP (" WG):	2.1	.41
FAN RPM:	N/A	1162
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	470/473/471
AMPS T1/T2/T3:	18.0	7.9/8.1/8.0

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	W-2-08E-PP-HW-CW-X-C
MOTOR MANUFACTURER:	WEG
MOTOR HP:	15
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	254/6T
MOTOR SHEAVE BORE X OD:	1 5/8 X 2B5V58
FAN SHEAVE BORE X OD:	1 7/16 X 2BK65H
BELT NO/SIZE:	2 / BX70
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	27, +2 1/2, -2 1/2
VFD SETTING:	40.2 HZ

OUTSIDE AIR DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	51X28.5	10.09	2200	218	138	1392	
	OA INTAKE		2	51X28.5	10.09	2200	218	168	1695	

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-31

NEBB CERTIFIED #2453

SHEET NO 30

# AHU-4

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
A218	GYMNASIUM B		1	36X12	3.0	840	280	251	753	
A218	GYMNASIUM B		2	36X12	3.0	840	280	249	747	
A218	GYMNASIUM B		3	36X12	3.0	840	280	231	693	
A218	GYMNASIUM B		4	36X12	3.0	840	280	242	726	
A218	GYMNASIUM B		5	36X12	3.0	840	280	227	681	
A218	GYMNASIUM B		6	36X12	3.0	840	280	241	723	
A218	GYMNASIUM B		7	36X12	3.0	840	280	276	828	
A218	GYMNASIUM B		8	36X12	3.0	840	280	251	753	
A218	GYMNASIUM B		9	36X12	3.0	840	280	275	825	
A218	GYMNASIUM B		10	36X12	3.0	840	280	243	729	
TOTAL CFM						8400			7458	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-32

NEBB CERTIFIED #2453

SHEET NO. 31

# AHU-4

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: GYM  
FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	8400	7630
SUCTION SP (" WG):	N/A	-2.06
DISCHARGE SP (" WG):	N/A	+ .08
TOTAL SP (" WG):	2.5	2.14
FAN RPM:	N/A	1223
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	470/473/471
AMPS T1/T2/T3:	12.4	7.1/7.2/7.1

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	W-2-08E-PP-HW-CW-X-C
MOTOR MANUFACTURER:	WEG
MOTOR HP:	10
MOTOR RPM:	1760
MOTOR SF:	1.25
MOTOR FRAME:	213/5T
MOTOR SHEAVE BORE X OD:	1 3/8 X 2BK50H
FAN SHEAVE BORE X OD:	1 7/16 X 2BK55H
BELT NO/SIZE:	2 / BX64
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	26, +3, -2
VFD SETTING:	46.1 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-33

NEBB CERTIFIED #2453

SHEET NO. 32



# AHU-4

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
A218	GYMNASIUM B		1	30X30	6.25	2100	336	394	2463	
A218	GYMNASIUM B		2	30X30	6.25	2100	336	211	1319	
A218	GYMNASIUM B		3	30X30	6.25	2100	336	221	1381	
A218	GYMNASIUM B		4	30X30	6.25	2100	336	395	2469	
TOTAL CFM						8400			7632	

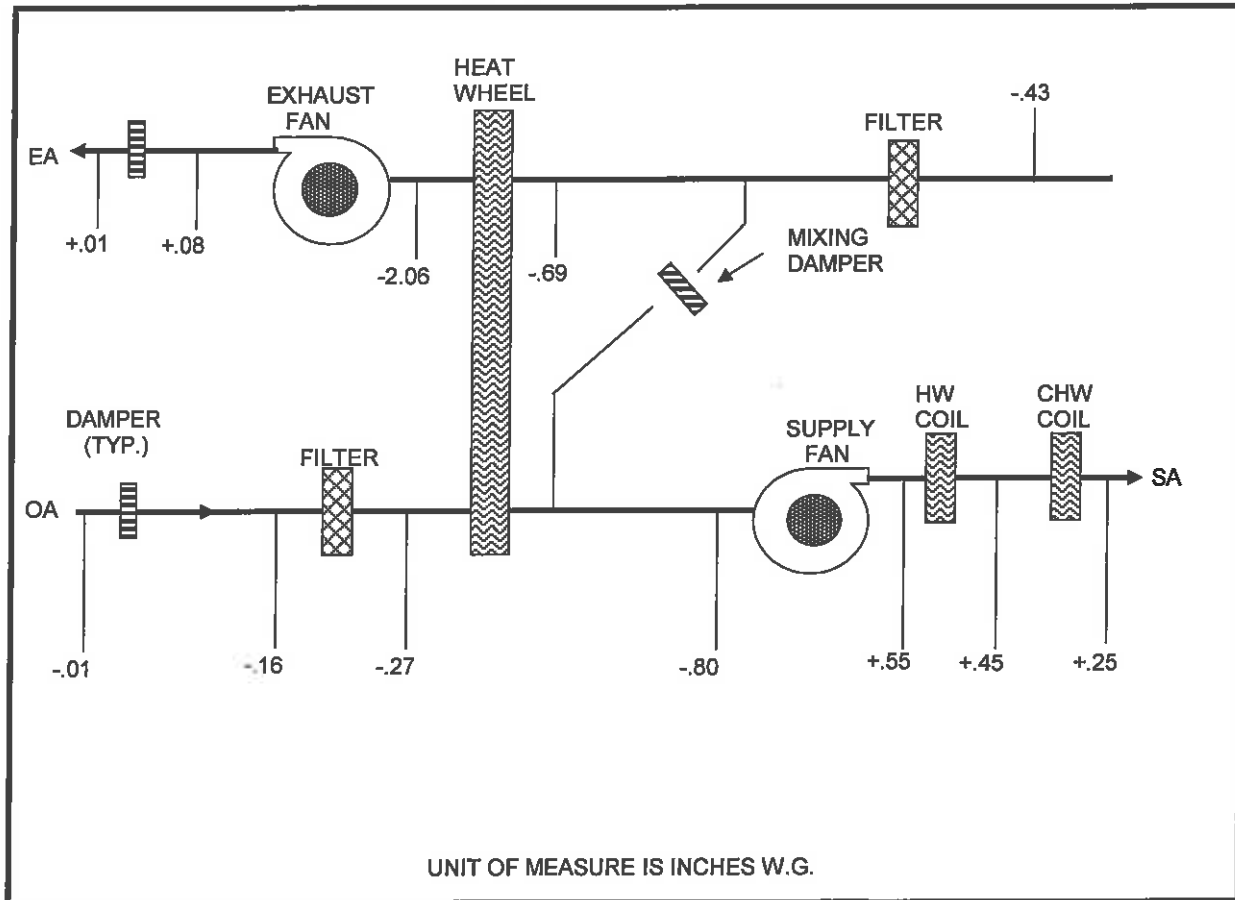
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE:20240-34

NEBB CERTIFIED #2453

SHEET NO. 33

# AHU-4

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-35

NEBB CERTIFIED #2453

SHEET NO. 34

# AHU-5

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	<u>ACTUAL</u>		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RETURN CFM			
	AHU-5						
A225	GIRLS LOCKER ROOM	10285	968	970	968	5.66	NO
A205	OFFICE	1312	226	267	226	12.21	NO
A204	OFFICE BATHROOM	1148	227	259	227	13.54	NO
A226	TEAM ROOM 1	6474	498	573	493	5.31	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-36

NEBB CERTIFIED #2453

SHEET NO. 35

# AHU-5

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: WOMENS LOCKER ROOM

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2000 / 1960 (NOTE)	1919
TOTAL SP (" WG):	4.0	2.04
EXT SP (" WG):	2.0	.77
FAN RPM:	N/A	1816
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	473/474/478
AMPS T1/T2/T3:	3.86	3.0/3.1/3.0

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VHC36
MOTOR MANUFACTURER:	WEG
MOTOR HP:	3
MOTOR RPM:	1765
MOTOR SF:	1.15
MOTOR FRAME:	182/4T
MOTOR SHEAVE BORE X OD:	1 1/8 X VP50
FAN SHEAVE BORE X OD:	3/4 X BX36H
BELT NO/SIZE:	1 / BX44
FINAL SHEAVE POSITION:	90% OPEN
C-C WITH ADJUSTMENT ("):	17 1/2, + 3, -1
VFD SETTING:	55.33 HZ

OUTSIDE AIR DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	27X26	4.875	1960	402	400	1950	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-37

NEBB CERTIFIED #2453

SHEET NO. \_\_\_\_\_

## AHU-5

### \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
A204	WOMENS RESTROOM		1	2408	225	227	
A205	WOMENS COACH OFFICE		2	2408	235	226	
A225	WOMENS LOCKER RM		3	2412	500	487	
A225	WOMENS LOCKER RM		4	2412	500	481	
A226	TEAM ROOM 1		5	2412	500	498	
TOTAL CFM					1960	1919	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-38

NEBB CERTIFIED #2453

SHEET NO. 34

# AHU-5

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED:WOMENS LOCKER ROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2000 / 1850 (NOTE)	2069
SUCTION SP (" WG):	N/A	-1.63
DISCHARGE SP (" WG):	N/A	+1.11
TOTAL SP (" WG):	3.2	1.74
FAN RPM:	N/A	1722
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	473/474/478
AMPS T1/T2/T3:	3.86	3.0/3.0/3.02

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VHC36
MOTOR MANUFACTURER:	WEG
MOTOR HP:	3
MOTOR RPM:	2170
MOTOR SF:	1.15
MOTOR FRAME:	182/4T
MOTOR SHEAVE BORE X OD:	1 1/8 X VP50
FAN SHEAVE BORE X OD:	3/4 X BX36H
BELT NO/SIZE:	1 / BX45
FINAL SHEAVE POSITION:	100% OPEN
C-C WITH ADJUSTMENT ("):	18, +1, -3
VFD SETTING:	54.9 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-39

NEBB CERTIFIED #2453

SHEET NO. 37

# AHU-5

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
A204	WOMENS RESTROOM		1	10X10	.410	215	524	N/A	259	
A205	WOMENS COACH OFFICE		2	10X10	.410	215	524	N/A	267	
A230	TOILET ROOM		3	10X10	.410	215	524	N/A	239	
A230	TOILET ROOM		4	8X8	.262	110	420	N/A	112	
A229	SHOWERS		5	8X8	.262	110	420	N/A	115	
A229	SHOWERS		6	8X8	.262	135	515	N/A	139	
A225	WOMENS LOCKER ROOM		7	6X6	.139	45	324	N/A	63	
A225	WOMENS LOCKER ROOM		8	6X6	.139	45	324	N/A	53	
A225	WOMENS LOCKER ROOM		9	6X6	.139	45	324	N/A	44	
A225	WOMENS LOCKER ROOM		10	6X6	.139	45	324	N/A	54	
A225	WOMENS LOCKER ROOM		11	6X6	.139	45	324	N/A	40	
A225	WOMENS LOCKER ROOM		12	6X6	.139	45	324	N/A	53	
A225	WOMENS LOCKER ROOM		13	6X6	.139	45	324	N/A	60	
A227	TOILET ROOM		14	10X10	.410	215	524	N/A	221	
A228	SHOWERS		15	8X8	.262	140	534	N/A	142	
A226	TEAM ROOM 1		16	6X6	.139	45	324	N/A	53	
A226	TEAM ROOM 1		17	6X6	.139	45	324	N/A	56	
A226	TEAM ROOM 1		18	6X6	.139	45	324	N/A	48	
A226	TEAM ROOM 1		19	6X6	.139	45	324	N/A	53	
TOTAL CFM						1850			2071	

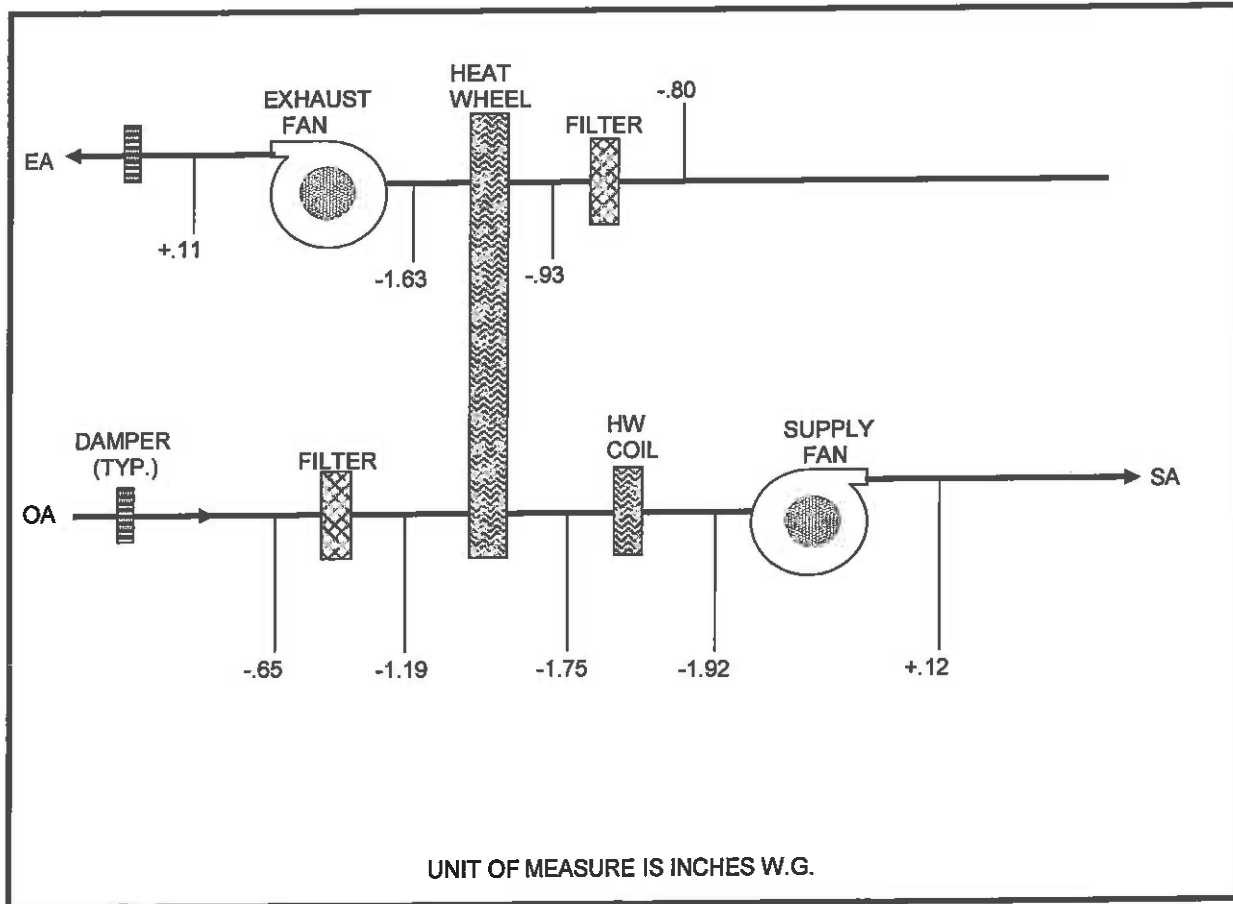
PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-40

NEBB CERTIFIED #2453

SHEET NO. 38

# AHU-5

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-41

NEBB CERTIFIED #2453

SHEET NO. 39



**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	<u>ACTUAL</u>		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	AUDITORIUM/STAGE	365000	14918	18375	N/A	3.02	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-47

NEBB CERTIFIED #2453

SHEET NO. 40

# AHU-7

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: AUDITORIUM

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	18000 / 18760 (NOTE)	14918
TOTAL SP (" WG):	4.2	2.11
EXT SP (" WG):	2.1	.17
FAN RPM:	N/A	1094
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	464/461/465
AMPS T1/T2/T3:	29.5	16.1/16.5/16.4

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	W-2-18E
MOTOR MANUFACTURER:	WEG
MOTOR HP:	25.0
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	284/6T
MOTOR SHEAVE BORE X OD:	1 7/8 X 3B5V60
FAN SHEAVE BORE X OD:	1 11/16 X 3B5V80
BELT NO/SIZE:	3 / BX88
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	34, +2, -1
VFD SETTING:	49 HZ

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-48

NEBB CERTIFIED #2453

SHEET NO. 41

# AHU-7

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO AUDITORIUM

CONDITION: SUPPLY FAN AT 49.1HZ

TEMPERATURE (°F): 72

DUCT SP (" WG): 0.13

DUCT WIDTH ("): 50

DUCT HEIGHT ("): 42

DUCT AREA (SQ FT): 14.583

INTERNAL DUCT LINING ("): 2

TOTAL FPM: 57281

NUMBER OF POINTS: 56

	DESIGN		ACTUAL
CFM:	18760		14918
FPM:	1286		1023

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED / RETURNED / EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-49

NEBB CERTIFIED #2453

SHEET NO. 42

# AHU-7

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: AUDITORIUM

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	18000	18375
SUCTION SP (" WG):	N/A	-1.78
DISCHARGE SP (" WG):	N/A	+.11
TOTAL SP (" WG):	2.5	1.89
FAN RPM:	2	1021
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	462/465/461
AMPS T1/T2/T3:	24.1	14.1/14.3/14.6

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	W-2-18E
MOTOR MANUFACTURER:	WEG
MOTOR HP:	20.0
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	254/6T
MOTOR SHEAVE BORE X OD:	1 5/8 X 2B5V66
FAN SHEAVE BORE X OD:	1 11/16 X 2B5V94
BELT NO/SIZE:	2 / BX90
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	33 1/2, +2, -1
VFD SETTING:	49.3 HZ

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-65

NEBB CERTIFIED #2453

SHEET NO. 43

# AHU-7

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR RETURNED BY FAN FROM AUDITORIUM

CONDITION: 100% EXHAUST, 49.4 HZ

TEMPERATURE (°F): 67

DUCT SP (" WG): -0.5

DUCT WIDTH ("): 50

DUCT HEIGHT ("): 42

DUCT AREA (SQ FT): 14.583

INTERNAL DUCT LINING ("): 2

TOTAL FPM: 70563

NUMBER OF POINTS: 56

	DESIGN		ACTUAL
CFM:	18000		18375
FPM:	1234		1260

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

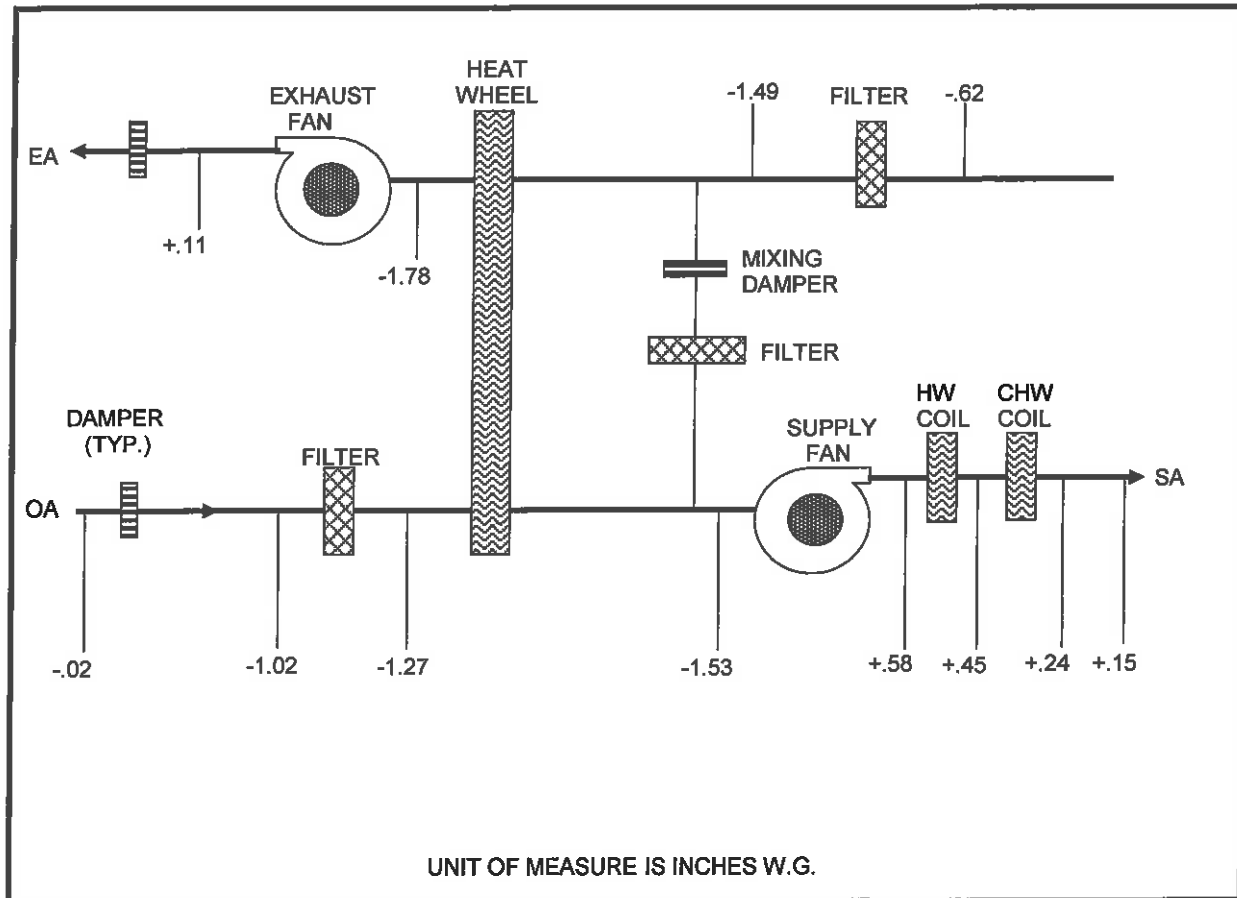
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-66

NEBB CERTIFIED #2453

SHEET NO. 44

# AHU-7

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-71

NEBB CERTIFIED #2453

SHEET NO. 45

# AHU-8

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RETURN CFM			
	CAFETERIA	93067	10931	11112	8556	7.16	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-72

NEBB CERTIFIED #2453

SHEET NO. 46

# AHU-8

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: CAFETERIA

FAN LOCATION: D ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	11000	11370
OA CFM:	8100	8556
TOTAL SP (" WG):	4.3	2.49
EXT SP (" WG):	2.2	1.3
FAN RPM:	N/A	1424
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	484/482/483
AMPS T1/T2/T3:	18.0	12.5/12.7/12.4

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	ENERGY PACK W-2-11E
MOTOR MANUFACTURER:	WEG
MOTOR HP:	15.0
MOTOR RPM:	1765
MOTOR SF:	1.25
MOTOR FRAME:	254T
MOTOR SHEAVE BORE X OD:	1 5/8 X 2B5V56
FAN SHEAVE BORE X OD:	1 7/16 X 2B5V62
BELT NO/SIZE:	2 / BX74
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	28, +2, -2
VFD SETTING:	53.3 HZ

OUTSIDE AIR DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	48X36	12	4050	338	343	4116	
	OA INTAKE		2	48X36	12	4050	338	370	4440	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-73

NEBB CERTIFIED #2453

SHEET NO. 47



# AHU-8

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN  
LOCATION: INLET SIDE OF CHILLED WATER COIL  
CONDITION: 53.2 HZ, MIN OA  
FACE WIDTH ("): 43  
FACE HEIGHT ("): 76  
FACE AREA (SQ FT): 22.694  
  
TOTAL FPM: 9018  
NUMBER OF POINTS: 18

	DESIGN		ACTUAL
CFM:	11000		11370
FPM:	485		501

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-74

NEBB CERTIFIED #2453

SHEET NO. 48

## AHU-8

### \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
D214	CAFETERIA		1	18X18	710	681	
D214	CAFETERIA		2	18X18	710	690	
D214	CAFETERIA		3	18X18	710	676	
D214	CAFETERIA		4	18X18	710	651	
D214	CAFETERIA		5	18X18	710	673	
D214	CAFETERIA		6	18X18	710	662	
D215	STUDENT SERVERY		7	18X18	500	652	
D215	STUDENT SERVERY		8	18X18	500	420	
D214	CAFETERIA		9	18X18	710	689	
D214	CAFETERIA		10	18X18	710	732	
D214	CAFETERIA		11	18X18	710	715	
D214	CAFETERIA		12	18X18	710	732	
D214	CAFETERIA		13	18X18	710	759	
D214	CAFETERIA		14	18X18	710	743	
D215	STUDENT SERVERY		15	18X18	500	568	
D215	STUDENT SERVERY		16	18X18	500	435	
D216	STAFF WORK AREA		17	18X18	500	453	
TOTAL CFM					11020	10931	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-75

NEBB CERTIFIED #2453

SHEET NO. 49

# AHU-8

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: CAFETERIA

FAN LOCATION: D ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	11000	11112
TOTAL SP (" WG):	2.5	1.92
EXT SP (" WG):	1.2	1.68
FAN RPM:	N/A	1282
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	484/482/483
AMPS T1/T2/T3:	12.4	9.2/9.3/9.4

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR CES
FAN MODEL NO:	ENERGY PACK W-2-11E
MOTOR MANUFACTURER:	WEG
MOTOR HP:	10.0
MOTOR RPM:	1760
MOTOR SF:	1.25
MOTOR FRAME:	213/5T
MOTOR SHEAVE BORE X OD:	1 3/8 X 4 1/2
FAN SHEAVE BORE X OD:	1 7/16 X 6
BELT NO/SIZE:	2 / BX70
FINAL SHEAVE POSITION:	FIXED
C-C WITH ADJUSTMENT ("):	28, +2, -2
VFD SETTING:	53.0 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-76

NEBB CERTIFIED #2453

SHEET NO. 50

# AHU-8

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
D214	CAFETERIA		1	44X22	6.722	2750	409	380	2554	
D214	CAFETERIA		2	44X22	6.722	2750	409	426	2864	
D214	CAFETERIA		3	44X22	6.722	2750	409	440	2958	
D214	CAFETERIA		4	44X22	6.722	2750	409	407	2736	
TOTAL CFM						11000			11112	

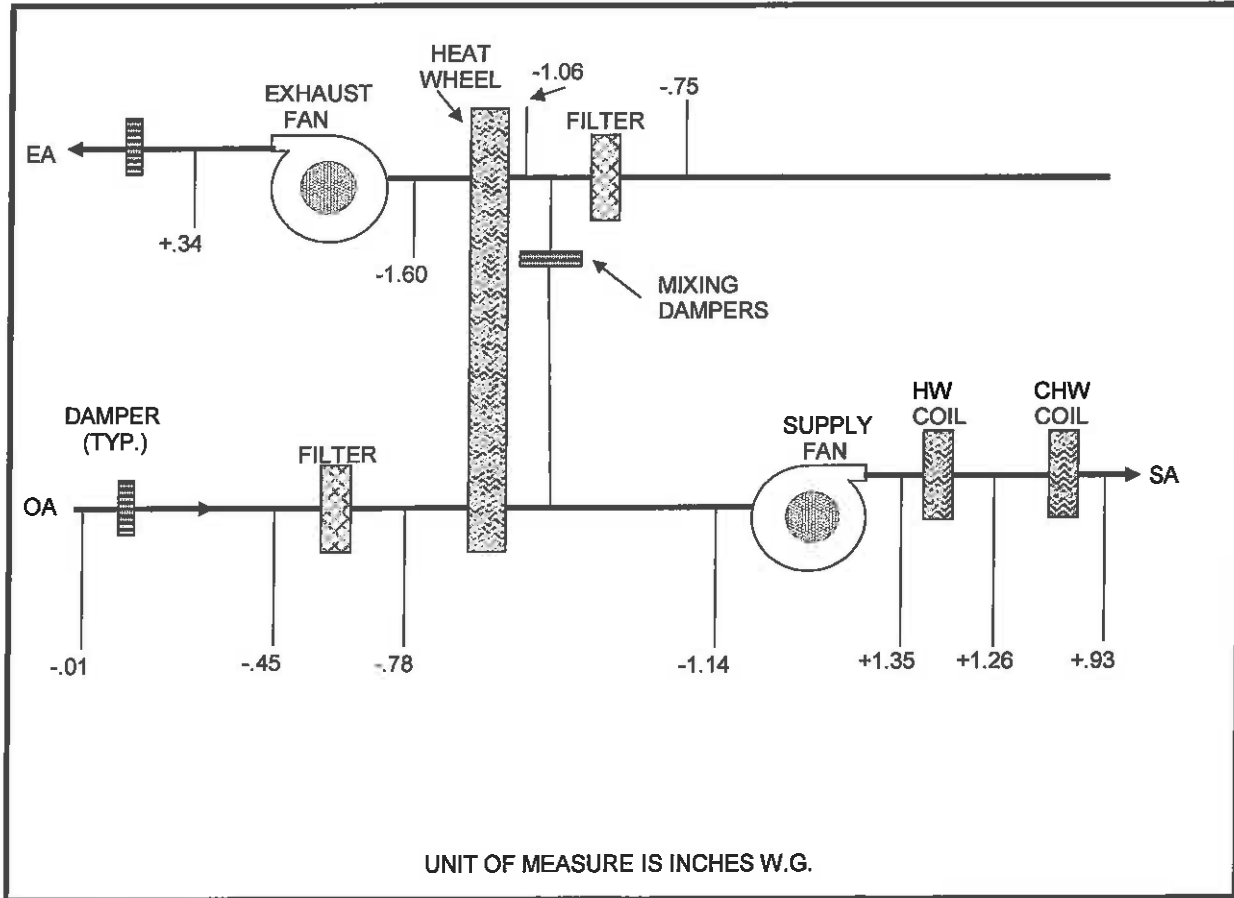
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-77

NEBB CERTIFIED #2453

SHEET NO. 51

# AHU-8

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-78

NEBB CERTIFIED #2453

SHEET NO. 52

# AHU-10

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	AHU 10						
B219 B234 B233	MENS LOCKER ROOM SHOWERS TOILET ROOM	11055	996	722	996	5.41	NO
B218	MENS COACH OFFICE	2214	307	188	307	8.32	NO
B217	MENS RESTROOM	975	0	149	0	9.17	NO
B213	TEAM ROOM 2	6727	634	465	634	5.65	NO
B223	MENS ROOM	2005	0	380	0	11.37	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-86

NEBB CERTIFIED #2453

SHEET NO. 53

# AHU-10

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: MENS LOCKER / TEAM ROOM B219 / B213 (M122)

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2150 / 1840	2176
TOTAL SP (" WG):	3.8	2.19
EXT SP (" WG):	1.8	.28
FAN RPM:	N/A	1989
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	472/474/477
AMPS T1/T2/T3:	6.33	4.7/4.7/4.8

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VH36
MOTOR MANUFACTURER:	WEG
MOTOR HP:	5
MOTOR RPM:	1760
MOTOR SF:	1.15
MOTOR FRAME:	18Z/4T
MOTOR SHEAVE BORE X OD:	1 1/8 X 1VP75
FAN SHEAVE BORE X OD:	3/4 X 5.5
BELT NO/SIZE:	1 / B51
FINAL SHEAVE POSITION:	50%
C-C WITH ADJUSTMENT ("):	17.5
VFD SETTING:	54.07 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-87

NEBB CERTIFIED #2453

SHEET NO. 54

# AHU-10

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B219	MENS LOCKER RM		1	2414	445	532	
B219	MENS LOCKER RM		2	2410	400	464	
B218	MENS COACH OFFICE		3	2408	260	307	
B213	TEAM ROOM		4	2414	535	634	
B212	SHARED GEAR STOR		5	2408	200	239	
TOTAL CFM					1840	2176	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-88

NEBB CERTIFIED #2453

SHEET NO. 55



# AHU-10

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: MENS LOCKER / TEAM ROOM B219, B213 (M122)

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2150 / 2235 (NOTE)	2072
SUCTION SP (" WG):	N/A	-1.48
DISCHARGE SP (" WG):	N/A	+1.13
TOTAL SP (" WG):	2.1	1.61
FAN RPM:	N/A	1678
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	472/474/477
AMPS T1/T2/T3:	3.86	3.3/3.4/3.4

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	VHC036
MOTOR MANUFACTURER:	WEG
MOTOR HP:	3
MOTOR RPM:	1765
MOTOR SF:	1.15
MOTOR FRAME:	184/4T
MOTOR SHEAVE BORE X OD:	1 1/8 X 1VP50
FAN SHEAVE BORE X OD:	3/4 X 4.0
BELT NO/SIZE:	1 / BX46
FINAL SHEAVE POSITION:	90% CLOSED
C-C WITH ADJUSTMENT ("):	18, +1, -2
VFD SETTING:	50 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-89

NEBB CERTIFIED #2453

SHEET NO. 56

# AHU-10

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B219	MENS LOCKER RM		1	6X6	30	32	
B219	MENS LOCKER RM		2	6X6	30	40	
B219	MENS LOCKER RM		3	6X6	30	29	
B219	MENS LOCKER RM		4	6X6	30	33	
B219	MENS LOCKER RM		5	6X6	30	38	
B219	MENS LOCKER RM		6	6X6	30	39	
B219	MENS LOCKER RM		7	6X6	30	30	
B219	MENS LOCKER RM		8	6X6	30	49	
B219	MENS LOCKER RM		9	6X6	30	29	
B234	SHOWERS		10	8X8	135	112	
B234	SHOWERS		11	6X6	75	62	
B233	TOILET ROOM		12	12X12	225	229	
B213	TEAM ROOM		13	6X6	80	72	
B213	TEAM ROOM		14	6X6	80	74	
B213	TEAM ROOM		15	6X6	80	82	
B211	TOILET ROOM		16	6X6	75	64	
B211	TOILET ROOM		17	10X10	200	173	
B212	SHARED EAR STOR		18	10X10	200	168	
B218	MENS COACH OFFICE		19	10X10	200	188	
B217	MENS RESTROOM		20	6X6	75	51	
B217	MENS RESTROOM		21	6X6	85	58	
B217	MENS RESTROOM		22	6X6	75	40	
B223	MEN		23	12X12	190	186	
B223	MEN		24	12X12	190	194	
TOTAL CFM					2235	2072	

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

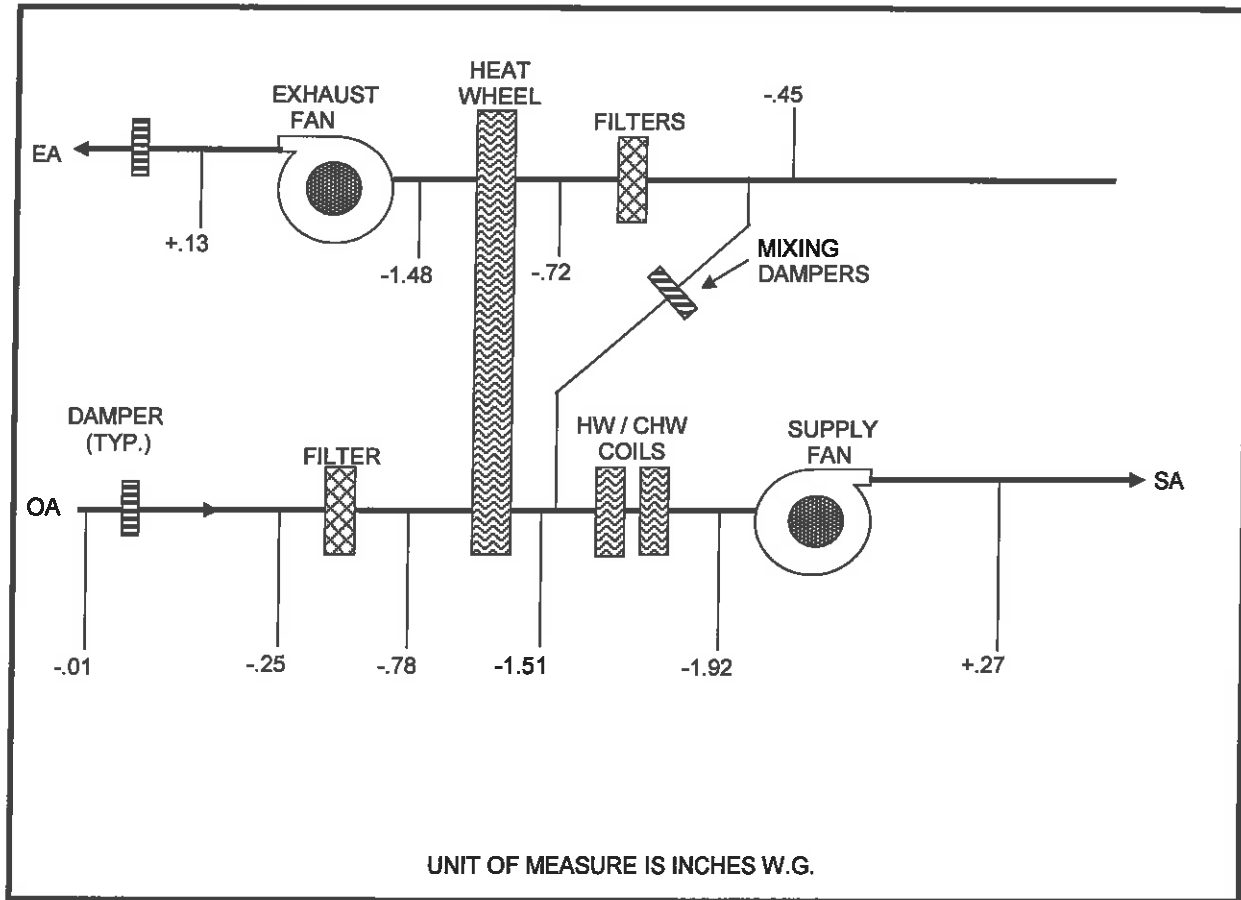
CODE: 20240-90

NEBB CERTIFIED #2453

SHEET NO. 57

# AHU-10

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-91

NEBB CERTIFIED #2453

SHEET NO. 58

# DOAS-1

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
B111	ASSISTANT PRINCIPAL A	1212	36	44	36	2.18	NO
B112	ASSISTANT PRINCIPAL B	1216	36	27	36	1.78	NO
B131	MAIN OFFICE CONF ROOM	1782	213	144	213	7.17	NO
B113	PRINCIPAL SECRETARY	1142	36	35	36	1.89	NO
B114	PRINCIPAL	1804	84	55	84	2.79	NO
B129	COPY WORK ROOM	1595	67	54	67	2.52	NO
B128	STAFF LUNCH ROOM	1811	160	77	160	5.30	NO
B130	MAIN OFF. FILES/RECORDS	2045	38	27	38	1.11	NO
B117	GUIDANCE DIRECTOR	1684	79	45	79	2.81	NO
B115	GUIDANCE COUNSELOR A	1159	35	29	35	1.81	NO
B116	GUIDANCE COUNSELOR B	1165	35	35	35	1.80	NO
B138	TUTORIAL ROOM	780	74	51	74	5.69	NO
B139	GUIDANCE FILE/RECORDS	1865	55	48	55	1.77	NO
B141	PSYCH. OFFICE	1164	37	46	37	2.37	NO
B118	GUIDANCE CONF. ROOM	2180	251	155	251	6.91	NO
B120	GUIDANCE COUNSELOR D	1299	68	45	68	3.14	NO
B119	GUIDANCE COUNSELOR C	1246	68	44	68	3.27	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-96

NEBB CERTIFIED #2453

SHEET NO. 59

# DOAS-1

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
B121	SOCIAL WORKER B	1243	67	50	67	3.23	NO
B122	SPEECH OFFICE	1793	73	58	73	2.44	NO
B143	SOCIAL WORKER A	1765	55	32	55	1.87	NO
B142	PSYCHOLOGIST OFFICE	1842	55	53	55	1.79	NO
B127	GUIDANCE WAITING	12315	479	293	479	2.33	NO
B105	CENTRAL COPY	3071	72	43	72	1.41	NO
B101	ADMIN. OFFICE	9876	507	305	507	3.08	NO
B104	TARDY RM/ADMIN ASSIST.	824	85	36	85	6.19	NO
B134	FLAGSHIP CONF. RM	3702	335	211	335	5.43	NO
B188	WAITING AREA	827	80	41	80	5.80	NO
B146	COT ROOM 1	488	0	39	0	4.80	NO
B147	COT ROOM 2	488	0	39	0	4.80	NO
B145	NURSES EXAM AREA	4404	85	0	85	1.16	NO
B144	SHARED NURSES OOFICE	1954	60	25	60	1.84	NO
B107	WOMANS ROOM	2355	111	122	111	3.11	NO
B108	MENS ROOM	2339	137	137	137	3.51	NO
B150	MENS STAFF RESTROOM	1074	0	141	0	7.88	NO
B149	WOMANS STAFF RESTROOM	1062	0	135	0	7.63	NO
B137	NURSE UNISEX TOILET	457	0	33	0	4.33	NO
B186	NURSE UNISEX TOILET	488	0	33	0	4.06	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-97

NEBB CERTIFIED #2453

SHEET NO. 60

# DOAS-1

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: ADMINISTRATION OFFICES, PRINCIPALS, GUIDANCE, MISC.

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	4400 / 4760 (NOTE)	4593
TOTAL SP (" WG):	7.0	6.51
EXT SP (" WG):	3.6	1.51
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	474/472/474
AMPS T1/T2/T3:	9.1	10.0/9.7/9.4

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-04E-WW-WW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR MODEL NO:	07M267W280G4
MOTOR HP:	8
MOTOR SF:	1.15
MOTOR FRAME:	213TZ
VFD SETTING:	55.6 HZ

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-98

NEBB CERTIFIED #2453

SHEET NO. 61

# DOAS-1

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
A103	CORRIDOR		1	2408	150	N/A	119	N/A	
B107	WOMEN		2	2408	150	N/A	111	N/A	
B152	CORRIDOR		3	2408	160	N/A	124	N/A	
B108	MEN		4	2408	150	N/A	137	N/A	
B151	ELEV MACH RM		5	12X12	260	N/A	231	N/A	
B134	FLAGSHIP CONF RM		6	CB12	180	.28	166	.24	
B134	FLAGSHIP CONF RM		7	CB12	180	.28	169	.25	
B145	NURSES EXAM AREA		8	CB4	90	.28	85	.25	
B135	STORAGE		9	2406	20	N/A	120	N/A	1
B188	WAITING AREA		10	CB4	80	.22	80	.22	
B144	SHARED NURSE OFFICE		11	CB3	60	.40	60	.40	
B139	GUIDANCE FILE/RECORDS		12	2406	30	N/A	55	N/A	1
B141	PSYCH OFFICE		13	CB2	40	.63	37	.54	
B127	GUIDANCE WAITING		14	CB8	130	.25	136	.27	
B127	GUIDANCE WAITING		15	CB8	130	.25	115	.19	
B127	GUIDANCE WAITING		16	CB8	130	.25	115	.19	
B142	PSYCHOLOGIST OFFICE		17	CB3	60	.40	55	.33	
B143	SOCIAL WORKER		18	CB3	60	.40	55	.33	
B152	CORRIDOR		19	2408	160	N/A	140	N/A	
B124	CORRIDOR		20	2408	130	N/A	113	N/A	
B122	SPEECH OFFICE		21	CB5	40	.62	36	.51	
B122	SPEECH OFFICE		22	CB5	40	.62	37	.52	
B121	SOCIAL WORKER		23	CB-10	65	.40	67	.43	
B120	GUIDANCE COUNSELOR		24	CB-10	65	.40	68	.43	
B119	GUIDANCE COUNSELOR		25	CB-10	65	.40	68	.43	
B109	CORRIDOR		26	2406	70	N/A	66	N/A	
B105	CENTRAL COPY/MAIL		27	CB5	40	.62	36	.50	
B105	CENTRAL COPY/MAIL		28	CB5	40	.62	36	.50	
B102	ADMIN WORK		29	CB2	40	.63	36	.51	

NOTE 1: VOLUME DAMPER 100% CLOSED

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-99

NEBB CERTIFIED #2453

SHEET NO. 62

# DOAS-1

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
B104	TARDY ROOM		30	2406	75	N/A	85	N/A	1
B106	MAIL ROOM STORAGE		31	2406	40	N/A	50	N/A	1
B132	VAULT		32	2406	20	N/A	60	N/A	1
B133	STORAGE		33	2406	20	N/A	41	N/A	1
B131	MAIN OFFICE CONF RM		34	CB4	120	.50	107	.40	
B131	MAIN OFFICE CONF RM		35	2408	120	N/A	106	N/A	
B130	MAIN OFFICE FILES/RECORDS		36	2406	40	N/A	38	N/A	
B110	CORRIDOR		37	2406	70	N/A	69	N/A	
B129	SHARED COPY / WORK ROOM		38	CB5	40	.62	34	.45	
B129	SHARED COPY / WORK ROOM		39	CB5	40	.62	33	.43	
B128	SHARED LUNCH RM		40	CB4	80	.22	80	.22	
B128	SHARED LUNCH RM		41	CB4	80	.22	80	.22	
B138	TUTORIAL ROOM		42	CB4	80	.22	74	.19	
B101	ADMIN OFFICE		43	CB9	50	.53	45	.43	
B101	ADMIN OFFICE		44	CB9	50	.53	44	.41	
B101	ADMIN OFFICE		45	CB12	200	.35	188	.31	
B101	ADMIN OFFICE		46	CB12	200	.35	194	.33	
B111	ASST PRINCIPAL		47	CB5	40	.62	36	.51	
B112	ASST PRINCIPAL		48	CB5	40	.62	36	.51	
B113	PRINCIPAL SECRETARY		49	CB5	40	.62	36	.51	
B114	PRINCIPAL OFFICE		50	CB7	80	.32	84	.35	
B115	GUIDANCE COUNSELOR		51	CB5	40	.62	35	.47	
B116	GUIDANCE COUNSELOR		52	CB5	40	.62	35	.47	
B117	GUIDANCE DIRECTOR		53	CB7	80	.32	79	.31	
B118	GUIDANCE CONFERENCE RM		54	CB3	65	.47	63	.44	
B118	GUIDANCE CONFERENCE RM		55	CB3	65	.47	63	.44	
B118	GUIDANCE CONFERENCE RM		56	CB3	65	.47	62	.43	
B118	GUIDANCE CONFERENCE RM		57	CB3	65	.47	63	.44	

NOTE 1: VOLUME DAMPER 100% CLOSED

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-100

NEBB CERTIFIED #2453

SHEET NO. 63



# DOAS-1

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: ADMINISTRATION / PRINCIPAL / GUIDANCE / MISC OFFICES (M112)

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	4400 / 5075 (NOTE)	3136
SUCTION SP (" WG):	N/A	1.92
DISCHARGE SP (" WG):	N/A	+.33
TOTAL SP (" WG):	2.2	2.25
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	474 / 472 / 474
AMPS T1/T2/T3:	5.9	3.6/3.6/3.5

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-04E-WW-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR MODEL NO:	06K11W356G5
MOTOR HP:	4 1/2
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	88.5 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-101

NEBB CERTIFIED #2453

SHEET NO. 64

# DOAS-1

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B118	GUIDANCE CONF ROOM		1	14X14	1.361	260	191	N/A	155	
B117	GUIDANCE DIRECTOR		2	8X8	.257	80	311	N/A	45	
B116	GUIDANCE COUNSELOR		3	6X6	.139	40	288	255	35	
B115	GUIDANCE COUNSELOR		4	6X6	.139	40	288	206	29	
B114	PRINCIPAL		5	6X6	.139	80	576	393	55	
B113	PRINCIPAL SECRETARY		6	6X6	.139	40	288	251	35	
B112	ASST PRINCIPAL		7	6X6	.139	40	288	193	27	
B111	ASST PRINCIPAL		8	6X6	.139	40	288	318	44	
B122	SPEECH OFFICE		9	8X8	.231	80	346	N/A	58	
B121	SOCIAL OFFICE		10	8X8	.231	65	281	N/A	50	
B120	GUIDANCE COUNSELOR		11	8X8	.231	65	281	N/A	45	
B119	GUIDANCE COUNSELOR		12	8X8	.231	65	281	N/A	44	
B143	SOCIAL WORKER A		13	8X8	.231	60	260	N/A	32	
B142	PSYCHOLOGIST OFFICE		14	8X8	.231	60	260	N/A	53	
B141	PSYCH OFFICE		15	8X8	.231	40	173	N/A	46	
B127	GUIDANCE WAITING		16	16X16	1.777	520	293	N/A	293	
B138	TUTORIAL ROOM		17	8X8	.231	80	346	N/A	51	
B188	WAITING AREA		18	8X8	.231	80	346	N/A	41	
B144	SHARED NURSES OFFICE		19	8X8	.231	60	260	N/A	25	
B139	GUIDANCE FILES/RECORDS		20	8X8	.231	30	130	N/A	48	
B128	SHARED LUNCH ROOM		21	8X8	.231	160	693	332	77	
B129	SHARED COPY/WORKROOM		22	8X8	.231	80	346	N/A	54	
B137	NURSE UNISEX TOILET		23	8X8	.231	75	325	N/A	33	
B186	NURSE UNISEX TOILET		24	8X8	.231	75	325	N/A	33	
B135	STORAGE		25	6X6	.139	20	144	118	15	
B130	MAIN OFF FILES/RECORDS		26	6X6	.139	40	288	194	27	
B131	MAIN OFFICE CONF RM		27	12X12	N/A	240	N/A	N/A	144	
B133	STORAGE		28	6X6	.139	20	144	132	17	
B132	VAULT		29	6X6	.139	20	144	190	24	
B101	ADMIN OFFICE		30	16X16	1.777	540	304	N/A	305	
B104	TARDY ROOM		31	6X6	.139	75	540	262	36	
B106	MAIL ROOM STORAGE		32	6X6	.139	40	288	237	32	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-102

NEBB CERTIFIED #2453

SHEET NO. 65

# DOAS-1

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B105	CENTRAL COPY/MAIL		33	6X6	.139	80	576	308	43	
B146	PRIVATE COT 1		34	6X6	.139	75	540	281	39	
B147	PRIVATE COT 2		35	6X6	.139	75	540	286	40	
B148	STORAGE		36	6X6	.139	25	180	228	32	
B149	WOMENS STAFF		37	10X10	N/A	215	N/A	N/A	135	
B150	MEN STAFF		38	10X10	N/A	215	N/A	N/A	141	
B151	ELEV MACH ROOM		39	12X12	.674	260	386	216	146	
B108	MEN		40	8X8	N/A	60	N/A	N/A	51	
B108	MEN		41	8X8	N/A	60	N/A	N/A	47	
B108	MEN		42	8X8	N/A	60	N/A	N/A	39	
B107	WOMEN		43	8X8	N/A	60	N/A	N/A	29	
B107	WOMEN		44	8X8	N/A	60	N/A	N/A	50	
B107	WOMEN		45	8X8	N/A	60	N/A	N/A	43	
A103	CORRIDOR		46	10X10	N/A	180	N/A	N/A	90	
B134	FLAGSHIP CONF RM		47	10X10	N/A	360	N/A	N/A	211	

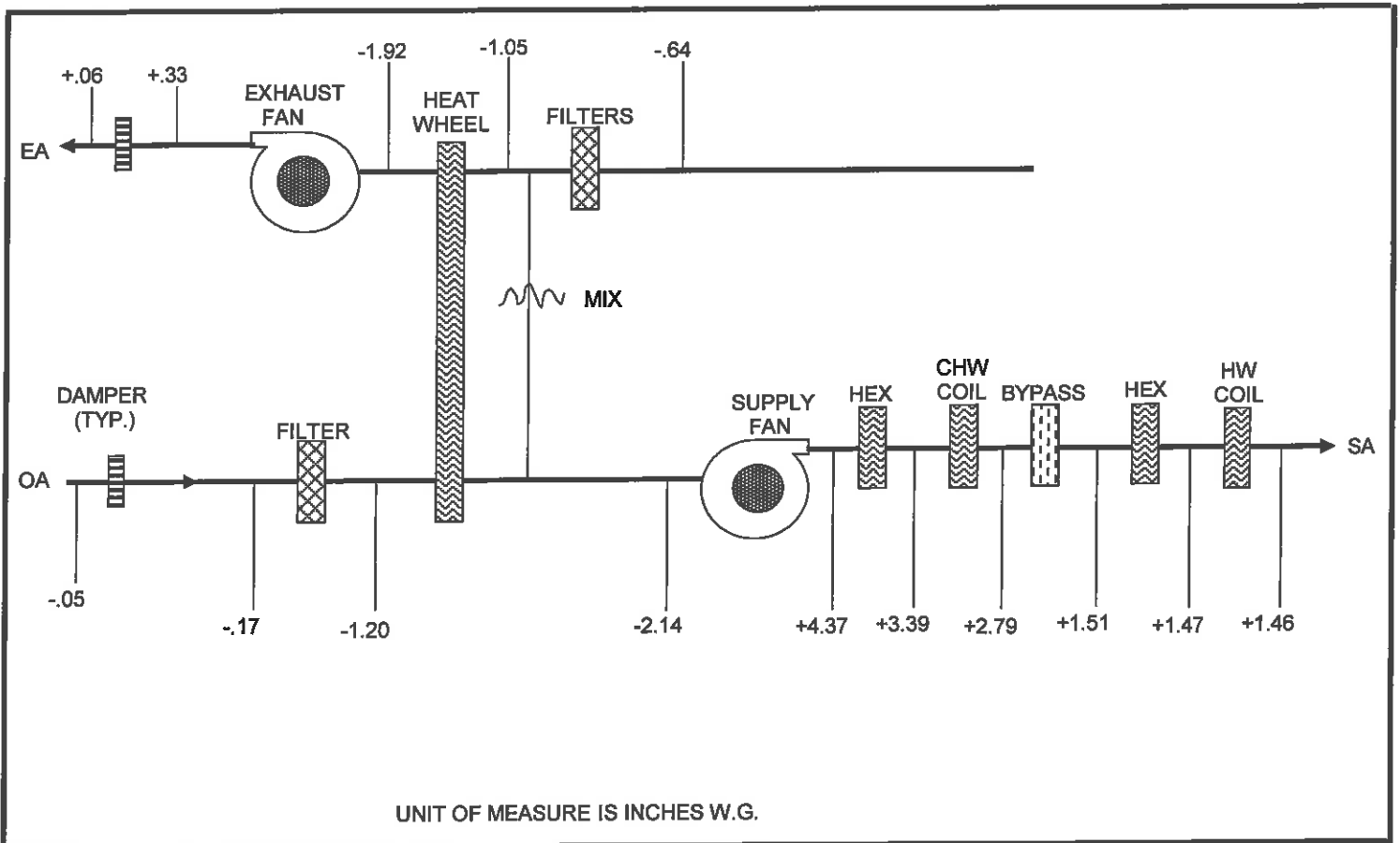
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-103

NEBB CERTIFIED #2453

SHEET NO. 66

# DOAS-1

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-104

NEBB CERTIFIED #2453

SHEET NO. 67

# DOAS-2

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
A111	SOCIAL STUDIES 3	6248	490	497	490	4.77	NO
B170	SOCIAL STUDIES 9	6682	497	497	497	4.46	NO
B168	SOCIAL STUDIES 8	6350	516	478	516	4.88	NO
A110	SOCIAL STUDIES 4	6278	477	487	477	4.65	NO
A109	SOCIAL STUDIES 5	6188	477	461	477	4.63	NO
B167	SOCIAL STUDIES 7	6947	507	495	507	4.38	NO
B165	SOCIAL STUDIES 6	6529	490	502	490	4.61	NO
B174	SOCIAL STUDIES	6110	513	485	513	5.04	NO
B177	CLASSROOM / DINING	3726	534	509	534	8.60	NO
B185	CHILD DEVELOPMENT	8907	576	591	576	3.98	NO
B155	STEP WORK ROOM	6440	576	488	576	5.37	NO
B156	STEP CLASSROOM	3247	324	322	324	5.99	NO
B158	OFFICE	817	80	42	80	5.88	NO
B157	QUIET ROOM	403	46	34	46	6.85	NO
B154	TRAINING ROOM	4775	344	135	344	4.32	NO
B162	B163 WEIGHT/EXERCISE	51608	3284	3125	3284	3.82	NO
B161	ATHLETIC DIRECTOR	1431	89	0	89	3.73	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-105

NEBB CERTIFIED #2453

SHEET NO. 68

# DOAS-2

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
A107	ADULT ED OFFICE	1327	39	45	39	2.03	NO
A113	ISS	5176	403	360	403	4.67	NO
A105	SECURITY OFFICE	2923	42	37	42	0.86	NO
B182	ADULT EDUCATION	2019	74	73	74	2.20	NO
B184	MENS BATHROOM	2306	546	567	546	14.75	NO
B183	WOMENS BATHROOM	2315	551	621	551	16.10	NO
B173	MENS STAFF	1166	187	214	187	11.01	NO
B172	WOMENS STAFF	1159	197	213	197	11.03	NO
B160	UNISEX TOILET	297	0	72	0	14.55	NO
B189	UNISEX TOILET	384	0	97	0	15.16	NO
A114	UNISEX TOILET	443	0	94	0	12.73	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-106

NEBB CERTIFIED #2453

SHEET NO. 69

## DOAS-2

### \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: CHILD DEVELOPMENT / STEP TRAINING / SOCIAL STUDIES

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	13180 / 13440 (NOTE)	13444
OA CFM:	13180 / 13440 (NOTE)	13444
TOTAL SP (" WG):	7.0	5.77
EXT SP (" WG):	3.6	1.19
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	476/481/478
AMPS T1/T2/T3:	8.6	21.9/22.2/22.3

UNIT / MOTOR DATA (TYP OF 3)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-13E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	7 1/2
MOTOR SF:	1.15
MOTOR FRAME:	213TZ
VFD SETTING:	54.7 HZ

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-107

NEBB CERTIFIED #2453

SHEET NO. 70

## DOAS-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO CHILD DEV/STEP TRAINING/SOCIAL STUDIES

CONDITION: 58.6 HZ

TEMPERATURE (°F): 65

DUCT SP (" WG): 0.57

DUCT WIDTH ("): 28

DUCT HEIGHT ("): 48

DUCT AREA (SQ FT): 9.330

INTERNAL DUCT LINING ("): 2

TOTAL FPM: 57633

NUMBER OF POINTS: 40

	DESIGN		ACTUAL
CFM:	13440		13444
FPM:	1441		1441

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-108

NEBB CERTIFIED #2453

SHEET NO. 71



# DOAS-2

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
B185	CHILD DEVELOPMENT		1	CB12	150	0.20	143	.18	
B185	CHILD DEVELOPMENT		2	CB12	150	0.20	151	.20	
B185	CHILD DEVELOPMENT		3	CB12	150	0.20	139	.17	
B185	CHILD DEVELOPMENT		4	CB12	150	0.20	143	.18	
B184	MEN		5	18X18	600	N/A	546	N/A	
B183	WOMEN		6	18X18	600	N/A	551	N/A	
B156	STEP CLASS		8	9X9	160	N/A	169	N/A	
B156	STEP CLASS		9	CB8	160	0.37	155	.35	
B182	C.O.W. STORAGE		10	6X6	40	N/A	74	N/A	
B180	STORAGE		11	6X6	20	N/A	27	N/A	
B177	DINING ROOM		12	CB8	140	0.28	134	.26	
B177	DINING ROOM		13	CB8	140	0.28	136	.27	
B177	DINING ROOM		14	12X12	280	N/A	264	N/A	
C141	CORRIDOR		15	15X15	340	N/A	340	N/A	
B174	HEALTH CLASSROOM		16	CB12	180	0.28	169	.25	
B174	HEALTH CLASSROOM		17	CB12	180	0.28	172	.26	
B174	HEALTH CLASSROOM		18	CB12	180	0.28	172	.26	
B171	CORRIDOR		19	6X6	40	N/A	67	N/A	
B173	MEN STAFF		20	9X9	180	N/A	187	N/A	
B172	WOMEN STAFF		21	9X9	180	N/A	197	N/A	
B168	SOCIAL STUDIES 8		22	CB12	180	0.28	172	.26	
B168	SOCIAL STUDIES 8		23	CB12	180	0.28	172	.26	
B168	SOCIAL STUDIES 8		24	CB12	180	0.28	172	.26	
B170	SOCIAL STUDIES 9		25	CB12	180	0.28	162	.23	
B170	SOCIAL STUDIES 9		26	CB12	180	0.28	166	.24	
B170	SOCIAL STUDIES 9		27	CB12	180	0.28	169	.25	
A111	SOCIAL STUDIES 3		28	CB12	180	0.28	166	.24	
A111	SOCIAL STUDIES 3		29	CB12	180	0.28	162	.23	
A111	SOCIAL STUDIES 3		30	CB12	180	0.28	162	.26	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-109

NEBB CERTIFIED #2453

SHEET NO. 72

**DOAS-2****\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
A110	SOCIAL STUDIES 4		31	CB12	180	0.28	159	.22	
A110	SOCIAL STUDIES 4		32	CB12	180	0.28	159	.22	
A110	SOCIAL STUDIES 4		33	CB12	180	0.28	159	.22	
A109	SOCIAL STUDIES 5		34	CB12	180	0.28	159	.22	
A109	SOCIAL STUDIES 5		35	CB12	180	0.28	159	.22	
A109	SOCIAL STUDIES 5		36	CB12	180	0.28	159	.22	
B155	STEP WORK ROOM		37	CB12	150	0.20	143	.18	
B155	STEP WORK ROOM		38	CB12	150	0.20	143	.18	
B155	STEP WORK ROOM		39	CB12	150	0.20	143	.18	
B155	STEP WORK ROOM		40	CB12	150	0.20	147	.19	
B159	STORAGE		41	6X6	30	N/A	29	N/A	
B157	QUIET ROOM		42	6X6	30	N/A	46	N/A	
B158	OFFICE		43	6X6	60	N/A	80	N/A	
B154	TRAINING ROOM		44	CB12	180	0.28	172	.26	
B154	TRAINING ROOM		45	CB12	180	0.28	172	.26	
B161	AD OFFICE		46	9X9	80	N/A	89	N/A	
B162	WEIGHT / EXERCISE		47	22X22	600	N/A	589	N/A	
B162	WEIGHT / EXERCISE		48	22X22	600	N/A	556	N/A	
B162	WEIGHT / EXERCISE		49	CB12	180	0.28	176	.27	
B162	WEIGHT / EXERCISE		50	CB12	180	0.28	176	.27	
B162	WEIGHT / EXERCISE		51	CB12	180	0.28	191	.32	
B162	WEIGHT / EXERCISE		52	CB12	180	0.28	179	.28	
B162	WEIGHT / EXERCISE		53	CB12	180	0.28	172	.26	
B162	WEIGHT / EXERCISE		54	CB12	180	0.28	172	.26	
B162	WEIGHT / EXERCISE		55	22X22	600	N/A	482	N/A	
B162	WEIGHT / EXERCISE		56	22X22	600	N/A	591	N/A	
B162	WEIGHT / EXERCISE STORAGE		57	6X6	50	N/A	45	N/A	
B162	WEIGHT / EXERCISE STORAGE		58	6X6	50	N/A	48	N/A	
B176	PANTRY		59	6X6	40	N/A	47	N/A	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-110

NEBB CERTIFIED #2453

SHEET NO. 73

## DOAS-2

### \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
B175	EQUIP STORAGE		60	9X9	240	N/A	215	N/A	
B167	SOCIAL STUDIES 7		61	CB12	180	0.28	169	.25	
B167	SOCIAL STUDIES 7		62	CB12	180	0.28	169	.25	
B167	SOCIAL STUDIES 7		63	CB12	180	0.28	169	.25	
B165	SOCIAL STUDIES 6		64	CB12	180	0.28	162	.23	
B165	SOCIAL STUDIES 6		65	CB12	180	0.28	162	.23	
B165	SOCIAL STUDIES 6		66	CB12	180	0.28	166	.24	
A107	ADULT ED OFFICE		67	6X6	40	N/A	39	N/A	
A106	HALL		68	6X6	40	N/A	59	N/A	
A105	SECURITY OFFICE		69	CB3	40	.176	42	.19	
A113	ISS		70	CB4	110	0.42	100	.35	
A113	ISS		71	CB4	110	0.42	99	.34	
A113	ISS		72	CB4	110	0.42	102	.36	
A113	ISS		73	CB4	110	0.42	102	.36	
A115	STORAGE		74	6X6	40	N/A	34	N/A	
A116	TUNNEL ACCESS		75	6X6	20	N/A	29	N/A	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-111

NEBB CERTIFIED #2453

SHEET NO. 74

## DOAS-2

### \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: CHILD DEVELOPMENT / STEP TRAINING / SOCIAL STUDIES  
FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	13990 / 13410 (NOTE)	12390
SUCTION SP (" WG):	N/A	-2.06
DISCHARGE SP (" WG):	N/A	+ .34
TOTAL SP (" WG):	3.7	2.40
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	476 / 481 / 478
AMPS T1/T2/T3:	5.0	9.9/10.3/10.1

UNIT / MOTOR DATA (TYP OF 3)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-13E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	4
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	63.2 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-112

NEBB CERTIFIED #2453

SHEET NO. 75

## DOAS-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN FROM CHILD DEV/STEP TRAINING/SOCIAL STUDIES  
CONDITION: 75.2 HZ  
TEMPERATURE (°F): 70  
DUCT SP (" WG): -.76  
  
DUCT WIDTH ("): 28  
DUCT HEIGHT ("): 48  
DUCT AREA (SQ FT): 9.330  
INTERNAL DUCT LINING ("): 2  
TOTAL FPM: 53112  
NUMBER OF POINTS: 40

	DESIGN		ACTUAL
CFM:	13410		12390
FPM:	1437		1328

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-113

NEBB CERTIFIED #2453

SHEET NO. 76

# DOAS-2

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B155	STEP WORK ROOM		1	16X16	N/A	600	N/A	N/A	488	
B185	CHILD DEVELOPMENT		2	6X6	.139	40	288	309	43	
B184	MEN		3	10X10	N/A	215	N/A	N/A	194	
B184	MEN		4	10X10	N/A	215	N/A	N/A	182	
B184	MEN		5	10X10	N/A	215	N/A	N/A	191	
B183	WOMEN		6	10X10	N/A	215	N/A	N/A	217	
B183	WOMEN		7	10X10	N/A	215	N/A	N/A	215	
B183	WOMEN		8	10X10	N/A	215	N/A	N/A	189	
B182	ADULT ED		9	6X6	.210	40	288	347	73	
B180	STORAGE		10	6X6	.139	20	144	554	70	
B181	CUSTODIAL		11	8X8	.231	105	455	468	98	
B177	DINING ROOM		12	16X16	N/A	560	N/A	N/A	509	
B174	HEALTH CLASS		13	16X16	N/A	540	N/A	N/A	485	
B173	MEN STAFF		14	8X8	N/A	210	N/A	N/A	214	
B172	WOMEN STAFF		15	8X8	N/A	210	N/A	N/A	213	
B170	SOCIAL STUDIES 9		16	16X16	N/A	540	N/A	N/A	497	
B185	CHILD DEVELOPMENT		17	16X16	N/A	600	N/A	N/A	548	
B156	STEP CLASS		18	12X12	N/A	340	N/A	N/A	322	
B176	PANTRY		19	6X6	.139	40	288	266	35	
B189	UNISEX TOILET		19A	8X8	N/A	105	N/A	N/A	97	
B175	EQUIP STORAGE		20	10X10	N/A	240	N/A	N/A	246	
B168	SOCIAL STUDIES 8		21	16X16	N/A	540	N/A	N/A	478	
B167	SOCIAL STUDIES 7		22	16X16	N/A	540	N/A	N/A	495	
A111	SOCIAL STUDIES 3		23	16X16	N/A	540	N/A	N/A	497	
A110	SOCIAL STUDIES 4		24	16X16	N/A	540	N/A	N/A	487	
B157	QUIET ROOM		25	6X6	.139	30	216	357	34	
B158	OFFICE		26	6X6	.139	30	216	326	42	
B163	WEIGHT / EXERCISE		27	22X22	3.36	870	259	410	1378	
B163	WEIGHT / EXERCISE		28	22X22	3.36	870	259	242	813	
B163	WEIGHT / EXERCISE		29	22X22	3.36	870	259	158	531	
B163	WEIGHT / EXERCISE		30	22X22	3.36	870	259	120	403	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-114

NEBB CERTIFIED #2453

SHEET NO. 77

## DOAS-2

### \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B163	WEIGHT/EXERCISE STOR		33	6X6	.139	100	719	727	101	
B165	SOCIAL STUDIES 6		34	16X16	N/A	540	N/A	N/A	502	
A109	SOCIAL STUDIES 5		35	16X16	N/A	540	N/A	N/A	461	
A107	ADULT ED OFFICE		36	6X6	.139	40	288	324	45	
A106	HALL		37	6X6	.139	40	288	288	40	
A105	SECURITY OFFICE		38	6X6	.139	40	288	268	37	
A113	ISS		39	14X14	N/A	440	N/A	N/A	360	
A115	STORAGE		40	6X6	.139	40	288	288	40	
A114	UNISEX		41	8X8	N/A	110	N/A	N/A	94	
A116	TUNNEL ACCESS		42	6X6	.139	20	144	223	31	
B159	STORAGE		43	6X6	.139	30	216	302	42	
B160	UNISEX TOILET		44	8X8	N/A	110	N/A	N/A	72	
B154	TRAINING ROOM		45	10X10	N/A	180	N/A	N/A	135	

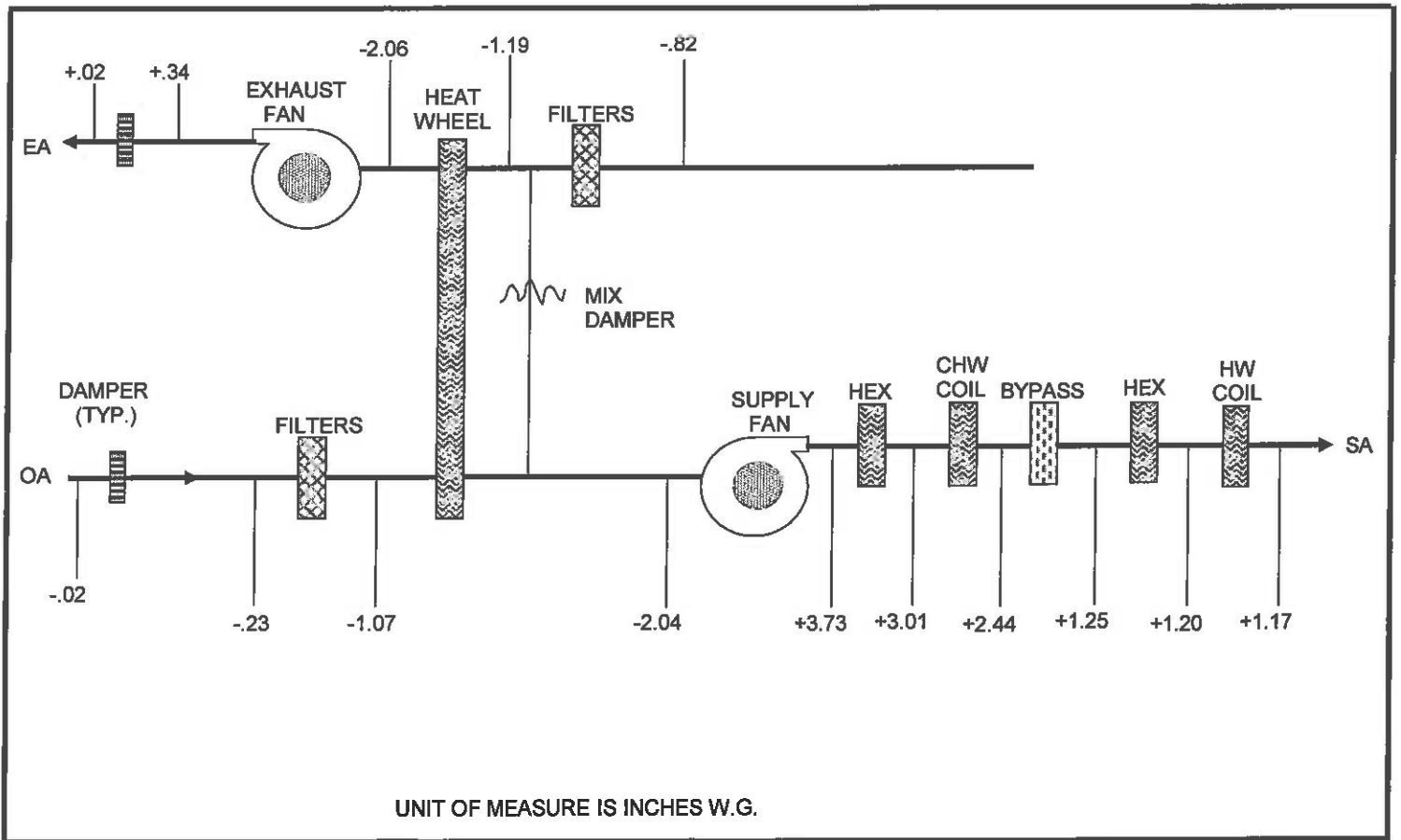
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-115

NEBB CERTIFIED #2453

SHEET NO. 78

# DOAS-2

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-116

NEBB CERTIFIED #2453

SHEET NO. 79



# DOAS-3

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
C132	ENGLISH	5604	546	503	546	5.85	NO
C133	ENGLISH	5625	543	492	543	5.79	NO
C134	ENGLISH	5615	588	530	588	6.28	NO
C135	ENGLISH	6062	608	533	608	6.02	NO
C136	ENGLISH	6068	598	513	598	5.91	NO
C125	ENGLISH	5683	602	586	602	6.36	NO
C124	ENGLISH	8393	752	728	752	5.38	NO
C139	WRITING CENTER	2944	278	268	278	5.67	NO
C109	MEIDA PRODUCTION/TECH	2199	50	46	50	1.36	NO
C127	BUSINESS	5830	558	544	558	5.74	NO
C128	ENGLISH	5707	573	504	573	6.02	NO
C130	ENGLISH	5790	579	517	579	6.00	NO
C129	ENGLISH	5961	558	505	558	5.62	NO
C110	STUDENT SERVICES	4144	567	550	567	8.21	NO
C107	BUSINESS	5254	540	493	540	6.17	NO
C106	SOCIAL STUDIES	6923	540	520	540	4.68	NO
C106	CLASSROOM	3277	210	228	210	4.17	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-117

NEBB CERTIFIED #2453

SHEET NO. 80

# DOAS-3

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
C103	CONFERENCE	2481	215	237	215	5.73	NO
C100	RADIO STATION	1974	78	64	78	2.37	NO
C140	DIRECTOR	1313	34	39	34	1.78	NO
C121	POTTERY CLASS	10957	592	596	592	3.26	NO
C120	DWG / PAINTING	14975	829	770	829	3.32	NO
C105	ART LAB	7349	520	519	520	4.25	NO
C115	OFFICE	1554	59	76	59	2.93	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-118

NEBB CERTIFIED #2453

SHEET NO. 81

# DOAS-3

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: ART / POTTERY / ENGLISH & MUSIC

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	11460 / 11950 (NOTE)	12168
OA CFM:	11460 / 11950 (NOTE)	12313
TOTAL SP (" WG):	7.0	5.71
EXT SP (" WG):	3.6	1.47
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	473/474/475
AMPS T1/T2/T3:	7.4	22.0/22.1/22.0

UNIT / MOTOR DATA (TYP OF 3)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-11E-WW-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	6.5 AO
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	59.1 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE			41X93	26.48	11460	433	465	12313	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-119

NEBB CERTIFIED #2453

SHEET NO. 82

# DOAS-3

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
C129	ENGLISH CLASS 10		1	CB12	180	0.28	185	.30	
C129	ENGLISH CLASS 10		2	CB12	180	0.28	188	.31	
C129	ENGLISH CLASS 10		3	CB12	180	0.28	185	.30	
C119	MUD STORAGE		4	6X6	40	N/A	53	N/A	
C118	ELEC CLOSET		5	9X9	240	N/A	240	N/A	
C117	KILN ROOM		6	CB12	200	.35	191	.31	
C115	OFFICE		7	CB3	60	0.40	59	.38	
C111	CORRIDOR		8	9X9	120	N/A	112	N/A	
C113	STORAGE		9	6X6	40	N/A	45	N/A	
C121	POTTERY CLASS		10	CB7	85	0.36	87	.38	
C121	POTTERY CLASS		11	CB7	85	0.36	85	.36	
C121	POTTERY CLASS		12	CB7	85	0.36	57	.38	
C121	POTTERY CLASS		13	CB7	85	0.36	86	.37	
C121	POTTERY CLASS		14	CB7	85	0.36	83	.34	
C121	POTTERY CLASS		15	CB7	85	0.36	83	.34	
C121	POTTERY CLASS		16	CB7	85	0.36	81	.33	
C120	DWG / PAINTING		17	CB7	85	0.36	83	.34	
C120	DWG / PAINTING		18	CB7	85	0.36	85	.36	
C120	DWG / PAINTING		19	CB7	85	0.36	86	.37	
C120	DWG / PAINTING		20	CB7	85	0.36	86	.37	
C120	DWG / PAINTING		21	CB7	85	0.36	84	.35	
C120	DWG / PAINTING		22	CB7	85	0.36	83	.34	
C120	DWG / PAINTING		23	CB7	85	0.36	83	.34	
C120	DWG / PAINTING		24	CB7	85	0.36	83	.34	
C120	DWG / PAINTING		25	CB7	85	0.36	78	.30	
C120	DWG / PAINTING		26	CB7	85	0.36	78	.30	
C132	ENGLISH CLASS 1		27	CB8	130	.24	134	.26	
C132	ENGLISH CLASS 1		28	CB8	130	.24	134	.26	
C132	ENGLISH CLASS 1		29	CB8	130	.24	139	.28	
C132	ENGLISH CLASS 1		30	CB8	130	.24	139	.28	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-120

NEBB CERTIFIED #2453

SHEET NO. 83

# DOAS-3

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
C133	ENGLISH CLASS 2		31	CB8	130	.24	134	.26	
C133	ENGLISH CLASS 2		32	CB8	130	.24	134	.26	
C133	ENGLISH CLASS 2		33	CB8	130	.24	136	.27	
C133	ENGLISH CLASS 2		34	CB8	130	.24	139	.28	
C134	ENGLISH CLASS 3		35	CB8	145	0.30	148	.32	
C134	ENGLISH CLASS 3		36	CB8	145	0.30	146	.31	
C134	ENGLISH CLASS 3		37	CB8	145	0.30	146	.31	
C134	ENGLISH CLASS 3		38	CB8	145	0.30	148	.32	
C137	CORRIDOR		39	9X9	180	N/A	172	N/A	
C135	ENGLISH CLASS 4		40	CB8	145	0.30	151	.33	
C135	ENGLISH CLASS 4		41	CB8	145	0.30	153	.34	
C135	ENGLISH CLASS 4		42	CB8	145	0.30	153	.34	
C135	ENGLISH CLASS 4		43	CB8	145	0.30	151	.33	
C130	ENGLISH CLASS 9		44	CB12	180	0.28	191	.32	
C130	ENGLISH CLASS 9		45	CB12	180	0.28	197	.34	
C130	ENGLISH CLASS 9		46	CB12	180	0.28	191	.32	
C128	ENGLISH CLASS 7		47	CB12	180	0.28	194	.33	
C128	ENGLISH CLASS 7		48	CB12	180	0.28	185	.30	
C128	ENGLISH CLASS 7		49	CB12	180	0.28	194	.33	
C136	ENGLISH CLASS 5		50	CB8	145	0.30	148	.32	
C136	ENGLISH CLASS 5		51	CB8	145	0.30	151	.33	
C136	ENGLISH CLASS 5		52	CB8	145	0.30	151	.33	
C136	ENGLISH CLASS 5		53	CB8	145	0.30	148	.32	
C127	ENGLISH CLASS 8		54	CB12	180	0.28	185	.30	
C127	ENGLISH CLASS 8		55	CB12	180	0.28	188	.31	
C127	ENGLISH CLASS 8		56	CB12	180	0.28	185	.30	
C110	WRITING LAB		57	9X9	130	N/A	154	N/A	
C110	WRITING LAB		58	9X9	130	N/A	123	N/A	
C110	WRITING LAB		59	CB8	150	0.33	144	.30	
C110	WRITING LAB		60	CB8	150	0.33	146	.31	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-121

NEBB CERTIFIED #2453

SHEET NO. 84

# DOAS-3

## \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION	NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
C109	BOOK STORAGE	61	6X6	40	N/A	50	N/A	
C105	ART LAB	62	CB8	135	0.26	129	.24	
C105	ART LAB	63	CB8	135	0.26	129	.24	
C105	ART LAB	64	CB8	135	0.26	131	.25	
C105	ART LAB	65	CB8	135	0.26	131	.25	
C104	STORAGE	66	6X6	40	N/A	78	N/A	
C103	CONFERENCE RM	67	CB4	110	0.42	101	.35	
C103	CONFERENCE RM	68	9X9	130	N/A	114	N/A	
C102	TR 5	69	6X6	40	N/A	50	N/A	
C101	ELL	70	CB4	110	0.42	103	.37	
C101	ELL	71	6X6	110	N/A	107	N/A	
C140	DIRECTOR	72	CB2	40	0.63	34	.45	
C100	RADIO	73	CB4	80	0.22	78	.21	
C126	CORRIDOR	74	9X9	180	N/A	165	N/A	
C108	AV STORAGE	75	6X6	40	N/A	45	N/A	
C107	BUSINESS 2 CLASS	76	CB12	180	0.28	179	.28	
C107	BUSINESS 2 CLASS	77	CB12	180	0.28	179	.28	
C107	BUSINESS 2 CLASS	78	CB12	180	0.28	182	.29	
C106	SOCIAL STUDIES	79	CB12	180	0.28	179	.28	
C106	SOCIAL STUDIES	80	CB12	180	0.28	179	.28	
C106	SOCIAL STUDIES	81	CB12	180	0.28	182	.29	
C139	PROTOTYPING CLASS	82	CB13	135	0.11	133	.11	
C139	PROTOTYPING CLASS	83	CB13	135	0.11	145	.13	
C124	CAD/DRAFTING CLASS	84	CB12	180	0.28	188	.31	
C124	CAD/DRAFTING CLASS	85	CB12	180	0.28	191	.32	
C124	CAD/DRAFTING CLASS	86	CB12	180	0.28	182	.29	
C124	CAD/DRAFTING CLASS	87	CB12	180	0.28	191	.32	
C125	ENGLISH CLASS 6	88	CB8	145	0.30	153	.34	
C125	ENGLISH CLASS 6	89	CB8	145	0.30	153	.34	
C125	ENGLISH CLASS 6	90	CB8	145	0.30	148	.32	
C125	ENGLISH CLASS 6	91	CB8	145	0.30	148	.32	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-122

NEBB CERTIFIED #2453

SHEET NO. 85

# DOAS-3

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: ART / POTTERY / ENGLISH & MUSIC

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	11950 / 11995 (NOTE)	11611
SUCTION SP (" WG):	N/A	-1.97
DISCHARGE SP (" WG):	N/A	+.26
TOTAL SP (" WG):	3.7	2.23
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	473 / 474 / 475
AMPS T1/T2/T3:	5.0	9.4/9.5/9.5

UNIT / MOTOR DATA (TYP OF 3)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-11E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	4 A0
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	63.3 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-123

NEBB CERTIFIED #2453

SHEET NO. 86

# DOAS-3

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
C119	MUD STORAGE		1	8X8	.231	40	173	433	100	
C118	ELECT CLOSET		2	10X10	.420	240	571	560	235	
C117	KILN ROOM		3	10X10	.420	200	476	410	172	
C121	POTTERY CLASS		4	16X16	N/A	595	N/A	N/A	596	
C115	OFFICE		5	6X6	.139	60	432	547	76	
C120	DWG / PAINTING		6	14X14	N/A	425	N/A	N/A	415	
C120	DWG / PAINTING		7	14X14	.90	425	472	394	355	
C113	STORAGE		8	6X6	.139	40	288	288	40	
C122	CORRIDOR		9	10X10	N/A	240	N/A	N/A	243	
C132	ENGLISH CLASS 1		10	16X16	N/A	540	N/A	N/A	503	
C129	ENGLISH CLASS 10		11	16X16	N/A	540	N/A	N/A	505	
C133	ENGLISH CLASS 2		12	16X16	N/A	540	N/A	N/A	543	
C130	ENGLISH CLASS 9		13	16X16	N/A	540	N/A	N/A	517	
C134	ENGLISH CLASS 3		14	16X16	N/A	580	N/A	N/A	583	
C135	ENGLISH CLASS 4		15	16X16	N/A	580	N/A	N/A	533	
C136	ENGLISH CLASS 5		16	16X16	N/A	580	N/A	N/A	513	
C110	STUDENT STUDIES		17	16X16	N/A	600	N/A	N/A	550	
C127	ENGLISH CLASS 8		18	16X16	N/A	540	N/A	N/A	544	
C128	ENGLISH CLASS 7		19	16X16	N/A	540	N/A	N/A	504	
C109	BOOK STORAGE		20	6X6	.139	40	288	331	46	
C108	AV STORAGE		21	6X6	.139	40	288	258	36	
C106	SOCIAL STUDIES		22	16X16	N/A	540	N/A	N/A	520	
C105	ART LAB		23	16X16	N/A	540	N/A	N/A	519	
C104	STORAGE		24	6X6	.139	40	288	288	40	
C103	CONFERENCE RM		25	10X10	N/A	240	N/A	N/A	237	
C102	TR 5		26	6X6	.139	20	144	259	36	
C101	ELL		27	8X8	N/A	110	N/A	N/A	119	
C101	ELL		28	8X8	N/A	110	N/A	N/A	109	
C140	DIRECTOR		29	6X6	.139	40	288	281	39	
C100	RADIO		30	6X6	.139	80	576	460	64	
C107	BUSINESS 2 CLASS		31	16X16	N/A	540	N/A	N/A	493	
C139	WRITING CENTER		32	12X12	N/A	270	N/A	N/A	268	
C124	CAD/DRAFTING		33	18X18	N/A	720	N/A	N/A	728	
C126	CORRIDOR		34	10X10	N/A	240	N/A	N/A	241	
C125	ENGLISH CLASS 6		35	16X16	N/A	580	N/A	N/A	586	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-124

NEBB CERTIFIED #2453

SHEET NO. 87



### \*\* STATIC PRESSURE PROFILE \*\*



# DOAS-4

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
D118	BUSINESS COMPUTER	8647	495	3076	495	21.34	NO
D117	BUSINESS 1 CLASS	8653	493	284	493	3.42	NO
D152	TEACHERS LOUNGE	4748	76	49	76	0.96	NO
D153	STUDENT LOUNGE	2616	69	47	69	1.58	NO
D114	SPEC ED OFFCE	4838	237	134	237	2.94	NO
D108	SPEC ED TESTING	658	54	26	54	4.92	NO
D107	SPEC ED TESTING	634	54	26	54	5.11	NO
D115	WORK ROOM	941	58	37	58	3.70	NO
D105	PT/OT ROOM	3087	186	69	186	3.62	NO
D113	SOCIAL STUDIES 1	5264	486	379	486	5.54	NO
D103	SOCIAL STUDIES 2	5681	463	343	463	4.89	NO
D104	SPEC ED WORK ROOM	2838	164	85	164	3.47	NO
D121	VIDEO AMPHITHEATER	14100	1926	1653	1926	8.20	NO
D128	TV PRODUCTION	13536	213	107	213	0.94	NO
D127	CONTROL ROOM	2980	104	85	104	2.09	NO
D136	MENS BATHROOM	2727	541	473	541	11.90	NO
D135	WOMANS BATHROOM	2730	558	473	558	12.26	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-126

NEBB CERTIFIED #2453

SHEET NO. 89

# DOAS-4

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
D131	MENS STAFF	329	0	99	0	18.05	NO
D132	WOMANS STAFF	333	0	101	0	18.20	NO
D109	MENS BATHROOM	681	0	40	0	3.52	NO
D110	WOMANS BATHROOM	695	0	41	0	3.54	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-127

NEBB CERTIFIED #2453

SHEET NO. 90

# DOAS-4

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: BUSINESS DEPARTMENT

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6770 / 7430 (NOTE)	7015
OA CFM:	6770 / 7430 (NOTE)	7101
TOTAL SP (" WG):	7.0	5.63
EXT SP (" WG):	3.6	1.54
FAN RPM:	3470	N/A
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	470/473/474
AMPS T1/T2/T3:	6.8	6.5/6.3/6.4/6.4/6.2/6.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-07E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	6.0
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	58.9 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE			51X41	14.521	7450	513	489	7101	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-128

NEBB CERTIFIED #2453

SHEET NO. 91

# DOAS-4

## \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
D118	BUSINESS COMPUTER		2	CB8	135	0.26	123	.22	
D118	BUSINESS COMPUTER		3	CB8	135	0.26	123	.22	
D118	BUSINESS COMPUTER		4	CB8	135	0.26	123	.22	
D118	BUSINESS COMPUTER		5	CB8	135	0.26	126	.23	
D117	BUSINESS 1 CLASS		6	CB12	180	0.28	162	.24	
D117	BUSINESS 1 CLASS		7	CB12	180	0.28	162	.24	
D117	BUSINESS 1 CLASS		8	CB12	180	0.28	169	.25	
D129	CORRIDOR		9	2408	160	N/A	140	N/A	
D105	PT/OT ROOM		10	6X6	100	N/A	96	N/A	
D105	PT/OT ROOM		11	CB4	100	0.35	90	.28	
D104	SP ED WORK		12	6X6	100	N/A	83	N/A	
D104	SP ED WORK		13	CB4	100	0.35	81	.23	
D103	SOCIAL STUDIES 2		14	CB12	180	0.28	155	.21	
D103	SOCIAL STUDIES 2		15	CB12	180	0.28	139	.17	
D103	SOCIAL STUDIES 2		16	CB12	180	0.28	169	.25	
D129	CORRIDOR		17	2408	160	N/A	161	N/A	
D115	WORK ROOM		18	CB3	60	0.40	58	.37	
D108	SP ED TESTING		19	CB3	60	0.40	54	.33	
D107	SP ED		20	CB3	60	0.40	54	.32	
D114	SP ED OFFICE		21	CB8	130	0.25	123	.22	
D114	SP ED OFFICE		22	9X9	130	N/A	114	N/A	
D106	STORAGE		23	6X6	40	N/A	92	N/A	
D113	SOCIAL STUDIES 1		24	CB12	180	0.28	172	.26	
D113	SOCIAL STUDIES 1		25	CB12	180	0.28	155	.21	
D113	SOCIAL STUDIES 1		26	CB12	180	0.28	159	.22	
D140	STORAGE		27	6X6	25	N/A	98	N/A	
D153	STUDENT STORE		28	6X6	65	N/A	69	N/A	
D152	CUSTODIAL OFFICE		29	CB4	100	0.35	76	.20	
D154	CUSTODIAL STORAGE		30	6X6	40	N/A	63	N/A	
D124	BUSINESS CONFERENCE		31	CB8	160	0.37	160	.37	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-129

NEBB CERTIFIED #2453

SHEET NO. 92

# DOAS-4

## \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
D121	ACCESSIBLE PLATFORM		32	CB12	175	0.27	151	.20	
D123	VIDEO/AMPHITHEATER		33	CB12	175	0.27	159	.22	
D123	VIDEO/AMPHITHEATER		34	CB12	175	0.27	147	.19	
D123	VIDEO/AMPHITHEATER		35	CB12	175	0.27	151	.20	
D123	VIDEO/AMPHITHEATER		36	CB12	175	0.27	169	.25	
D123	VIDEO/AMPHITHEATER		37	CB12	175	0.27	172	.26	
D123	VIDEO/AMPHITHEATER		38	15X15	500	N/A	481	N/A	
D123	VIDEO/AMPHITHEATER		39	15X15	500	N/A	490	N/A	
D122	STORAGE		40	6X6	20	N/A	120	N/A	
D136	MEN		41	12X12	300	N/A	262	N/A	
D136	MEN		42	12X12	300	N/A	279	N/A	
D135	WOMEN		43	12X12	300	N/A	267	N/A	
D135	WOMEN		44	12X12	300	N/A	291	N/A	
D128	TV PRODUCTION		45	CB10	60	0.34	52	.25	
D128	TV PRODUCTION		46	CB10	60	0.34	52	.25	
D128	TV PRODUCTION		47	CB10	60	0.34	56	.27	
D128	TV PRODUCTION		48	CB10	60	0.34	53	.26	
D127	CONTROL ROOM		49	CB7	85	0.36	62	.19	
D127	CONTROL ROOM		50	CB7	85	0.36	62	.19	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-130

NEBB CERTIFIED #2453

SHEET NO. 93

# DOAS-4

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: BUSINESS DEPARTMENT

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	7180 / 7615 (NOTE)	8010
SUCTION SP (" WG):	N/A	-2.23
DISCHARGE SP (" WG):	N/A	+ .36
TOTAL SP (" WG):	3.7	2.59
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	470 / 473 / 474
AMPS T1/T2/T3:	4.7	3.5/ 3.2/3.1/3.1/3.2/3.2/3.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-07E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	3.5
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	75.2 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-131

NEBB CERTIFIED #2453

SHEET NO. 94

# DOAS-4

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
D118	BUSINESS COMPUTER		1	16X16	1.777	270	152	1122	1994	
D118	BUSINESS COMPUTER		2	16X16	1.777	270	152	609	1082	
D117	BUSINESS 1 CLASS		3	16X16	1.777	540	304	160	284	
D153	STUDENT STORE		4	6X6	N/A	65	N/A	N/A	47	
D152	TEACHERS LOUNGE		5	6X6	N/A	100	N/A	N/A	49	
D154	CUSTODIAL STORAGE		6	6X6	.139	40	288	381	53	
D114	SP ED OFFICE		7	12X12	N/A	260	N/A	N/A	134	
D106	STORAGE		8	6X6	N/A	40	N/A	N/A	55	
D115	WORK ROOM		9	6X6	N/A	60	N/A	N/A	37	
D108	SP ED TESTING		10	6X6	N/A	60	N/A	N/A	26	
D107	SP ED TESTING		11	6X6	N/A	60	N/A	N/A	26	
D105	PT/OT ROOM		12	10X10	N/A	200	N/A	N/A	69	
D104	SP ED WORK TRAINING		13	10X10	N/A	200	N/A	N/A	85	
D109	BOYS		14	8X8	N/A	105	N/A	N/A	40	
D110	GIRLS		15	8X8	N/A	105	N/A	N/A	41	
D103	SOCIAL STUDIES 2		16	16X16	1.777	540	304	193	343	
D113	SOCIAL STUDIES 1		17	16X16	1.777	540	304	213	379	
D140	STORAGE		18	6X6	.139	25	180	302	42	
D65.1	STAIR		20	8X8	N/A	120	N/A	N/A	80	
D127	CONTROL ROOM		21	10X10	N/A	170	N/A	N/A	85	
D128	TV PRODUCTION		22	8X8	N/A	120	N/A	N/A	54	
D121	ACCESSIBLE PLATFORM		24	22X22	3.361	1045	311	244	820	
D121	ACCESSIBLE PLATFORM		25	22X22	3.361	1045	311	248	833	
D122	STORAGE		26	6X6	N/A	20	N/A	N/A	61	
D136	MENS		27	12X12	N/A	325	N/A	N/A	238	
D136	MENS		28	12X12	N/A	325	N/A	N/A	235	
D135	WOMENS		29	12X12	N/A	325	N/A	N/A	232	
D135	WOMENS		30	12X12	N/A	325	N/A	N/A	241	
D132	WOMEN STAFF		31	8X8	N/A	105	N/A	N/A	101	
D131	MEN STAFF		32	8X8	N/A	105	N/A	N/A	99	
D134	CUSTODIAN		33	8X8	.228	105	461	404	92	
D128	TV PRODUCTION		34	8X8	N/A	N/A	N/A	N/A	53	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-132

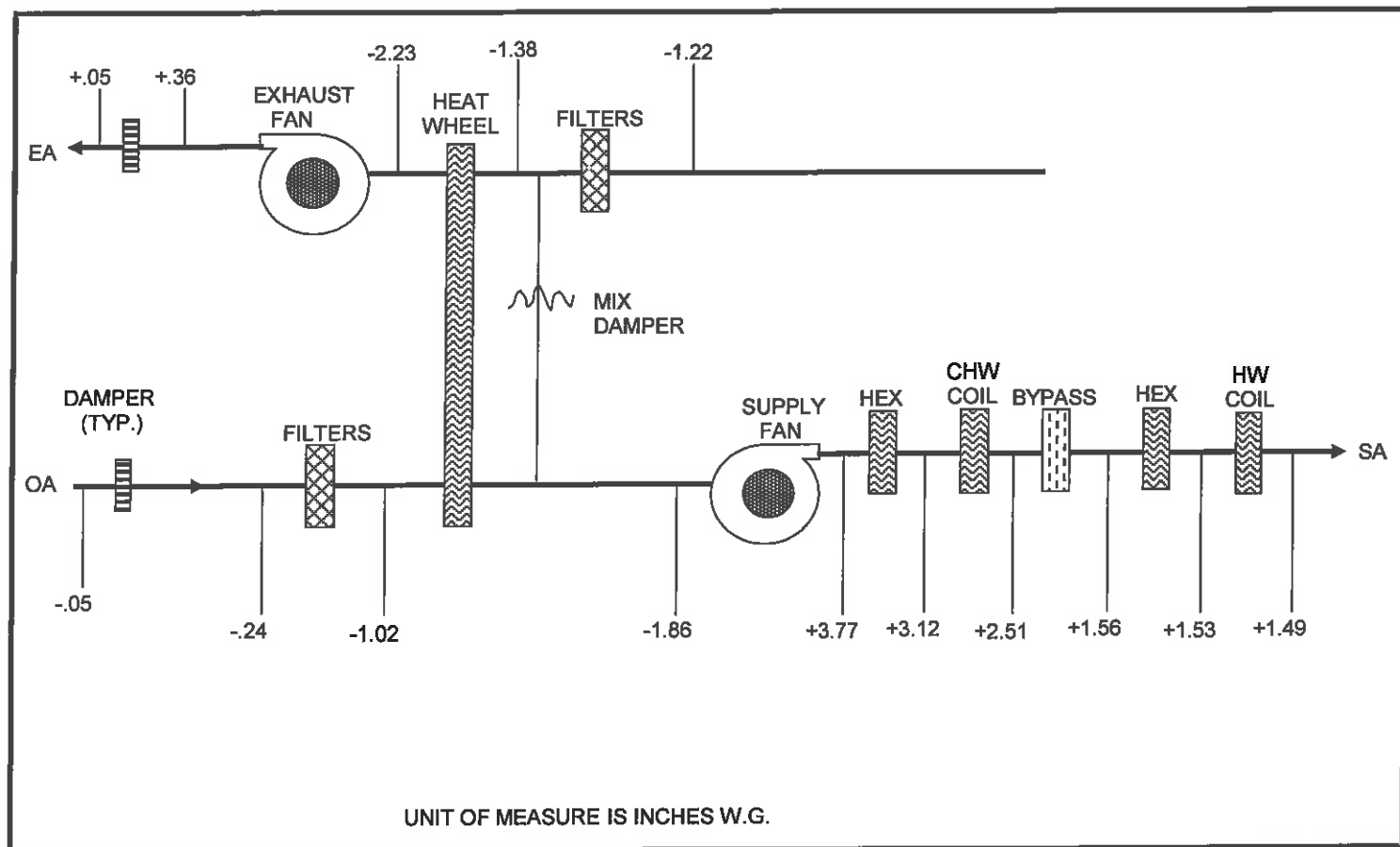
NEBB CERTIFIED #2453

SHEET NO. 95



# DOAS-4

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-133

NEBB CERTIFIED #2453

SHEET NO. 96

# DOAS-5

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
D209	MATH CLASSROOM 10	6156	501	439	501	4.88	NO
D211	COMPUTER CLASSROOM	4936	630	624	630	7.66	NO
D205	MATH CLASSROOM 8	5950	565	462	565	5.70	NO
D206	MATH CLASSROOM 7	6040	512	469	512	5.09	NO
D208	MATH CLASSROOM 11	6250	504	449	504	4.84	NO
D210	MATH CLASSROOM 9	6205	501	452	501	4.84	NO
D207	SPEC ED RESOURCE RM	2936	295	264	295	6.03	NO
B309	DATA DEPARTMENT	3938	118	113	118	1.80	NO
B311	MEDIA WORKROOM	1050	35	56	35	3.20	NO
B307	CONFERENCE ROOM	2574	203	195	203	4.73	NO
B314	CUSTODIAL OFFICE	7013	671	616	671	5.74	NO
B316	DEPARTMENT OFFICES	12092	494	489	494	2.45	NO
B304	OFFICE A	2029	48	67	48	1.98	NO
B308	CONFERENCE ROOM	1891	208	206	208	6.60	NO
B303	IT DEPT	5385	535	517	535	5.96	NO
3100	CLASSROOM	7064	323	0	323	2.74	NO
B300	DEPARTMENT OFFICES	3507	162	404	162	6.91	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-134

NEBB CERTIFIED #2453

SHEET NO. 97

# DOAS-5

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
B204	OFFICE	2355	44	59	44	1.50	NO
B201	WORK ROOM	1917	44	74	44	2.32	NO
D204	WOMAN	2210	0	295	0	8.01	NO
D203	MEN	2269	0	254	0	6.72	NO
B312	MEN STAFF	1333	0	268	0	12.06	NO
B313	WOMEN STAFF	1330	0	235	0	10.60	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-135

NEBB CERTIFIED #2453

SHEET NO. 98

# DOAS-5

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: COMPUTER / MATH / MEZ / MEDIA CENTER AREAS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	9930 / 9950 (NOTE)	9079
OA CFM:	9930 / 9950 (NOTE)	9236
TOTAL SP (" WG):	7.0	5.97
EXT SP (" WG):	3.6	1.73
FAN RPM:	3510	N/A
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	456/457/459
AMPS T1/T2/T3:	9.6	8.3/8.4/8.3/8.5/8.4/8.4

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-10E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	8.5
MOTOR SF:	1.15
MOTOR FRAME:	213TZ
VFD SETTING:	57.5 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE			41X69	19.65	9930	505	470	9236	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-136

NEBB CERTIFIED #2453

SHEET NO. 99

**DOAS-5****\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
B230	ATHLETICS STORAGE		1	9X9	130	N/A	115	N/A	
B230	ATHLETICS STORAGE		2	9X9	130	N/A	117	N/A	
A201	CORRIDOR		3	12X12	260	N/A	226	N/A	
D211	COMPUTER CLASSROOM		4	CB8	115	.19	105	.16	
D211	COMPUTER CLASSROOM		5	CB8	115	.19	105	.16	
D211	COMPUTER CLASSROOM		6	CB8	115	.19	105	.16	
D211	COMPUTER CLASSROOM		7	CB8	115	.19	105	.16	
D211	COMPUTER CLASSROOM		8	CB8	115	.19	105	.16	
D211	COMPUTER CLASSROOM		9	CB8	115	.19	105	.16	
D244	C.O.W. STORAGE		10	2406	50	N/A	61	N/A	
D210	MATH CLASSROOM 9		11	CB8	135	.26	126	.23	
D210	MATH CLASSROOM 9		12	CB8	135	.26	126	.23	
D210	MATH CLASSROOM 9		13	CB8	135	.26	126	.23	
D210	MATH CLASSROOM 9		14	CB8	135	.26	123	.22	
D209	MATH CLASSROOM 10		15	CB8	135	.26	126	.23	
D209	MATH CLASSROOM 10		16	CB8	135	.26	126	.23	
D209	MATH CLASSROOM 10		17	CB8	135	.26	123	.22	
D209	MATH CLASSROOM 10		18	CB8	135	.26	126	.23	
D208	MATH CLASSROOM 11		19	CB8	135	.26	123	.22	
D208	MATH CLASSROOM 11		20	CB8	135	.26	126	.23	
D208	MATH CLASSROOM 11		21	CB8	135	.26	126	.23	
D208	MATH CLASSROOM 11		22	CB8	135	.26	129	.24	
D207	SPEC ED RESOURCE		23	CB8	150	.33	149	.32	
D207	SPEC ED RESOURCE		24	CB8	150	.33	146	.31	
D206	MATH CLASSROOM 7		25	CB8	150	.33	139	.28	
D206	MATH CLASSROOM 7		26	CB8	150	.33	141	.29	
D206	MATH CLASSROOM 7		27	CB8	150	.33	91	.12	
D206	MATH CLASSROOM 7		28	CB8	150	.33	141	.29	

# DOAS-5

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
D205	MATH CLASSROOM 8		29	CB8	150	.33	141	.29	
D205	MATH CLASSROOM 8		30	CB8	150	.33	141	.29	
D205	MATH CLASSROOM 8		31	CB8	150	.33	144	.30	
D205	MATH CLASSROOM 8		32	CB8	150	.33	139	.28	
D200	CORRIDOR		33	9X9	200	N/A	220	N/A	
A201	CORRIDOR		46	N/A	265	N/A	224	N/A	
B205	MER ROOM		47	2406	40	N/A	109	N/A	
B220	CORRIDOR		48	2408	150	N/A	158	N/A	
B207	ELECTRICAL CLOSET		49	12X12	360	N/A	301	N/A	
B220	CORRIDOR		50	2408	150	N/A	170	N/A	
B204	MEDIA OFFICE		51	CB1	30	.81	22	.43	
B204	MEDIA OFFICE		52	CB1	30	.81	22	.42	
B201	MEDIA WORK ROOM		53	CB1	30	.81	22	.43	
B201	MEDIA WORK ROOM		54	CB1	30	.81	22	.42	
B214	MEDIA/PERIODICALS STOR		55	CB1	30	.81	23	.45	
B214	MEDIA/PERIODICALS STOR		56	CB1	30	.81	23	.45	
B214	MEDIA/PERIODICALS STOR		57	CB1	30	.81	23	.45	
B203	MEDIA RECEPTION		58	CB4	110	.42	93	.30	
B203	MEDIA RECEPTION		59	CB4	110	.42	95	.31	
B203	MEDIA RECEPTION		60	CB4	110	.42	95	.31	
B203	MEDIA RECEPTION		61	CB4	110	.42	93	.30	
B209	COMPUTER RESOURCE		62	CB7	80	.32	69	.24	
B209	COMPUTER RESOURCE		63	CB7	80	.32	68	.23	
B209	COMPUTER RESOURCE		64	CB7	80	.32	68	.23	
B209	COMPUTER RESOURCE		65	CB7	80	.32	69	.24	
B209	COMPUTER RESOURCE		66	CB7	80	.32	68	.23	
B209	COMPUTER RESOURCE		67	CB7	80	.32	69	.24	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-138

NEBB CERTIFIED #2453

SHEET NO. 101

# DOAS-5

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
B300	DEPARTMENT OFFICES		68	CB4	90	.28	81	.23	
B300	DEPARTMENT OFFICES		69	CB4	90	.28	81	.23	
B300	DEPARTMENT OFFICES		70	CB4	90	.28	81	.23	
B300	DEPARTMENT OFFICES		71	CB4	90	.28	81	.23	
B300	DEPARTMENT OFFICES		72	CB4	90	.28	81	.23	
B300	DEPARTMENT OFFICES		73	CB4	90	.28	80	.22	
B303	FACULTY ROOM		74	CB8	150	.33	136	.27	
B303	FACULTY ROOM		75	CB8	150	.33	129	.24	
B303	FACULTY ROOM		76	CB8	150	.33	136	.27	
B303	FACULTY ROOM		77	CB8	150	.33	134	.26	
B304	COPY ROOM		78	CB10	60	.34	48	.22	
B308	CONFERENCE RM		79	CB4	120	.50	103	.37	
B308	CONFERENCE RM		80	CB4	120	.50	105	.38	
B307	CONFERENCE RM		81	CB4	120	.50	100	.35	
B307	CONFERENCE RM		82	CB4	120	.50	103	.37	
B309	DATA DEPARTMENT		83	CB10	65	.40	57	.31	
B309	DATA DEPARTMENT		84	CB10	65	.40	61	.35	
B311	MEDIA WORK ROOM		85	CB2	40	.63	35	.48	
B314	FACULTY ROOM		86	CB8	150	.33	136	.27	
B314	FACULTY ROOM		87	CB8	150	.33	134	.26	
B314	FACULTY ROOM		88	CB8	150	.33	136	.27	
B314	FACULTY ROOM		89	CB8	150	.33	134	.26	
B314	FACULTY ROOM		90	CB8	150	.33	131	.25	
B316	DEPARTMENT OFFICES		91	CB4	90	.28	83	.24	
B316	DEPARTMENT OFFICES		92	CB4	90	.28	81	.23	
B316	DEPARTMENT OFFICES		93	CB4	90	.28	85	.25	
B316	DEPARTMENT OFFICES		94	CB4	90	.28	81	.23	
B316	DEPARTMENT OFFICES		95	CB4	90	.28	83	.24	
B316	DEPARTMENT OFFICES		96	CB4	90	.28	81	.23	
B310	CORRIDOR		97	9X9	135	N/A	129	N/A	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-139

NEBB CERTIFIED #2453

SHEET NO. 102

# DOAS-5

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: COMPUTER / MATH / MEZ / MEDIA CENTER AREAS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	9290 / 10250 (NOTE)	8476
SUCTION SP (" WG):	N/A	-2.29
DISCHARGE SP (" WG):	N/A	+.39
TOTAL SP (" WG):	3.7	2.68
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	457 / 457 / 457
AMPS T1/T2/T3:	5.9	3.9/4.0/4.0/4.1/4.2/3.9

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-10E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	4.5
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	60.3 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-140

NEBB CERTIFIED #2453

SHEET NO. 103



# DOAS-5

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
D211	COMPUTER CLASSROOM		1	16X16	N/A	690	N/A	N/A	624	
D244	C.O.W. STORAGE		2	6X6	.139	50	360	590	82	
D210	MATH CLASS 9		3	16X16	N/A	540	N/A	N/A	452	
D209	MATH CLASS 10		4	16X16	N/A	540	N/A	N/A	439	
D208	MATH CLASS 11		5	16X16	N/A	540	N/A	N/A	449	
D207	SPEC ED RESOURCE RM		6	12X12	N/A	300	N/A	N/A	264	
D206	MATH CLASS 7		7	16X16	N/A	600	N/A	N/A	469	
D205	MATH CLASS 8		8	16X16	N/A	600	N/A	N/A	462	
D204	WOMEN		9	10X10	N/A	190	N/A	N/A	166	
D204	WOMEN		10	10X10	N/A	190	N/A	N/A	129	
D203	MEN		11	10X10	N/A	190	N/A	N/A	161	
D203	MEN		12	10X10	N/A	190	N/A	N/A	93	
B230	BAND/ATHLETIC STORAGE		13	12X12	N/A	300	N/A	N/A	280	
B303	IT DEPT		16	16X16	N/A	600	N/A	N/A	517	
B300	DEPARTMENT OFFICES		17	16X16	N/A	540	N/A	N/A	404	
B304	COPY ROOM		18	6X6	.139	60	432	483	67	
B307	CONFERENCE RM		19	8X8	N/A	240	N/A	N/A	195	
B308	CONFERENCE RM		20	8X8	N/A	240	N/A	N/A	206	
B309	DATA DEPARTMENT		21	8X8	N/A	130	N/A	N/A	113	
B311	MEDIA WORK ROOM		22	6X6	.139	40	288	407	56	
B312	MEN STAFF		23	8X8	.231	165	714	602	139	
B312	MEN STAFF		24	8X8	N/A	165	N/A	N/A	129	
B313	WOMEN STAFF		25	8X8	.231	165	714	498	115	
B313	WOMEN STAFF		26	8X8	.231	165	714	519	120	
B314	FACULTY ROOM		27	18X18	N/A	750	N/A	N/A	616	
B316	DEPARTMENT OFFICES		28	16X16	N/A	540	N/A	N/A	489	
B214	MEDIA/PERIODICALS		29	6X6	.139	90	647	568	79	
B201	MEDIA WORK ROOM		30	6X6	.139	60	432	530	74	
B204	MEDIA OFFICE		31	6X6	.139	60	432	422	59	
B203	MEDIA RECEPTION		32	14X14	N/A	440	N/A	N/A	373	
B207	ELECT ROOM		33	12X12	.674	360	534	577	389	
B205	MER ROOM		34	6X6	.139	40	288	640	89	
B209	COMPUTER RESOURCE		35	14X14	N/A	480	N/A	N/A	281	

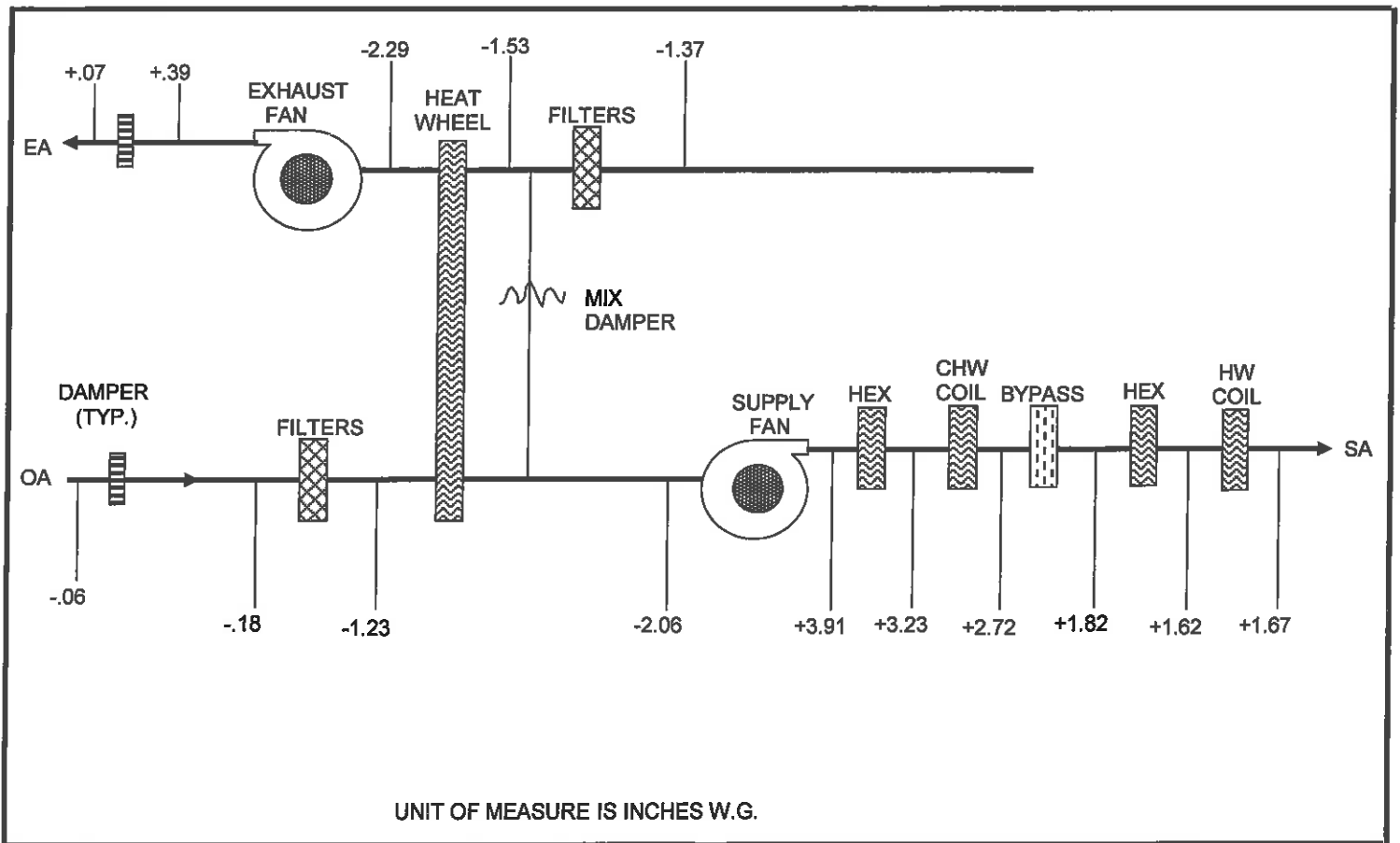
PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-141

NEBB CERTIFIED #2453

SHEET NO. 124

# DOAS-5

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-142

NEBB CERTIFIED #2453

SHEET NO. 105

# DOAS-6

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
F205	MATH CLASS 3	5853	573	392	573	5.87	NO
F202	MATH CLASS 5	5819	558	383	558	5.75	NO
2403	UPBEAT	6417	501	349	501	4.68	NO
G205	OFFICE	1381	69	56	69	3.00	NO
A202	IT OFFICE/CLASSROOM	2405	122	75	122	3.04	NO
G207	COMPUTER LAB	6755	573	386	573	5.09	NO
G203/204	CONFERENCE ROOM	5494	503	362	503	5.49	NO
F207	MATH CLASS 1	5906	552	363	552	5.61	NO
F201	MATH CLASS 6	6007	544	380	544	5.43	NO
F206	MATH CLASS 2	5827	562	404	562	5.79	NO
F204	MATH CLASS 4	5803	563	406	563	5.82	NO
A211	UNISEX FAMILY	845	0	75	0	5.33	NO
A210	MEN STAFF	1306	0	138	0	6.34	NO
A209	WOMEN STAFF	1292	0	144	0	6.69	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-143

NEBB CERTIFIED #2453

SHEET NO. 106

# DOAS-6

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: MATH CLASSROOMS / UPBEAT / CONF ROOMS / COMPUTER LAB

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6260	5723
OA CFM:	6260	5881
TOTAL SP (" WG):	7.0	4.23
EXT SP (" WG):	3.6	1.07
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	476/476/477
AMPS T1/T2/T3:	5.0	4.8/4.6/4.5/4.7/4.5/4.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-05E-WW-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	4 1/2
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	55.9 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	51X41	14.52	6260	431	405	5881	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-144

NEBB CERTIFIED #2453

SHEET NO. 107

## DOAS-6

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO MATH CLASSROOMS, UPBEAT, CONF RM, COMPUTER LAB

CONDITION: SUPPLY VFD @ 55.9 HZ

TEMPERATURE (°F): 58

DUCT SP (" WG): +.47

DUCT WIDTH ("): 60

DUCT HEIGHT ("): 20

DUCT AREA (SQ FT): 8.330

INTERNAL DUCT LINING ("): 1

TOTAL FPM: 27482

NUMBER OF POINTS: 40

	DESIGN		ACTUAL
CFM:	6260		5723
FPM:	752		687

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-145

NEBB CERTIFIED #2453

SHEET NO. 108

# DOAS-6

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
F200	CORRIDOR		1	12X12	400	N/A	356	N/A	
F207	MATH CLASS 1		2	CB11	100	.27	93	.23	
F207	MATH CLASS 1		3	CB11	100	.27	91	.22	
F207	MATH CLASS 1		4	CB11	100	.27	93	.23	
F207	MATH CLASS 1		5	CB11	100	.27	91	.22	
F207	MATH CLASS 1		6	CB11	100	.27	93	.23	
F207	MATH CLASS 1		7	CB11	100	.27	91	.22	
F206	MATH CLASS 2		8	CB11	100	.27	93	.23	
F206	MATH CLASS 2		9	CB11	100	.27	93	.23	
F206	MATH CLASS 2		10	CB11	100	.27	94	.24	
F206	MATH CLASS 2		11	CB11	100	.27	94	.24	
F206	MATH CLASS 2		12	CB11	100	.27	94	.24	
F206	MATH CLASS 2		13	CB11	100	.27	94	.24	
F205	MATH CLASS 3		14	CB11	100	.27	91	.22	
F205	MATH CLASS 3		15	CB11	100	.27	91	.22	
F205	MATH CLASS 3		16	CB11	100	.27	93	.23	
F205	MATH CLASS 3		17	CB11	100	.27	93	.23	
F205	MATH CLASS 3		18	CB11	100	.27	91	.22	
F205	MATH CLASS 3		19	CB11	100	.27	114	.35	
F204	MATH CLASS 4		20	CB11	100	.27	94	.24	
F204	MATH CLASS 4		21	CB11	100	.27	93	.23	
F204	MATH CLASS 4		22	CB11	100	.27	94	.24	
F204	MATH CLASS 4		23	CB11	100	.27	94	.24	
F204	MATH CLASS 4		24	CB11	100	.27	94	.24	
F204	MATH CLASS 4		25	CB11	100	.27	94	.24	
F202	MATH CLASS 5		26	CB11	100	.27	93	.23	
F202	MATH CLASS 5		27	CB11	100	.27	91	.22	
F202	MATH CLASS 5		28	CB11	100	.27	95	.24	
F202	MATH CLASS 5		29	CB11	100	.27	93	.23	
F202	MATH CLASS 5		30	CB11	100	.27	93	.23	
F202	MATH CLASS 5		31	CB11	100	.27	93	.23	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-146

NEBB CERTIFIED #2453

SHEET NO. 109

# DOAS-6

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
F201	MATH CLASS 6		32	CB11	100	.27	93	.23	
F201	MATH CLASS 6		33	CB11	100	.27	88	.21	
F201	MATH CLASS 6		34	CB11	100	.27	88	.21	
F201	MATH CLASS 6		35	CB11	100	.27	91	.22	
F201	MATH CLASS 6		36	CB11	100	.27	93	.23	
F201	MATH CLASS 6		37	CB11	100	.27	91	.22	
G203	CONFERENCE ROOM		38	CB3	60	.40	51	.29	
G203	CONFERENCE ROOM		39	CB3	60	.40	51	.29	
G203	CONFERENCE ROOM		40	CB3	60	.40	53	.31	
G203	CONFERENCE ROOM		41	CB3	60	.40	52	.30	
G204	PPT ROOM		42	CB7	85	.36	74	.27	
G204	PPT ROOM		43	CB7	85	.36	74	.27	
G204	PPT ROOM		44	CB7	85	.36	74	.27	
G204	PPT ROOM		45	CB7	85	.36	74	.27	
G205	OFFICE		46	CB5	40	.62	35	.47	
G205	OFFICE		47	CB5	40	.62	34	.46	
G206	TR 4		48	2406	20	N/A	20	.19	
	2403		49	CB3	75	.62	62	.42	
	2403		50	CB3	75	.62	62	.42	
	2403		51	CB3	75	.62	63	.43	
	2403		52	CB3	75	.62	63	.43	
	2403		53	CB3	75	.62	63	.43	
	2403		54	CB3	75	.62	62	.42	
	2403		55	CB3	75	.62	63	.44	
	2403		56	CB3	75	.62	63	.43	
A206	CORRIDOR		57	N/A	200	N/A	170	N/A	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-147

NEBB CERTIFIED #2453

SHEET NO. 110

# DOAS-6

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
2401	COMPUTER LAB/HEALTH		58	CB7	80	.32	71	.25	
2401	COMPUTER LAB/HEALTH		59	CB7	80	.32	72	.26	
2401	COMPUTER LAB/HEALTH		60	CB7	80	.32	71	.25	
2401	COMPUTER LAB/HEALTH		61	CB7	80	.32	71	.25	
2401	COMPUTER LAB/HEALTH		62	CB7	80	.32	72	.26	
2401	COMPUTER LAB/HEALTH		63	CB7	80	.32	72	.26	
2401	COMPUTER LAB/HEALTH		64	CB7	80	.32	72	.26	
2401	COMPUTER LAB/HEALTH		65	CB7	80	.32	72	.26	
A202	IT OFFICE/CLASSROOM		66	CB5	35	.48	30	.36	
A202	IT OFFICE/CLASSROOM		67	CB5	35	.48	31	.37	
A202	IT OFFICE/CLASSROOM		68	CB5	35	.48	30	.36	
A202	IT OFFICE/CLASSROOM		69	CB5	35	.48	31	.37	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-148

NEBB CERTIFIED #2453

SHEET NO. 111



# DOAS-6

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: MATH CLASSROOMS / UPBEAT / CONFERENCE / COMPUTER LAB

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6150 / 6310 (NOTE)	4002
SUCTION SP (" WG):	N/A	1.18
DISCHARGE SP (" WG):	N/A	+.14
TOTAL SP (" WG):	3.7	1.32
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	476 / 476 / 477
AMPS T1/T2/T3:	4.0	1.4/1.5/1.5/1.4/1.3/1.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-05E-WW-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	3
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	51.2 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-149

NEBB CERTIFIED #2453

SHEET NO. 112

## DOAS-6

### \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
F207	MATH CLASS 1		1	16X16	600	363	
F206	MATH CLASS 2		2	16X16	600	404	
F205	MATH CLASS 3		3	16X16	600	392	
F204	MATH CLASS 4		4	16X16	600	406	
F202	MATH CLASS 5		5	16X16	600	383	
F201	MATH CLASS 6		6	16X16	600	380	
A212	CUSTODIAN		7	8X8	110	80	
A211	FAMILY TOILET		8	8X8	110	75	
A210	MEN STAFF		9	10X10	215	138	
A209	WOMEN STAFF		10	10X10	215	144	
G203	CONFERENCE RM		11	12X12	240	150	
G204	PPT ROOM		12	12X12	340	212	
G206	TR 4		13	6X6	20	20	
G205	OFFICE		14	8X8	80	56	
G207	2403		15	16X16	600	349	
A203	COMPUTER LAB		16	16X16	640	386	
A202	IT OFFICE		17	8X8	140	75	

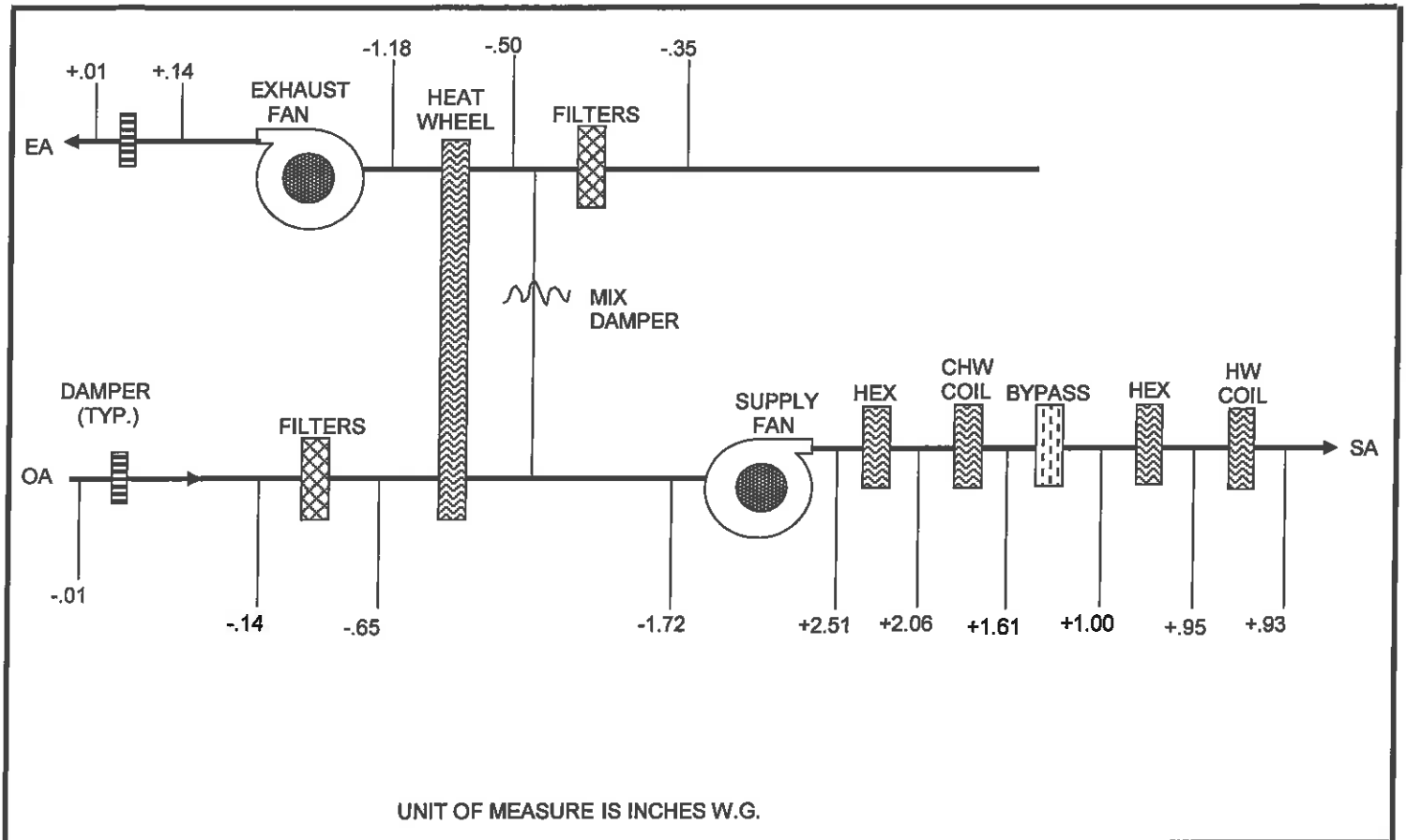
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-150

NEBB CERTIFIED #2453

SHEET NO. 113

# DOAS-6

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-151

NEBB CERTIFIED #2453

SHEET NO. 114

# DOAS-7

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
G223	GENERAL MUSIC CLASS	7424	563	510	563	4.55	NO
G218	MUSIC OFFICE 1	1205	21	27	21	1.34	NO
G220	BAND CLASSROOM	39792	1959	1746	1959	2.95	NO
G217	CONTROL ROOM	1174	104	102	104	5.32	NO
G219	MUSIC OFFICE 2	1171	21	29	21	1.49	NO
G215	CHORUS CLASSROOM	22953	1560	1458	1560	4.08	NO
G212	JAZZ ENSEMBLE	9959	518	406	518	3.12	NO
G211	TICKET BOOTH	1232	20	25	20	1.22	NO
G225	MENS DRESSING ROOM	1135	95	89	95	5.02	NO
G224	WOMENS DRESSING ROOM	1163	93	83	93	4.80	NO
G227	MEN	594	0	84	0	8.48	NO
G226	WOMEN	592	0	91	0	9.22	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-152

NEBB CERTIFIED #2453

SHEET NO. 115

# DOAS-7

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: MUSIC DEPARTMENT

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	5840 / 6025 (NOTE)	5757
OA CFM:	5840 / 6025 (NOTE)	5823
TOTAL SP (" WG):	7.0	3.67
EXT SP (" WG):	3.6	.70
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	478/476/476
AMPS T1/T2/T3:	5.7	4.1/4.1/4.1/4.1/4.0/4.1

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-O6E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	5
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	46.7 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	51X41	14.52	6025	415	401	5823	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-153

NEBB CERTIFIED #2453

SHEET NO. 116

# DOAS-7

## \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
G220	BAND CLASSROOM		27	CB8	130	.245	134	.26	
G220	BAND CLASSROOM		28	CB8	130	.245	129	.24	
G220	BAND CLASSROOM		29	CB8	130	.245	134	.26	
G220	BAND CLASSROOM		30	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		31	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		32	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		33	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		34	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		35	CB8	130	.245	129	.24	
G220	BAND CLASSROOM		36	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		37	CB7	130	.842	117	.68	
G220	BAND CLASSROOM		38	CB8	130	.245	134	.26	
G220	BAND CLASSROOM		39	CB8	130	.245	134	.26	
G220	BAND CLASSROOM		40	CB8	130	.245	131	.25	
G220	BAND CLASSROOM		41	CB8	130	.27	131	.25	
G222	CORRIDOR		42	9X9	160	N/A	149	N/A	
G223	GENERAL MUSIC CLASS		43	CB11	100	.27	98	.26	
G223	GENERAL MUSIC CLASS		44	CB11	100	.27	93	.23	
G223	GENERAL MUSIC CLASS		45	CB11	100	.27	93	.23	
G223	GENERAL MUSIC CLASS		46	CB11	100	.27	93	.23	
G223	GENERAL MUSIC CLASS		47	CB11	100	.27	93	.23	
G223	GENERAL MUSIC CLASS		48	CB11	100	.27	93	.23	
G224	WOMEN DRESSING RM		49	CB4	100	.35	93	.30	
G225	MEN DRESSING RM		50	CB4	100	.35	95	.31	
G228	UNIFORM STORAGE		51	CB5	25	.24	23	.27	
G228	UNIFORM STORAGE		52	CB5	25	.24	24	.29	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-154

NEBB CERTIFIED #2453

SHEET NO. 117

# DOAS-7

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
G212	JAZZ ENSEMBLE		1	CB4	100	.35	87	.26	
G212	JAZZ ENSEMBLE		2	CB4	100	.35	87	.26	
G212	JAZZ ENSEMBLE		3	CB4	100	.35	87	.26	
G212	JAZZ ENSEMBLE		4	CB4	100	.35	87	.26	
G212	JAZZ ENSEMBLE		5	CB4	100	.35	87	.26	
G212	JAZZ ENSEMBLE		6	CB4	100	.35	83	.24	
G211	TICKET BOOTH		7	CB1	40	1.44	20	.36	
G213	STORAGE		8	6X6	20	N/A	37	N/A	1
G214	STORAGE		9	6X6	20	N/A	35	N/A	1
G215	CHORUS CLASSROOM		10	CB8	150	.33	134	.26	
G215	CHORUS CLASSROOM		11	CB8	150	.33	129	.24	
G215	CHORUS CLASSROOM		12	CB8	150	.33	129	.24	
G215	CHORUS CLASSROOM		13	CB8	150	.33	129	.24	
G215	CHORUS CLASSROOM		14	CB8	150	.33	131	.25	
G215	CHORUS CLASSROOM		15	CB8	150	.33	126	.23	
G215	CHORUS CLASSROOM		16	CB8	150	.33	126	.23	
G215	CHORUS CLASSROOM		17	CB8	150	.33	126	.23	
G215	CHORUS CLASSROOM		18	CB8	150	.33	131	.25	
G215	CHORUS CLASSROOM		19	CB8	150	.33	131	.25	
G215	CHORUS CLASSROOM		20	CB8	150	.33	134	.26	
G215	CHORUS CLASSROOM		21	CB8	150	.33	134	.26	
G219	MUSIC OFFICE 2		22	CB1	30	.81	21	.41	
G218	MUSIC OFFICE 1		23	CB1	30	.81	21	.40	
G217	CONTROL BOOTH		24	CB3	60	.40	52	.30	
G217	CONTROL BOOTH		25	CB3	60	.40	52	.30	
G216	CORRIDOR		26	9X9	180	N/A	162	N/A	

NOTE 1: VOLUME DAMPER 100% CLOSED

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-155

NEBB CERTIFIED #2453

SHEET NO. 118

# DOAS-7

## \*\* CHILLED BEAMS \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
G229	MUSIC STORAGE 1		53	CB5	25	.24	23	.25	
G229	MUSIC STORAGE 1		54	CB5	25	.24	23	.26	
G229	MUSIC STORAGE 1		55	CB5	25	.24	23	.25	
G229	MUSIC STORAGE 1		56	CB5	25	.24	23	.25	
G01	MECH SPACE		57	6X6	25	N/A	71	N/A	1
G02	MECH SPACE		58	6X6	25	N/A	38	N/A	1
G03	MECH SPACE		59	6X6	25	N/A	51	N/A	1
G04	MECH SPACE		60	6X6	25	N/A	62	N/A	1
G05	MECH SPACE		61	6X6	25	N/A	59	N/A	1

NOTE 1: VOLUME DAMPER 100% CLOSED

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-156

NEBB CERTIFIED #2453

SHEET NO. 119



# DOAS-7

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: MUSIC DEPARTMENT

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	5870 / 6055 (NOTE)	4961
SUCTION SP (" WG):	N/A	-1.24
DISCHARGE SP (" WG):	N/A	+ .16
TOTAL SP (" WG):	3.7	1.40
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	477 / 476 / 477
AMPS T1/T2/T3:	4.0	2.0/2.1/1.9/2.0/2.0/2.1

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-06E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	3
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	68.4 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-157

NEBB CERTIFIED #2453

SHEET NO. 120

# DOAS-7

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
G212	JAZZ ENSEMBLE		1	16X16	N/A	600	N/A	N/A	406	
G211	TICKET BOOTH		2	6X6	.139	40	288	176	25	
G214	STORAGE		3	6X6	.139	20	144	137	19	
G213	STORAGE		4	6X6	.139	20	144	137	19	
G05	MECH ROOM		5	6X6	.139	25	180	173	24	
G03	MECH ROOM		6	6X6	.139	25	180	181	21	
G01	MECH ROOM		7	6X6	.139	25	180	151	21	
G02	MECH ROOM		8	6X6	.139	25	180	158	22	
G04	MECH ROOM		9	6X6	.139	25	180	144	20	
G215	CHORUS CLASSROOM		10	22X22	3.067	900	293	240	736	
G215	CHORUS CLASSROOM		11	36X12	2.67	900	337	270	722	
G219	MUSIC OFFICE 2		12	6X6	.139	30	216	207	29	
G218	MUSIC OFFICE 1		13	6X6	.139	30	216	194	27	
G217	CONTROL BOOTH		14	8X8	N/A	120	N/A	N/A	102	
G220	BAND CLASSROOM		15	36X12	2.67	975	365	336	897	
G220	BAND CLASSROOM		16	36X12	2.67	975	365	318	849	
G223	GENERAL MUSIC CLASS		17	16X16	N/A	600	N/A	N/A	510	
G227	MEN		18	8X8	N/A	105	N/A	N/A	84	
G225	MENS DRESSING RM		19	8X8	N/A	100	N/A	N/A	89	
G226	WOMEN		20	8X8	N/A	105	N/A	N/A	91	
G224	WOMENS DRESSING RM		21	8X8	N/A	100	N/A	N/A	83	
G228	UNIFORM STORAGE		22	6X6	.139	50	360	309	43	
G229	MUSIC STORAGE 1		23	8X8	N/A	100	N/A	N/A	90	
G222	CORRIDOR		24	10X10	N/A	160	N/A	N/A	132	

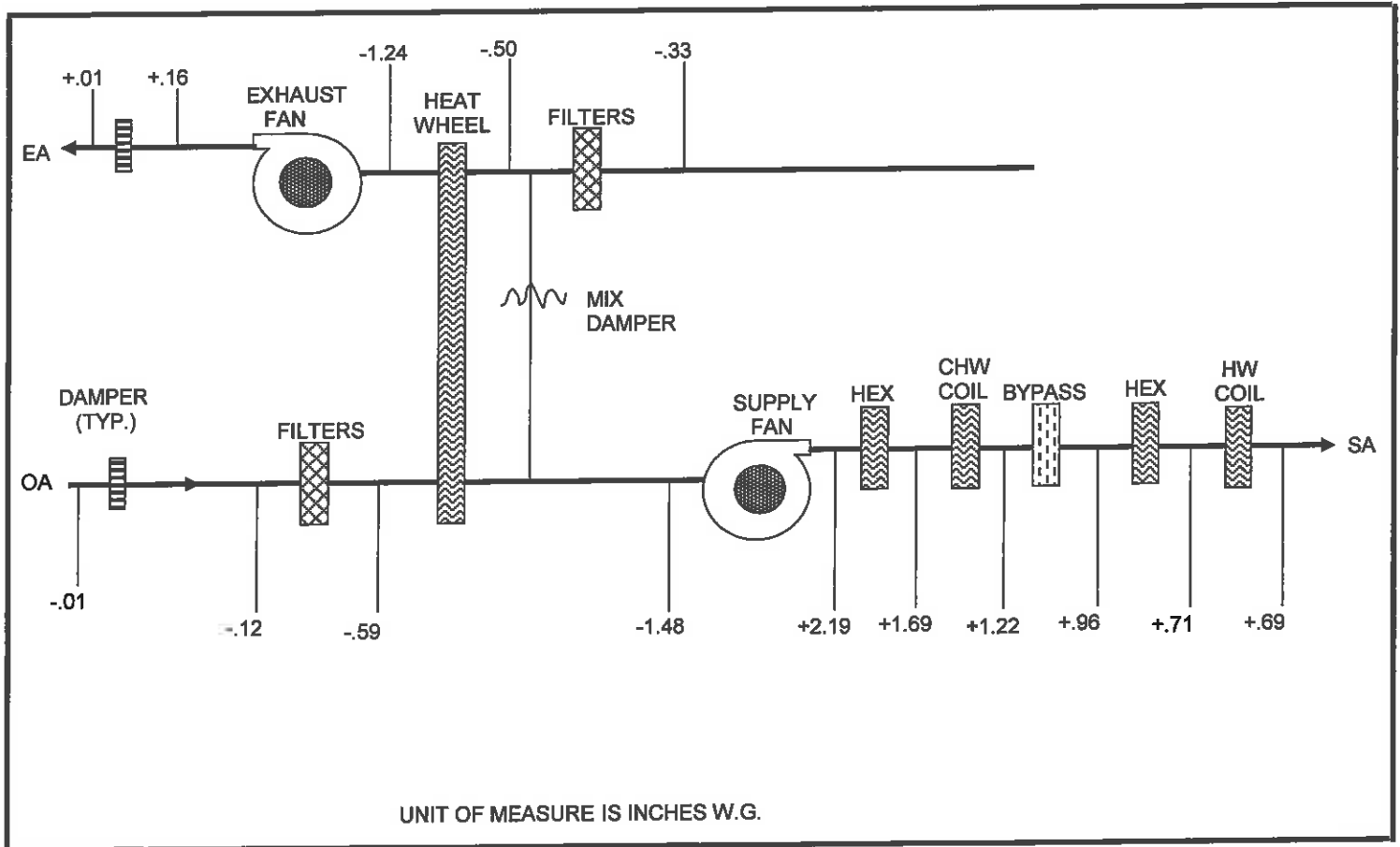
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-158

NEBB CERTIFIED #2453

SHEET NO. 121

# DOAS-7

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-159

NEBB CERTIFIED #2453

SHEET NO. 122

# DOAS-8

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
E231	STUDENT SERVICES	6733	563	623	563	5.55	NO
E232	WORLD LANGUAGE	6668	566	644	566	5.79	NO
F225	WORLD LANGUAGE 1	6716	574	625	574	5.58	NO
F224	WORLD LANGUAGE 2	6699	570	622	570	5.57	NO
F223	WORLD LANGUAGE 3	6670	547	580	547	5.22	NO
F221	WORLD LANGUAGE 7	6651	542	567	542	5.12	NO
F214	LANGUAGE LAB	7498	830	929	830	7.43	NO
F211	WORLD LANG./STUDENT SVCS	5162	576	578	576	6.72	NO
F218	STUDENT SERVICES	4581	459	496	459	6.50	NO
F222	WORLD LANGUAGE 4	6611	552	596	552	5.41	NO
F217	SPECIAL ED CLASS 3	4311	459	458	459	6.39	NO
F210	STUDENT SERVICES	5128	572	611	572	7.15	NO
G231	WORLD LANGUAGE	6676	530	532	530	4.78	NO
F208	WOMEN	1956	0	667	0	20.46	NO
		1993	0	686	0	20.65	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-160

NEBB CERTIFIED #2453

SHEET NO. 123

# DOAS-8

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: SPECIAL EDUCATION / WORLD LANGUAGE CLASSROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	8620 8610 (NOTE 1)	8042
OA CFM:	8610	8131
TOTAL SP (" WG):	7.0	4.01
EXT SP (" WG):	3.6	.64
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	467/471/469
AMPS T1/T2/T3:	7.9	5.7/5.6/5.6/5.7/5.7

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-O9E-WW-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	7
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	N/A (NOTE 2)

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	41X70	19.93	8610	432	408	8131	

NOTE 1: FAN DESIGN / OUTLET TOTAL

NOTE 2: VFD DISPLAY IS NOT FUNCTIONING

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-161

NEBB CERTIFIED #2453

SHEET NO. 124

# DOAS-8

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
F211	STUDENT SERVICES		30	CB12	150	.20	143	.18	
F211	STUDENT SERVICES		31	CB12	150	.20	143	.18	
F211	STUDENT SERVICES		32	CB12	150	.20	147	.19	
F211	STUDENT SERVICES		33	CB12	150	.20	143	.18	
F223	WORLD LANGUAGE 3		34	CB11	100	.27	90	.22	
F223	WORLD LANGUAGE 3		35	CB11	100	.27	90	.22	
F223	WORLD LANGUAGE 3		36	CB11	100	.27	90	.22	
F223	WORLD LANGUAGE 3		37	CB11	100	.27	94	.24	
F223	WORLD LANGUAGE 3		38	CB11	100	.27	93	.23	
F223	WORLD LANGUAGE 3		39	CB11	100	.27	90	.22	
F214	LANGUAGE LAB		40	CB12	150	.20	135	.16	
F214	LANGUAGE LAB		41	CB12	150	.20	139	.17	
F214	LANGUAGE LAB		42	CB12	150	.20	139	.17	
F214	LANGUAGE LAB		43	CB12	150	.20	139	.17	
F214	LANGUAGE LAB		44	CB12	150	.20	139	.17	
F214	LANGUAGE LAB		45	CB12	150	.20	139	.17	
F222	WORLD LANGUAGE 4		46	CB11	100	.27	93	.23	
F222	WORLD LANGUAGE 4		47	CB11	100	.27	90	.22	
F222	WORLD LANGUAGE 4		48	CB11	100	.27	90	.22	
F222	WORLD LANGUAGE 4		49	CB11	100	.27	93	.23	
F222	WORLD LANGUAGE 4		50	CB11	100	.27	93	.23	
F222	WORLD LANGUAGE 4		51	CB11	100	.27	93	.23	
F217	SPECIAL ED CLASS 3		52	CB8	120	.21	114	.19	
F217	SPECIAL ED CLASS 3		53	CB8	120	.21	117	.20	
F217	SPECIAL ED CLASS 3		54	CB8	120	.21	114	.19	
F217	SPECIAL ED CLASS 3		55	CB8	120	.21	114	.19	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-162

NEBB CERTIFIED #2453

SHEET NO. 125

# DOAS-8

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
E231	STUDENT SERVICES		1	CB11	100	.27	94	.24	
E231	STUDENT SERVICES		2	CB11	100	.27	93	.23	
E231	STUDENT SERVICES		3	CB11	100	.27	96	.25	
E231	STUDENT SERVICES		4	CB11	100	.27	94	.24	
E231	STUDENT SERVICES		5	CB11	100	.27	93	.23	
E231	STUDENT SERVICES		6	CB11	100	.27	93	.23	
E232	WORLD LANGUAGE		7	CB11	100	.27	94	.24	
E232	WORLD LANGUAGE		8	CB11	100	.27	93	.23	
E232	WORLD LANGUAGE		9	CB11	100	.27	93	.23	
E232	WORLD LANGUAGE		10	CB11	100	.27	96	.25	
E232	WORLD LANGUAGE		11	CB11	100	.27	96	.25	
E232	WORLD LANGUAGE		12	CB11	100	.27	94	.24	
F225	WORLD LANGUAGE 1		13	CB11	100	.27	98	.26	
F225	WORLD LANGUAGE 1		14	CB11	100	.27	96	.25	
F225	WORLD LANGUAGE 1		15	CB11	100	.27	90	.22	
F225	WORLD LANGUAGE 1		16	CB11	100	.27	96	.25	
F225	WORLD LANGUAGE 1		17	CB11	100	.27	98	.26	
F225	WORLD LANGUAGE 1		18	CB11	100	.27	96	.25	
F220	CORRIDOR		19	N/A	350	N/A	336	N/A	
F210	STUDENT SERVICES		20	CB12	150	.20	143	.18	
F210	STUDENT SERVICES		21	CB12	150	.20	143	.18	
F210	STUDENT SERVICES		22	CB12	150	.20	143	.18	
F210	STUDENT SERVICES		23	CB12	150	.20	143	.18	
F224	WORLD LANGUAGE 2		24	CB11	100	.27	90	.22	
F224	WORLD LANGUAGE 2		25	CB11	100	.27	96	.25	
F224	WORLD LANGUAGE 2		26	CB11	100	.27	96	.25	
F224	WORLD LANGUAGE 2		27	CB11	100	.27	94	.24	
F224	WORLD LANGUAGE 2		28	CB11	100	.27	98	.26	
F224	WORLD LANGUAGE 2		29	CB11	100	.27	96	.25	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-163

NEBB CERTIFIED #2453

SHEET NO. 126

# DOAS-8

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
F221	WORLD LANGUAGE 7		56	CB11	100	.27	93	.23	
F221	WORLD LANGUAGE 7		57	CB11	100	.27	88	.21	
F221	WORLD LANGUAGE 7		58	CB11	100	.27	90	.22	
F221	WORLD LANGUAGE 7		59	CB11	100	.27	88	.21	
F221	WORLD LANGUAGE 7		60	CB11	100	.27	90	.22	
F221	WORLD LANGUAGE 7		61	CB11	100	.27	93	.23	
F218	SPECIAL ED CLASS 4		62	CB8	120	.21	114	.19	
F218	SPECIAL ED CLASS 4		63	CB8	120	.21	114	.19	
F218	SPECIAL ED CLASS 4		64	CB8	120	.21	114	.19	
F218	SPECIAL ED CLASS 4		65	CB8	120	.21	117	.20	
G231	WORLD LANGUAGE		66	CB11	100	.27	88	.21	
G231	WORLD LANGUAGE		67	CB11	100	.27	88	.21	
G231	WORLD LANGUAGE		68	CB11	100	.27	86	.20	
G231	WORLD LANGUAGE		69	CB11	100	.27	88	.21	
G231	READING RESOURCE		70	CB11	100	.27	90	.22	
G231	READING RESOURCE		71	CB11	100	.27	90	.22	
G230	CORRIDOR		72	N/A	350	N/A	315	N/A	
F219	STAGE STORAGE		73	CB5	25	.24	26	.27	
F219	STAGE STORAGE		74	CB5	25	.24	25	.25	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-164

NEBB CERTIFIED #2453

SHEET NO. 127



# DOAS-8

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: SPECIAL ED / WORLD LANGUAGE CLASSROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	9200 / 9190 (NOTE)	9273
SUCTION SP (" WG):	N/A	-1.93
DISCHARGE SP (" WG):	N/A	+.46
TOTAL SP (" WG):	3.7	2.39
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	467 / 469 / 471
AMPS T1/T2/T3:	5.0	3.7/3.6/3.6/3.5/3.6/3.5

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-09E-WN-HW-CW-X-C
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	4
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	58.4 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-165

NEBB CERTIFIED #2453

SHEET NO. 128

# DOAS-8

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
E231	STUDENT SERVICES		1	16X16	600	623	
E232	WORLD LANGUAGE		2	16X16	600	644	
E225	WORLD LANGUAGE 1		3	16X16	600	625	
F208	WOMEN		4	14X14	320	326	
F208	WOMEN		5	14X14	320	341	
F209	MEN		6	14X14	320	341	
F209	MEN		7	14X14	320	345	
F210	STUDENT SERVICES		8	16X16	600	611	
F224	WORLD LANGUAGE 2		9	16X16	600	622	
F211	WORLD LANGUAGE 6		10	16X16	600	578	
F223	WORLD LANGUAGE 3		11	16X16	600	580	
F222	WORLD LANGUAGE 4		12	16X16	600	596	
F221	WORLD LANGUAGE 7		13	16X16	600	567	
G231	WORLD LANGUAGE		14	16X16	600	532	
F214	LANGUAGE LAB		15	18X18	900	929	
F217	SPECIAL ED 3		16	14X14	480	458	
F218	SPECIAL ED 4		17	14X14	480	496	
F219	STAGE STORAGE		18	6X6	50	59	

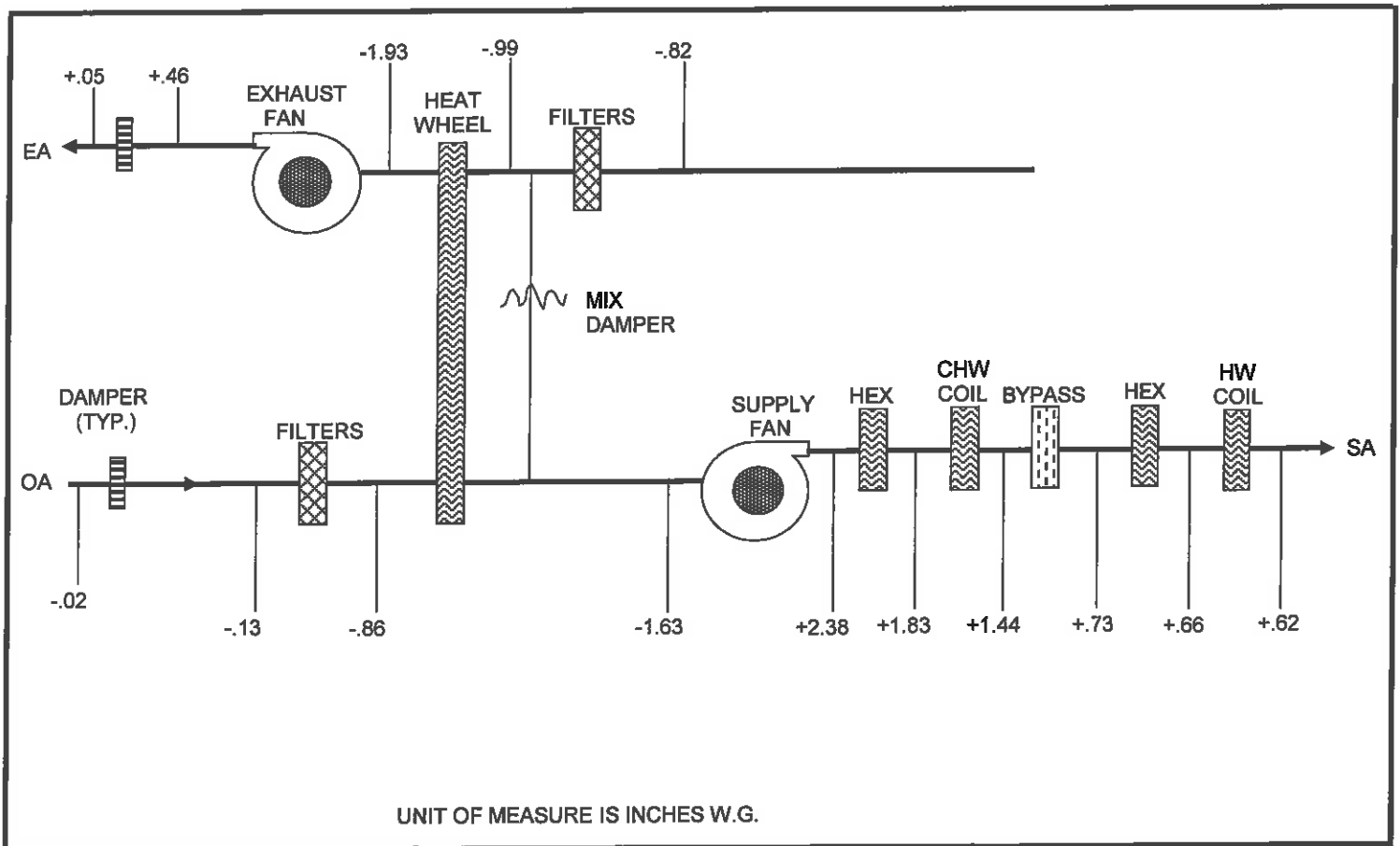
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-166

NEBB CERTIFIED #2453

SHEET NO. 129

# DOAS-8

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-167

NEBB CERTIFIED #2453

SHEET NO. 130

**DOAS-9****\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
E229	EARTH SCIENCE RM 1	9907	844	924	844	5.60	NO
E205	ANATOMY & PHYSIOLOGY	9968	780	816	780	4.91	NO
E225	MR HANBURY	11269	844	823	844	4.49	NO
E211	SHARED WORK ROOM	3006	207	203	207	4.13	NO
D234	BIولوجY CLASS 4	10734	876	650	876	4.90	NO
E226	EARTH SCIENCE RM 2	8631	850	825	850	5.91	NO
E207	AP/ECE BIOLOGY	10600	774	895	774	5.07	NO
E208	BIOLOGY CLASS 3	8689	776	767	776	5.36	NO
D240	GENERAL SCIENCE RM 1	6611	525	1887	525	17.13	NO
D242	OFFICE	1256	80	57	80	3.82	NO
D239	OFFICE	952	67	74	67	4.66	NO
D238	MENS STAFF BATHROOM	314	0	60	0	11.46	NO
D237	WOMENS STAFF BATHROOM	305	0	61	0	12.00	NO
D230	STAFF DINING ROOM	2746	157	166	157	3.63	NO
D222	OFFICE	1001	83	45	83	4.98	NO
E213	MEN	1448	0	261	0	10.81	NO
E214	WOMEN	1393	0	274	0	11.80	NO
E206	DISECTION STORAGE	1749	64	574	64	19.69	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-168

NEBB CERTIFIED #2453

SHEET NO. 131

# DOAS-9

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: BIOLOGY AND MISCELLANEOUS CLASSROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	7980 / 8770 (NOTE)	7874
OA CFM:	7980 / 8770 (NOTE)	8056
TOTAL SP (" WG):	7.0	4.70
EXT SP (" WG):	3.6	1.18
FAN RPM:	3460	N/A
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	484/485/485
AMPS T1/T2/T3:	7.4	6.3/6.1/6.4/6.5/6.2/6.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-O8E
MOTOR MANUFACTURER:	BALDOR
MOTOR MODEL NO:	06K111W730G6
MOTOR HP:	6.5
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	54.2 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	41X72	20.5	7980	389	393	8056	

NOTE: FAN DESIGN / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-169

NEBB CERTIFIED #2453

SHEET NO. 132

# DOAS-9

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
E205	ANATOMY & PHYSIOLOGY		1	CB12	150	.20	126	.14	
E205	ANATOMY & PHYSIOLOGY		2	CB12	150	.20	131	.15	
E205	ANATOMY & PHYSIOLOGY		3	CB12	150	.20	126	.14	
E205	ANATOMY & PHYSIOLOGY		4	CB12	150	.20	131	.15	
E205	ANATOMY & PHYSIOLOGY		5	CB12	150	.20	135	.16	
E205	ANATOMY & PHYSIOLOGY		6	CB12	150	.20	131	.15	
E206	DISSECTION STORAGE		7	CB5	45	.79	32	.39	
E206	DISSECTION STORAGE		8	CB5	45	.79	32	.39	
E207	AP/ECE BIOLOGY		9	CB13	150	.14	127	.10	
E207	AP/ECE BIOLOGY		10	CB13	150	.14	133	.11	
E207	AP/ECE BIOLOGY		11	CB13	150	.14	133	.11	
E207	AP/ECE BIOLOGY		12	CB13	150	.14	133	.11	
E207	AP/ECE BIOLOGY		13	CB13	150	.14	121	.09	
E207	AP/ECE BIOLOGY		14	CB13	150	.14	127	.10	
E228	CORRIDOR		15	9X9	250	N/A	210	N/A	
E229	EARTH SCIENCE RM1		16	CB12	110	.11	107	.10	
E229	EARTH SCIENCE RM1		17	CB12	110	.11	107	.10	
E229	EARTH SCIENCE RM1		18	CB12	110	.11	107	.10	
E229	EARTH SCIENCE RM1		19	CB12	110	.11	107	.10	
E229	EARTH SCIENCE RM1		20	CB12	110	.11	101	.09	
E229	EARTH SCIENCE RM1		21	CB12	110	.11	107	.10	
E229	EARTH SCIENCE RM1		22	CB12	110	.11	101	.09	
E229	EARTH SCIENCE RM1		23	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		24	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		25	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		26	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		27	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		28	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		29	CB12	110	.11	101	.09	
E226	EARTH SCIENCE RM 2		30	CB12	110	.11	107	.10	
E226	EARTH SCIENCE RM 2		31	CB12	110	.11	107	.10	

PROJECT: BERLIN HIGH SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-170

NEBB CERTIFIED #2453

SHEET NO. 133

# DOAS-9

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
E225	PHYSICS CLASSROOM		32	CB12	110	.11	107	.10	
E225	PHYSICS CLASSROOM		33	CB12	110	.11	101	.09	
E225	PHYSICS CLASSROOM		34	CB12	110	.11	107	.10	
E225	PHYSICS CLASSROOM		35	CB12	110	.11	107	.10	
E225	PHYSICS CLASSROOM		36	CB12	110	.11	101	.09	
E225	PHYSICS CLASSROOM		37	CB12	110	.11	107	.10	
E225	PHYSICS CLASSROOM		38	CB12	110	.11	107	.10	
E225	PHYSICS CLASSROOM		39	CB12	110	.11	107	.10	
E208	BIOLOGY CLASSROOM 3		40	CB8	150	.33	129	.24	
E208	BIOLOGY CLASSROOM 3		41	CB8	150	.33	129	.24	
E208	BIOLOGY CLASSROOM 3		42	CB8	150	.33	131	.25	
E208	BIOLOGY CLASSROOM 3		43	CB8	150	.33	129	.24	
E208	BIOLOGY CLASSROOM 3		44	CB8	150	.33	129	.24	
E208	BIOLOGY CLASSROOM 3		45	CB8	150	.33	129	.24	
E209	TR 2		46	6X6	20	N/A	21	N/A	
E211	SHARED WORK ROOM		47	CB3	60	.40	51	.29	
E211	SHARED WORK ROOM		48	CB3	60	.40	52	.30	
E211	SHARED WORK ROOM		49	CB3	60	.40	52	.30	
E211	SHARED WORK ROOM		50	CB3	60	.40	52	.30	
E203	CORRIDOR		51	N/A	400	N/A	326	N/A	
D240	GENERAL SCIENCE RM 1		52	CB4	100	.35	88	.27	
D240	GENERAL SCIENCE RM 1		53	CB4	100	.35	88	.27	
D240	GENERAL SCIENCE RM 1		54	CB4	100	.35	88	.27	
D240	GENERAL SCIENCE RM 1		55	CB4	100	.35	90	.28	
D240	GENERAL SCIENCE RM 1		56	CB4	100	.35	91	.29	
D240	GENERAL SCIENCE RM 1		57	CB4	100	.35	80	.22	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-171

NEBB CERTIFIED #2453

SHEET NO. 134

# DOAS-9

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
D234	BIOLOGY CLASSROOM 4		58	CB12	115	.12	169	.25	
D234	BIOLOGY CLASSROOM 4		59	CB12	115	.12	96	.08	
D234	BIOLOGY CLASSROOM 4		60	CB12	115	.12	101	.09	
D234	BIOLOGY CLASSROOM 4		61	CB12	115	.12	106	.10	
D234	BIOLOGY CLASSROOM 4		62	CB12	115	.12	101	.09	
D234	BIOLOGY CLASSROOM 4		63	CB12	115	.12	106	.10	
D234	BIOLOGY CLASSROOM 4		64	CB12	115	.12	96	.08	
D234	BIOLOGY CLASSROOM 4		65	CB12	115	.12	101	.09	
D239	OFFICE		66	6X6	75	N/A	67	67	
D243	ELECT CLOSET		67	14X14	360	N/A	306	N/A	
D242	OFFICE		68	6X6	75	N/A	80	80	
D231	DRY STORAGE		69	6X6	40	N/A	84	N/A	
D230	STAFF DINING ROOM		70	CB11	120	.39	80	.17	
D230	STAFF DINING ROOM		71	CB11	120	.39	77	.16	
D222	OFFICE		72	6X6	60	N/A	83	83	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-172

NEBB CERTIFIED #2453

SHEET NO. 135



# DOAS-9

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: BIOLOGY AND MUSIC CLASSROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	7980 / 8645 (NOTE)	9210
SUCTION SP (" WG):	N/A	-1.99
DISCHARGE SP (" WG):	N/A	+.43
TOTAL SP (" WG):	3.7	2.42
FAN RPM:	N/A	N/A
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	404 / 485 / 485
AMPS T1/T2/T3:	4.7	3.5/3.3/3.4   3.3/3.2/3.3

UNIT / MOTOR DATA (TYP OF 2)	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-08E
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	3.5
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	62.5 HZ

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-173

NEBB CERTIFIED #2453

SHEET NO. 136

# DOAS-9

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
E225	PHYSICS CLASSROOM		1	22X22	N/A	900	N/A	N/A	823	
E226	EARTH SCIENCE 2		2	22X22	N/A	900	N/A	N/A	825	
E229	EARTH SCIENCE 1		3	22X22	N/A	900	N/A	N/A	924	
E207	AP-ECE BIOLOGY CLASS		4	22X22	N/A	900	N/A	N/A	895	
E206	DISSECTION STORAGE		5	6X6	N/A	90	N/A	N/A	78	
E205	ANATOMY CLASSROOM		6	22X22	N/A	900	N/A	N/A	816	
E208	BIOLOGY CLASS 3		7	22X22	N/A	900	N/A	N/A	767	
E211	SHARED WORK ROOM		8	12X12	N/A	240	N/A	N/A	206	
E213	MEN		9	12X12	N/A	315	N/A	N/A	261	
E214	WOMEN		10	12X12	N/A	315	N/A	N/A	274	
E215	CUSTODIAN		11	8X8	.356	105	295	305	87	
D234	BIOLOGY CLASS 4		12	18X18	2.25	920	409	N/A	623	
D240	GENERAL SCIENCE 1		13	16X16	1.777	600	338	1062	1887	
D243	ELEC CLOSET		14	10X10	.556	360	647	487	271	
D242	OFFICE		15	10X10	N/A	75	N/A	N/A	67	
D239	OFFICE		16	10X10	N/A	75	N/A	N/A	74	
D238	MEN STAFF		17	10X10	N/A	75	N/A	N/A	60	
D237	WOMEN STAFF		17	10X10	N/A	75	N/A	N/A	61	
D230	STAFF DINING		19	10X10	N/A	N/A	N/A	N/A	166	
D222	KITCHEN OFFICE		20	6X6	.139	N/A	N/A	325	45	

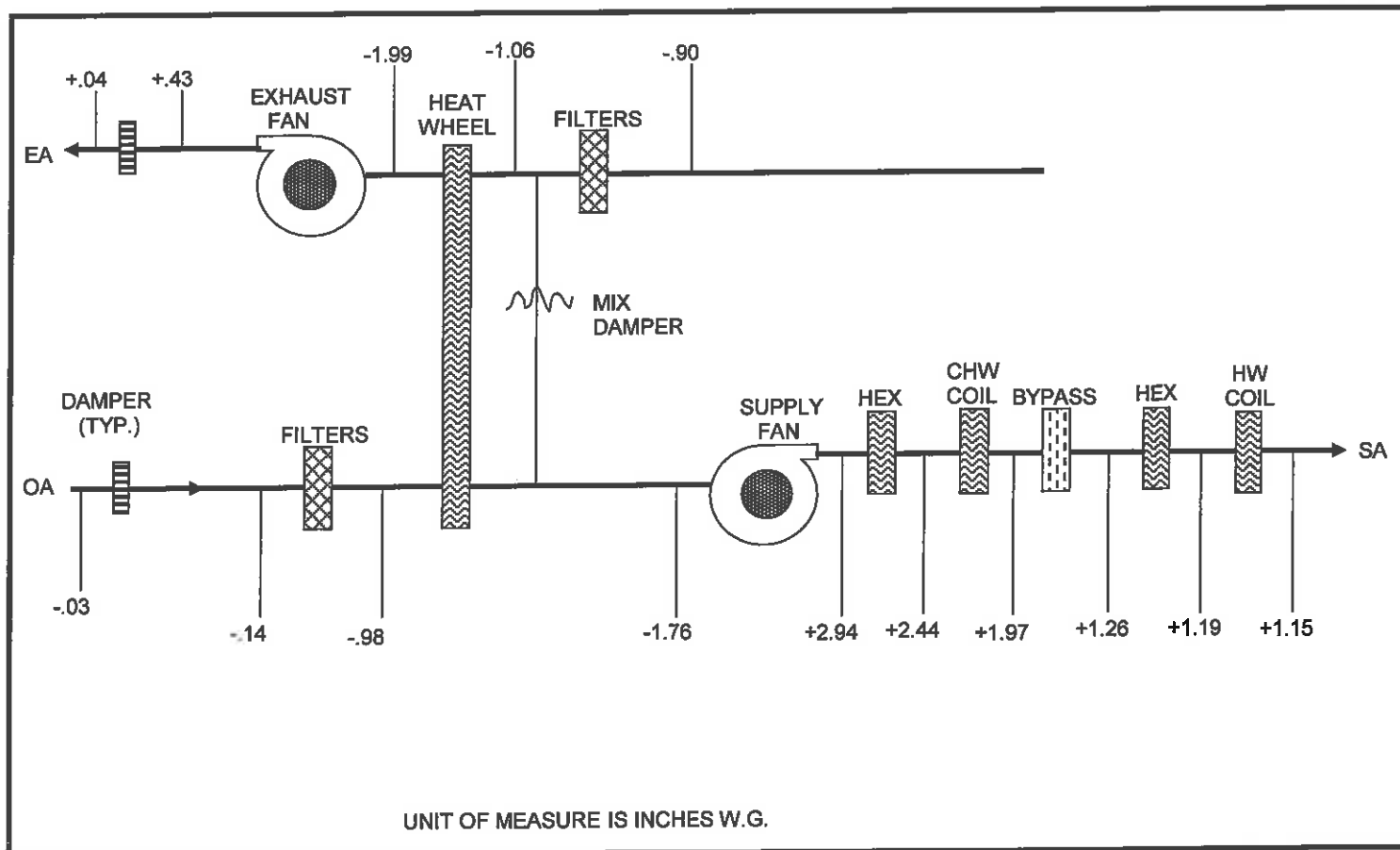
PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-174

NEBB CERTIFIED #2453

SHEET NO. 137

# DOAS-9

## \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-175

NEBB CERTIFIED #2453

SHEET NO. 138

# DOAS-10

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERAABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
E219	CHEMISTRY CLASS 4	10056	874	665	874	5.21	NO
E218	CHEMISTRY CLASS 1	9439	853	679	853	5.42	NO
E222	CHEMISTRY CLASS 2	9353	882	706	882	5.66	NO
E223	CHEMISTRY CLASS 3	10757	922	699	922	5.14	NO
E217	CHEMICAL STORAGE	1791	64	408	64	13.67	NO
E220	STAFF PREP ROOM	1823	75	261	75	8.59	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-176

NEBB CERTIFIED #2453

SHEET NO. 139

# DOAS-10

## \*\* DIRECT DRIVE SUPPLY FAN REPORT \*\*

AREA SERVED: R-6 CHEMISTRY CLASSROOMS

FAN LOCATION: R-6 ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	4000 / 3990 (NOTE)	3908
OA CFM:	4000 / 3990 (NOTE)	4028
TOTAL SP (" WG):	7.0	4.32
EXT SP (" WG):	3.6	1.05
FAN RPM:	N/A	3561
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3:	N/A	484/483/484
AMPS T1/T2/T3:	7.4	5.5/5.6/5.6

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-04E
MOTOR MANUFACTURER:	BALDOR
MOTOR MODEL NO:	06K111W730G6
MOTOR HP:	6.5
MOTOR SF:	1.15
MOTOR FRAME:	184TZ
VFD SETTING:	56.5 HZ

OUTSIDE AIR DATA										
	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	OA INTAKE		1	41X36	10.25	4000	390	393	4028	

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-177

NEBB CERTIFIED #2453

SHEET NO. 140

# DOAS-10

**\*\* CHILLED BEAMS \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN DIFFERENTIAL PRESSURE ("WC)	ACTUAL CFM	ACTUAL DIFFERENTIAL PRESSURE ("WC)	NOTES
E218	CHEMISTRY CLASS 1		1	CB12	110	.11	115	.12	
E218	CHEMISTRY CLASS 1		2	CB12	110	.11	105	.10	
E218	CHEMISTRY CLASS 1		3	CB12	110	.11	110	.11	
E218	CHEMISTRY CLASS 1		4	CB12	110	.11	110	.11	
E218	CHEMISTRY CLASS 1		5	CB12	110	.11	101	.09	
E218	CHEMISTRY CLASS 1		6	CB12	110	.11	101	.09	
E218	CHEMISTRY CLASS 1		7	CB12	110	.11	101	.09	
E218	CHEMISTRY CLASS 1		8	CB12	110	.11	110	.11	
E219	CHEMISTRY CLASS 4		9	CB12	150	.20	143	.18	
E219	CHEMISTRY CLASS 4		10	CB12	150	.20	151	.20	
E219	CHEMISTRY CLASS 4		11	CB12	150	.20	151	.20	
E219	CHEMISTRY CLASS 4		12	CB12	150	.20	139	.17	
E219	CHEMISTRY CLASS 4		13	CB12	150	.20	151	.20	
E219	CHEMISTRY CLASS 4		14	CB12	150	.20	139	.17	
E220	STAFF PREP ROOM		15	CB5	45	.79	37	.52	
E220	STAFF PREP ROOM		16	CB5	45	.79	38	.56	
E221	CORRIDOR		17	8X8	250	N/A	238	N/A	
E217	CHEM STORAGE		18	CB5	45	.79	32	.40	
E217	CHEM STORAGE		19	CB5	45	.79	32	.39	
E222	CHEMISTRY CLASS 2		20	CB12	110	.11	110	.11	
E222	CHEMISTRY CLASS 2		21	CB12	110	.11	110	.11	
E222	CHEMISTRY CLASS 2		22	CB12	110	.11	131	.15	
E222	CHEMISTRY CLASS 2		23	CB12	110	.11	110	.11	
E222	CHEMISTRY CLASS 2		24	CB12	110	.11	110	.11	
E222	CHEMISTRY CLASS 2		25	CB12	110	.11	101	.09	
E222	CHEMISTRY CLASS 2		26	CB12	110	.11	105	.10	
E222	CHEMISTRY CLASS 2		27	CB12	110	.11	105	.10	
E223	CHEMISTRY CLASS 3		28	CB12	150	.20	155	.21	
E223	CHEMISTRY CLASS 3		29	CB12	150	.20	155	.21	
E223	CHEMISTRY CLASS 3		30	CB12	150	.20	151	.20	
E223	CHEMISTRY CLASS 3		31	CB12	150	.20	151	.20	
E223	CHEMISTRY CLASS 3		32	CB12	150	.20	155	.21	
E223	CHEMISTRY CLASS 3		33	CB12	150	.20	155	.21	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-178

NEBB CERTIFIED #2453

SHEET NO. 141

# DOAS-10

## \*\* DIRECT DRIVE EXHAUST FAN REPORT \*\*

AREA SERVED: R-6 CHEMISTRY CLASSROOMS

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	3200	2749
SUCTION SP (" WG):	N/A	-.76
DISCHARGE SP (" WG):	N/A	+.09
TOTAL SP (" WG):	3.7	.85
FAN RPM:	N/A	1688
VOLTS/PHASE/CYCLE:	460 / 3 / 60	N/A
T1-T2/T2-T3/T1-T3:	N/A	484 / 483 / 484
AMPS T1/T2/T3:	5	1.7/1.8/1.7

UNIT / MOTOR DATA	
FAN MANUFACTURER:	VENMAR
FAN MODEL NO:	WPA-2-04E
MOTOR MANUFACTURER:	BALDOR
MOTOR MODEL NO:	06K111W356G5
MOTOR HP:	4
MOTOR SF:	1.15
MOTOR FRAME:	182TZ
VFD SETTING:	46.9 HZ

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-179

NEBB CERTIFIED #2453

SHEET NO. 142

# DOAS-10

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
E218	CHEMISTRY CLASS 1		1	22X22	3.361	790	235	202	679	
E219	CHEMISTRY CLASS 4		2	22X22	3.361	810	241	198	665	
E222	CHEMISTRY CLASS 2		3	22X22	3.361	790	235	210	706	
E223	CHEMISTRY CLASS 3		4	22X22	3.361	810	241	208	699	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-180

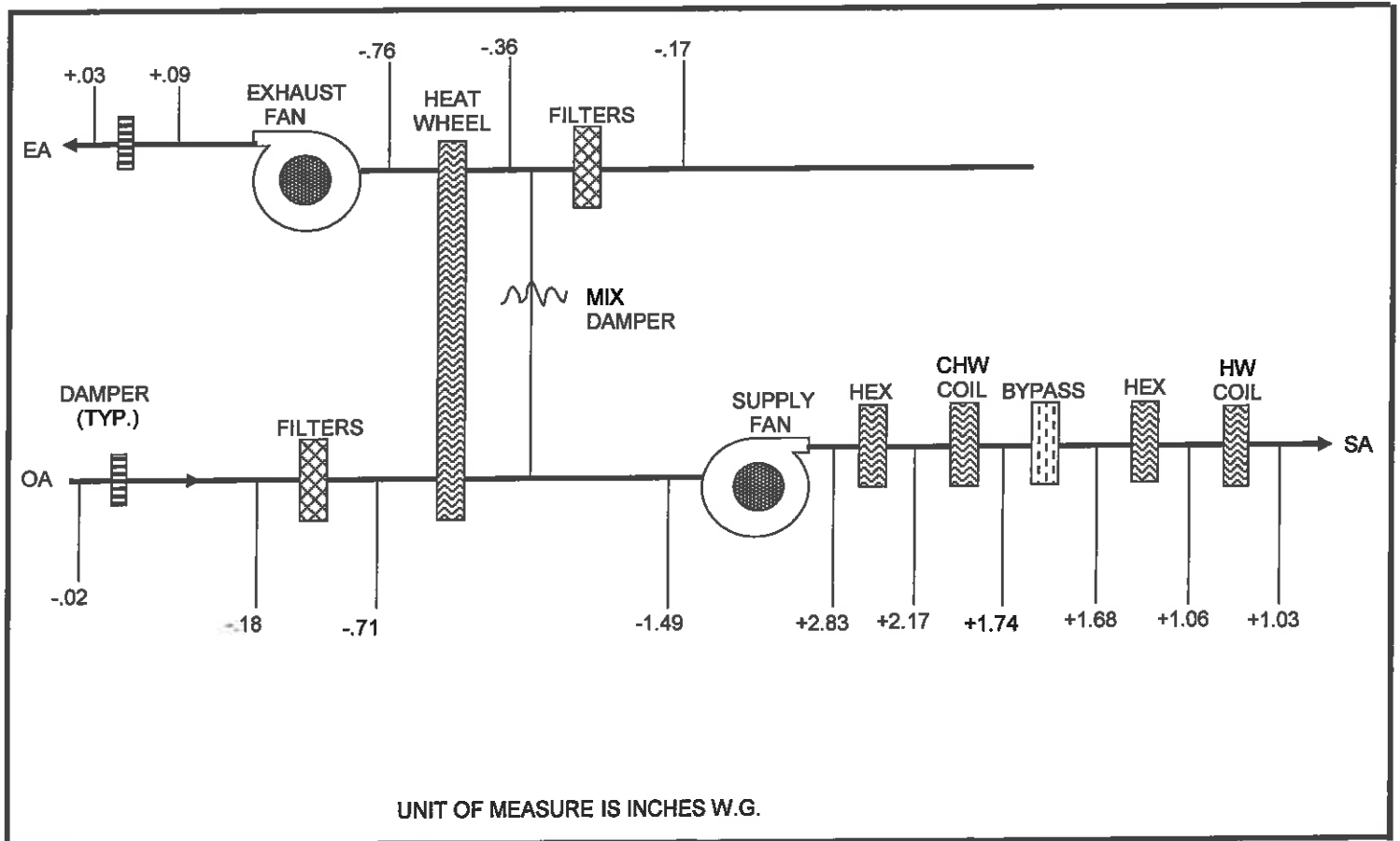
NEBB CERTIFIED #2453

SHEET NO. 143



# DOAS-10

**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-181

NEBB CERTIFIED #2453

SHEET NO. 144

# MAU-1 / KEF-1 & 2

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
	KITCHEN	8040	3803	3680	3803	28.38	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-213

NEBB CERTIFIED #2453

SHEET NO. 145

# MAU-1 (KEF-1 & KEF-2 ON)

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: KITCHEN

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	6000/3900/4974 (NOTE)	3803
OA CFM:	6000/3900/4974 ↓	3803
TOTAL SP (" WG):	3.145	.70
EXT SP (" WG):	2.5	.64
FAN RPM:	1296	1037
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	482/483/482
AMPS T1/T2/T3:	6.6	4.0/4.0/4.0

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	1GX-112
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	5
MOTOR RPM:	1750
MOTOR SF:	1.15
MOTOR FRAME:	184T
MOTOR SHEAVE BORE X OD:	1 1/8 X 1VP56
FAN SHEAVE BORE X OD:	1 X BK70
BELT NO/SIZE:	1 / BX59
FINAL SHEAVE POSITION:	75% CLOSED
C-C WITH ADJUSTMENT ("):	21 1/2, +2, -2
VFD SETTING:	43.42 HZ

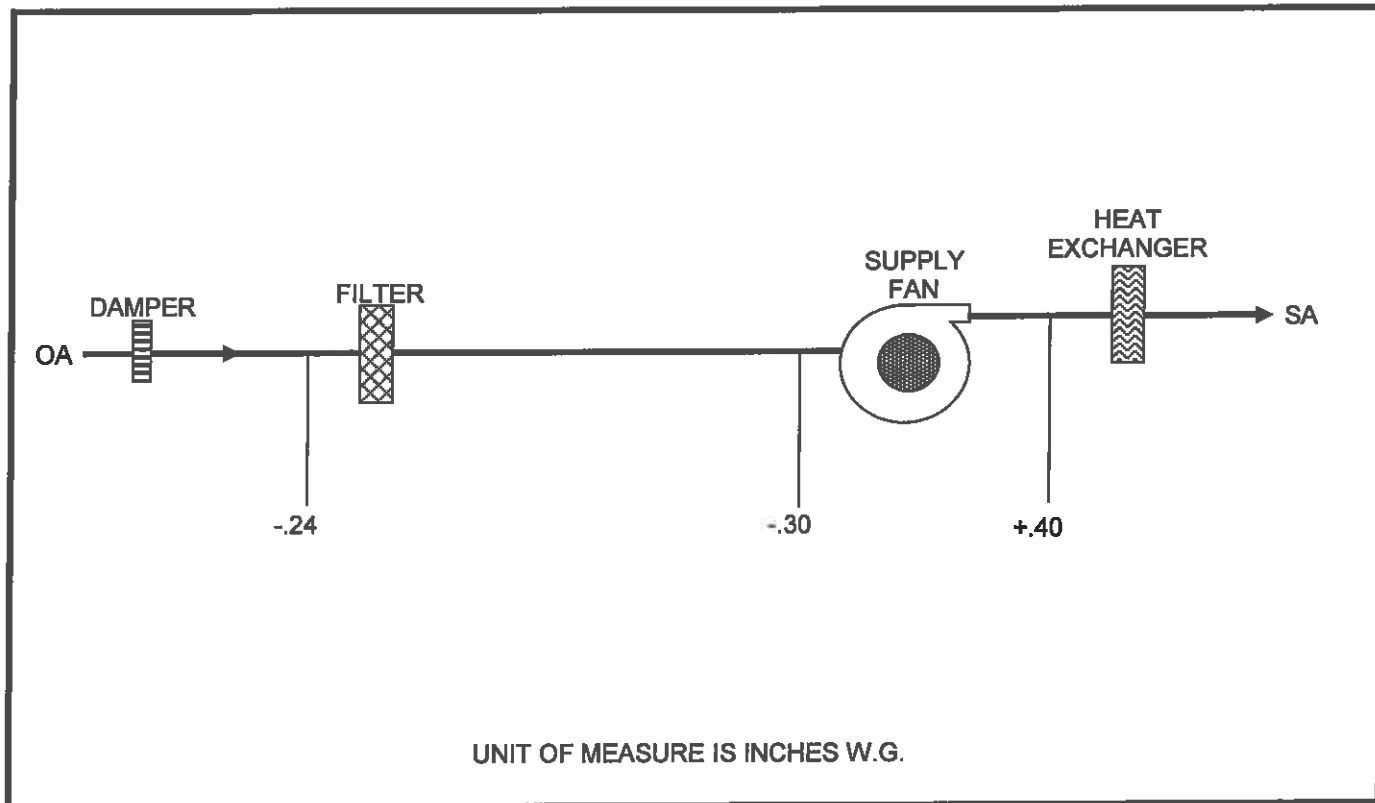
NOTE: FAN DESIGN / SK-M17 CFM / OUTLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-214

NEBB CERTIFIED #2453

SHEET NO. 146

**MAU-1 (43.42 HZ)**  
**\*\* STATIC PRESSURE PROFILE \*\***



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-215

NEBB CERTIFIED #2453

SHEET NO. 147

# MAU-1

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
D218	KEF-1 MU PLENUM		1	134X21	1712	1371	1
D218	KEF-2 MU PLENUM		2	134X21	1662	1270	1
D226	KITCHEN PREP		3	12X12	320	228	
D226	KITCHEN PREP		4	12X12	320	226	
D219	KITCHEN POT WASH		5	12X12	320	233	
D218	KITCHEN COOK LINE 1		6	12X12	320	229	
D217	KITCHEN COOK LINE 2		7	12X12	320	246	
TOTAL CFM					4974	3803	

NOTE 1: AIRFLOW MEASURED WITH RVA USING A 33.43 AK FACTOR

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-216

NEBB CERTIFIED #2453

SHEET NO. 148

# MAU-2 / EF-12

## \*\* AIR CHANGE DATA \*\*

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
B178	CONSUMER SCIENCE	12639	813	2613	813	12.40	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-221

NEBB CERTIFIED #2453

SHEET NO. 149

# MAU-2

## \*\* SUPPLY FAN REPORT \*\*

AREA SERVED: CONSUMER SCIENCE

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2500	813
TOTAL SP (" WG):	2.821	1.76
EXT SP (" WG):	2.5	1.47
FAN RPM:	1912	1663
VOLTS/PHASE/CYCLE:	460/3/60	N/A
T1-T2/T2-T3/T1-T3	N/A	490/493/491
AMPS T1/T2/T3:	4.2	3.8/3.7/3.8

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	1GX-109
MOTOR MANUFACTURER:	BALDOR
MOTOR HP:	3
MOTOR RPM:	1765
MOTOR SF:	1.15
MOTOR FRAME:	182T
MOTOR SHEAVE BORE X OD:	1 1/8 X VP56
FAN SHEAVE BORE X OD:	3/4 X AK49
BELT NO/SIZE:	1 / AP51
FINAL SHEAVE POSITION:	100% CLOSED
C-C WITH ADJUSTMENT ("):	19 + 2, -2

OUTSIDE AIR DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	18X14 (4)									
	OA INTAKE		1	28X36	7.0	2500	357	362	2534	

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-222

NEBB CERTIFIED #2453

SHEET NO. 150

## MAU-2

### \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B178	CONSUMER SCIENCE		1	15X15	280	91	
B178	CONSUMER SCIENCE		2	15X15	280	84	
B178	CONSUMER SCIENCE		3	15X15	280	87	
B178	CONSUMER SCIENCE		4	15X15	280	89	
B178	CONSUMER SCIENCE		5	15X15	280	95	
B178	CONSUMER SCIENCE		6	15X15	280	103	
B178	CONSUMER SCIENCE		7	15X15	280	88	
B178	CONSUMER SCIENCE		8	15X15	280	83	
B178	CONSUMER SCIENCE		9	15X15	280	92	
TOTAL CFM					2520	812	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-223

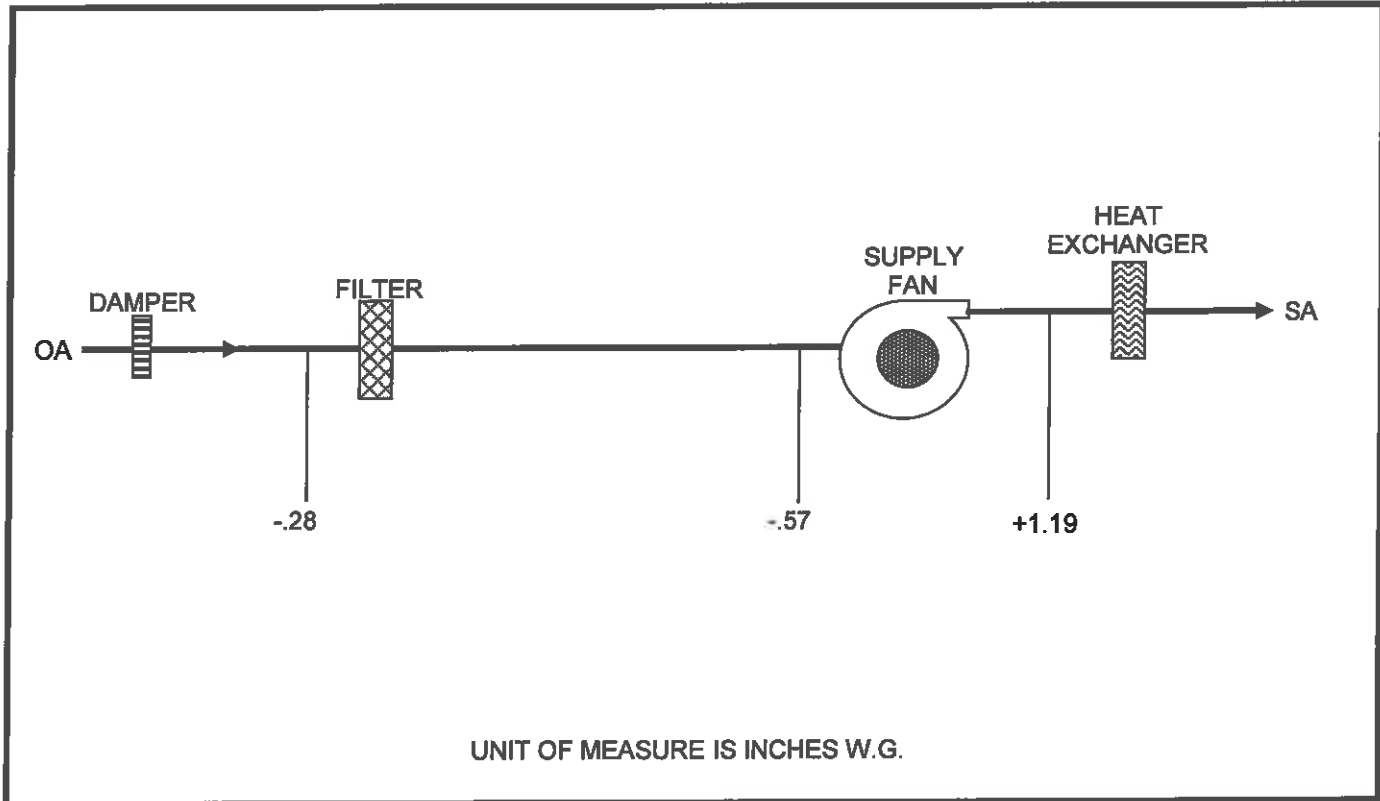
NEBB CERTIFIED #2453

SHEET NO. 151



## MAU-2

### \*\* STATIC PRESSURE PROFILE \*\*



PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-224

NEBB CERTIFIED #2453

SHEET NO. 152

# KEF-1

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: KITCHEN

FAN LOCATION: D ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2736	1960

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	CUBE-180
MOTOR MANUFACTURER:	MARATHON
MOTOR HP:	1/2
MOTOR RPM:	1725
MOTOR SF:	1.15
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP34S
FAN SHEAVE BORE X OD:	3/4 X 6
BELT NO/SIZE:	1 / 4L260
FINAL SHEAVE POSITION:	CLOSED
C-C WITH ADJUSTMENT ("):	12, +1, -1

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	VELGRID TOTAL		1	28X10	11.2	2736	244	175	1960	

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-210

NEBB CERTIFIED #2453

SHEET NO. 153

## KEF-2

### \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: KITCHEN

FAN LOCATION: D ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2078	1232

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	CUBE-161
MOTOR MANUFACTURER:	MARATHON
MOTOR HP:	1/2
MOTOR RPM:	1725
MOTOR SF:	1.15
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP34S
FAN SHEAVE BORE X OD:	3/4 X 5
BELT NO/SIZE:	1 / AP20
FINAL SHEAVE POSITION:	50%
C-C WITH ADJUSTMENT ("):	12, +1, -1

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
	VELGRID TOTAL		1	28X10	11.2	2078	186	110	1232	

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-211

NEBB CERTIFIED #2453

SHEET NO. 154

# KEF-4

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: DISHWASHER  
FAN LOCATION: D ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	450	488

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	CUBE-099-3-X
MOTOR MANUFACTURER:	MARATHON
MOTOR HP:	1/3
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP34S
FAN SHEAVE BORE X OD:	3/4 X AK54
BELT NO/SIZE:	1 / 4L230R
FINAL SHEAVE POSITION:	50%
C-C WITH ADJUSTMENT ("):	5, +1, -1

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
D219	HOOD INTAKE		1	8 X 8	0.444	450	1014	1098	488	

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-212

NEBB CERTIFIED #2453

SHEET NO. 155

# EXHAUST FANS

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		OA CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM			
G237	WOMEN	2893	0	595	0	12.34	NO
G236	MEN	2629	0	621	0	14.17	NO
B227	WOMEN	1999	0	392	0	11.77	NO
D223	UNISEX LOCKERS	1902	0	143	0	4.51	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-182

NEBB CERTIFIED #2453

SHEET NO. 150

# EF-7

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: CHEMICAL STORAGE E217

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	270	408

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-081
MOTOR MANUFACTURER:	GREENHECK
MOTOR MODEL NO:	CK48HB02K01
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X 1VP25
FAN SHEAVE BORE X OD:	3/4 X AK46
BELT NO/SIZE:	1 / 3L220
FINAL SHEAVE POSITION:	90% OPEN
C-C WITH ADJUSTMENT ("):	5, +1, -1

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
E217	CHEM STORAGE		1	8X12	.44	270	614	927	408	

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-186

NEBB CERTIFIED #2453

SHEET NO. 157

# EF-8

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: STAFF PREP ROOM E220

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	270	261

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-081
MOTOR MANUFACTURER:	GREENHECK
MOTOR MODEL NO:	CK48HB02K01
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X 1VP25
FAN SHEAVE BORE X OD:	3/4 X AK46
BELT NO/SIZE:	1 / 3L220
FINAL SHEAVE POSITION:	90% OPEN
C-C WITH ADJUSTMENT ("):	5, +1, -1

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
E220	STAFF PREP ROOM		1	8X12	.44	270	614	594	261	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-187

NEBB CERTIFIED #2453

SHEET NO. 158

# EF-9

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: DISSECTION STORAGE E206

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	270	574
SUCTION SP (" WG):	N/A	-.02

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-081
MOTOR MANUFACTURER:	GREENHECK
MOTOR MODEL NO:	CK48HB02K01
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X 1VP25
FAN SHEAVE BORE X OD:	3/4 X AK64
BELT NO/SIZE:	1 / 3L230
FINAL SHEAVE POSITION:	100% OPEN
C-C WITH ADJUSTMENT ("):	5, +1 1/2, -1/2

AIR INLET DATA										
ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
E206	DISSECTION STOR		1	12X12	1.0	270	270	574	574	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-188

NEBB CERTIFIED #2453

SHEET NO. 159



# EF-10

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: MEN G236

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	600	622
SUCTION SP (" WG):	N/A	-.23
DISCHARGE SP (" WG):	N/A	+.01
TOTAL SP (" WG):	N/A	.24
FAN RPM:	1245	1214
VOLTS/PHASE/CYCLE:	120/1/60	118/1/60
AMPS:	4.6	4.0

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-091
MOTOR MANUFACTURER:	GREENHECK
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP30
FAN SHEAVE BORE X OD:	3/4 X AK41
BELT NO/SIZE:	1 / 3L190R
FINAL SHEAVE POSITION:	80% CLOSED
C-C WITH ADJUSTMENT ("):	4 1/2, +1 1/2, -1/2

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-189

NEBB CERTIFIED #2453

SHEET NO. 160

# EF-10

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
G236	MENS		1	10X10	150	157	
G236	MENS		2	10X10	150	149	
G236	MENS		3	10X10	150	165	
G236	MENS		4	10X10	150	151	
TOTAL CFM					600	622	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-190

NEBB CERTIFIED #2453

SHEET NO. 161

# EF-11

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: WOMEN G237

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	600	596
SUCTION SP (" WG):	N/A	-.26
DISCHARGE SP (" WG):	N/A	+.01
TOTAL SP (" WG):	N/A	.27
FAN RPM:	1245	1222
VOLTS/PHASE/CYCLE:	120/1/60	118/1/60
AMPS:	4.6	3.9

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-091
MOTOR MANUFACTURER:	GREENHECK
MOTOR MODEL NO:	CK48HB02K01
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP30
FAN SHEAVE BORE X OD:	3/4 X AK41
BELT NO/SIZE:	1 / 3L190R
FINAL SHEAVE POSITION:	80% CLOSED
C-C WITH ADJUSTMENT ("):	4 1/2, +1 1/2, -1/2

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-191

NEBB CERTIFIED #2453

SHEET NO. 162

# EF-11

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
G237	WOMEN		1	10X10	150	142	
G237	WOMEN		2	10X10	150	154	
G237	WOMEN		3	10X10	150	153	
G237	WOMEN		4	10X10	150	147	
TOTAL CFM					600	596	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-192

NEBB CERTIFIED #2453

SHEET NO. 163

## EF-12

### \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: CONSUMER SCIENCE

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	2750	2633
SUCTION SP (" WG):	N/A	-.36
DISCHARGE SP (" WG):	N/A	+.08
TOTAL SP (" WG):	N/A	.44
FAN RPM:	730	702
VOLTS/PHASE/CYCLE:	115/1/60	118/1/60
AMPS:	7.2	5.7

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	CUBE-200-5-6
MOTOR MANUFACTURER:	MARATHON
MOTOR HP:	1/2
MOTOR RPM:	1725
MOTOR SF:	1.25
MOTOR FRAME:	48Z
MOTOR SHEAVE BORE X OD:	1/2 X VP34S
FAN SHEAVE BORE X OD:	3/4 X AK74
BELT NO/SIZE:	1 / AP27
FINAL SHEAVE POSITION:	50%
C-C WITH ADJUSTMENT ("):	6, +2, -2

PROJECT: BERLIN HIGH SCHOOL

SUBMITTED BY: AIR BALANCING SERVICE CO.

CODE: 20240-193

NEBB CERTIFIED #2453

SHEET NO. 164

## EF-12

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 70

DUCT SP (" WG): -.19

DUCT WIDTH ("): 20

DUCT HEIGHT ("): 18

DUCT AREA (SQ FT): 2.500

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 21060

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	2750		2633
FPM:	1100		1053

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-194

NEBB CERTIFIED #2453

SHEET NO. 165

# EF-12

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	DESIGN CFM	DESIGN VEL	ACTUAL VEL	ACTUAL CFM	NOTES
B178	RANGE HOOD 1		1	13X12	1.083	550	508	484	524	
B178	RANGE HOOD 2		2	12X12	1.000	500	500	477	477	
B178	RANGE HOOD 3		3	12X10	0.833	425	510	490	408	
B178	RANGE HOOD 3		4	12X10	0.833	425	510	489	407	
B178	RANGE HOOD 3		5	12X10	0.833	425	510	486	405	
B178	RANGE HOOD 3		6	12X10	0.833	425	510	484	403	
TOTAL CFM						2750			2624	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-195

NEBB CERTIFIED #2453

SHEET NO. 166

# EF-16

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: WOMENS TOILET B227

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	380 / 405 (NOTE)	418

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-081-4-X
MOTOR MANUFACTURER:	GREENHECK
MOTOR HP:	1/4
MOTOR RPM:	1725
MOTOR SF:	1.35
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP30
FAN SHEAVE BORE X OD:	3/4 X AK46
BELT NO/SIZE:	1 / 3L190R
FINAL SHEAVE POSITION:	100% OPEN
C-C WITH ADJUSTMENT ("):	4 3/4, + 2 1/2, -1

NOTE: FAN DESIGN / INLET TOTAL

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-199

NEBB CERTIFIED #2453

SHEET NO. 167



# EF-16

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
B227	WOMEN		1	12X12	190	206	
B227	WOMEN		2	12X12	190	186	
B228	TR 1		3	6X6	25	26	1
TOTAL CFM					405	418	

NOTE 1: AIRFLOW MEASURED WITH RVA USING A .139 AK FACTOR

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-200

NEBB CERTIFIED #2453

SHEET NO. 168

# EF-19

## \*\* EXHAUST FAN REPORT \*\*

AREA SERVED: D WING CUST.-LOCKER-TLT

FAN LOCATION: ROOF

FAN PERFORMANCE DATA		
	DESIGN	ACTUAL
CFM:	210	221
AMPS:	3.6	3.2

UNIT / MOTOR DATA	
FAN MANUFACTURER:	GREENHECK
FAN MODEL NO:	GB-071-6-X
MOTOR MANUFACTURER:	MARATHON
MOTOR HP:	1/6
MOTOR RPM:	1725
MOTOR SF:	1.15
MOTOR FRAME:	48Y
MOTOR SHEAVE BORE X OD:	1/2 X VP25
FAN SHEAVE BORE X OD:	3/4 X AK46
BELT NO/SIZE:	1 / 3L180
FINAL SHEAVE POSITION:	100% CLOSED
C-C WITH ADJUSTMENT ("):	4.5, +3, -1/2

PROJECT:BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-204

NEBB CERTIFIED #2453

SHEET NO. 169

## EF-19

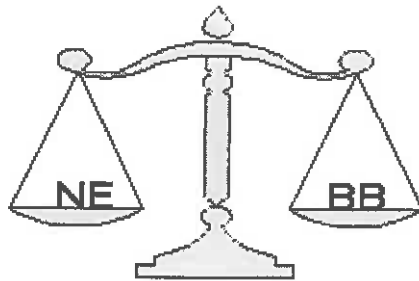
### \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	ACTUAL CFM	NOTES
D221	CUSTODIAN		1	6X6	75	78	
D223	UNISEX LOCKER		2	6X6	60	74	
D224	UNISEX		3	6X6	75	69	
TOTAL CFM					210	221	

PROJECT: BERLIN HIGH SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-205

NEBB CERTIFIED #2453

SHEET NO. 170



## **CERTIFIED TEST, ADJUST AND BALANCE REPORT**

**REPORT DATE: 01-19-21**

**PROJECT: HUBBARD ELEMENTARY SCHOOL  
VENTILATION AIRFLOW INVESTIGATION**

**ADDRESS: 139 GROVE STREET  
EAST BERLIN, CT**

**CUSTOMER: BERLIN BOARD OF EDUCATION**

**NEBB TAB CONTRACTOR: AIR BALANCING SERVICE CO.  
16 PROGRESS CIRCLE UNIT 1A  
NEWINGTON, CT 06111**

**PHONE NUMBER: (860) 500-5008**

**FAX NUMBER: (860) 500-5010**

**WEBSITE: WWW.AIRBAL.COM**

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RTU-1 THROUGH RTU-5	8-13
EF	14
KEF	15

**PROJECT: HUBBARD ELEMENTARY SCHOOL**

**REPORT DATE: 01-19-21**

**SUBMITTED BY: AIR BALANCING SERVICE CO.**

**NEBB CERTIFIED #2453**

**CODE: 20240T**

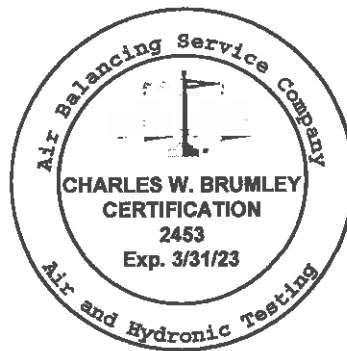
Firm Certification Number: 2453

Firm Name: Air Balancing Service Company

Certification: Testing, Adjusting and Balancing of Environmental Systems

Certified Professional Name: CHARLES W. BRUMLEY

Expiration Date: 3/31/23



A handwritten signature in cursive script, appearing to read "C. W. Brumley".

**\*\* AIR INSTRUMENT CALIBRATION REPORT \*\***

<b>INSTRUMENT SERIAL NUMBER</b>	<b>APPLICATION</b>	<b>CALIBRATION</b>
EXTECH PHOTO TACH SERIAL NO. 151117272	MOTOR AND FAN RPM'S	8/13/2020
ALNOR INSTRUMENTS SERIAL NO. A03813	AIRFLOW VELOCITY	7/21/2020
SHORTRIDGE AIRDATA MULTIMETER ADM-860C SERIAL NO. M93531	MULTIMETER USED IN VELOCITY, STATIC PRESSURES, FLOWHOOD READINGS, DIFFERENTIAL PRESSURES, TEMPERATURE	4/20/2020
FLUKE AMMETER 323 SERIAL NO. 37642839WS	VOLTAGE AND AMPERAGE	8/13/2020

**PROJECT: HUBBARD ELEMENTARY SCHOOL  
REPORT DATE: 01-19-21  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240CALI**

**NEBB CERTIFIED #2453**

**ABBREVIATION / MEANING**

**ABBREVIATION / MEANING**

AC	AIR CONDITIONER	MIN	MINIMUM
AC/HR	AIR CHANGES PER HOUR	MUA	MAKE-UP AIR
AHU	AIR HANDLING UNIT	NO.	NUMBER
AK	AREA FACTOR	OA	OUTSIDE AIR
AMP	AMPERAGE	OA%	PERCENT OF OUTSIDE AIR
CEF	CEILING EXHAUST FAN	OD	OUTSIDE DIAMETER
CFM	CUBIC FEET PER MINUTE	OED	OPEN END DUCT
CNTRL	CONTROL	PERF	PERFORATED DIFFUSER
CU FT	CUBIC FEET	POS	POSITION
CV	CONSTANT VOLUME	PRESS	PRESSURE
DD	DIRECT DRIVE	PRIM	PRIMARY
DEL	ACTUAL DELIVERED	RA	RETURN AIR
DES	DESIGN	RA%	PERCENT OF RETURN AIR
DIFF	DIFFERENTIAL	RHC	REHEAT COIL
EF	EXHAUST FAN	RPM	REVOLUTIONS PER MINUTE
ESP	EXTERNAL STATIC PRESSURE (" WG)	RTU	ROOF TOP UNIT
FPM	FEET PER MINUTE	SA	SUPPLY AIR
FT	FEET	SF	SERVICE FACTOR
H	HEIGHT	SL	SLOT
HP	HORSE POWER	SN	SERIAL NUMBER
HR	HOUR	SP	STATIC PRESSURE (" WG)
HTG	HEATING	SQ FT	SQUARE FEET
L	LENGTH	TEMP	TEMPERATURE
LD	LINEAR DIFFUSER	TF	THERMAFUSER
LFD	LAMINAR FLOW DIFFUSER	TSP	TOTAL STATIC PRESSURE (" WG)
LR	LIGHT RETURN	VAV	VARIABLE AIR VOLUME
LT	LIGHT TROEFFER	VEL	VELOCITY IN FEET PER MINUTE
MA	MIXED AIR	VFD	VARIABLE FREQUENCY DRIVE
MAU	MAKE-UP AIR UNIT	W	WIDTH
MAX	MAXIMUM	WEF	WALL EXHAUST FAN
MD	MOTORIZED DAMPER	WG	WATER GAUGE
MER	MECHANICAL EQUIPMENT ROOM	W/	WITH
MFR	MANUFACTURER		



**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
S-1	CLASSROOM	6323	676	0	6.41	YES
S-2	CLASSROOM	6447	1283	0	11.94	YES
S-3	CLASSROOM	6383	747	0	7.02	YES
S-4	CLASSROOM	6351	693	0	6.55	YES
S-5	CLASSROOM	7243	779	0	6.45	YES
S-5	TOILET	216	0	121	33.61	NO
S-9	COMPUTER ROOM	10059	2901	2104	17.30	YES
W-1	CLASSROOM	7480	730	0	5.86	YES
W-2/W-3	CLASSROOM	7515	1299	0	10.37	YES
W-4/W-5	CLASSROOM	7430	1200	0	9.69	YES
N-9	ELL CLASSROOM	2027	294	0	8.70	YES
N-8	MUSIC CLASSROOM	9551	594	0	3.73	YES
	KITCHEN	7910	3876	5707	43.29	NO
N-7	ART CLASSROOM	10193	758	0	4.46	YES
	KITCHEN OFFICE	548	114	21	12.48	NO
	KITCHEN LOCKER ROOM	545	0	228	25.10	NO
N-6	PPT	2522	324	0	7.71	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
N-4	CLASSROOM	6417	797	0	7.45	YES
N-3	CLASSROOM	6451	734	0	6.83	YES
N-2	CLASSROOM	6406	747	0	7.00	YES
N-1	CLASSROOM	6544	703	0	6.45	YES
A-8	CLASSROOM	6302	699	0	6.66	YES
A-8/A-7	TOILET	412	0	145	21.12	NO
A-7	CLASSROOM	6626	741	0	6.71	YES
	WEST BOYS RESTROOM	1315	0	292	13.32	NO
	STAFF RESTROOM	464	0	132	17.07	NO
	WEST GIRLS RESTROOM	1320	0	318	14.45	NO
A-3	CLASSROOM	2948	0	104	2.12	NO
A-2	CLASSROOM	6344	674	0	6.37	YES
A-2/A-1	TOILET	402	0	128	19.10	NO
A-1	CLASSROOM	6517	726	0	6.68	YES
	EAST GIRLS RESTROOM	1349	0	246	10.94	YES
	EAST BOYS RESTROOM	1381	0	366	15.90	YES
S-7	ISOLATION ROOM	1782	N/A	0	0.00	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
S-6	SPEECH	1769	322	0	10.92	YES
S-8	NURSES ROOM	9343	1126	0	7.23	YES
S-8	NURSES TOILET	478	0	91	11.42	NO
N-5	OT/PT	2506	N/A	N/A	N/A	NO
	MEDIA CENTER	19353	2408	2133	7.47	YES
	MEDIA CTR WORKROOM	3031	303	0	6.00	NO
	MED CTR EXPLORATION STATION	1946	103	0	3.18	NO
	TEACHERS ROOM	700	0	61	5.23	NO
	STAFF LOUNGE RESTROOM	454	0	175	23.13	NO
	STAFF LOUNGE	4273	0	0	0.00	YES
	MAIN OFFICE	5386	743	0	8.28	YES
	WORK ROOM	1132	358	0	18.98	YES
	PRINCIPAL OFFICE	2122	396	0	11.20	YES
	MAIN OFFICE NURSES OFFICE	2051	360	0	10.53	YES
	NURSES TOILET	362	0	128	21.22	NO
	MAIN OFFICE LAV	175	0	151	51.77	NO
	GYM TOILET	457	0	187	24.56	NO
	GYM	44249	3076	2406	4.17	NO
	CAFETERIA / STAGE	48166	2615	2333	3.26	YES
	KITCHEN TOILET	303	0	19	3.76	NO
	FACULTY TOILET	312	0	39	7.50	NO
	CUSTODIAN OFFICE	2021	57	0	1.69	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

# UV'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
S-1	CLASSROOM		1	56X11	4.28	0	0	
S-2	CLASSROOM		2	56X11	4.28	0	0	
S-3	CLASSROOM		3	56X11	4.28	3	13	
S-4	CLASSROOM		4	56X11	4.28	28	120	
S-5	CLASSROOM		5	56X11	4.28	25	107	
S-6	CLASSROOM		6	56X11	4.28	18	77	
S-8	NURSE		7	69X11	5.27	19	100	
W-1	CLASSROOM		8	56X11	4.28	14	60	
W-2/W-3	CLASSROOM		9	56X11	4.28	0	0	
W-2/W-3	CLASSROOM		10	56X11	4.28	16	68	
W-4/4-5	CLASSROOM		11	56X11	4.28	0	0	
W-4/4-5	CLASSROOM		12	56X11	4.28	0	0	
N-9	CONFERENCE		13	56X11	4.28	0	0	
N-8	MUSC		14	56X11	4.28	0	0	1
N-8	MUSIC		15	56X11	4.28	0	0	
N-7	ART		16	69X11	5.27	0	0	
N-9	PPT		17	56X11	4.28	0	0	
N-4	CLASSROOM		18	56X11	4.28	0	0	
N-3	CLASSROOM		19	56X11	4.28	0	0	
N-2	CLASSROOM		20	56X11	4.28	0	0	
N-1	CLASSROOM		21	56X11	4.28	13	56	
TOTAL CFM							601	

NOTE 1: UNIT VENTILATOR NOT OPERATING AT THIS TIME

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-4

NEBB CERTIFIED #2453

SHEET NO. 4

# UV'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
A-3	CLASSROOM		22	56X11	4.28	0	0	
A-7	CLASSROOM		23	56X11	4.28	0	0	
A-1	CLASSROOM		24	56X11	4.28	0	0	
A-8	CLASSROOM		25	56X11	4.28	8	34	
	PRINCIPAL		26	41X14	3.99	41	164	
	MAIN OFFICE		27	41X14	3.99	43	172	
	MAIN OFFICE		28	41X14	3.99	58	231	
	WORK ROOM		29	41X14	3.99	54	215	
	NURSE		30	41X14	3.99	53	211	
TOTAL CFM							1027	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 5

# UV'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	FAN SPEED	NOTES
S-1	CLASSROOM		1	5X42.5	1.33	508	676	LOW	
S-2	CLASSROOM		2	5X42.5	1.06	1210	1283	HIGH	
S-3	CLASSROOM		3	5X42.5	1.33	562	747	LOW	
S-4	CLASSROOM		4	5X42.5	1.33	521	693	LOW	
S-5	CLASSROOM		5	5X42.5	1.33	586	779	LOW	
A-1	CLASSROOM		6	5X42.5	1.33	546	726	LOW	
A-2	CLASSROOM		7	5X42.5	1.33	507	674	LOW	
S-6	CLASSROOM		8	6X27.5	.917	351	322	HIGH	
S-8	NURSE		9	5X51	1.59	708	1126	LOW	
W-1	CLASSROOM		10	5X42.5	1.33	549	730	LOW	
W-2 / W-3	CLASSROOM		11	5X34	1.06	616	653	LOW	
W-2 / W-3	CLASSROOM		12	5X34	1.06	609	646	LOW	
W-4 / W-5	CLASSROOM		13	5X34	1.06	517	548	LOW	
W-4 / W-5	CLASSROOM		14	5X34	1.06	615	652	LOW	
N-9	ELL CLASSROOM		15	6X27.5	.917	321	294	LOW	
N-8	MUSIC CLASSROOM		16	5X34	1.06	N/A	N/A	N/A	1
N-8	MUSIC CLASSROOM		17	5X34	1.06	560	594	N/A	
N-7	ART CLASSROOM		18	5X51	1.59	477	758	LOW	
N-6	PPT		19	6X27.5	.917	353	324	HIGH	
TOTAL CFM							12225		

NOTE 1: UNIT VENTILATOR NOT OPERATING AT THIS TIME

PROJECT: HUBBARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-6

NEBB CERTIFIED #2453

SHEET NO. 6

# UV'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	FAN SPEED	NOTES
N-4	CLASSROOM		20	5X42.5	1.33	599	797	LOW	
N-3	CLASSROOM		21	5X42.5	1.33	552	734	LOW	
A-7	CLASSROOM		22	5X42.5	1.33	557	741	LOW	
A-8	CLASSROOM		23	5X42.5	1.33	526	700	LOW	
N-2	CLASSROOM		24	5X42.5	1.33	562	747	LOW	
N-1	CLASSROOM		25	5X42.5	1.33	529	704	LOW	
	PRINCIPAL OFFICE		26	6X27.5	.917	432	396	HIGH	
	MAIN OFFICE		27	6X27.5	.917	409	375	LOW	
	MAIN OFFICE		28	6X27.5	.917	401	368	LOW	
	WORK ROOM		29	6X27.5	.917	390	358	LOW	
	MAIN OFFICE NURSE		30	6X27.5	.917	393	360	N/A	
	STAFF LOUNGE		31	5X42.5	1.33	N/A	N/A	N/A	1
TOTAL CFM							6280		

NOTE 1: UNIT VENTILATOR NOT OPERATING AT THIS TIME

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-7

NEBB CERTIFIED #2453

SHEET NO. 7

# RTU'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	RTU-1							
	COMPUTER ROOM		1	36X14	3.5	415	1453	
	RTU-2							
	GYM		1	23X17	2.72	42	114	
	GYM		2	23X22	3.51	13	46	
TOTAL CFM							160	
	RTU-3							
	MEDIA CENTER		1	36X14	3.5	298	1043	
	RTU-4							
	KITCHEN		1	60X17	7.083	280	1983	
	RTU-5							
	CAFETERIA		1	60X17	7.083	330	2337	
	MAU							
	KITCHEN		1	24X32	5.33	299	1594	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-15

NEBB CERTIFIED #2453

SHEET NO. 8



# RTU-1

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	COMPUTER ROOM		1	18X18	N/A	N/A	699	
	COMPUTER ROOM		2	18X18	N/A	N/A	813	
	COMPUTER ROOM		3	18X18	N/A	N/A	686	
	COMPUTER ROOM		4	18X18	N/A	N/A	703	
TOTAL CFM							2901	
	<b>RETURN</b>							
	COMPUTER ROOM		1	24X24	4.0	266	1064	
	COMPUTER ROOM		2	24X24	4.0	260	1040	
TOTAL CFM							2104	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-10

NEBB CERTIFIED #2453

SHEET NO. 9

# RTU-2

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	GYM		1	12X12	.81	343	278	
	GYM		2	12X12	.81	402	326	
	GYM		3	12X12	.81	444	360	
	GYM		4	12X12	.81	391	317	
	GYM		5	12X12	.81	517	419	
	GYM		6	12X12	.81	626	507	
	GYM		7	12X12	.81	571	462	
	GYM		8	12X12	.81	502	407	
	CUSTODIAN OFFICE		9	9X9	N/A	N/A	57	
TOTAL CFM							3133	
	<b>RETURN</b>							
	GYM		1	30X30	6.25	189	1181	
	GYM		2	30X30	6.25	196	1225	
TOTAL CFM							2406	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-11

NEBB CERTIFIED #2453

SHEET NO. 10

# RTU-3

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	MEDIA CENTER		1	12X12	N/A	N/A	327	
	MEDIA CENTER		2	12X12	N/A	N/A	338	
	MEDIA CENTER		3	12X12	N/A	N/A	0	
	MEDIA CENTER		4	12X12	N/A	N/A	302	
	MEDIA CENTER		5	12X12	N/A	N/A	219	
	MEDIA CENTER		6	12X12	N/A	N/A	237	
	MEDIA CENTER		7	12X12	N/A	N/A	212	
	MEDIA CENTER		8	12X12	N/A	N/A	184	
	WORK ROOM		9	12X12	N/A	N/A	303	
	EXPLORATION STATION		10	9X9	N/A	N/A	103	
	MEDIA CENTER		11	48X1SL	N/A	N/A	131	
	MEDIA CENTER		12	48X1SL	N/A	N/A	52	
TOTAL CFM							2408	
	<b>RETURN</b>							
	MEDIA CENTER		1	16X64	7.11	300	2133	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-12

NEBB CERTIFIED #2453

SHEET NO. 11

# RTU-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
	KITCHEN OFFICE		1	6X6	114	
	KITCHEN		2	18X18	580	
	KITCHEN		3	18X18	313	
	KITCHEN		4	18X18	761	
	KITCHEN		5	12X12	628	
TOTAL CFM					2396	
	<b>RETURN</b>					
	KITCHEN OFFICE		1	6X6	21	
	KITCHEN		2	22X22	1821	
TOTAL CFM					1842	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-13

NEBB CERTIFIED #2453

SHEET NO. 12

# RTU-5

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
<b>SUPPLY</b>								
4407	CAFETERIA		1	18X18	N/A	N/A	328	
4407	CAFETERIA		2	18X18	N/A	N/A	255	
4407	CAFETERIA		3	18X18	N/A	N/A	352	
4407	CAFETERIA		4	18X18	N/A	N/A	289	
4407	CAFETERIA		5	12X12	N/A	N/A	226	
4407	CAFETERIA		6	12X12	N/A	N/A	350	
4407	CAFETERIA		7	12X12	N/A	N/A	202	
4407	CAFETERIA		8	12X12	N/A	N/A	169	
4407	CAFETERIA/STAGE		9	14X8	.505	457	231	
4407	CAFETERIA/STAGE		10	14X8	.505	421	213	
TOTAL CFM							2615	
<b>RETURN</b>								
4407	CAFETERIA		1	18X48	N/A	N/A	1016	
4407	CAFTETERIA		2	18X48	N/A	N/A	931	
4407	CAFETERIA/STAGE		3	14X8	.505	392	198	
4407	CAFETERIA/STAGE		4	14X8	.505	373	188	
TOTAL CFM							2333	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-14

NEBB CERTIFIED #2453

SHEET NO. 13

# EF

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
S-5	TOILET		1	8X8	.355	0	121	
S-6	SPEECH		2	6X6	0	0	0	
A-1/A-2	TOILET		3	6X6	.120	538	65	
A-1/A-2	TOILET		4	6X6	0	524	63	
S-8	NURSE TOILET		5	12X9	0	0	91	
WEST	GIRLS RESTROOM		6	6X6	0	0	167	
WEST	GIRLS RESTROOM		7	6X6	0	0	151	
WEST	FACULTY TOILET		8	6X6	0	0	132	
WEST	BOYS RESTROOM		9	6X6	0	0	121	
WEST	BOYS RESTROOM		10	6X6	0	0	171	
	TEACHERS ROOM		11	6X6	0	0	61	
N-6	PPT		12	6X6	0	0	82	
N-5	OT/PT		13	6X6	0	0	84	
A-7/A-8	TOILET		14	6X6	.120	584	70	
A-7/A-8	TOILET		15	6X6	.120	627	75	
EAST	BOYS RESTROOM		16	12X12	0	0	366	
EAST	GIRLS RESTROOM		17	12X12	0	0	246	
	STAFF LOUNGE TOILET		18	6X6	0	0	175	
	MAIN OFFICE NURSE TOILET		19	6X6	0	0	128	
	MAIN OFFICE LAV		20	6X6	.120	1273	151	
	GYM OFFICE TOILET		21	6X6	.157	1194	187	
EAST	FACULTY TOILET		22	8X8	0	0	39	
	CLASSROOM		23	11X10	0	0	104	
	DISHWASHER		24	33.75X33.75	7.91	123	973	
	KITCHEN TOILET		25	6X6	0	0	19	
	KITCHEN LOCKER ROOM		26	12X10	0	0	228	
TOTAL CFM							4070	

PROJECT: HUBBARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-8

NEBB CERTIFIED #2453

SHEET NO. 14

# KEF

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN FROM KITCHEN

LOCATION: INLET SIDE OF GREASE FILTERS

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 200

FACE HEIGHT ("): 12

FACE AREA (SQ FT): 16.667

TOTAL FPM: 5112

NUMBER OF POINTS: 18

	DESIGN	ACTUAL
CFM:	N/A	4733
FPM:	N/A	284

### VELOCITY PROFILE (FPM)

280	322	288	298	298	312	274	270	275
270	320	288	323	296	259	262	236	241

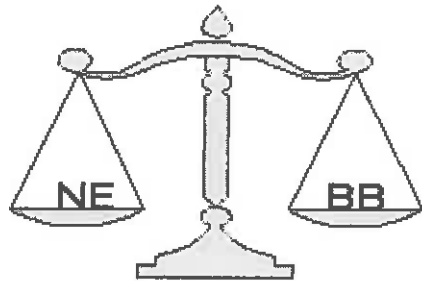
NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: HUBBARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-9

NEBB CERTIFIED #2453

SHEET NO. 15



## **CERTIFIED TEST, ADJUST AND BALANCE REPORT**

**REPORT DATE: 01-19-21**

**PROJECT: MARY E. GRISWOLD ELEMENTARY SCHOOL  
VENTILATION AIRFLOW INVESTIGATION**

**ADDRESS: 133 HEATHER LANE  
KENSINGTON, CT**

**CUSTOMER: BERLIN BOARD OF EDUCATION**

**NEBB TAB CONTRACTOR: AIR BALANCING SERVICE CO.  
16 PROGRESS CIRCLE UNIT 1A  
NEWINGTON, CT 06111**

**PHONE NUMBER: (860) 500-5008**

**FAX NUMBER: (860) 500-5010**

**WEBSITE: WWW.AIRBAL.COM**



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**PROJECT: MARY E. GRISWOLD ELEMENTARY SCHOOL**

**REPORT DATE: 01-19-21**

**SUBMITTED BY: AIR BALANCING SERVICE CO.      NEBB CERTIFIED #2453**

**CODE: 20240T**

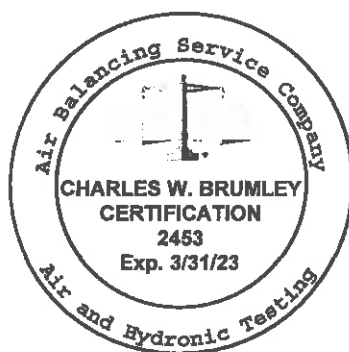
Firm Certification Number: 2453

Firm Name: Air Balancing Service Company

Certification: Testing, Adjusting and Balancing of Environmental Systems

Certified Professional Name: CHARLES W. BRUMLEY

Expiration Date: 3/31/23



A handwritten signature in black ink, appearing to read "C. W. Brumley", written below the circular seal.

**\*\* AIR INSTRUMENT CALIBRATION REPORT \*\***

<b>INSTRUMENT SERIAL NUMBER</b>	<b>APPLICATION</b>	<b>CALIBRATION</b>
EXTECH PHOTO TACH SERIAL NO. 151117272	MOTOR AND FAN RPM'S	8/13/2020
ALNOR INSTRUMENTS SERIAL NO. A03813	AIRFLOW VELOCITY	7/21/2020
SHORTRIDGE AIRDATA MULTIMETER ADM-860C SERIAL NO. M93531	MULTIMETER USED IN VELOCITY, STATIC PRESSURES, FLOWHOOD READINGS, DIFFERENTIAL PRESSURES, TEMPERATURE	4/20/2020
FLUKE AMMETER 323 SERIAL NO. 37642839WS	VOLTAGE AND AMPERAGE	8/13/2020

**PROJECT: MARY E. GRISWOLD ELEMENTARY SCHOOL**  
**REPORT DATE: 01-19-21**  
**SUBMITTED BY: AIR BALANCING SERVICE CO.**  
**CODE: 20240CALI**

**NEBB CERTIFIED #2453**

**ABBREVIATION / MEANING**

**ABBREVIATION / MEANING**

AC	AIR CONDITIONER	MIN	MINIMUM
AC/HR	AIR CHANGES PER HOUR	MUA	MAKE-UP AIR
AHU	AIR HANDLING UNIT	NO.	NUMBER
AK	AREA FACTOR	OA	OUTSIDE AIR
AMP	AMPERAGE	OA%	PERCENT OF OUTSIDE AIR
CEF	CEILING EXHAUST FAN	OD	OUTSIDE DIAMETER
CFM	CUBIC FEET PER MINUTE	OED	OPEN END DUCT
CNTRL	CONTROL	PERF	PERFORATED DIFFUSER
CU FT	CUBIC FEET	POS	POSITION
CV	CONSTANT VOLUME	PRESS	PRESSURE
DD	DIRECT DRIVE	PRIM	PRIMARY
DEL	ACTUAL DELIVERED	RA	RETURN AIR
DES	DESIGN	RA%	PERCENT OF RETURN AIR
DIFF	DIFFERENTIAL	RHC	REHEAT COIL
EF	EXHAUST FAN	RPM	REVOLUTIONS PER MINUTE
ESP	EXTERNAL STATIC PRESSURE (" WG)	RTU	ROOF TOP UNIT
FPM	FEET PER MINUTE	SA	SUPPLY AIR
FT	FEET	SF	SERVICE FACTOR
H	HEIGHT	SL	SLOT
HP	HORSE POWER	SN	SERIAL NUMBER
HR	HOUR	SP	STATIC PRESSURE (" WG)
HTG	HEATING	SQ FT	SQUARE FEET
L	LENGTH	TEMP	TEMPERATURE
LD	LINEAR DIFFUSER	TF	THERMAFUSER
LFD	LAMINAR FLOW DIFFUSER	TSP	TOTAL STATIC PRESSURE (" WG)
LR	LIGHT RETURN	VAV	VARIABLE AIR VOLUME
LT	LIGHT TROEFFER	VEL	VELOCITY IN FEET PER MINUTE
MA	MIXED AIR	VFD	VARIABLE FREQUENCY DRIVE
MAU	MAKE-UP AIR UNIT	W	WIDTH
MAX	MAXIMUM	WEF	WALL EXHAUST FAN
MD	MOTORIZED DAMPER	WG	WATER GAUGE
MER	MECHANICAL EQUIPMENT ROOM	W/	WITH
MFR	MANUFACTURER		

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	EXHAUST CFM		
K-1	CLASSROOM	7003	1035	0	8.87	YES
K-1/K-2	TOILET	416	0	357	51.49	NO
K-2	CLASSROOM	7100	1293	0	10.93	YES
K-3	CLASSROOM	7227	1126	0	9.35	YES
K-3	TOILET	300	0	29	5.80	NO
K-4	CLASSROOM	6094	803	0	7.91	YES
K-4/K-5	TOILET	320	0	66	12.38	NO
K-5	CLASSROOM	5967	677	0	6.81	YES
W-3	CLASSROOM	6421	646	0	6.04	YES
W-4	CLASSROOM	6436	588	0	5.48	YES
W-5	CLASSROOM	6593	754	0	6.86	YES
W-6	CLASSROOM	6329	568	0	5.38	YES
W-7A	CLASSROOM	3673	0	0	0.00	YES
W-7B	CLASSROOM	3365	586	0	10.45	YES
W-8	CLASSROOM	7571	610	0	4.83	YES
W-9	CLASSROOM	6815	747	0	6.58	YES
CW-5	CLASSROOM	7317	498	0	4.08	YES
CE-5	CLASSROOM	7368	614	0	5.00	YES
E-9	CLASSROOM	7570	624	0	4.95	YES
E-8	CLASSROOM	7693	1020	0	7.96	YES
E-7	CLASSROOM	7452	0	0	0.00	YES
CE-4	CLASSROOM	7521	814	0	6.49	YES
CW-4	CLASSROOM	5797	719	0	7.44	YES
E-6	CLASSROOM	6562	676	0	6.18	YES
E-5	CLASSROOM	6421	697	0	6.51	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-1

NEBB CERTIFIED #2453

SHEET NO. 1

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RET/EXH CFM		
E-4	CLASSROOM	6476	536	0	4.97	YES
	MEDIA CENTER	27310	3306	2266	7.26	YES
	MEDIA CENTER OFFICE 1	1324	207	64	9.38	NO
	MEDIA CENTER OFFICE 2	2288	210	248	6.50	NO
	GIRL'S BATHROOM	1263	0	191	9.07	NO
	STAFF BATHROOM	469	0	127	16.25	NO
	BOY'S BATHROOM	1267	0	202	9.57	NO
CE-3	CLASSROOM	6556	573	0	5.24	YES
CE-2	CLASSROOM	6673	593	0	5.33	YES
CE2/CE-3	TOILET	428	0	96	13.46	YES
CW-3	CLASSROOM	6797	594	0	5.24	YES
CW-3/CW-2	TOILET	430	0	134	18.70	NO
CW-2	CLASSROOM	6512	508	0	4.68	YES
CE-1	CLASSROOM	6219	597	0	5.76	YES
CE-1/CW-1	TOILET	576	0	72	7.50	NO
CW-1	CLASSROOM	6525	517	0	4.75	YES
E-3	CLASSROOM	6564	0	0	0.00	YES
E-2	CLASSROOM	6414	638	0	5.97	YES
	GIRL'S GRADE 5 BATHROOM	1025	0	138	8.08	NO
	BOY'S GRADE 5 BATHROOM	1168	0	155	7.96	NO
E-1	CLASSROOM	6421	608	0	5.68	YES
	STAFF BATHROOM	565	0	51	5.42	NO
S-4	PSYCHOLOGIST	2163	240	29	6.66	NO
S-3	LEAD TEACHER	1439	0	58	2.42	NO
S-2	SOCIAL WORKER	2162	257	60	7.13	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-2

NEBB CERTIFIED #2453

SHEET NO. 2

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RET/EXH CFM		
S-1	SPEECH / LANGUAGE	2070	0	0	0.00	NO
S-0	COPY ROOM	1592	0	95	3.58	NO
	BOY'S GRADE 4 BATHROOM	1135	0	272	14.38	NO
	GIRL'S GRADE 4 BATHROOM	1019	0	295	17.37	NO
	COMPUTER / BAND ROOM	10166	2196	2138	12.96	YES
	BOY'S BATHROOM	1301	0	192	8.85	NO
	GIRL'S BATHROOM	1305	0	192	8.83	NO
	FACULTY LOUNGE	4719	510	257	6.48	NO
	FACULTY RESTROOM	423	0	87	12.34	NO
CW-6	CLASSROOM	5823	1357	539	13.98	YES
CW-7A	CLASSROOM	2762	689	693	15.05	YES
CW-7B	CLASSROOM	2752	545	462	11.88	YES
W-11	CLASSROOM	5662	729	909	9.63	YES
W-10	CLASSROOM	5929	1222	775	12.37	YES
	READING CLASSROOM 1	1936	87	189	5.86	NO
	READING CLASSROOM 2	2060	308	191	8.97	NO
	BAND OFFICE	1346	275	93	12.26	NO
	GYM / CAFETERIA	89257	7749	7137	5.21	YES
	GYM OFFICE BATHROOM	794	0	0	0.00	NO
	MAIN OFFICE	4167	217	236	3.40	NO
	PRINCIPAL OFFICE	800	300	68	22.50	YES
	MAIN OFFICE STAFF BATHROOM	265	0	44	9.96	NO
	SECURITY OFFICE	925	51	97	6.29	NO
	NURSES OFFICE	2956	27	159	3.23	NO
	NURSE ROOM B	1682	166	86	5.92	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-3

NEBB CERTIFIED #2453

SHEET NO. 3

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
			SUPPLY CFM	RET/EXH CFM		
	NURSE TOILET	325	0	64	11.82	NO
	OLD GYM / AUDITORIUM	49946	8357	8908	10.70	NO
	STAFF ROOM / COPY ROOM	884	0	212	14.39	NO
	KITCHEN	13417	1347	5963	26.67	NO
	KITCHEN OFFICE	454	97	0	12.82	NO
	KITCHEN BATHROOM	307	97	87	18.96	NO
	KITCHEN DRY STORAGE	1012	0	172	10.20	NO
	KITCHEN STORAGE	435	0	109	15.03	NO
	TIMEOUT ROOM	864	0	0	0.00	NO
	CUSTODIAN OFFICE	3822	0	175	2.75	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-4

NEBB CERTIFIED #2453

SHEET NO. 4



# RTU / AHU OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>RTU-1</b>							
	FACULTY LOUNGE		1	14.5X18	1.815	155	281	
	<b>RTU-2</b>							
	COMPUTER ROOM		1	35.5X15	3.698	73	270	
	<b>RTU-3</b>							
	MEDIA CENTER		1	60X17	7.083	57	404	
	<b>RTU-4</b>							
	KITCHEN		1	24X23	3.833	84	322	
	<b>RTU</b>							
	MAIN OFFICE		1	32X23	5.111	53	271	
	<b>AHU-1</b>							
	GYM		1	N/A	N/A	N/A	N/A	2
	<b>AHU-2</b>							
	GYM		1	N/A	N/A	N/A	N/A	2
	<b>AHU-3</b>							
	GYM / CAFÉ		1	N/A	N/A	N/A	612	1
	RTU-1		1	25.5X8	1.417	171	242	
	RTU-2		1	28.5X20	3.958	114	451	
	RTU-3		1	25.5X8	1.417	136	193	
	RTU-4		1	25.5X8	1.417	81	115	

NOTE 1: VELOCITY PRESSURE TAKEN IN MECHANICAL ROOM

NOTE 2: OUTDOOR AIR DUCT IS NOT ACCESSIBLE

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-29

NEBB CERTIFIED #2453

SHEET NO. 5

# AHU-1

## \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO OLD GYM / AUDITORIUM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 69

DUCT SP (" WG): +.17

DUCT SIZE (" DIA): 25

DUCT AREA (SQ FT): 3.407

INTERNAL DUCT LINING ("): 0.500

TOTAL FPM: 23966

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		4082
FPM:	N/A		1198

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 6

# AHU-1

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR RETURNED BY FAN FROM OLD GYM / AUDITORIUM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 67

DUCT SP (" WG): -.245

DUCT WIDTH ("): 24

DUCT HEIGHT ("): 24

DUCT AREA (SQ FT): 4.000

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 17992

NUMBER OF POINTS: 16

	DESIGN		ACTUAL
CFM:	N/A		4500
FPM:	N/A		1125

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-7

NEBB CERTIFIED #2453

SHEET NO. 7

## AHU-2

### \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO OLD GYM / AUDITORIUM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 99

DUCT SP (" WG): +.14

DUCT SIZE (" DIA): 27

DUCT AREA (SQ FT): 3.410

INTERNAL DUCT LINING ("): 1.000

TOTAL FPM: 22784

NUMBER OF POINTS: 20

20

	DESIGN		ACTUAL
CFM:	N/A		3884
FPM:	N/A		1139

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-8

NEBB CERTIFIED #2453

SHEET NO. 8

## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO OLD GYM / AUDITORIUM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 99

DUCT SP (" WG): +.28

DUCT WIDTH ("): 21

DUCT HEIGHT ("): 20

DUCT AREA (SQ FT): 2.917

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 23152

NUMBER OF POINTS: 16

	DESIGN		ACTUAL
CFM:	N/A		4221
FPM:	N/A		1447

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-9

NEBB CERTIFIED #2453

SHEET NO. 9

## AHU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR RETURNED BY FAN FROM OLD GYM / AUDITORIUM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 67

DUCT SP (" WG): -.82

DUCT WIDTH ("): 24

DUCT HEIGHT ("): 24

DUCT AREA (SQ FT): 4.000

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 17653

NUMBER OF POINTS: 16

	DESIGN		ACTUAL
CFM:	N/A		4412
FPM:	N/A		1103

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-10

NEBB CERTIFIED #2453

SHEET NO. 10

# AHU-3

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO GYM (VP-1)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 68

DUCT SP (" WG): +.06

DUCT WIDTH ("): 30

DUCT HEIGHT ("): 16

DUCT AREA (SQ FT): 3.330

INTERNAL DUCT LINING ("): 0

TOTAL FPM: 23024

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		3833
FPM:	N/A		1151

POSITION	1	2	3	4	5
1	1422	790	896	1104	1442
2	1586	737	781	994	1722
3	1577	767	656	956	1634
4	1328	951	809	1170	1702
SUBTOTALS FPM:	5913	3245	3142	4224	6500

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

3833 CFM + 3916 CFM = 7749 CFM

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-11

NEBB CERTIFIED #2453

SHEET NO. 11

# AHU-3

## \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO GYM (VP-2)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 68

DUCT SP (" WG): +.06

DUCT SIZE (" DIA): 24

DUCT AREA (SQ FT): 3.140

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 24931

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		3916
FPM:	N/A		1247

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$3833 \text{ CFM} + 3916 \text{ CFM} = 7749 \text{ CFM}$$

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-12

NEBB CERTIFIED #2453

SHEET NO. 12



# AHU-3

## \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR RETURNED BY FAN FROM GYM

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 67

DUCT SP (" WG): -.154

DUCT WIDTH ("): 48

DUCT HEIGHT ("): 20

DUCT AREA (SQ FT): 6.667

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 34201

NUMBER OF POINTS: 32

	DESIGN		ACTUAL
CFM:	N/A		7127
FPM:	N/A		1069

POSITION	1	2	3	4	5	6	7	8
1	941	1039	978	948	1011	1352	1336	909
2	1124	1114	943	1004	1268	1307	1426	823
3	1140	1116	1085	957	1072	1179	1270	971
4	965	1072	1155	1068	1014	981	866	767
SUBTOTALS FPM:	4170	4341	4161	3977	4365	4819	4898	3470

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-13

NEBB CERTIFIED #2453

SHEET NO. 13

# CUH'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
K-1	CLASSROOM		1	11X136	10.38	7	73	
K-2	CLASSROOM		2	11X136	10.38	0	0	
K-3	CLASSROOM		3	11X68	5.19	6	31	
K-4	CLASSROOM		4	11X68	5.19	22	114	
K-5	CLASSROOM		5	11X68	5.19	5	26	
W-3	CLASSROOM		6	11X68	5.19	0	0	
W-4	CLASSROOM		7	11X68	5.19	6	31	
W-5	CLASSROOM		8	11X68	5.19	21	109	
W-6	CLASSROOM		9	11X68	5.19	0	0	
W-7A	CLASSROOM		10	11X80	6.11	N/A	N/A	1
W-7B	CLASSROOM		11	11X80	6.11	34	208	
W-8	CLASSROOM		12	11X80	6.11	0	0	
W-9	CLASSROOM		13	11X80	6.11	N/A	N/A	1
CE-4	CLASSROOM		14	11X80	6.11	4	24	
CE-3	CLASSROOM		15	11X60	4.58	5	23	
CW-3	CLASSROOM		16	11X60	4.58	6	27	
CW-5	CLASSROOM		17	11X80	6.11	0	0	
CE-5	CLASSROOM		18	11X80	6.11	0	0	
E-9	CLASSROOM		19	11X80	6.11	33	202	
E-8	CLASSROOM		20	11X80	6.11	18	110	
E-7	CLASSROOM		21	11X80	6.	24	144	
E-6	CLASSROOM		22	11X60	4.58	0	0	
E-5	CLASSROOM		23	11X60	4.58	0	0	
E-4	CLASSROOM		24	11X60	4.58	5	23	
E-3	CLASSROOM		25	11X60	4.58	N/A	N/A	1
E-2	CLASSROOM		26	11X60	4.58	8	37	
E-1	CLASSROOM		27	11X60	4.58	23	105	
CE-2	CLASSROOM		28	11X60	4.58	0	0	
CW-2	CLASSROOM		29	11X60	4.58	0	0	
CE-1	CLASSROOM		30	11X60	4.58	5	23	
CW-1	CLASSROOM		31	11X60	4.58	0	0	

NOTE 1: CABINET UNIT HEATER IS NOT RUNNING AT THIS TIME

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-16

NEBB CERTIFIED #2453

SHEET NO. 14

# CUH'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	SPEED	NOTES
CW-4	CLASSROOM		1	5X42.5	1.33	541	720	LOW	
E-6	CLASSROOM		2	5X42.5	1.33	508	676	HIGH	
E-5	CLASSROOM		3	5X42.5	1.33	524	697	LOW	
E-4	CLASSROOM		4	5X42.5	1.33	403	536	LOW	
CE-3	CLASSROOM		5	5X42.5	1.33	431	573	LOW	
CE-2	CLASSROOM		6	5X42.5	1.33	446	593	HIGH	
CW-2	CLASSROOM		7	5X42.5	1.33	382	508	LOW	
CW-3	CLASSROOM		8	5X42.5	1.33	447	595	HIGH	
CE-1	CLASSROOM		9	5X42.5	1.33	449	597	HIGH	
CW-1	CLASSROOM		10	5X42.5	1.33	389	517	HIGH	
E-2	CLASSROOM		11	5X42.5	1.33	480	638	LOW	
E-1	CLASSROOM		12	5X42.5	1.33	457	608	LOW	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-15

NEBB CERTIFIED #2453

SHEET NO. 15

# CUH

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	PRINCIPAL		1	28X5	.826	363	300	
	PRINCIPAL		2	28X5	.826	353	292	
	PRINCIPAL		3	28X5	.826	N/A	N/A	1
TOTAL CFM							592	
	O.A INTAKE		1	12X6	.5	283	142	
	<b>SUPPLY</b>							
	NURSE "B"		1	28X5	.826	334	276	
	NURSE "B"		2	28X5	.826	201	166	
	NURSE "B"		3	28X5	.826	329	272	
	NURSE "B"		4	28X5	.826	213	176	
TOTAL CFM							890	
	O.A INTAKE		1	12X6	.5	266	133	
	<b>RETURN</b>							
	NURSE "B"		1	20X8	.80	247	198	
	NURSE "B"		2	20X8	.80	161	129	
TOTAL CFM							327	

NOTE 1: CABINET UNIT HEATER IS NOT RUNNING AT THIS TIME

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-17

NEBB CERTIFIED #2453

SHEET NO. 16

# FCU

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
	MRS. DONOVAN #1		1	9X9	87	
	CATHY D'AMATO #2		2	9X9	308	
TOTAL CFM					395	
	<b>RETURN</b>					
	MRS. DONOVAN #1		1	20X20	189	
	CATHY D'AMATO #2		2	20X20	191	
TOTAL CFM					380	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-35

NEBB CERTIFIED #2453

SHEET NO. 17

# FCU

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
	BAND OFFICE		1	12X12	275	
	RETURN					
	BAND OFFICE		1	10X10	93	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-36

NEBB CERTIFIED #2453

SHEET NO. 18

# MAIN OFFICE RTU

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
<b>SUPPLY</b>						
S-4	SCHOOL PSYCHOLOGIST		1	12X12	240	
S-3	LEAD TEACHER		2	9X9	0	
S-2	LCSW		3	12X12	257	
S-1	SPEECH / LANGUAGE		4	12X12	0	
	MAIN OFFICE		5	15X15	29	
	MAIN OFFICE		6	15X15	188	
	SECURITY		7	9X9	51	
	NURSE		8	12X12	27	
TOTAL CFM					792	
<b>RETURN</b>						
S-4	SCHOOL PSYCHOLOGIST		1	12X12	29	
S-3	LEAD TEACHER		2	12X12	58	
S-2	LCSW		3	12X12	60	
S-1	SPEECH / LANGUAGE		4	12X12	0	
	MAIN OFFICE		5	10X10	95	
	MAIN OFFICE		6	22X22	236	
	PRINCIPAL		7	8X8	68	
	SECURITY		8	8X8	97	
	NURSE "B"		9	8X8	86	1
	NURSE		10	12X12	159	1
	NURSE		11	12X12	0	
TOTAL CFM					888	

NOTE 1: RETURN OR EXHAUST

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-18

NEBB CERTIFIED #2453

SHEET NO. 19

# RTU-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
	FACULTY LOUNGE		1	12X12	214	
	FACULTY LOUNGE		2	12X12	223	
	FACULTY TOILET		3	6X6	73	
TOTAL CFM					510	
	RETURN					
	FACULTY LOUNGE		1	16X16	257	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-19

NEBB CERTIFIED #2453

SHEET NO. 20



## RTU-2

### \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	COMPUTER CLASSROOM		1	18X18	N/A	N/A	516	
	COMPUTER CLASSROOM		2	18X18	N/A	N/A	533	
	COMPUTER CLASSROOM		3	18X18	N/A	N/A	589	
	COMPUTER CLASSROOM		4	18X18	N/A	N/A	559	
TOTAL CFM							2197	
	<b>RETURN</b>							
	COMPUTER CLASSROOM		1	30X30	6.25	326	2038	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-20

NEBB CERTIFIED #2453

SHEET NO. 21

# RTU-3

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	SUPPLY							
	MEDIA CENTER		1	12X6	.275	364	100	
	MEDIA CENTER		2	12X6	.275	327	90	
	MEDIA CENTER		3	12X6	.275	376	103	
	MEDIA CENTER		4	36X6	.825	489	403	
	MEDIA CENTER		5	48X6	1.1	516	568	
	MEDIA CENTER		6	48X6	1.1	350	385	
	MEDIA CENTER		7	48X6	1.1	532	585	
	MEDIA CENTER		8	48X6	1.1	451	496	
	MEDIA CENTER OFFICE 1		9	9X9	N/A	N/A	207	
	MEDIA CENTER OFFICE 2		10	9X9	N/A	N/A	210	
	MEDIA CENTER OFFICE 2		11	9X9	N/A	N/A	68	
	MEDIA CENTER RECEPTION		12	6X6	N/A	N/A	92	
TOTAL CFM							3307	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-22

NEBB CERTIFIED #2453

SHEET NO. 22

# RTU-3

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	RETURN					
	MEDIA CENTER OFFICE 1		1	2410	64	
	MEDIA CENTER OFFICE 2		2	2410	248	
	MEDIA CENTER		3	24X24	824	
	MEDIA CENTER		4	24X24	804	
TOTAL CFM					1940	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-21

NEBB CERTIFIED #2453

SHEET NO. 23

# RTU-4

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	SUPPLY							
	KITCHEN		1	15X15	N/A	N/A	358	
	KITCHEN		2	15X15	N/A	N/A	326	
	KITCHEN		3	21X21	N/A	N/A	244	
	KITCHEN		4	21X21	N/A	N/A	318	
	KITCHEN DISHWASHER		5	9X9	N/A	N/A	101	
	KITCHEN OFFICE		6	9X9	N/A	N/A	97	
	KITCHEN BATHROOM		7	6X6	N/A	N/A	97	
TOTAL CFM							1541	
	RETURN							
	KITCHEN		1	30X30	6.25	106	663	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-21

NEBB CERTIFIED #2453

SHEET NO. 24

# RTU-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
CW-7A	CLASSROOM		1	15X15	305	
CW-7A	CLASSROOM		2	15X15	384	
CW-7B	CLASSROOM		3	15X15	254	
CW-7B	CLASSROOM		4	15X15	291	
	CORRIDOR		5	12X12	55	
TOTAL CFM					1289	
	RETURN					
CW-7A	CLASSROOM		1	22X22	693	
CW-7B	CLASSROOM		2	22X22	462	
TOTAL CFM					1155	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-25

NEBB CERTIFIED #2453

SHEET NO. 25

# RTU-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
CW-6	CLASSROOM		1	15X15	332	
CW-6	CLASSROOM		2	15X15	337	
CW-6	CLASSROOM		3	15X15	381	
CW-6	CLASSROOM		4	15X15	307	
	CORRIDOR		5	12X12	0	
TOTAL CFM					1357	
	RETURN					
CW-6	CLASSROOM		1	46X22	539	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-26

NEBB CERTIFIED #2453

SHEET NO. 26

# RTU-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
W-11	CLASSROOM		1	15X15	333	
W-11	CLASSROOM		2	15X15	396	
W-11	CLASSROOM		3	15X15	0	1
W-11	CLASSROOM		4	15X15	0	1
TOTAL CFM					729	
	RETURN					
W-11	CLASSROOM		1	22X22	794	
W-11	CLASSROOM		2	22X22	115	
TOTAL CFM					909	

SHOWED BYPASS 54% OPEN

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-27

NEBB CERTIFIED #2453

SHEET NO. 27

# RTU-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
W-10	CLASSROOM		1	15X15	280	
W-10	CLASSROOM		2	15X15	330	
W-10	CLASSROOM		3	15X15	320	
W-10	CLASSROOM		4	15X15	292	
TOTAL CFM					1222	
	RETURN					
W-10	CLASSROOM		1	46X22	775	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-28

NEBB CERTIFIED #2453

SHEET NO. 28



# UV'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	SPEED	NOTES
K-1	CLASSROOM		1	5X51	1.59	651	1035	LOW	
K-2	CLASSROOM		2	5X42.5	1.33	972	1293	HIGH	
K-3	CLASSROOM		3	5X51	1.59	708	1126	LOW	
K-4	CLASSROOM		4	5X42.5	1.33	604	803	LOW	
K-5	CLASSROOM		5	5X42.5	1.33	509	677	LOW	
W-3	CLASSROOM		6	5X42.5	1.33	486	646	HIGH	
W-4	CLASSROOM		7	5X42.5	1.33	442	588	LOW	
W-5	CLASSROOM		8	5X42.5	1.33	567	754	LOW	
W-6	CLASSROOM		9	5X42.5	1.33	427	568	LOW	
W-7A	CLASSROOM		10	5X34	1.06	0	0	N/A	1,2
W-7B	CLASSROOM		11	5X34	1.06	553	586	HIGH	1
W-8	CLASSROOM		12	5X42.5	1.33	459	610	HIGH	
W-9	CLASSROOM		13	5X42.5	1.33	562	747	LOW	
CW-5	CLASSROOM		14	5X34	1.06	470	498	LOW	
CW-5	CLASSROOM		15	5X34	1.06	0	0	N/A	1
CE-5	CLASSROOM		16	5X34	1.06	0	0	N/A	1
CE-5	CLASSROOM		17	5X34	1.06	579	614	LOW	
E-9	CLASSROOM		18	5X42.5	1.33	469	624	LOW	
E-8	CLASSROOM		19	5X42.5	1.33	767	1020	LOW	
E-7	MUSIC		20	5X42.5	1.33	0	0	N/A	1
CE-4	ART		21	5X42.5	1.33	612	814	HIGH	

NOTE 1: W-7A & W-7B ARE ONE ROOM WITH A DIVIDER WALL WHICH IS OPEN.

NOTE 2: UNIT VENTILATOR IS NOT RUNNING AT THIS TIME

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-14

NEBB CERTIFIED #2453

SHEET NO. 29

# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
K-1/K-2	TOILET		1	8X8	.267	717	191	
K-1/K-2	TOILET		2	8X8	.267	622	166	
K-3	TOILET		3	6X6	.150	190	29	
K-4/K-5	TOILET		4	8X8	.267	248	66	
	GIRL'S BATHROOM		5	6X6	N/A	N/A	89	
	GIRL'S BATHROOM		6	6X6	N/A	N/A	102	
	STAFF TOILET		7	6X6	N/A	N/A	127	
	BOY'S BATHROOM		8	6X6	N/A	N/A	92	
	BOY'S BATHROOM		9	6X6	N/A	N/A	110	
CE-2/CE-3	TOILET		10	6X6	.150	275	41	
CE-2/CE-3	TOILET		11	6X6	.150	369	55	
CW-2/CW-3	TOILET		12	6X6	.150	507	76	
CW-2/CW-3	TOILET		13	6X6	.150	389	58	
CE-1/CW-1	TOILET		14	8X8	.267	151	40	
CE-1/CW-1	TOILET		15	8X8	.267	121	32	
	GIRL'S GRADE 5 TOILET		16	10X10	.416	332	138	
	BOY'S GRADE 5 TOILET		17	10X10	.416	372	155	
	STAFF TOILET		18	10X10	N/A	N/A	51	
	BOY'S GRADE 4 TOILET		19	10X10	0	705	272	
	GIRL'S GRADE 4 TOILET		20	10X10	0	764	295	
	BOY'S BATHROOM		21	6X6	0	655	97	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-30

NEBB CERTIFIED #2453

SHEET NO. 30

# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	BOY'S BATHROOM		22	6X6	N/A	N/A	95	
	GIRL'S BATHROOM		23	6X6	.150	725	109	
	GIRL'S BATHROOM		24	6X6	N/A	N/A	85	
	NURSE TOILET		25	8X8	N/A	N/A	64	
	MAIN OFFICE STAFF TOILET		26	6X6	N/A	N/A	44	
	STAFF ROOM / COPY		27	6X6	N/A	N/A	212	
	KITCHEN TOILET		28	10X11	N/A	N/A	87	1
	KITCHEN DRY STORAGE PAPER		29	6X6	.18	604	109	
	KITCHEN DRY STORAGE FOOD		30	6X6	.18	958	172	
	TIMEOUT ROOM		31	6X6	N/A	N/A	#VALUE!	
	TIMEOUT ROOM		32	10X9	N/A	N/A	#VALUE!	1
	CUSTODIAN OFFICE		33	10X4	.20	873	175	

NOTE 1: CEILING MOUNT EXHAUST FAN

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-31

NEBB CERTIFIED #2453

SHEET NO. 31

# EF

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	KITCHEN DISHWASHER HOOD LEFT		1	24X9.5	1.58	236	373	
	KITCHEN DISHWASHER HOOD RIGHT		2	24X9.5	1.58	348	550	
TOTAL CFM							923	

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-34

NEBB CERTIFIED #2453

SHEET NO. 32

# KEF

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: KITCHEN HOOD LEFT

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 120

FACE HEIGHT ("): 48

FACE AREA (SQ FT): 40.000

TOTAL FPM: 2345

NUMBER OF POINTS: 40

	DESIGN		ACTUAL
CFM:	N/A		2360
FPM:	N/A		59

### VELOCITY PROFILE (FPM)

39	36	0	26	38	40	0	0	26	35
39	56	44	26	38	43	0	36	0	41
50	91	81	45	47	55	53	44	57	76
97	145	116	80	125	113	117	113	114	122

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-32

NEBB CERTIFIED #2453

SHEET NO. 33

# KEF

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: KITCHEN HOOD RIGHT

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 120

FACE HEIGHT ("): 48

FACE AREA (SQ FT): 40.000

TOTAL FPM: 2664

NUMBER OF POINTS: 40

	DESIGN	ACTUAL
CFM:	N/A	2680
FPM:	N/A	67

### VELOCITY PROFILE (FPM)

48	63	0	124	49	44	-29	37	37	58
70	35	0	82	48	-61	58	109	40	49
97	132	34	-27	90	58	74	0	0	59
148	228	-30	41	160	159	133	146	129	119

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: GRISWOLD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-33

NEBB CERTIFIED #2453

SHEET NO. 34

**PROJECT: MCGEE MIDDLE SCHOOL**

**PROJECT DESCRIPTION:** Balance air systems as requested

**COMMENT:**

**1.) HVAC-1 – Serving the Auditorium**

We could not take readings in the space. We sent the unit to 100% outdoor air to get total but appears to be something wrong with exhaust side. The motorized damper for the exhaust is not opening, therefore the “ramped up” exhaust fan side was causing back pressure flow to go out the outdoor air intake. Town needs to investigate this unit.

**2.) HVAC-2 – Serving Lecture Halls A & B**

We also could not take readings in the space, but this unit has an integrated ERV-6 on it (we read outdoor air intake) but no knowing the return side cannot determine a total or what is going to each room.

**3.) RTU-1**

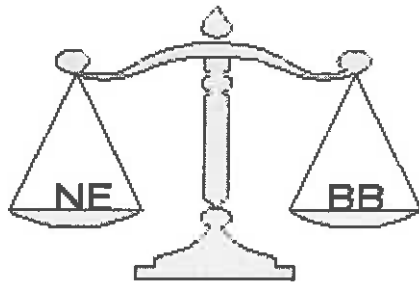
The powered exhaust side of these unit's motorized damper are stuck open. The fan is on, and pulling outdoor air backward through to further add outdoor air to the already open outdoor air intake.

**4.) ERV-1 – Room's 102 & 104**

The FCU-104 serving 104 return grill is installed in room 102. It should be in 104.

**5.) HVAC-4 – Serving Boy's & Girl's Locker Rooms**

The outdoor air mode is disconnected, and it is locked open approximately 70-80%. BMS showing is 10%.



## **CERTIFIED TEST, ADJUST AND BALANCE REPORT**

**REPORT DATE: 01-07-21**

**PROJECT: MCGEE MIDDLE SCHOOL  
VENTILATION AIRFLOW INVESTIGATION**

**ADDRESS: BERLIN, CT**

**CUSTOMER: BERLIN BOARD OF EDUCATION**

**NEBB TAB CONTRACTOR: AIR BALANCING SERVICE CO.  
16 PROGRESS CIRCLE UNIT 1A  
NEWINGTON, CT 06111**

**PHONE NUMBER: (860) 500-5008**

**FAX NUMBER: (860) 500-5010**

**WEBSITE: [WWW.AIRBAL.COM](http://WWW.AIRBAL.COM)**



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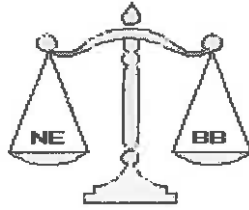
**PROJECT: MCGEE MIDDLE SCHOOL**

**REPORT DATE: 01-07-21**

**SUBMITTED BY: AIR BALANCING SERVICE CO.**

**NEBB CERTIFIED #2453**

**CODE: 20240T**



## CERTIFICATION

**PROJECT:** MCGEE MIDDLE SCHOOL  
VENTILATION AIRFLOW INVESTIGATION  
**ADDRESS:** BERLIN, CT  
**REPORT DATE:** 01-07-21

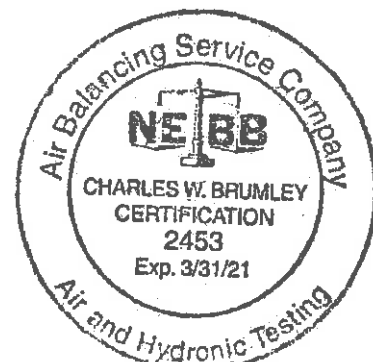
THE DATA PRESENTED IN THIS REPORT IS AN EXACT RECORD OF SYSTEM PERFORMANCE AND WAS OBTAINED IN ACCORDANCE WITH NEBB STANDARD PROCEDURES. ANY VARIANCES FROM DESIGN QUANTITIES WHICH EXCEED NEBB TOLERANCES ARE NOTED THROUGHOUT THIS REPORT.

THE AIR DISTRIBUTION SYSTEMS HAVE BEEN TESTED AND BALANCED AND FINAL ADJUSTMENTS HAVE BEEN MADE IN ACCORDANCE WITH NEBB "PROCEDURAL STANDARDS FOR TESTING - ADJUSTING - BALANCING OF ENVIRONMENTAL SYSTEMS" AND THE PROJECT SPECIFICATIONS.

### SUBMITTED AND CERTIFIED BY:

NEBB TAB FIRM: AIR BALANCING SERVICE CO.  
TAB SUPERVISOR: CHARLES W. BRUMLEY  
REG. NO: 2453

SIGNATURE:



TAB CERTIFIED TAB TECHNICIAN: PAUL R BOICE  
TECHNICIAN CERTIFICATION NO: BB914941T

**\*\* AIR INSTRUMENT CALIBRATION REPORT \*\***

<b>INSTRUMENT SERIAL NUMBER</b>	<b>APPLICATION</b>	<b>CALIBRATION</b>
EXTECH PHOTO TACH SERIAL NO. 151117272	MOTOR AND FAN RPM'S	8/13/2020
ALNOR INSTRUMENTS SERIAL NO. A03813	AIRFLOW VELOCITY	7/21/2020
SHORTRIDGE AIRDATA MULTIMETER ADM-860C SERIAL NO. M93531	MULTIMETER USED IN VELOCITY, STATIC PRESSURES, FLOWHOOD READINGS, DIFFERENTIAL PRESSURES, TEMPERATURE	4/20/2020
FLUKE AMMETER 323 SERIAL NO. 37642839WS	VOLTAGE AND AMPERAGE	8/13/2020

PROJECT: MCGEE MIDDLE SCHOOL  
REPORT DATE: 01-07-21  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240CALI

NEBB CERTIFIED #2453

## ABBREVIATION / MEANING

## ABBREVIATION / MEANING

AC	AIR CONDITIONER	MUA	MAKE-UP AIR
AHU	AIR HANDLING UNIT	N/A	NOT APPLICABLE/NOT AVAILABLE
AK	AREA FACTOR	NO.	NUMBER
AMP	AMPERAGE	OA	OUTSIDE AIR
CEF	CEILING EXHAUST FAN	OA%	PERCENT OF OUTSIDE AIR
CFM	CUBIC FEET PER MINUTE	OD	OUTSIDE DIAMETER
CNTRL	CONTROL	OED	OPEN END DUCT
CU FT	CUBIC FEET	PERF	PERFORATED DIFFUSER
CV	CONSTANT VOLUME	POS	POSITION
DD	DIRECT DRIVE	PRESS	PRESSURE
DEL	ACTUAL DELIVERED	PRIM	PRIMARY
DES	DESIGN	RA	RETURN AIR
DIFF	DIFFERENTIAL	RA%	PERCENT OF RETURN AIR
EF	EXHAUST FAN	RHC	REHEAT COIL
ESP	EXTERNAL STATIC PRESSURE (" WG)	RPM	REVOLUTIONS PER MINUTE
FPM	FEET PER MINUTE	RTU	ROOF TOP UNIT
FT	FEET	SA	SUPPLY AIR
H	HEIGHT	SF	SERVICE FACTOR
HP	HORSE POWER	SL	SLOT
HR	HOUR	SN	SERIAL NUMBER
HTG	HEATING	SP	STATIC PRESSURE (" WG)
L	LENGTH	SQ FT	SQUARE FEET
LD	LINEAR DIFFUSER	TEMP	TEMPERATURE
LFD	LAMINAR FLOW DIFFUSER	TF	THERMAFUSER
LR	LIGHT RETURN	TSP	TOTAL STATIC PRESSURE (" WG)
LT	LIGHT TROEFFER	VAV	VARIABLE AIR VOLUME
MA	MIXED AIR	VEL	VELOCITY IN FEET PER MINUTE
MAU	MAKE-UP AIR UNIT	VFD	VARIABLE FREQUENCY DRIVE
MAX	MAXIMUM	W	WIDTH
MD	MOTORIZED DAMPER	WEF	WALL EXHAUST FAN
MER	MECHANICAL EQUIPMENT ROOM	WG	WATER GAUGE
MFR	MANUFACTURER	W/	WITH
MIN	MINIMUM		

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS	NOTES
			SUPPLY CFM	RET/EXH CFM			
102	CLASSROOM	11298	1011	1355	7.20	NO	
102	TIMEOUT ROOM	983	97	0	5.92	NO	
102	OFFICE	787	0	0	0.00	NO	
104	MUSIC LAB	10836	1173	0	6.50	NO	
105B	CLASSROOM	2553	314	0	7.38	NO	
105A	PYSCHOLOGIST	2383	379	25	9.54	NO	
107	CLASSROOM	5046	867	88	10.31	NO	
108B	CLASSROOM	2401	399	0	9.97	NO	
108A	CLASSROOM	2555	292	0	6.86	NO	
113	CLASSROOM	7516	1073	295	8.57	NO	
111	CLASSROOM	7352	1016	233	8.29	NO	
114	CLASSROOM	9386	1152	153	7.36	NO	
	LAV STAFF	662	0	126	11.42	NO	
	LAV WOMEN	2082	242	365	10.52	NO	
120	CLASSROOM	7571	1253	319	9.93	NO	
119	CLASSROOM	7001	1179	215	10.10	NO	
	UNISEX	671	0	91	8.14	NO	
	MENS TOILET	1960	281	203	8.60	NO	
	MEN LAV	1648	0	83	3.02	YES	
	WOMENS RESTROOM	1383	0	151	6.55	YES	
106	READING CLASSROOM	5032	355	146	4.23	NO	
	NURSES OFF. WAITING RM	784	67	0	5.13	NO	
	NURSES OFFICE	2810	334	0	7.13	YES	
	NURSE ISOLATION ROOM	3690	578	0	9.40	NO	
	NURSE OFFICE TOILET	571	0	40	4.20	NO	
	NURSE ISOL. MEN/WOMEN	358	0	48	8.04	NO	
112	CLASSROOM	7410	1124	305	9.10	NO	
121	CLASSROOM	7295	1074	241	8.83	YES	
120A	CLASSROOM	2340	228	73	5.85	NO	
	CUSTODIAN OFFICE	2255	30	165	4.39	NO	
	CUSTODIAN OFFICE TOILET	318	0	406	76.60	NO	

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-3

NEBB CERTIFIED #2453

SHEET NO. 1

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS	NOTES
			SUPPLY CFM	RET/EXH CFM			
101	BAND	15294	4023	0	15.78	NO	
	MUSIC OFFICE	1164	0	0	0.00	NO	
101-104	WOMENS	678	0	194	17.17	NO	
	PREP RM 2 / BAND	677	29	0	2.57	NO	
101-104	LAV	586	0	228	23.34	NO	
103	CHORUS	13692	3699	0	16.21	NO	
109	CLASSROOM	7006	1114	723	9.54	NO	
109/110	PREP ROOM	1897	122	401	12.68	NO	
110	CLASSROOM	6832	1131	342	9.93	NO	
115	CLASSROOM	7594	1211	99	9.57	NO	
116	CLASSROOM	7257	1199	101	9.91	NO	
118	CLASSROOM	7521	1202	194	9.59	YES	
117	CLASSROOM	7009	1119	145	9.58	NO	
122	CLASSROOM	7464	993	244	7.98	YES	
123	CLASSROOM	9408	1127	248	7.19	YES	
	AUDITORIUM	213063	0	0	0.00	NO	
	GIRL'S LOCKER RM OFFICE	881	79	0	5.38	NO	
	GIRL'S LOCKER RM OFFICE TOILET	199	0	286	86.23	NO	
	BOY'S LOCKER RM OFFICE	850	43	0	3.04	NO	
	BOY'S LOCKER RM OFFICE TOILET	199	0	274	82.61	NO	
1ST FLR	WMNS RM (NEAR FIRE ALARM)	1000	0	166	9.96	NO	
1ST FLR	MNS RM (NEAR LECTURE HALL)	1000	0	152	9.12	NO	

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 2

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS	NOTES
			SUPPLY CFM	RET/EXH CFM			
	GIRL'S LOCKER ROOM	11577	651	183	3.37	NO	
	BOY'S LOCKER ROOM	11815	975	268	4.95	NO	
	TEACHERS WORK ROOM	3440	343	72	5.98	NO	
	HEALTH ROOM 2	686	121	24	10.58	NO	
	CONFERENCE ROOM	674	34	38	3.38	NO	
	OFFICE (T.SAVAGE)	684	40	48	4.21	NO	
	BREAK ROOM	678	51	43	4.51	NO	
	OFFICE A	734	102	32	8.34	NO	
	MAIN CONFERENCE ROOM	1892	189	46	5.99	NO	
	SECRETARY/MAIN OFFICE	8357	554	64	3.98	NO	
	AQUARIUM ROOM	882	184	0	12.52	NO	
	SECURITY OFFICER	908	130	55	8.59	NO	
	ASSISTANT PRINCIPAL	1516	290	45	11.48	YES	
	PRINCIPAL	1882	431	0	13.74	YES	
	MENS ROOM	450	0	89	11.87	NO	
	WOMENS ROOM	438	0	79	10.82	NO	
	LEAD TEACHER	1536	230	0	8.98	YES	
227	CLASSROOM	7775	1181	260	9.11	YES	
228	CLASSROOM	7393	1332	209	10.81	NO	
232	CLASSROOM	7721	1276	0	9.92	NO	
220	CLASSROOM	7924	1194	35	9.04	NO	
226	CLASSROOM	7938	1192	104	9.01	YES	
225	CLASSROOM	5206	1231	389	14.19	YES	
224	CLASSROOM	4695	1283	269	16.40	YES	
223	CLASSROOM	5653	1409	316	14.95	YES	
216	CLASSROOM	7874	1201	39	9.15	NO	
215	CLASSROOM	8065	1241	29	9.23	YES	
218	CLASSROOM	8698	1687	673	11.64	NO	
217	CLASSROOM	8559	1315	445	9.22	NO	
211	CLASSROOM	6272	1063	455	10.17	NO	
209	CLASSROOM	2917	130	0	2.67	NO	
205	CLASSROOM	6437	1259	110	11.74	NO	
204	ART ROOM	15517	1389	57	5.37	YES	
206A	PT/OT	1397	366	191	15.72	NO	

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-6

NEBB CERTIFIED #2453

SHEET NO. 3

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS	NOTES
			SUPPLY CFM	RET/EXH CFM			
229	CLASSROOM	7431	1334	294	10.77	YES	
230	CLASSROOM	7345	1364	262	11.14	YES	
231	CLASSROOM	7981	977	238	7.34	YES	
219	CLASSROOM	8043	1185	64	8.84	YES	
205A	SCHOOL STORE/OFFICE	2281	317	167	8.34	NO	
	STAFF LUNCH ROOM	4258	0	131	1.85	YES	
	WOMENS STAFF 2ND FL	958	0	126	7.89	NO	
	MENS STAFF 2ND FL	1021	0	172	10.11	NO	
2ND FL	WOMENS ROOM	1466	0	165	6.75	NO	
2ND FL	MENS ROOM	1373	0	158	6.90	NO	
222B	COUNSELORS SUITE	1492	177	30	7.12	NO	
	CONFERENCE ROOM (INSIDE)	1212	129	67	6.39	NO	
222A	COUNSELOR	2246	131	232	6.20	NO	
	CONF. ROOM/ MRS.STEVENSON	1393	241	55	10.38	NO	
221	HEALTH	6772	864	494	7.66	YES	
2ND FL	WOMENS LAV	0	0	0	0.00	NO	
201	ART ROOM	16325	1928	952	7.09	NO	
2ND FL	STAFF LAV A	518	0	90	10.42	NO	
2ND FL	STAFF LAV B	528	0	110	12.50	NO	
2ND FL	MENS LAV D	1826	252	341	11.20	NO	
2ND FL	WOMENS LAV C	1923	248	312	9.73	NO	
2ND FL	LIBRARY A	2914	343	177	7.06	NO	
2ND FL	WORK ROOM (INSIDE MEDIA)	4910	785	322	9.59	NO	
2ND FL	OFFICE/MRS SALINA	1636	244	39	8.95	NO	
2ND FL	CLASSROOM	7224	1013	728	8.41	NO	
233	READING	2989	187	114	3.75	NO	

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-8

NEBB CERTIFIED #2453

SHEET NO. 4



**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	ACTUAL		ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS	NOTES
			SUPPLY CFM	RET/EXH CFM			
2ND FL	LIBRARY MEDIA CENTER	42440	4638	2639	6.56	NO	
2ND FL	CAFETERIA A, B & C	34339	4645	1018	8.12	NO	2
202	ART	11975	1300	50	6.51	YES	
210	CLASSROOM	6670	538	178	4.84	YES	
208	CLASSROOM	7176	772	278	6.45	NO	
203	SHOP	15739	1570	6174	23.54	NO	
2ND FL	CAFETERIA A	8333	1383	210	9.96	NO	1
2ND FL	CAFETERIA B	17427	2376	280	0.00	NO	1
2ND FL	CAFETERIA C	8579	886	528	6.20	NO	1
	KITCHEN	12800	3897	2557	18.27		
2ND FL	COMPUTER LAB	3574	550	480	9.23	NO	
	KITCH LCKR RM TOILET	279	0	96	20.65	NO	
	KITCHEN OFFICE	360	25	0	4.17	NO	
217A	IT OFFICE	1251	415	371	19.90	NO	
217B	ESOL	1260	170	292	13.90	NO	
206A	OFFICE	953	238	228	14.98	NO	
206	CLASSROOM	3192	652	572	12.26	NO	
207	CLASSROOM	5667	1252	917	13.26	NO	
214	CLASSROOM	3184	703	569	13.25	NO	
213	CLASSROOM	2024	456	324	13.52	NO	
212	OFFICE	1206	289	251	14.38	NO	
2ND FL	WOMEN	1431	0	330	13.84	YES	
2ND FL	MEN	1727	0	231	8.03	YES	
2ND FL	PRACT. GYM/WEELLNESS	50667	6204	5925	7.35	NO	

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

NOTE 1: CAFÉ HAD TWO FOLDING DIVIDING WALLS WHICH FORM CAFÉ A, B & C WHEN CLOSED.

NOTE 2: CAFÉ AREA AND ACH WITH DIVIDING WALLS OPEN

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-9

NEBB CERTIFIED #2453

SHEET NO. 5

# MINIMUM OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	RTU-1		1	32X24	5.33	242	1290	
	RTU-1		2	32X15	3.33	441	1469	
	RTU-1		3	32X15	3.33	421	1402	
TOTAL CFM							4161	
	RTU-2		1	32X21	4.67	827	3862	
	RTU-2		2	32X21	4.67	798	3727	
TOTAL CFM							7589	
	RTU-3		1	28.5X20.5	4.057	52	211	
	RTU-4		1	30.5X24.5	5.19	214	1111	
	RTU-4		2	10X32	2.22	342	759	
	RTU-4		3	10X32	2.22	285	633	
TOTAL CFM							2503	
	RTU-5		1	30.5X24.5	5.19	84	436	
	RTU-5		2	10X32	2.22	101	224	
	RTU-5		3	10X32	2.22	133	295	
TOTAL CFM							955	
	RTU-6		1	29X21	4.23	42	178	
	RTU-7		1	29X21	4.229	24	101	
	RTU-8		1	32.5X28.5	6.432	36	232	
	RTU-8		2	32.5X28.5	2.370	46	109	
	RTU-8		3	32.5X28.5	2.370	34	81	
TOTAL CFM							422	

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-85

NEBB CERTIFIED #2453

SHEET NO. 6

# MINIMUM OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	RTU-9		1	30.5X25.5	5.401	35	189	
	RTU-9		2	30.5X25.5	5.401	34	184	
TOTAL CFM							373	
	RTU-10		1	28X20	3.889	21	82	
	RTU-11		1	29X20	4.028	45	181	
	RTU-12		1	29X20	4.028	44	177	
	RTU-13		1	29X20	4.028	56	226	
	RTU-14		1	28.5X20.5	4.057	116	471	
	RTU-15		1	28.5X20.5	4.057	85	345	
	ERV-1		1	31X35	7.535	98	738	
	ERV-2		1	35X31	7.535	67	505	
	ERV-3		1	31X35	7.535	382	2878	
	ERV-4		1	31X35	7.535	165	1243	
	ERV-5		1	53X31	11.410	285	3252	
	ERV-6/HVAC-2		1	31X15	3.229	285	920	1,2
	HVAC-3		1	38X29	7.653	160	1224	
	HVAC-4		1	40X13	3.611	264	953	

NOTE 1: INLET SCREEN PARTIALLY PLUGGED / BROKEN

NOTE 2: ERV-6 SUPPLIES OUTDOOR AIR TO HVAC-2

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-86

NEBB CERTIFIED #2453

SHEET NO. 7

# ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
114/123	PREP/STORAGE		1	12X12	291	
	EXHAUST					
114/123	PREP/STORAGE		1	20X20	425	1

NOTE: MEASURED USING VELGRID WITH A 2.778 AK FACTOR

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-37

NEBB CERTIFIED #2453

SHEET NO. 8

# HVAC-3

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
	CAFETERIA		1	48X24	716	
	CAFETERIA		2	48X24	667	
	CAFETERIA		3	48X24	289	
	CAFETERIA		4	48X24	379	
	CAFETERIA		5	48X24	449	
	CAFETERIA		6	48X24	463	
	CAFETERIA		7	48X24	400	
	CAFETERIA		8	48X24	397	
	CAFETERIA		9	48X24	601	
	CAFETERIA		10	48X24	285	
TOTAL CFM					4646	
	RETURN					
	CAFETERIA		1	48X24	109	
	CAFETERIA		2	48X24	101	
	CAFETERIA		3	48X24	138	
	CAFETERIA		4	48X24	142	
	CAFETERIA		5	48X24	247	
	CAFETERIA		6	48X24	281	
TOTAL CFM					1018	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-52

NEBB CERTIFIED #2453

SHEET NO. 9

# HVAC-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
	CAFETERIA A		1	48X24	716	
	CAFETERIA A		2	48X24	667	
TOTAL CFM					1383	
	<b>RETURN</b>					
	CAFETERIA A		1	48X24	109	
	CAFETERIA A		2	48X24	101	
TOTAL CFM					210	
	<b>SUPPLY</b>					
	CAFETERIA B		1	48X24	289	
	CAFETERIA B		2	48X24	379	
	CAFETERIA B		3	48X24	449	
	CAFETERIA B		4	48X24	463	
	CAFETERIA B		5	48X24	400	
	CAFETERIA B		6	48X24	397	
TOTAL CFM					2377	
	<b>RETURN</b>					
	CAFETERIA B		1	48X24	138	
	CAFETERIA B		2	48X24	142	
TOTAL CFM					280	
	<b>SUPPLY</b>					
	CAFETERIA C		1	48X24	601	
	CAFETERIA C		2	48X24	285	
TOTAL CFM					1446	
	<b>RETURN</b>					
	CAFETERIA C		1	48X24	247	
	CAFETERIA C		2	48X24	281	
TOTAL CFM					528	
	<b>SUPPLY</b>					
	KITCHEN OFFICE		1	6X6	25	

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-55

NEBB CERTIFIED #2453

SHEET NO. 10

# HVAC-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
	GIRL'S LOCKER ROOM		1	16X6	200	
	GIRL'S LOCKER ROOM		2	16X6	219	
	GIRL'S LOCKER ROOM		3	16X6	232	
	GIRL'S LOCKER RM OFFICE		4	6X6	79	
	BOY'S LOCKER ROOM		5	12X12	356	
	BOY'S LOCKER ROOM		6	12X12	398	
	BOY'S LOCKER ROOM		7	12X6	221	
	BOY'S LOCKER RM OFFICE		8	6X6	43	
TOTAL CFM					1748	
	<b>RETURN/EXHAUST</b>					
	GIRL'S LCKR RM TOILET		1	16X13	183	1
	GIRL'S LCKR RM OFFICE TOILET		2	10X10	286	2
	BOY'S LOCKER ROOM		3	12X12	80	3
	BOY' LCKR RM TOILET		4	16X13	188	1
	BOY'S LCKR OFFICE TOILET		5	10X10	274	2
TOTAL CFM					1011	

NOTE 1: CEILING EXHAUST FAN

NOTE 2: MEASURED USING RVA AND A .521 AK

NOTE 3: MEASURED USING RBA AND A .75 AK

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-1

NEBB CERTIFIED #2453

SHEET NO. 11

# HVAC-4

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	LOCKER ROOMS		1	20X20	2.78	795	2210	

NOTE: BMS SHOWING OUTDOOR AIR OPEN 10%, ACTUAL IS 70-80%

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-2

NEBB CERTIFIED #2453

SHEET NO. 12



# FCU-102/ERV-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
102	CLASSROOM		1	12X12	322	
102	CLASSROOM		2	12X12	289	
102	CLASSROOM		3	6X6	78	
102	CLASSROOM		4	12X12	344	
102	TIMEOUT ROOM		5	12X12	97	
102	OFFICE		6	6X6	0	
TOTAL CFM					1130	
	RETURN					
	TIMEOUT ROOM		1	12X12	45	
	CLASSROOM		2	20X20	1019	
TOTAL CFM					1064	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-15

NEBB CERTIFIED #2453

SHEET NO. 13

# KITCHEN HOOD

**\*\* AIR INLET REPORT \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
102	CLASSROOM		1	39X18	4.875	278	1355	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-16

NEBB CERTIFIED #2453

SHEET NO. 14

# FCU-104/ERV-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
104	MUSIC LAB		1	12X12	302	
104	MUSIC LAB		2	12X12	300	
104	MUSIC LAB		3	12X12	283	
104	MUSIC LAB		4	12X12	288	
TOTAL CFM					1173	
	RETURN					
102	CLASSROOM		1	22X22	1073	1
	EXHAUST					
104	MUSIC LAB		1	22X22	0	

NOTE 1: IT IS INSTALLED IN ROOM 102

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-17

NEBB CERTIFIED #2453

SHEET NO. 15

# FCU-109/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
109	CLASSROOM		1	12X12	270	
109	CLASSROOM		2	12X12	288	
109	CLASSROOM		3	12X12	303	
109	CLASSROOM		4	12X12	253	
109/110	PREP		5	9X9	122	
TOTAL CFM					1236	
	RETURN					
109	CLASSROOM		1	20X20	1027	
	EXHAUST					
109	CLASSROOM		2	22X22	263	
109/110	PREP		1	22X22	401	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-25

NEBB CERTIFIED #2453

SHEET NO. 16

## EXISTING EF

### \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: FUME HOOD / CLASSROOM 109

CONDITION: 18" SASH HEIGHT

FACE WIDTH ("): 40

FACE HEIGHT ("): 18

FACE AREA (SQ FT): 5.000

TOTAL FPM: 549

NUMBER OF POINTS: 6

	DESIGN		ACTUAL
CFM:	N/A		460
FPM:	N/A		92

#### VELOCITY PROFILE (FPM)

72	96	97
85	106	93

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-26

NEBB CERTIFIED #2453

SHEET NO. 17

# FCU-110/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
110	CLASSROOM		1	12X12	272	
110	CLASSROOM		2	12X12	279	
110	CLASSROOM		3	12X12	290	
110	CLASSROOM		4	12X12	290	
TOTAL CFM					1131	
	RETURN					
110	CLASSROOM		1	20X20	974	
	EXHAUST					
110	CLASSROOM		1	22X22	342	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-27

NEBB CERTIFIED #2453

SHEET NO. 18

# FCU-111/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
111	CLASSROOM		1	12X12	274	
111	CLASSROOM		2	12X12	252	
111	CLASSROOM		3	12X12	240	
111	CLASSROOM		4	12X12	250	
TOTAL CFM					1016	
	RETURN					
111	CLASSROOM		1	20X20	990	
	EXHAUST					
111	CLASSROOM		1	22X22	233	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-28

NEBB CERTIFIED #2453

SHEET NO. 19

# FCU-112/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
112	CLASSROOM		1	12X12	288	
112	CLASSROOM		2	12X12	284	
112	CLASSROOM		3	12X12	265	
112	CLASSROOM		4	12X12	287	
TOTAL CFM					1124	
	RETURN					
112	CLASSROOM		1	20X20	1082	
	EXHAUST					
112	CLASSROOM		1	22X22	305	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-29

NEBB CERTIFIED #2453

SHEET NO. 20



# FCU-113/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
113	SCIENCE CLASSROOM		1	12X12	276	
113	SCIENCE CLASSROOM		2	12X12	290	
113	SCIENCE CLASSROOM		3	12X12	235	
113	SCIENCE CLASSROOM		4	12X12	272	
TOTAL CFM					1073	
	RETURN					
113	SCIENCE CLASSROOM		1	20X20	990	
	EXHAUST					
113	SCIENCE CLASSROOM		1	22X22	295	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-30

NEBB CERTIFIED #2453

SHEET NO. 21

# FCU-114/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
114	CLASSROOM		1	12X12	300	
114	CLASSROOM		2	12X12	275	
114	CLASSROOM		3	12X12	308	
114	CLASSROOM		4	12X12	269	
TOTAL CFM					1152	
	RETURN					
114	CLASSROOM		1	20X20	835	
	EXHAUST					
114	CLASSROOM		1	12X12	153	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-38

NEBB CERTIFIED #2453

SHEET NO. 22

# FCU-115/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
115	CLASSROOM		1	12X12	293	
115	CLASSROOM		2	12X12	303	
115	CLASSROOM		3	12X12	296	
115	CLASSROOM		4	12X12	319	
TOTAL CFM					1211	
	RETURN					
115	CLASSROOM		1	20X20	1097	
	EXHAUST					
115	CLASSROOM		1	12X12	99	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-39

NEBB CERTIFIED #2453

SHEET NO. 23

# FCU-116/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
116	CLASSROOM		1	12X12	306	
116	CLASSROOM		2	12X12	296	
116	CLASSROOM		3	12X12	283	
116	CLASSROOM		4	12X12	314	
TOTAL CFM					1199	
	RETURN					
116	CLASSROOM		1	20X20	1160	
	EXHAUST					
116	CLASSROOM		1	12X12	101	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-40

NEBB CERTIFIED #2453

SHEET NO. 24

# FCU-117/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
117	CLASSROOM		1	12X12	291	
117	CLASSROOM		2	12X12	261	
117	CLASSROOM		3	12X12	289	
117	CLASSROOM		4	12X12	278	
TOTAL CFM					1119	
	RETURN					
117	CLASSROOM		1	20X20	1034	
	EXHAUST					
117	CLASSROOM		1	36X18	145	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-41

NEBB CERTIFIED #2453

SHEET NO. 25

# FCU-118/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
118	CLASSROOM		1	12X12	291	
118	CLASSROOM		2	12X12	326	
118	CLASSROOM		3	12X12	303	
118	CLASSROOM		4	12X12	282	
TOTAL CFM					1202	
	RETURN					
118	CLASSROOM		1	20X20	1195	
	EXHAUST					
118	CLASSROOM		1	22X22	194	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-42

NEBB CERTIFIED #2453

SHEET NO. 26

# FCU-119/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
119	CLASSROOM		1	12X12	280	
119	CLASSROOM		2	12X12	286	
119	CLASSROOM		3	12X12	306	
119	CLASSROOM		4	12X12	297	
TOTAL CFM					1169	
	RETURN					
119	CLASSROOM		1	20X20	1213	
	EXHAUST					
119	CLASSROOM		1	22X46	215	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-45

NEBB CERTIFIED #2453

SHEET NO. 27

# FCU-120/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
120	CLASSROOM		1	12X12	305	
120	CLASSROOM		2	12X12	305	
120	CLASSROOM		3	12X12	330	
120	CLASSROOM		4	12X12	313	
120A	CLASSROOM		5	12X12	228	
TOTAL CFM					1481	
	RETURN					
120	CLASSROOM		1	20X20	677	
120A	CLASSROOM		2	12X12	113	
TOTAL CFM					790	
	EXHAUST					
120	CLASSROOM		1	22X22	319	
120A	CLASSROOM		2	12X12	73	
TOTAL CFM					392	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-46

NEBB CERTIFIED #2453

SHEET NO. 28



# FCU-121

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
121	CLASSROOM		1	12X12	264	
121	CLASSROOM		2	12X12	286	
121	CLASSROOM		3	12X12	261	
121	CLASSROOM		4	12X12	263	
TOTAL CFM					1074	
	RETURN					
121	CLASSROOM		1	20X20	1126	
	EXHAUST					
121	CLASSROOM		1	12X12	241	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-48

NEBB CERTIFIED #2453

SHEET NO. 29

# FCU-122/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
122	CLASSROOM		1	12X12	254	
122	CLASSROOM		2	12X12	249	
122	CLASSROOM		3	12X12	243	
122	CLASSROOM		4	12X12	247	
TOTAL CFM					993	
	RETURN					
122	CLASSROOM		1	20X20	1053	
	EXHAUST					
122	CLASSROOM		1	12X12	244	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-49

NEBB CERTIFIED #2453

SHEET NO. 36

# FCU-123/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
123	CLASSROOM		1	12X12	270	
123	CLASSROOM		2	12X12	291	
123	CLASSROOM		3	12X12	283	
123	CLASSROOM		4	12X12	283	
TOTAL CFM					1127	
	RETURN					
123	CLASSROOM		1	20X20	1039	
	EXHAUST					
123	CLASSROOM		1	12X12	248	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-47

NEBB CERTIFIED #2453

SHEET NO. 31

# FCU-202/ERV-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
202	ART		1	12X12	330	
202	ART		2	12X12	328	
202	ART		3	12X12	332	
202	ART		4	12X12	310	
TOTAL CFM					1300	
	RETURN					
202	ART		1	20X20	1202	
	EXHAUST					
202	ART		1	22X22	50	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-18

NEBB CERTIFIED #2453

SHEET NO. 32

# FCU-204/ERV-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
204	ART CLASSROOM		1	12X12	355	
204	ART CLASSROOM		2	12X12	354	
204	ART CLASSROOM		3	12X12	339	
204	ART CLASSROOM		4	12X12	341	
TOTAL CFM					1389	
	RETURN					
204	ART CLASSROOM		1	20X20	1232	
	EXHAUST					
204	ART CLASSROOM		1	22X22	57	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-19

NEBB CERTIFIED #2453

SHEET NO. 33

# FCU-205/ERV-1

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
205	CLASSROOM		1	12X12	331	
205	CLASSROOM		2	12X12	309	
205	CLASSROOM		3	12X12	306	
205	CLASSROOM		4	12X12	313	
TOTAL CFM					1259	
	RETURN					
205	CLASSROOM		1	20X20	987	
	EXHAUST					
205	CLASSROOM		1	18X36	110	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-20

NEBB CERTIFIED #2453

SHEET NO. 34

# FCU-215/ERV-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
215	CLASSROOM		1	12X12	263	
215	CLASSROOM		2	12X12	322	
215	CLASSROOM		3	12X12	329	
215	CLASSROOM		4	12X12	300	
TOTAL CFM					1214	
	RETURN					
215	CLASSROOM		1	20X20	1040	
	EXHAUST					
215	CLASSROOM		1	22X22	29	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-21

NEBB CERTIFIED #2453

SHEET NO. 35

# FCU-216/ERV-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
216	CLASSROOM		1	12X12	287	
216	CLASSROOM		2	12X12	311	
216	CLASSROOM		3	12X12	302	
216	CLASSROOM		4	12X12	301	
TOTAL CFM					1201	
	RETURN					
216	CLASSROOM		1	20X20	1018	
	EXHAUST					
216	CLASSROOM		1	18X36	39	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-22

NEBB CERTIFIED #2453

SHEET NO. 36



# FCU-219/ERV-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
219	CLASSROOM		1	12X12	292	
219	CLASSROOM		2	12X12	319	
219	CLASSROOM		3	12X12	296	
219	CLASSROOM		4	12X12	278	
TOTAL CFM					1185	
	RETURN					
219	CLASSROOM		1	20X20	1066	
	EXHAUST					
219	CLASSROOM		1	22X22	64	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-23

NEBB CERTIFIED #2453

SHEET NO. 37

# FCU-220/ERV-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
220	CLASSROOM		1	12X12	296	
220	CLASSROOM		2	12X12	304	
220	CLASSROOM		3	12X12	312	
220	CLASSROOM		4	12X12	283	
TOTAL CFM					1195	
	RETURN					
220	CLASSROOM		1	20X20	985	
	EXHAUST					
220	CLASSROOM		1	22X46	35	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-24

NEBB CERTIFIED #2453

SHEET NO. 38

# FCU-223/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
223	CLASSROOM		1	12X12	330	
223	CLASSROOM		2	12X12	387	
223	CLASSROOM		3	12X12	324	
223	CLASSROOM		4	12X12	368	
TOTAL CFM					1409	
	RETURN					
223	CLASSROOM		1	20X20	702	
	EXHAUST					
223	CLASSROOM		1	22X22	316	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-31

NEBB CERTIFIED #2453

SHEET NO. 39

# FCU-224/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
224	CLASSROOM		1	12X12	308	
224	CLASSROOM		2	12X12	323	
224	CLASSROOM		3	12X12	341	
224	CLASSROOM		4	12X12	311	
TOTAL CFM					1283	
	RETURN					
224	CLASSROOM		1	20X20	1115	
	EXHAUST					
224	CLASSROOM		1	22X22	296	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-32

NEBB CERTIFIED #2453

SHEET NO. 40

# FCU-225/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
225	MATH CLASSROOM		1	12X12	308	
225	MATH CLASSROOM		2	12X12	310	
225	MATH CLASSROOM		3	12X12	293	
225	MATH CLASSROOM		4	12X12	320	
TOTAL CFM					1231	
	RETURN					
225	MATH CLASSROOM		1	20X20	1191	
	EXHAUST					
225	MATH CLASSROOM		1	22X22	389	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-33

NEBB CERTIFIED #2453

SHEET NO. 41

# FCU-226/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
226	CLASSROOM		1	12X12	272	
226	CLASSROOM		2	12X12	305	
226	CLASSROOM		3	12X12	326	
226	CLASSROOM		4	12X12	289	
TOTAL CFM					1192	
	RETURN					
226	CLASSROOM		1	20X20	1326	
	EXHAUST					
226	CLASSROOM		1	12X12	104	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-43

NEBB CERTIFIED #2453

SHEET NO. 42

# FCU-227/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
227	MATH CLASSROOM		1	12X12	296	
227	MATH CLASSROOM		2	12X12	318	
227	MATH CLASSROOM		3	12X12	286	
227	MATH CLASSROOM		4	12X12	281	
TOTAL CFM					1181	
	RETURN					
227	MATH CLASSROOM		1	20X20	1262	
	EXHAUST					
227	MATH CLASSROOM		1	12X12	260	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-44

NEBB CERTIFIED #2453

SHEET NO. 43

# FCU-228/ERV-4

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
228	CLASSROOM		1	12X12	323	
228	CLASSROOM		2	12X12	354	
228	CLASSROOM		3	12X12	340	
228	CLASSROOM		4	12X12	315	
TOTAL CFM					1332	
	RETURN					
228	CLASSROOM		1	20X20	1290	
	EXHAUST					
228	CLASSROOM		1	16X12	209	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-34

NEBB CERTIFIED #2453

SHEET NO. 44



# FCU-229/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
229	CLASSROOM		1	12X12	350	
229	CLASSROOM		2	12X12	329	
229	CLASSROOM		3	12X12	330	
229	CLASSROOM		4	12X12	325	
TOTAL CFM					1334	
	RETURN					
229	CLASSROOM		1	20X20	1244	
	EXHAUST					
229	CLASSROOM		1	18X12	294	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-35

NEBB CERTIFIED #2453

SHEET NO. 45

# FCU-230/ERV-3

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
230	CLASSROOM		1	12X12	347	
230	CLASSROOM		2	12X12	335	
230	CLASSROOM		3	12X12	329	
230	CLASSROOM		4	12X12	353	
TOTAL CFM					1364	
	RETURN					
230	CLASSROOM		1	20X20	1264	
	EXHAUST					
230	CLASSROOM		1	18X12	262	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-36

NEBB CERTIFIED #2453

SHEET NO. 46

# FCU-231/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
231	CLASSROOM		1	12X12	255	
231	CLASSROOM		2	12X12	252	
231	CLASSROOM		3	12X12	229	
231	CLASSROOM		4	12X12	241	
TOTAL CFM					977	
	RETURN					
231	CLASSROOM		1	20X20	1030	
	EXHAUST					
231	CLASSROOM		1	12X12	238	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-50

NEBB CERTIFIED #2453

SHEET NO. 417

# FCU-232/ERV-5

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
232	CLASSROOM		1	12X12	345	
232	CLASSROOM		2	12X12	331	
232	CLASSROOM		3	12X12	297	
232	CLASSROOM		4	12X12	303	
TOTAL CFM					1276	
	RETURN					
232	CLASSROOM		1	20X20	750	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-51

NEBB CERTIFIED #2453

SHEET NO. 48

# RTU-1

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	TEACHERS WORK RM		1	20X12	72	
	HEALTH ROOM 2		2	8X8	24	
	CONFERENCE ROOM		3	8X8	38	
	OFFICE (T. SAVAGE)		4	8X8	48	
	BREAK ROOM		5	8X8	43	
	OFFICE A		6	8X8	32	
	MAIN CONF. ROOM		7	14X14	46	
	SECRETARY/MAIN OFF.		8	20X18	64	
	SECURITY OFFICER		9	8X8	55	
	ASST. PRINCIPAL		10	12X12	45	
	PRINCIPAL		11	14X14	0	
	LEAD TEACHER		12	12X12	0	
	NURSE OFF. WAITING		13	8X8	0	
	NURSE OFFICE		14	10X8	0	
	NURSE ISOLATION		15	14X10	0	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-56

NEBB CERTIFIED #2453

SHEET NO. 49

## RTU-2

### \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
105B	CLASSROOM		1	12X12	314	
105A	PHYSIOLOGIST		2	12X12	379	
107	CLASSROOM		3	12X12	427	
107	CLASSROOM		4	12X12	440	
108B	CLASSROOM		5	16X12	399	
108A	CLASSROOM		6	16X12	292	
	LAV WOMEN		7	12X12	242	
	MEN TOILET		8	12X12	281	
2ND FL	WOMEN LAV C		9	9X9	248	
2ND FL	MEN LAV D		10	9X9	252	
	CUSTODIAN OFFICE		11	9X9	30	
	RETURN					
105B	CLASSROOM		1	12X12	0	
105A	PHYSIOLOGIST		2	12X12	25	
107	CLASSROOM		3	16X16	88	
108B	CLASSROOM		4	14X14	+68	1
108A	CLASSROOM		5	14X14	+64	1
	NURSES OFF. WAITING RM		6	8X8	0	
	NURSES OFFICE		7	10X8	0	
	NURSE ISOLATION		8	14X10	+65	1
	CUSTODIAN OFFICE		9	2410	165	

NOTE 1: POSITION AIRFLOW FROM DIFFUSER

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-59

NEBB CERTIFIED #2453

SHEET NO. 50

## RTU-2

### \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
217	COMPUTER CLASSRM		1	15X15	355	
217	COMPUTER CLASSRM		2	15X15	113	
217	COMPUTER CLASSRM		3	15X15	433	
217	COMPUTER CLASSRM		4	15X15	414	
217A	IT OFFICE		5	13X10	415	
217B	ESOL		6	12X9	170	
	RETURN					
217	COMPUTER CLASSRM		1	18X36	445	
217A	IT OFFICE		2	12X10	371	
217B	ESOL		3	12X10	0	
	SUPPLY					
106	CLASSROOM		1	12X12	115	
106	CLASSROOM		2	12X12	240	
	RETURN					
106	CLASSROOM		1	20X18	146	
	SUPPLY					
205A	SCHOOL STORE/OFFICE		1	9X9	135	
205A	SCHOOL STORE/OFFICE		2	9X9	182	
	RETURN					
205A	SCHOOL STORE/OFFICE		1	10X10	167	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-60

NEBB CERTIFIED #2453

SHEET NO. 51

## RTU-2

### \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
208	CLASSROOM		1	9X9	210	
208	CLASSROOM		2	9X9	136	
208	CLASSROOM		3	9X9	204	
208	CLASSROOM		4	9X9	118	
208	CLASSROOM		5	9X9	104	
TOTAL CFM					772	
	RETURN					
208	CLASSROOM		1	20X18	278	
	SUPPLY					
209	CLASSROOM		1	6X6	42	
209	CLASSROOM		2	6X6	43	
209	CLASSROOM		3	6X6	45	
TOTAL CFM					130	
	SUPPLY					
210	CLASSROOM		1	15X15	383	
210	CLASSROOM		2	15X15	155	
TOTAL CFM					538	
	RETURN					
210	CLASSROOM		1	20X18	178	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-64

NEBB CERTIFIED #2453

SHEET NO. 52



## RTU-2

### \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
211	CLASSROOM		1	15X15	527	
211	CLASSROOM		2	15X15	535	
TOTAL CFM					1062	
	<b>RETURN</b>					
211	CLASSROOM		1	20X18	455	
	<b>SUPPLY</b>					
218	COMPUTER LAB		1	15X15	419	
218	COMPUTER LAB		2	15X15	365	
218	COMPUTER LAB		3	15X15	448	
218	COMPUTER LAB		4	15X15	455	
TOTAL CFM					1687	
	<b>RETURN</b>					
218	COMPUTER LAB		1	18X36	673	
	<b>SUPPLY</b>					
221	HEALTH		1	15X15	438	
221	HEALTH		2	15X15	426	
TOTAL CFM					864	
	<b>RETURN</b>					
221	HEALTH		1	20X18	494	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-67

NEBB CERTIFIED #2453

SHEET NO. 53

# RTU-2

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
222B	COUNSELORS SUITE		1	9X9	177	
222A	COUNSEL. (MRS. CRAWFORD)		2	15X15	131	
	CONF. RM (INTERIOR)		3	9X9	129	
	CONF. RM (MRS. STEVENSON)		4	9X9	241	
TOTAL CFM					678	
	<b>RETURN</b>					
222B	COUNSELORS SUITE		1	8X6	30	
222A	COUNSEL. (MRS. CRAWFORD)		2	12X12	232	
	CONF. RM (INTERIOR)		3	8X6	67	
	CONF. RM (MRS. STEVENSON)		4	8X6	55	
TOTAL CFM					384	
	<b>SUPPLY</b>					
2ND FL	COMPUTER LAB		1	12X12	299	
2ND FL	COMPUTER LAB		2	12X12	251	
TOTAL CFM					550	
	<b>RETURN</b>					
2ND FL	COMPUTER LAB		1	12X12	480	

PROJECT: MCGEE MIDDLE SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-70

NEBB CERTIFIED #2453

SHEET NO. 54

# RTU-3

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	SUPPLY							
	KITCHEN		1	44X6	1.320	744	982	
	KITCHEN		2	44X6	1.320	871	1150	
	KITCHEN		3	32X6	.960	697	669	
	KITCHEN		4	32X6	.960	1142	1096	
TOTAL CFM							3897	
	RETURN							
	KITCHEN		1	40X28	7.778	290	2557	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-71

NEBB CERTIFIED #2453

SHEET NO. 55

# RTU-4 / RTU-5 (100% OUTDOOR AIR)

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	RTU-4							
	LOWER GYM		1	30.5X24.5	5.19	463	2403	1
	OA INTAKE		2	10X32	2.22	840	1865	1
	OA INTAKE		3	10X32	2.22	752	1669	1
TOTAL CFM							5937	
	RTU-5							
	UPPER GYM		1	30.5X24.5	5.19	657	3410	
	OA INTAKE		2	10X32	2.22	900	1998	
	OA INTAKE		3	10X32	2.22	984	2184	
TOTAL CFM							7592	

NOTE: BMS SHOWED "0" FOR MINIMUM OUTDOOR AIR

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-73

NEBB CERTIFIED #2453

SHEET NO. 56

# RTU-6

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	PRACTICE GYM A / WELLNESS		1	26X26	N/A	N/A	N/A	
	PRACTICE GYM A / WELLNESS		2	26X26	N/A	N/A	N/A	
TOTAL CFM							3284	1
	<b>RETURN</b>							
	PRACTICE GYM A / WELLNESS		1	30X30	6.25	497	3106	2

NOTE 1: SUPPLY AIR CALCULATED BY OUTDOOR AIR + RETURN AIR = SUPPLY AIR  
178 CFM + 3106 CFM = 3284 CFM

NOTE 2: OUTDOOR AIR 100% CLOSED

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-72

NEBB CERTIFIED #2453

SHEET NO. 57

# RTU-7

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	PRACTICE GYM B / WELLNESS		1	26X26	N/A	N/A	N/A	
	PRACTICE GYM B / WELLNESS		2	26X26	N/A	N/A	N/A	
TOTAL CFM							2920	1
	<b>RETURN</b>							
	PRACTICE GYM B / WELLNESS		1	30X30	6.25	451	2819	2

NOTE 1: SUPPLY AIR CALCULATED BY OUTDOOR AIR + RETURN AIR = SUPPLY AIR  
101 CFM + 2819 CFM = 2920 CFM

NOTE 2: OUTDOOR AIR 100% CLOSED

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-74

NEBB CERTIFIED #2453

SHEET NO. 58

# RTU-8 (LIBRARY/MEDIA CTR)

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	LIBRARY A		1	6X6	159	
	LIBRARY A		2	6X6	184	
	WORKROOM		3	12X12	391	
	WORKROOM		4	12X12	394	
	OFFICE MRS. SALINA		5	9X9	244	
	CLASSROOM		6	12X12	226	
	CLASSROOM		7	12X12	269	
	CLASSROOM		8	12X12	242	
	CLASSROOM		9	12X12	276	
233	READING		10	6X6	100	
233	READING		11	6X6	87	
	LIBRARY/MEDIA CTR		12	12X12	277	
	LIBRARY/MEDIA CTR		13	12X12	325	
	LIBRARY/MEDIA CTR		14	12X12	197	
	LIBRARY/MEDIA CTR		15	12X12	320	
	LIBRARY/MEDIA CTR		16	12X12	334	
	LIBRARY/MEDIA CTR		17	12X12	326	
	LIBRARY/MEDIA CTR		18	12X12	320	
	LIBRARY/MEDIA CTR		19	12X12	344	
	LIBRARY/MEDIA CTR		20	12X12	304	
	LIBRARY/MEDIA CTR		21	12X12	353	
	LIBRARY/MEDIA CTR		22	12X12	215	
	LIBRARY/MEDIA CTR		23	12X12	349	
	LIBRARY/MEDIA CTR		24	12X12	313	
	LIBRARY/MEDIA CTR		25	12X12	315	
	LIBRARY/MEDIA CTR		26	12X12	338	
TOTAL CFM					7202	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-76

NEBB CERTIFIED #2453

SHEET NO. 59

# RTU-8 (LIBRARY MEDIA CTR)

**\*\* AIR INLET REPORT \*\***

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	LIBRARY A		1	10X6	177	
	WORKROOM		2	18X18	322	
	OFFICE MRS. SALINA		3	10X6	39	
	CLASSROOM		4	20X20	728	
233	READING		5	10X6	114	
	LIBRARY/MEDIA CTR		6	18X24	495	
	LIBRARY/MEDIA CTR		7	18X24	699	
	LIBRARY/MEDIA CTR		8	12X24	380	
	LIBRARY/MEDIA CTR		9	12X24	352	
	LIBRARY/MEDIA CTR		10	12X24	366	
	LIBRARY/MEDIA CTR		11	12X24	347	
TOTAL CFM					4019	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-77

NEBB CERTIFIED #2453

SHEET NO. 60



# RTU-9 (PARTIAL)

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
101	BAND		1	24X16	858	
101	BAND		2	24X16	710	
101	BAND		3	24X16	741	
101	BAND		4	24X16	765	
101	BAND		5	24X16	949	
	BAND PREP ROOM 2		6	9X9	29	
TOTAL CFM					4052	
	RETURN					
101	BAND		1	30X30	2150	
101	BAND		2	30X30	1900	
TOTAL CFM					4050	

NOTE: MEASURED USING VELGRID WITH A 6.25 FACTOR

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-78

NEBB CERTIFIED #2453

SHEET NO. 61

# RTU-10

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	CHORAL		1	34X14	2.38	352	838	
	CHORAL		2	34X14	2.38	400	952	
	CHORAL		3	34X14	2.38	418	995	
	CHORAL		4	34X14	2.38	384	914	
TOTAL CFM							3699	
	<b>RETURN</b>							
	CHORAL		1	48X40	13.333	146	1947	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-79

NEBB CERTIFIED #2453

SHEET NO. 62

# RTU'S 11

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
206A	PT / OT		1	12X12	366	
206	CLASSROOM		2	12X12	271	
206	CLASSROOM		3	12X12	381	
TOTAL CFM					1018	
	RETURN					
	OFFICE		1	12X12	228	
206	CLASSROOM		2	22X22	572	
206A	PT/OT		3	12X12	191	
TOTAL CFM					991	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-82

NEBB CERTIFIED #2453

SHEET NO. 63

# RTU'S 12

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
214	CLASSROOM		1	12X12	364	
214	CLASSROOM		2	12X12	339	
213	CLASSROOM		3	12X12	213	
213	CLASSROOM		4	12X12	243	
212	OFFICE		5	12X12	289	
TOTAL CFM					1448	
	RETURN					
214	CLASSROOM		1	22X22	569	
213	CLASSROOM		2	12X12	324	
212	OFFICE		3	12X12	251	
TOTAL CFM					1144	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-80

NEBB CERTIFIED #2453

SHEET NO. 64

# RTU'S 13

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
207	CLASSROOM		1	12X12	353	
207	CLASSROOM		2	12X12	295	
207	CLASSROOM		3	12X12	280	
207	CLASSROOM		4	12X12	324	
TOTAL CFM					1252	
	RETURN					
214	CLASSROOM		1	22X22	917	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-81

NEBB CERTIFIED #2453

SHEET NO. 65

# RTU-14

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	SUPPLY							
201	ART ROOM		1	28X10	1.944	992	1928	1
	RETURN							
201	ART ROOM		1	24X12	2.0	476	952	
	EXHAUST							
201	ART ROOM		1	12X6	.360	634	228	

NOTE 1: DUCT TRAVERSE

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-83

NEBB CERTIFIED #2453

SHEET NO. 66

# RTU-15

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	SUPPLY							
203	SHOP		1	18X10	1.25	668	835	1
203	SHOP		2	18X10	1.25	588	735	1
TOTAL CFM							1570	
	RETURN							
203	SHOP		1	24X12	2.00	513	1026	
	EXHAUST							
203	CANOPY HOOD		1	20X18	2.50	713	1783	2,3
203	CANOPY HOOD		2	20X18	2.50	880	2200	2,3
203	CANOPY HOOD		3	20X18	2.50	787	1968	2,3
TOTAL CFM							5951	
	EXHAUST							
203	SHOP		1	12X6	.360	622	224	

NOTE 1: DUCT TRAVERSE

NOTE 2: EXHAUST STARTER HAS HIGH, LOW, AND OFF POSITIONS. FAN WILL ONLY RUN IN LOW MODE.

NOTE 3: THEY DO NOT USE THIS HOOD/FAN ANYMORE.

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-84

NEBB CERTIFIED #2453

SHEET NO. 67

# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	EXHAUST					
	LAV STAFF		1	6X6	126	
	LAV WOMEN		2	10X6	157	
	LAV WOMEN		3	10X6	208	
	UNISEX TOILET		4	6X6	91	
	MEN TOILET		5	10X6	38	
	MEN TOILET		6	10X6	165	
	MEN LAV		7	12X12	83	
	WOMEN'S RESTROOM		8	12X12	151	
	NURSE OFFICE TOILET		9	6X6	40	
	NURSE ISOL. MEN/WOMEN		10	6X6	48	
	MENS ROOM (MAIN OFFICE)		11	8X8	89	1
	WMNS ROOM (MAIN OFFICE)		12	8X8	79	1
	WMNS RM (AUDIT. ENT.)		13	10X10	166	2
	MENS ROOM ( AUDIT. ENT.)		14	10X10	152	3
	LAV		15	10X10	228	
	WOMENS		16	10X10	194	
	CUSTODIAN OFFICE TOILET		17	12X10	406	
TOTAL CFM					2421	

NOTE 1: MEASURED USING RVA WITH A .333 AK FACTOR

NOTE 2: NEXT TO FIRE ALARM CONTROL PANEL

NOTE 3: NEXT TO LECTURE HALL A

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-13

NEBB CERTIFIED #2453

SHEET NO. 68



# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	EXHAUST					
2ND FL	WOMEN STAFF		1	8X8	126	
2ND FL	MEN STAFF		2	8X8	172	
2ND FL	WOMENS		3	8X8	165	
2ND FL	MENS		4	8X8	158	
2ND FL	WOMENS LAV		5	12X12	330	
2ND FL	MENS LAV		6	12X12	231	
2ND FL	STAFF LAV A		7	6X6	90	
2ND FL	STAFF LAV B		8	6X6	110	
2ND FL	WOMEN LAV C		9	12X10	312	
2ND FL	MEN LAV D		10	12X10	341	
2ND FL	KITCHEN LCKER RM TOILET		11	10X10	96	1
2ND FL	STAFF LUNCH ROOM		12	12X10	131	
TOTAL CFM				10X10	2262	

NOTE 1: CEILING MOUNT EXHAUST FAN

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-14

NEBB CERTIFIED #2453

SHEET NO. 69

# KEF

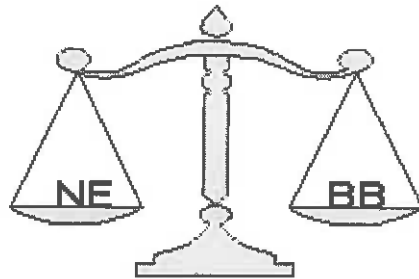
## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	KITCHEN HOOD		1	35X222	53.958	31	1673	

PROJECT: MCGEE MIDDLE SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-10

NEBB CERTIFIED #2453

SHEET NO. 70



## **CERTIFIED TEST, ADJUST AND BALANCE REPORT**

**REPORT DATE: 01-19-21**

**PROJECT: WILLARD ELEMENTARY SCHOOL  
VENTILATION AIRFLOW INVESTIGATION**

**ADDRESS: 1088 NORTON ROAD  
BERLIN, CT**

**CUSTOMER: BERLIN BOARD OF EDUCATION**

**NEBB TAB CONTRACTOR: AIR BALANCING SERVICE CO.  
16 PROGRESS CIRCLE UNIT 1A  
NEWINGTON, CT 06111**

**PHONE NUMBER: (860) 500-5008**

**FAX NUMBER: (860) 500-5010**

**WEBSITE: WWW.AIRBAL.COM**

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**PROJECT: WILLARD ELEMENTARY SCHOOL**

**REPORT DATE: 01-19-21**

**SUBMITTED BY: AIR BALANCING SERVICE CO.**

**NEBB CERTIFIED #2453**

**CODE: 20240T**

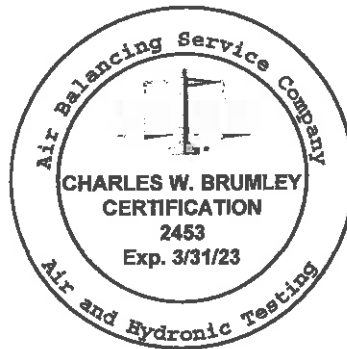
Firm Certification Number: 2453

Firm Name: Air Balancing Service Company

Certification: Testing, Adjusting and Balancing of Environmental Systems

Certified Professional Name: CHARLES W. BRUMLEY

Expiration Date: 3/31/23



A handwritten signature in cursive script, appearing to read "C. W. Brumley".

**\*\* AIR INSTRUMENT CALIBRATION REPORT \*\***

<b>INSTRUMENT SERIAL NUMBER</b>	<b>APPLICATION</b>	<b>CALIBRATION</b>
EXTECH PHOTO TACH SERIAL NO. 151117272	MOTOR AND FAN RPM'S	8/13/2020
ALNOR INSTRUMENTS SERIAL NO. A03813	AIRFLOW VELOCITY	7/21/2020
SHORTRIDGE AIRDATA MULTIMETER ADM-860C SERIAL NO. M93531	MULTIMETER USED IN VELOCITY, STATIC PRESSURES, FLOWHOOD READINGS, DIFFERENTIAL PRESSURES, TEMPERATURE	4/20/2020
FLUKE AMMETER 323 SERIAL NO. 37642839WS	VOLTAGE AND AMPERAGE	8/13/2020

PROJECT: WILLARD ELEMENTARY SCHOOL  
REPORT DATE: 01-19-21  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240CALI

NEBB CERTIFIED #2453

**ABBREVIATION / MEANING**

**ABBREVIATION / MEANING**

AC	AIR CONDITIONER	MIN	MINIMUM
AC/HR	AIR CHANGES PER HOUR	MUA	MAKE-UP AIR
AHU	AIR HANDLING UNIT	NO.	NUMBER
AK	AREA FACTOR	OA	OUTSIDE AIR
AMP	AMPERAGE	OA%	PERCENT OF OUTSIDE AIR
CEF	CEILING EXHAUST FAN	OD	OUTSIDE DIAMETER
CFM	CUBIC FEET PER MINUTE	OED	OPEN END DUCT
CNTRL	CONTROL	PERF	PERFORATED DIFFUSER
CU FT	CUBIC FEET	POS	POSITION
CV	CONSTANT VOLUME	PRESS	PRESSURE
DD	DIRECT DRIVE	PRIM	PRIMARY
DEL	ACTUAL DELIVERED	RA	RETURN AIR
DES	DESIGN	RA%	PERCENT OF RETURN AIR
DIFF	DIFFERENTIAL	RHC	REHEAT COIL
EF	EXHAUST FAN	RPM	REVOLUTIONS PER MINUTE
ESP	EXTERNAL STATIC PRESSURE (" WG)	RTU	ROOF TOP UNIT
FPM	FEET PER MINUTE	SA	SUPPLY AIR
FT	FEET	SF	SERVICE FACTOR
H	HEIGHT	SL	SLOT
HP	HORSE POWER	SN	SERIAL NUMBER
HR	HOUR	SP	STATIC PRESSURE (" WG)
HTG	HEATING	SQ FT	SQUARE FEET
L	LENGTH	TEMP	TEMPERATURE
LD	LINEAR DIFFUSER	TF	THERMAFUSER
LFD	LAMINAR FLOW DIFFUSER	TSP	TOTAL STATIC PRESSURE (" WG)
LR	LIGHT RETURN	VAV	VARIABLE AIR VOLUME
LT	LIGHT TROEFFER	VEL	VELOCITY IN FEET PER MINUTE
MA	MIXED AIR	VFD	VARIABLE FREQUENCY DRIVE
MAU	MAKE-UP AIR UNIT	W	WIDTH
MAX	MAXIMUM	WEF	WALL EXHAUST FAN
MD	MOTORIZED DAMPER	WG	WATER GAUGE
MER	MECHANICAL EQUIPMENT ROOM	W/	WITH
MFR	MANUFACTURER		

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
N-1	CLASSROOM	6400	801	0	7.51	YES
N-1	TOILET	232	0	323	83.53	NO
N-2	CLASSROOM	7192	682	0	5.69	YES
N-2	TOILET	210	0	243	69.43	NO
N-4	TOILET	215	0	211	58.88	NO
N-4	CLASSROOM	7095	704	0	5.95	YES
E-1	CLASSROOM	6871	606	0	5.29	YES
E-1	TOILET	270	0	28	6.22	NO
E-3	TOILET	211	0	25	7.11	NO
E-3	CLASSROOM	6814	614	0	5.41	YES
E-4	CLASSROOM	6285	795	0	7.59	YES
E-4/E-6	WASHROOM	250	0	101	24.24	NO
E-4/E-6	TOILET	273	0	75	16.48	NO
E-5	CLASSROOM	6177	614	0	5.96	YES
E-5/E-7	WASHROOM	249	0	108	26.02	NO
E-5/E-7	TOILET	187	0	70	22.46	NO
E-7	CLASSROOM	6484	612	0	5.66	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-1

NEBB CERTIFIED #2453

SHEET NO. 1



**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
E-8	CLASSROOM	6427	670	0	6.25	YES
E-9	CLASSROOM	6779	572	0	5.06	YES
E-10	CLASSROOM	6834	566	0	4.97	YES
E-11	CLASSROOM	6740	707	0	6.29	YES
E-12	CLASSROOM	6673	572	0	5.14	YES
E-13	CLASSROOM	6578	646	0	5.89	YES
E-14	CLASSROOM	1001	231	140	13.85	YES
E-15	CLASSROOM	6672	781	0	7.02	YES
E-16	CLASSROOM	6843	783	0	6.87	YES
S-3	CLASSROOM	2466	380	233	9.25	NO
S-5	ART	13423	1032	0	4.61	YES
S-2	MUSIC	10671	1241	0	6.98	YES
S-4	TIMEOUT ROOM	233	0	108	27.81	NO
S-7	CLASSROOM	2789	0	125	2.69	NO
W-15	CLASSROOM	8034	750	0	5.60	YES
W-14	CLASSROOM	8299	625	0	4.52	YES
W-12	CLASSROOM	8228	606	0	4.42	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-2

NEBB CERTIFIED #2453

SHEET NO. 2

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	RETURN / EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
W-11/W-13	CLASSROOM	8008	577	0	4.32	YES
W-10	CLASSROOM	8029	535	0	4.00	YES
W-8	CLASSROOM	8285	644	0	4.66	YES
W-9	CLASSROOM	4082	632	0	9.29	YES
W-7	CLASSROOM	4018	616	0	9.20	YES
W-5	CLASSROOM	3992	633	0	9.51	YES
	MEDIA CENTER	18686	2963	2127	9.51	YES
N-18	CONFERENCE	1684	222	262	9.33	YES
E-2	COMMONS LIB. CLASSRM	6505	880	685	8.12	NO
	COMPUTER LAB	10258	2345	1498	13.72	YES
N-20	SPEECH	1256	167	99	7.98	NO
	IT ROOM	1642	117	140	5.12	NO
	LIBRARY OFFICE	1564	125	185	7.10	NO
	STAFF COPY ROOM	1880	252	272	8.68	NO
	STAFF LOUNGE	4072	463	432	6.82	NO
W-6	CLASSROOM	8253	698	0	5.07	YES
W-4	CLASSROOM	7886	676	0	5.14	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
(AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
(AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-3

NEBB CERTIFIED #2453

SHEET NO. 3

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
W-3	CLASSROOM	3973	659	0	9.95	YES
W-10	GRADE 3/4 BOYS BATHRM	1860	0	29	0.94	NO
	GRADE 3 GIRLS BATHRM	1958	0	20	0.61	NO
	GRADE 1 BOYS BATHRM	2387	0	25	0.63	NO
	GRADE 1 GIRLS BATHRM	2549	0	58	1.37	NO
	STAFF BATHROOM 1	659	92	101	9.20	NO
	SATFF BATHROOM 2	677	124	90	10.99	NO
	GRADE 2 BOYS BATHRM	1464	0	426	17.46	NO
	GRADE 2 GIRLS BATHRM	1668	0	410	14.75	NO
	STAFF BATHROOM	195	0	37	11.38	NO
	STAFF BATHROOM	277	0	84	18.19	NO
	HANDICAP BATHROOM	681	0	207	18.24	NO
	GRADE 4 GIRLS BATHRM	1382	0	187	8.12	NO
N-1	WASH ROOM	1833	0	0	0.00	NO
N-2/N-4	WASH ROOM	3080	0	0	0.00	NO
E-1/E-3	WASH ROOM	2962	0	0	0.00	NO
N-9	ISOLATION ROOM	1218	449	0	22.12	YES

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-4

NEBB CERTIFIED #2453

SHEET NO. 4

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
L-6	CLASSROOM	7273	569	0	4.69	YES
L-5	CLASSROOM	7106	576	0	4.86	YES
L-4	CLASSROOM	7228	645	0	5.35	YES
L-3	CLASSROOM	7169	571	0	4.78	YES
L-2	CLASSROOM	7277	701	0	5.78	YES
L-1	CLASSROOM	6802	676	0	5.96	YES
	STAFF BATHROOM	737	0	54	4.40	NO
	GRADE 5 BOYS BATHROOM	1701	0	368	12.98	NO
	GRADE 5 GIRLS BATHROOM	1860	0	239	7.71	NO
	CAFETERIA	55332	3016	2756	3.27	NO
N-15	SPEECH THERAPY	1234	295	0	14.34	YES
N-11/N-13	CONFERENCE ROOM	2442	406	0	9.98	YES
	NURSE	1953	256	0	7.86	YES
	NURSE'S OFFICE	1229	348	0	16.99	YES
	NURSE'S TOILET	297	0	204	41.21	NO
S-1	ELL	739	188	100	15.26	NO
	MAIN OFFICE	3529	264	0	4.49	YES
	LEAD TEACHER OFFICE	874	292	0	20.05	YES
	PRINCIPALS OFFICE	3087	359	0	6.98	YES
	MAIN OFFICE STUDY ROOM	461	0	0	0.00	NO
	KITCHEN	9211	2815	4302	28.02	NO
	KITCHEN TOILET	232	0	51	13.19	NO
	LOUNGE	992	0	0	0.00	NO
	CUSTODIAN OFFICE	1702	85	0	3.00	NO
	KITCHEN OFFICE	596	58	0	5.84	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 5

**\*\* AIR CHANGE DATA \*\***

ROOM NO.	DESIGNATION	ROOM VOLUME	SUPPLY CFM	EXHAUST CFM	ACTUAL AIR CHANGES/HR (NOTE)	OPERABLE WINDOWS
L-6	CLASSROOM	7273	569	0	4.69	YES
L-5	CLASSROOM	7106	576	0	4.86	YES
L-4	CLASSROOM	7228	645	0	5.35	YES
L-3	CLASSROOM	7169	571	0	4.78	YES
L-2	CLASSROOM	7277	701	0	5.78	YES
L-1	CLASSROOM	6802	676	0	5.96	YES
	SATFF BATHROOM	737	0	54	4.40	NO
	GRADE 5 BOYS BATHROOM	1701	0	368	12.98	NO
	GRADE 5 GIRLS BATHROOM	1860	0	239	7.71	NO
	CAFÉ	55332	3016	2756	3.27	NO
N-15	SPEECH THERAPY	1234	295	0	14.34	YES
N-11/N-13	CONFERENCE ROOM	2442	406	0	9.98	YES
	NURSE	1953	256	0	7.86	YES
	NURSE OFFICE	1229	348	0	16.99	YES
	NURSE TOILET	297	0	204	41.21	NO
S-1	ELL	739	188	100	15.26	NO
	MAIN OFFICE	3529	264	0	4.49	YES
	LEAD TEACHER OFFICE	874	292	0	20.05	YES
	PRINCIPALS OFFICE	3087	359	0	6.98	YES
	MAIN OFFICE STUDY ROOM	461	0	0	0.00	NO
	KITCHEN	9211	2815	4302	28.02	NO
	KITCHEN TOILET	232	0	51	13.19	NO
	LOUNGE	992	0	0	0.00	NO
	CUSTODIAN OFFICE	1702	85	0	3.00	NO
	KITCHEN OFFICE	596	58	0	5.84	NO

NOTE: AIR CHANGES PER HOUR BASED UPON THE GREATER AIRFLOW QUANTITY (SUPPLY OR EXHAUST CFM)  
 (AIR CHANGES PER HOUR BASED UPON EXHAUST CFM IF ROOM IS NEGATIVE)  
 (AIR CHANGES PER HOUR BASED UPON SUPPLY CFM IF ROOM IS POSITIVE)

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-5

NEBB CERTIFIED #2453

SHEET NO. 6

# MUA / TRANSFER FANS

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
N-9	ISOLATION		1	6X6	0	0	19	
N-15	SPEECH THERAPIST		2	6X6	0	0	47	
N-11	CONFERENCE ROOM		3	6X4	0	0	101	
N-13	CONFERENCE ROOM		4	6X4	0	0	81	
N-7	NURSE		5	6X6	0	0	73	
	NURSE OFFICE		6	6X4	120	429	51	
	MAIN OFFICE		7	6X6	0	0	86	
	STUDY/STORAGE		8	6X6	0	0	0	
	LEAD TEACHER		9	6X6	0	0	99	
	PRINCIPAL		10	6X6	0	0	123	
	CUSTODIAN OFFICE		11	9X9	0	0	85	
	NORTH LOUNGE		12	9X9	0	0	0	

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-14

NEBB CERTIFIED #2453

SHEET NO. 7

# RTU'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	BMS DAMPER %	NOTES
	RTU-3								
	KITCHEN NORTH		1	36X15	3.75	241	904	40	
	RTU-3A								
	KITCHEN SOUTH		1	36X15	3.75	75	281	20	
	RTU-1								
	LOUNGE		1	27X11	2.062	118	243	N/A	
	RTU-4								
	MEDIA		1	27X11	2.062	136	280	N/A	
	RTU-7								
	GUIDANCE		1	27X11	2.062	122	252	N/A	
	RTU-2								
	CAFETERIA		1	60X17	7.083	108	765	N/A	
	RTU-5								
	LIBRARY		1	60X17	7.083	32	227	N/A	
	RTU-8								
	COMPUTER		1	36X15	3.75	250	938	N/A	
	RTU-6								
	GYM		1	60X17	7.083	150	1062	N/A	

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-15

NEBB CERTIFIED #2453

SHEET NO. 8

# RTU-1

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	DESIGN CFM	DESIGN VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	LIBRARY/CORRIDOR		1	2408	N/A	N/A	164	
	IT OFFICE		2	9X9	N/A	N/A	117	
TOTAL CFM							281	
	<b>RETURN</b>							
	IT OFFICE		1	10X6	N/A	N/A	140	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-8

NEBB CERTIFIED #2453

SHEET NO. 9



# RTU-1

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	STAFF LOUNGE		1	9X9	0	0	84	
	STAFF LOUNGE		2	9X9	0	0	167	
	STAFF LOUNGE		3	9X9	0	0	92	
	STAFF LOUNGE		4	9X9	0	0	120	
	STAFF WORKROOM /COPY		5	9X9	0	0	122	
	STAFF WORKROOM /COPY		6	9X9	0	0	130	
	STAFF LAV		7	6X6	0	0	92	
	STAFF LAV		8	6X6	0	0	124	
TOTAL CFM							931	
	<b>RETURN</b>							
	STAFF LOUNGE		1	18X18	0	0	400	
	STAFF WORKROOM /COPY		2	10X10	.4	275	110	
TOTAL CFM							510	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-16

NEBB CERTIFIED #2453

SHEET NO. 10

## RTU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO CAFETERIA (VP-1)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 76

DUCT SP (" WG): +.004

DUCT WIDTH ("): 26

DUCT HEIGHT ("): 14

DUCT AREA (SQ FT): 2.528

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 6460

NUMBER OF POINTS: 16

	DESIGN		ACTUAL
CFM:	N/A		1021
FPM:	N/A		404

POSITION	1	2	3	4
1	364	444	406	352
2	410	416	403	338
3	431	357	405	378
4	498	422	371	465
SUBTOTALS FPM:	1703	1639	1585	1533

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED / RETURNED / EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$1021 \text{ CFM} + 1992 \text{ CFM} = 3013 \text{ CFM}$$

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-18

NEBB CERTIFIED #2453

SHEET NO. 11

## RTU-2

### \*\* RECTANGULAR TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO CAFETERIA (VP-2)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 76

DUCT SP (" WG): +.02

DUCT WIDTH ("): 26

DUCT HEIGHT ("): 14

DUCT AREA (SQ FT): 2.528

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 12611

NUMBER OF POINTS: 16

	DESIGN		ACTUAL
CFM:	N/A		1992
FPM:	N/A		788

POSITION	1	2	3	4
1	606	687	781	879
2	641	683	801	900
3	729	778	824	894
4	847	830	864	867
SUBTOTALS FPM:	2823	2978	3270	3540

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED / RETURNED / EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$1021 \text{ CFM} + 1992 \text{ CFM} = 3013 \text{ CFM}$$

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-19

NEBB CERTIFIED #2453

SHEET NO. 12

# RTU-2

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	CAFETERIA		1	26X14	2.53	404	1022	
	CAFETERIA		2	26X14	2.53	788	1994	
TOTAL CFM							3016	
	<b>RETURN</b>							
	CAFETERIA		1	30X30	6.25	233	1456	
	CAFETERIA		2	30X30	6.25	208	1300	
TOTAL CFM							2756	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-17

NEBB CERTIFIED #2453

SHEET NO. 13

# RTU-3 (NORTH)

## \*\* AIR OUTLET/ INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
N-10	KITCHEN		1	36X26	N/A	1,2
	PANTRY		2	9X9	92	
	OFFICE		3	6X6	58	
TOTAL CFM					150	
	RETURN					
N-10	KITCHEN		1	46X20	1227	

NOTE 1: READING N/A / FREEZER UNDER DIFFUSER / TO CLOSE TO CEILING

NOTE 2: SUPPLY CFM TOTAL = 2131 CFM - PANTRY & OFFICE CFM = 1980 CFM TO  
THE KITCHEN NORTH

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-20

NEBB CERTIFIED #2453

SHEET NO. 14

# RTU-3 A(SOUTH)

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
N-10	KITCHEN		1	38X26	1423	
	RETURN					
N-10	KITCHEN		1	46X20	1192	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-21

NEBB CERTIFIED #2453

SHEET NO. 15

# RTU-4

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
E-2	LIBRARY COMMONS CLASS		1	2410	251	
E-2	LIBRARY COMMONS CLASS		2	2410	244	
E-2	LIBRARY COMMONS CLASS		3	2410	148	
E-2	LIBRARY COMMONS CLASS		4	2410	237	
TOTAL CFM					880	
	RETURN					
E-2	LIBRARY COMMONS CLASS		1	18X18	685	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-22

NEBB CERTIFIED #2453

SHEET NO. 16

# RTU-5

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
N-14	LIBRARY		1	24X10	0	0	231	
N-14	LIBRARY		2	24X10	0	0	244	
N-14	LIBRARY		3	48X12	4.0	277	1108	
N-14	LIBRARY		4	48X12	4.0	304	1216	
N-18	COMMONS CONFERENCE		5	2408	0	0	222	
N-20	SPEECH		6	2408	0	0	167	
	LIBRARY OFFICE		7	2408	0	0	125	
TOTAL CFM							3313	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-23

NEBB CERTIFIED #2453

SHEET NO. 17



# RTU-5

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
N-14	LIBRARY		1	30X18	3.75	294	1103	
N-14	LIBRARY		2	30X18	3.75	273	1024	
N-18	COMMONS / CONFERENCE		3	24X10	0	0	262	
N-20	SPEECH		4	24X24	0	0	99	
TOTAL CFM							2488	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-24

NEBB CERTIFIED #2453

SHEET NO. 18

# RTU-6

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	<b>SUPPLY</b>							
	GYM (VP-1)		1	24" DIA	3.14	857	2691	
	GYM (VP-2)		2	24" DIA	3.14	576	1809	
	STAGE		3	N/A	N/A	N/A	N/A	1
	STAGE		4	N/A	N/A	N/A	N/A	1
TOTAL CFM							4500	
	<b>RETURN</b>							
	GYM		1	36X24	6.0	257	1542	
	GYM		2	36X24	6.0	246	1476	
	STAGE		3	N/A	N/A	N/A	N/A	1
	STAGE		4	N/A	N/A	N/A	N/A	1
TOTAL CFM							3018	

NOTE 1: NOT ACCESSIBLE

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-25

NEBB CERTIFIED #2453

SHEET NO. 19

# RTU-6

## \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO GYM (VP-1)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 97

DUCT SP (" WG): +.02

DUCT SIZE (" DIA): 24

DUCT AREA (SQ FT): 3.140

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 17142

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		2691
FPM:	N/A		857

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED / RETURNED / EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$2691 \text{ CFM} + 1809 \text{ CFM} = 4500 \text{ CFM}$$

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-26

NEBB CERTIFIED #2453

SHEET NO. 20

# RTU-6

## \*\* ROUND DUCT TRAVERSE REPORT \*\*

DESIGNATION: TOTAL AIR DELIVERED BY FAN TO GYM (VP-2)

CONDITION: NORMAL OPERATION

TEMPERATURE (°F): 97

DUCT SP (" WG): +.013

DUCT SIZE (" DIA): 24

DUCT AREA (SQ FT): 3.140

INTERNAL DUCT LINING ("): N/A

TOTAL FPM: 11514

NUMBER OF POINTS: 20

	DESIGN		ACTUAL
CFM:	N/A		1809
FPM:	N/A		576

NOTE: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE: TOTAL AIR DELIVERED / RETURNED / EXHAUSTED BY FAN EQUALS VP-1 CFM + VP-2 CFM =

$$2691 \text{ CFM} + 1809 \text{ CFM} = 4500 \text{ CFM}$$

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-27

NEBB CERTIFIED #2453

SHEET NO. 21

# RTU-7

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	SUPPLY					
E-14	GUIDANCE		1	12X12	231	
S-1	ELL		2	9X9	188	
S-3	MATH		3	9X9	196	
S-3	MATH		4	9X9	184	
TOTAL CFM					799	
	RETURN					
E-14	GUIDANCE		1	10X8	140	
S-1	ELL		2	10X6	100	
S-3	MATH		3	12X10	233	
TOTAL CFM					473	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-28

NEBB CERTIFIED #2453

SHEET NO. 22

# RTU-8

## \*\* AIR OUTLET/INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	<b>SUPPLY</b>					
	COMPUTER LAB		1	18X18	571	
	COMPUTER LAB		2	18X18	594	
	COMPUTER LAB		3	18X18	648	
	COMPUTER LAB		4	18X18	532	
TOTAL CFM					2345	
	<b>RETURN</b>					
	COMPUTER LAB		1	48X20	1498	

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-29

NEBB CERTIFIED #2453

SHEET NO. 23

# UV'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	SPEED	NOTES
N-1	CLASSROOM		1	5X42.5	1.33	602	801	LOW	
N-2	CLASSROOM		2	5X42.5	1.33	513	682	LOW	
N-4	CLASSROOM		3	5X42.5	1.33	529	704	LOW	
E-1	CLASSROOM		4	5X42.5	1.33	456	606	LOW	
E-3	CLASSROOM		5	5X42.5	1.33	462	614	LOW	
E-5	CLASSROOM		6	5X42.5	1.33	462	614	LOW	
E-6	CLASSROOM		7	5X42.5	1.33	468	622	LOW	
E-7	CLASSROOM		8	5X34	1.06	577	612	LOW	
E-8	CLASSROOM		9	5X42.5	1.33	504	670	LOW	
E-9	CLASSROOM		10	5X42.5	1.33	430	572	LOW	
E-10	CLASSROOM		11	5X42.5	1.33	426	567	LOW	
E-12	CLASSROOM		12	5X42.5	1.33	430	572	LOW	
E-11	CLASSROOM		13	5X42.5	1.33	532	708	LOW	
E-13	CLASSROOM		14	5X42.5	1.33	486	646	LOW	
E-15	CLASSROOM		15	5X42.5	1.33	587	781	LOW	
E-16	CLASSROOM		16	5X42.5	1.33	589	783	LOW	
S-5	ART		17	5X34	1.06	542	575	LOW	
S-5	ART		18	5X34	1.06	432	458	LOW	1
W-15	CLASSROOM		19	5X42.5	1.33	564	750	LOW	
W-14	CLASSROOM		20	5X42.5	1.33	470	625	LOW	
W-12	CLASSROOM		21	5X42.5	1.33	456	606	LOW	
TOTAL CFM							13568		

NOTE 1: FOUND "OFF" BUT WORKS. PUT BACK TO "OFF"

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-30

NEBB CERTIFIED #2453

SHEET NO. 24

# UV'S

## \*\* AIR OUTLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	SPEED	NOTES
W-10	CLASSROOM		1	42.5X5	1.33	402	535	LOW	
W-8	CLASSROOM		2	42.5X5	1.33	484	644	LOW	
W-11	CLASSROOM		3	34X5	1.06	544	577	LOW	
W-9	CLASSROOM		4	34X5	1.06	596	632	LOW	
W-7	CLASSROOM		5	34X5	1.06	581	616	LOW	
W-5	CLASSROOM		6	34X5	1.06	597	633	LOW	
W-6	CLASSROOM		7	42.5X5	1.33	525	698	LOW	
W-4	CLASSROOM		8	42.5X5	1.33	508	676	LOW	
W-3	CLASSROOM		9	34X5	1.06	622	659	LOW	
E-4	CLASSROOM		10	42.5X5	1.33	598	795	LOW	
S-2	MUSIC		11	34X5	1.06	578	613	LOW	
S-2	MUSIC		12	34X5	1.06	592	628	LOW	
L-6	CLASSROOM		13	42.5X5	1.33	428	569	LOW	
L-5	CLASSROOM		14	42.5X5	1.33	433	576	LOW	
L-4	CLASSROOM		15	42.5X5	1.33	485	645	LOW	
L-3	CLASSROOM		16	42.5X5	1.33	429	571	LOW	
L-2	CLASSROOM		17	42.5X5	1.33	527	701	LOW	
L-1	CLASSROOM		18	42.5X5	1.33	508	676	LOW	
N-9	ISOLATION		19	28X4	.560	430	241	N/A	
N-15	SPEECH THERAPIST		20	28X4	.560	443	248	N/A	
N-11	CONFERENCE ROOM		21	28X4	.560	0	0	N/A	1
N-13	CONFERENCE ROOM		22	28X4	.560	401	225	N/A	
N-7	NURSE		23	28X4	.560	327	183	N/A	
	NURSE OFFICE		24	28X4	.560	531	297	N/A	
	LEAD TEACHER		25	28X4	.560	344	193	LOW	
	MAIN OFFICE		26	28X4	.560	317	178	HIGH	
	PRINCIPAL		27	28X4	.560	422	236	HIGH	
	PRINCIPAL		28	28X4	.560	N/A	N/A	HIGH	1
TOTAL CFM							13245		

NOTE 1: UNIT VENTILATOR IS NOT RUNNING AT THIS TIME

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-31

NEBB CERTIFIED #2453

SHEET NO. 25



# UV'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
	MAIN OFFICE		1	36X14	3.5	21	74	
	LEAD TEACHER		2	36X14	3.5	10	35	
	PRINCIPAL		3	36X14	3.5	5	18	
	PRINCIPAL		4	36X14	3.5	N/A	N/A	1
N-1	PRE-K		5	80X11	6.11	26	159	
N-2	PRE-K		6	80X11	6.11	48	293	
N-4	PRE-K		7	80X11	6.11	20	122	
E-1	CLASSROOM		8	80X11	6.11	0	0	
E-3	CLASSROOM		9	80X11	6.11	0	0	
E-5	CLASSROOM		10	80X11	6.11	0	0	
E-7	CLASSROOM		11	80X11	6.11	0	0	
E-9	CLASSROOM		12	80X11	6.11	N/A	N/A	1
E-11	CLASSROOM		13	80X11	6.11	10	61	
E-13	CLASSROOM		14	80X11	6.11	35	214	
E-15	CLASSROOM		15	80X11	6.11	46	281	
E-16	CLASSROOM		16	80X11	6.11	38	232	
S-2	MUSIC		17	40X11	3.06	14	43	
S-2	MUSIC		18	40X11	3.06	10	31	
W-15	CLASSROOM		19	80X11	6.11	0	0	
W-14	CLASSROOM		20	80X11	6.11	0	0	
W-12	CLASSROOM		21	80X11	6.11	37	226	
TOTAL CFM							1789	

NOTE 1: UNIT VENTILATOR IS NOT RUNNING AT THIS TIME

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-32

NEBB CERTIFIED #2453

SHEET NO. 26

# UV'S OUTDOOR AIR

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
W-10	CLASSROOM		22	80X11	6.11	4	24	
W-8	CLASSROOM		23	80X11	6.11	40	244	
W-6	CLASSROOM		24	80X11	6.11	0	0	
W-4	CLASSROOM		25	80X11	6.11	0	N/A	
L-1	CLASSROOM		26	80X11	6.11	0	0	
L-2	CLASSROOM		27	80X11	6.11	26	159	
L-3	CLASSROOM		28	80X11	6.11	9	55	
L-4	CLASSROOM		29	80X11	6.11	44	269	
L-5	CLASSROOM		30	80X11	6.11	0	0	
L-6	CLASSROOM		31	80X11	6.11	11	67	
W-13	CLASSROOM		32	40X11	3.06	20	61	
W-11	CLASSROOM		33	40X11	3.06	11	34	
W-9	CLASSROOM		34	40X11	3.06	7	21	
W-7	CLASSROOM		35	40X11	3.06	27	83	
W-5	CLASSROOM		36	40X11	3.06	8	24	
W-3	CLASSROOM		37	40X11	3.06	N/A	N/A	1
E-4	CLASSROOM		38	80X11	6.11	19	116	
E-6	CLASSROOM		39	80X11	6.11	32	196	
E-8	CLASSROOM		40	80X11	6.11	0	0	
E-10	CLASSROOM		41	80X11	6.11	33	202	
E-12	CLASSROOM		42	80X11	6.11	47	287	
53/55	ART		43	40X11	3.06	10	31	
53/55	ART		44	40X11	3.06	23	70	
N-15	SPEECH THERAPIST		45	36X14	3.06	8	28	
N-13	CONFERENCE ROOM		46	36X14	3.5	24	84	
N-11	CONFERENCE ROOM		47	36X14	3.5	N/A	N/A	1
N-9	NURSE ISOLATION		48	36X14	3.5	7	25	
N-7	NURSE OFFICE		49	36X14	3.5	0	0	
N-7	NURSE		50	36X14	3.5	6	21	
TOTAL CFM							2101	

NOTE 1: UNIT VENTILATOR IS NOT RUNNING AT THIS TIME

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-33

NEBB CERTIFIED #2453

SHEET NO. 27

# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	AK	ACTUAL VEL	ACTUAL CFM	NOTES
N-1	TOILET		1	8X6	.217	1487	323	1
N-1	CLASSROOM		2	22X22	0	0	0	
N-2	TOILET		3	8X6	.217	1118	243	
N-2	CLASSROOM		4	22X22	0	0	0	
N-4	TOILET		5	8X6	.217	973	211	
N-4	CLASSROOM		6	22X22	0	0	0	
E-1	TOILET		7	8X6	.217	127	28	
E-3	TOILET		8	8X6	.217	115	25	
E-4/E-6	TOILET		9	8X8	0	0	75	
E-4/E-6	WASH ROOM		10	8X8	0	0	101	
E-5/E-7	WORK/COPY		11	8X8	0	0	70	
E-5/E-7	WASH ROOM		12	8X8	0	0	108	
	STAFF WORK / COPY		13	6X6	.180	893	161	
	STAFF LOUNGE		14	10X8	0	0	32	
N-9	NURSE		15	10X10	0	0	204	
	BOYS		16	10X10	0	0	25	
	GIRLS		17	10X10	0	0	58	
	STAFF LAV		18	10X8	0	0	101	
	STAFF LAV		19	10X8	0	0	90	
	BOYS		20	17X5	0	0	426	
	GIRLS		21	17X5	0	0	410	

NOTE 1: FAN GOES "ON" WITH LIGHT SWITCH

PROJECT: WILLARD ELEMENTARY SCHOOL  
 SUBMITTED BY: AIR BALANCING SERVICE CO.  
 CODE: 20240-9

NEBB CERTIFIED #2453

SHEET NO. 28

# EXHAUST

## \*\* AIR INLET REPORT \*\*

ROOM NO.	DESIGNATION		NO.	SIZE	ACTUAL CFM	NOTES
	STAFF BATHROOM		22	12X9	37	1
	STAFF BATHROOM		23	12X9	84	1
	HANDICAP BATHROOM		24	10X8	207	
	GIRLS BATHROOM		25	10X8	187	
	BOYS BATHROOM		26	6X6	18	
	BOYS BATHROOM		27	6X6	11	
	GIRLS BATHROOM		28	6X6	11	
	GIRLS BATHROOM		29	6X6	9	
	LOWER LEVEL STAFF		30	6X6	54	
	LOWER LEVEL BOYS		31	10X8	368	
	LOWER LEVEL GIRLS		32	10X8	239	
E-14	GUIDANCE		33	6X6	0	
S-1	ELL		34	6X6	0	
S-3	CLASSROOM		35	6X6	0	
S-4	TIMEOUT		36	12X9	65	1
S-4	TIMEOUT		37	10X10	43	
S-7	CLASSROOM		38	10X8	125	
	KITCHEN TOILET		39	12X9	51	1

NOTE 1: FAN GOES "ON" WITH LIGHT SWITCH

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-10

NEBB CERTIFIED #2453

SHEET NO. 29

# KITCHEN DISHWASHER HOOD

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: HOOD OPENING

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 36

FACE HEIGHT ("): 36

FACE AREA (SQ FT): 9.000

TOTAL FPM: 546

NUMBER OF POINTS: 9

	DESIGN		ACTUAL
CFM:	N/A		549
FPM:	N/A		61

### VELOCITY PROFILE (FPM)

99	0	0
113	0	30
104	84	84

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-13

NEBB CERTIFIED #2453

SHEET NO. 30

# KITCHEN HOOD LEFT

## \*\* VELOCITY PROFILE REPORT \*\*

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: HOOD OPENING

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 93

FACE HEIGHT ("): 39

FACE AREA (SQ FT): 25.188

TOTAL FPM: 1893

NUMBER OF POINTS: 24

	DESIGN	ACTUAL
CFM:	N/A	1990
FPM:	N/A	79

### VELOCITY PROFILE (FPM)

88	135	122	115	133	126	121	120
96	73	52	34	75	81	73	77
76	66	40	0	65	45	39	0

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-11

NEBB CERTIFIED #2453

SHEET NO. 31

**KITCHEN HOOD RIGHT**  
**\*\* VELOCITY PROFILE REPORT \*\***

DESIGNATION: TOTAL AIR EXHAUSTED BY FAN

LOCATION: HOOD OPENING

CONDITION: NORMAL OPERATION

FACE WIDTH ("): 93

FACE HEIGHT ("): 39

FACE AREA (SQ FT): 25.188

TOTAL FPM: 1690

NUMBER OF POINTS: 24

	DESIGN	ACTUAL
CFM:	N/A	1763
FPM:	N/A	70

**VELOCITY PROFILE (FPM)**

121	124	126	149	133	114	91	31
66	66	60	66	87	66	-37	-38
42	44	48	47	75	88	80	41

NOTE 1: ACTUAL FPM IS AVERAGE OF VELOCITY PROFILE READINGS

NOTE 2: ABOVE READINGS WERE MEASURED WITH SHORTRIDGE AIR DATA MULTIMETER  
WITH 16 POINT VELGRID ATTACHMENT

PROJECT: WILLARD ELEMENTARY SCHOOL  
SUBMITTED BY: AIR BALANCING SERVICE CO.  
CODE: 20240-12

NEBB CERTIFIED #2453

SHEET NO. 32