

## Executive Summary

The Ventilation Rate Procedure of ASHRAE Standard 62.1, 2004 version, is used to confirm that proper outdoor air is brought in to each space for occupants. The calculations have been done to analyze the performance and code verification of the Luther Theological Seminary at Philadelphia, The New Learning Center. The outdoor air requirement for each zone has been calculated and totaled up through the fan coils, all the way back to the Rooftop Air Handling Units.

The New Learning Center has a relatively complicated HVAC system. There are 3 primary RTU's with 100% outdoor air, an energy recovery heat wheel, hot gas heat, direct expansion cooling, and gas reheat. There is also an outdoor air plenum in the basement to supply the fresh air to the basement and the first floor breezeway. The outdoor air is then blown into a mechanical closet with fan coils. In the closet, the air is mixed with return air and then ducted to the rooms.

The HVAC system must serve all 60,000 square feet of The New Learning Center. The building must meet all local and national codes, including ASHRAE 62.1. The system serves a variety of rooms. These rooms include mechanical rooms, a kitchen, storage spaces, classrooms, meeting rooms, assembly areas, offices, and lounges

The outdoor air was calculated for each individual room based on many factors. Occupancy, square footage, use, and outside air percentage combined to make a total for each outdoor air intake. The conclusions are presented in Table 1.

	Calculated Minimum OA (CFM)	Design OA (CFM)	ASHRAE 62.1 Code Verification
RTU-1	5995	6225	Verified
RTU-2	3105	6125	Verified
RTU-3	1528	1685	Verified
Basement Plenum	1711	2600	Verified

Table 1 shows that the minimum outdoor air requirement is met by all of the units in the system. These calculations are based off of the drawings and schedules provided by Paul H. Yeomans, Inc. RTU-2 may be oversized for a few reasons. One reason is that the occupancy and function can be interpreted in many different ways by ASHRAE Standard 62.1. Another reason is that the system supplies 100% outdoor air to the fan coils, and the air flow volume could be driven by the cooling load.

A third thing that may drive the supply is that RTU-2 serves many exterior rooms and it would be beneficial to supply more air in those rooms to keep the temperature constant and well mixed.