Executive Summary:

ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality, analyzes the amount of outdoor air intake needed to provide adequate ventilation. The Center for the Arts on the campus of the University of Delaware is a 52,000 square foot performing arts center that includes a proscenium theatre, recital hall, orchestra rehearsal, theatre rehearsal, practice rooms and administrative offices. Six air-handling units service the Center for the Arts, four constant volume and two variable air volume, ranging from 7,000 cfm to 35,000 cfm providing a total of 89,050 cfm.

The ventilation effectiveness for each zone needed to be assumed in order to complete the ventilation rate procedure. For the variable air volume units the ventilation effectiveness can be assumed by assuming that the air is supplied and returned to the spaces is through ceiling diffusers (E_z=0.8). The unit servicing the Recital Hall air is supplied through an under floor distribution system due to stringent noise criteria rating for the space (E_z=1.2). The remaining units that service the proscenium seating, proscenium stage and orchestra rehearsal respectively supply and return air through the ceiling but due to the height of the spaces the supply temperature is less then 15 degrees above space temperature (E_z=1.0).

Standard 62 was used to determine the minimum amount of outdoor air the air handling units need to supply to there respective spaces. Using Standard 62 it was found that the air handling units supply from 10% to 51% outdoor air. For all the air-handling units the sum of the zone outdoor airflow (ΣV_{oz}) was less then the design outdoor air intake airflow (V_{ot}). The scheduled minimum outdoor air is such that all units will provide their zones with at least the minimum required outdoor air as specified in Standard 62.1-2004. The maximum outdoor air fraction for the entire Center for the Arts is 0.86, which occurs in the Lobby on the north side of the building. All the air-handling units were found to comply with the ASHRAE Standard 62.1-2004 ventilation rate procedure.