

Executive Summary

This report examines the mechanical system of HITT Contracting Headquarters as it was designed. HITT Contracting Headquarters is a 132,000 square foot three story office building with an additional cellar level below. It is situated next to the Capitol beltway in Falls Church, VA outside of Washington, DC.

The mechanical system consists of seven AAON 50 ton rooftop units that utilize direct expansion cooling and electric resistance heating. These rooftop units provide partially conditioned supply air to VAV boxes throughout the building where the air is conditioned to meet the loads directly sensed by the space. Split system AC units are used to supplement the VAV system in café and fitness areas. Exhaust fans are located in the maintenance and restroom spaces to create negative pressure and directly exhaust contaminants.

This report further develops the analysis in technical reports I and II including:

- ASHRAE 62.1-2007 analysis
- Energy usage analysis

The building passes ASHRAE 62.1-2007 by a margin of +40%. The energy usage analysis demonstrated an estimated annual operating cost of \$340,000. It also has a mechanical system first cost of \$1,750,000 or \$13.18 per square foot. This is on the lower end of typical mechanical system first costs.

In conclusion, the mechanical system of HITT Contracting Headquarters is found to provide a good air distribution system that provides comfort to the occupants while meeting the loads demanded. The system first cost is inexpensive and takes up a minimal amount usable floor space. The downfall of the system is in its abundant energy usage when compared to systems of similar size.