

# Accepted Manuscript

## Research Paper

Performance and Energy consumptions of split type air conditioning units for different arrangements of outdoor units in confined building shafts

S.A. Nada, M.A. Said

PII: S1359-4311(17)31924-5

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.05.104>

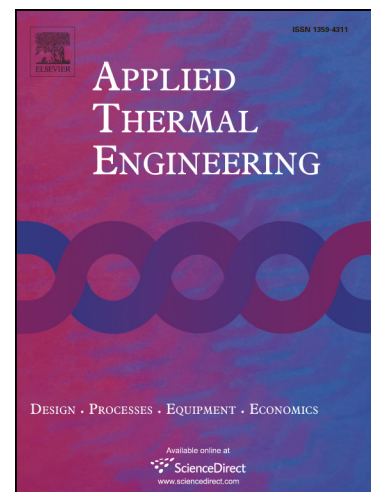
Reference: ATE 10417

To appear in: *Applied Thermal Engineering*

Received Date: 22 March 2017

Revised Date: 13 May 2017

Accepted Date: 20 May 2017



Please cite this article as: S.A. Nada, M.A. Said, Performance and Energy consumptions of split type air conditioning units for different arrangements of outdoor units in confined building shafts, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.05.104>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Performance and Energy consumptions of split type air conditioning units for different arrangements of outdoor units in confined building shafts

S.A. Nada\*, M. A. Said

Department of Mechanical Engineering, Benha Faculty of Engineering, Benha University, Benha, P.O. 13511, Egypt.

\*Corresponding author (Sameh Nada). Email: samehnadar@yahoo.com, Mob: +201066611381

## Abstract

Architectural constraints always recommend placing the outdoor units of split type air-conditioning (AC) systems in building shafts. This leads to high on-coil temperature, high electric consumption of and low performance of the units. In the present study, a CFD simulations of this problem are conducted for different installation arrangements of the outdoor units in two different situations of building shafts: the shaft is closed from the bottom by a basement slab, and the shaft is open from the bottom on the basement floor. The study aims to put installation guidelines for optimum arrangements of the outdoor units in building shafts. The results show that i) the performance of the AC units dramatically getting bad when the building shaft is closed from the bottom, (ii) for open-bottom shaft, the performance of the units decreases as the installation floor level of the unit increases, (iii) for open-bottom shafts, it is preferable to install all outdoor units at one wall except for upper floors units where it preferred to be installed on two adjacent walls, (iv) for closed bottom shafts, it is not recommended to install outdoor units in lower levels of the shafts but can be installed at upper levels.

## Keywords

Split type Air-conditioning units, Thermal Performance, Building shafts, outdoor units arrangements.

## Nomenclature

AC Air Conditioning

COP Coefficient of performance

DX Direct Expansion

$u, v, w$  Flow velocity components in x, y, and z-direction

$P$  Pressure, Pa

$T$  Temperature, °C

Download English Version:

<https://daneshyari.com/en/article/4990566>

Download Persian Version:

<https://daneshyari.com/article/4990566>

[Daneshyari.com](https://daneshyari.com)