

# Author's Accepted Manuscript

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A. Kilaire, M. Stacey



PII: S2352-7102(17)30306-6  
DOI: <http://dx.doi.org/10.1016/j.jobee.2017.06.001>  
Reference: JOBE276

To appear in: *Journal of Building Engineering*

Received date: 21 December 2015  
Revised date: 26 April 2017  
Accepted date: 1 June 2017

Cite this article as: A. Kilaire and M. Stacey, Design of a Prefabricated Passive and Active Double Skin Façade System for UK Offices, *Journal of Building Engineering*, <http://dx.doi.org/10.1016/j.jobee.2017.06.001>

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# Design of a Prefabricated Passive and Active Double Skin Façade System for UK Offices

A. Kilaire<sup>\*1</sup>, M. Stacey

Architecture and Tectonics Research Group, Architecture and Urbanism, University of Nottingham, United Kingdom.

\*Corresponding Author. Tel.: +44 1902 307430. A.Kilaire@wintech-group.com

## Abstract

The Egan Report, changes to Part L Building Regulations, and the importance of office workers are challenging designers to improve the construction process, reduce operational carbon emissions, and enhance occupant comfort for office buildings in the United Kingdom. This paper describes the development of a double skin facade system with integrated environmental systems, to overcome these challenges and provide both a passive and active approach to environmental control. A key part of the design process has been working with industrial partners to develop the design and realise a full-scale prototype. This has been tested and evaluated in terms of key aspects of the comfort, weather and aesthetic performance. An appraisal of the product demonstrates that it achieves proof of concept; it can be highly prefabricated and enhanced occupant comfort and carbon emissions targets can be met.

## Acronyms

IPADFS - Integrated Passive Active Double Facade System

CASE – Cooperative Awards in Science and Technology

EPSRC – Engineering and Physical Sciences Research Council

DSF –Double skin façade

CFD – Computational Fluid Dynamics

HCFC - Hydrochlorofluorocarbons

ODP - Ozone depleting potential

RSHP - Reversible air source heat pump

HVAC – Heating ventilation and air conditioning

COP – Coefficient of performance

Keywords: double skin facade; integrated design; passive design; prefabrication.

## 1. Introduction

### 1.1 Background

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<sup>1</sup> Present Address: Wintech Ltd, Quartz House, Wobaston Road, Wolverhampton. WV9 5HA

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