

Certificate holder:

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The master copy of this document appears on the website:

www.agrement.co.za

Validity

Users of any Agrément certificate should check its status: All currently valid certificates are listed on the website. In addition, check whether the certificate is [Active or Inactive](#).

The certificate holder is in possession of a confirmation certificate attesting to his/her status.

Republic of South Africa.
National Building Regulations,
Government Notice No. R. 711,
Government Gazette No 34586,
Pretoria, South Africa, 9
September 2011

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Subject:

**IES VIRTUAL ENVIRONMENT SOFTWARE
(VERSION VE 2016)**

Use

The certificate covers IES Virtual Environment Software (version VE 2016) when used for the assessment of the energy requirement of buildings as required in Regulation XA3 of Part XA: *Energy usage in buildings* of the National Building Regulations.

This certificate and Agrément South Africa's assessment apply only to those modules of the software used interactively to arrive at energy usage and demand estimates as described in this certificate, and where the terms and conditions of certification are complied with.

General description

IES Virtual Environment Software (version VE 2016) is an integrated software system for environmental performance assessment of buildings. Dynamic thermal simulation is carried out using ApachemSim calculation methods and software. The software provides tools specifically designed for both architects and engineers to design buildings that consume significantly less energy and incorporate low carbon and renewable technologies.

The software version VE 2016 may be used for the rational design air-conditioned buildings or naturally ventilated buildings of all occupancies in terms of the requirements of

Regulation XA3 b) and c) of Part XA: *Energy usage in buildings* of the National Building Regulations.

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PREAMBLE

This certificate is issued by Agrément South Africa in terms of the powers granted to it by the Minister of Public Works.

This certificate:

- has been granted after a technical assessment of the performance of the relevant modules of the IES Virtual Environment Software (version VE 2016) in terms of Agrément South Africa's assessment protocol for the uses covered by the certificate.
- is independent of any patent rights that may or may not subsist in the subject of the certificate.
- does not relieve the user from complying with any of the requirements imposed by the building authority concerned pertaining to the National Building Regulations.

Agrément South Africa considers that the accuracy of energy assessments carried out by competent persons using IES Virtual Environment Software (version VE 2016) will be satisfactory. However, Agrément South Africa does not on behalf of itself, or the government, or any of its employees or agents guarantee such accuracy.

No action for damages, or any other claim whatsoever, lies against Agrément South Africa, its members, the government or any of its employees should said software fail to comply with the standards set out in this certificate.

Building authorities or users of the software, who are in any doubt about the continued validity of this certificate should contact Agrément South Africa.

The validity of this certificate is reviewed every three years. The certificate shall remain valid as long as Agrément South Africa is satisfied that:

- the certificate holder complies with the general and specific conditions of certification
- no serious anomalies have become apparent in the results obtained using the software
- any changes in legislation, regulations, relevant standards or Agrément assessment protocol have not invalidated the technical assessment that formed the basis of certification.

Agrément South Africa reserves the right to withdraw the certificate at any time, should reasonable cause exist.

Notices affecting the validity of this certificate will be published in the *Government Gazette*.

PART 1: CONDITIONS OF CERTIFICATION

This certificate covers only IES Virtual Environment Software (version VE 2016):

- when used in terms of the certificate holder's terms and conditions
- as long as technical support and training are available from the certificate holder or licensees appointed by the certificate holder and registered as such with Agrément South Africa
- provided that the conditions of certification are complied with.

Any change to an aspect of the software could result in other aspects of the software no longer complying with Agrément South Africa's performance criteria. For these reasons, no changes, other than changes and/or additions to the user interface, or additions of features not affecting the main methods of computations, may be made to the IES Virtual Environment Software (version VE 2016) as described in this certificate unless such changes are approved in writing by Agrément South Africa before they are implemented.

General conditions

Marking

Where possible and appropriate, software packaging, marketing brochures, user manuals and other material must be marked with Agrément South Africa's identification logo and certificate number, as illustrated opposite.

Validity

The validity of this certificate is subject to a satisfactory review by Agrément South Africa every three years.

Quality monitoring

The certificate holder is required to participate in Agrément South Africa's post-certification quality management scheme, which requires:

- that the certificate holder shall continue to implement and manage the quality system approved by Agrément South Africa in the assessment of the IES Virtual Environment Software (version VE 2016)
- the cooperation of the certificate holder in facilitating post-certification quality monitoring by Agrément South Africa or its authorised agents.



Reappraisal:

- Such must be requested by the certificate holder prior to introducing new versions of the software into the market
- Reappraisal will be required by Agrément South Africa if there are changes to regulations or Agrément South Africa's criteria.

This certificate may be withdrawn if the certificate holder or a registered licensee fails to comply with the above-mentioned requirements.

On behalf of the Board of Agrément South Africa:



Chairperson

December 2016

PART 2: ASSESSMENT

Scope of assessment

This assessment is based on:

- an assessment of the software in accordance with Agrément South Africa's assessment protocol
- an assessment of Integrated Environmental Solutions Ltd's quality management system.

Assessment

In the opinion of Agrément South Africa, the IES Virtual Environment Software (version VE 2016) is suitable for the uses as specified on page 1 of this certificate.

Agrément South Africa's comments on the various aspects of the assessment are set out in Table 1.

Table 1: Assessment

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<p>Accuracy of the predictions made using IES Virtual Environment Software</p> <p>ANSI/ASHRAE standard 140-2007: “Standard method of test for the evaluation of building energy analysis computer programs”</p>	<p>Satisfactory</p>	<p>Tested in accordance with the ANSI/ASHRAE standard 140-2007.</p>
<p>Features of the software explicitly required to enable modelling in terms of Agrément South Africa’s assessment protocol</p> <p>Protocol for the Certification of Energy Simulation Software</p>	<p>All features required in terms of the protocol are present.</p>	<p>Refer to protocol.</p>
<p>Ability to be able to edit and add to existing material property database</p>	<p>No specific South African material database is included in the software, however, generic data are available.</p>	<p>Material properties for local materials may be added by users.</p>
<p>Ability to be able to add energy loads resulting from vertical transport, where provided, and for the supply of hot water</p> <p>SANS 10252-1: Water supply and drainage in buildings</p>	<p>Satisfactory</p>	<p>Hot water requirements are to be determined in accordance with SANS 10252-1. Lifts options may be simulated.</p>
<p>Ability to be able to determine energy consumption of buildings in terms of SANS 10400 Part XA for South African climate zones</p> <p>SANS 10400: The application of the National Building Regulations</p>	<p>Satisfactory</p>	<p>Climate files for the six zones in South Africa can be used to assess building performance in terms of SANS 10400.</p>

Table 1 (Continued): Assessment

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<i>Training and technical support</i>	Satisfactory	Training and technical support are readily available from the certificate holder.
<i>Quality management</i> <div style="border: 1px solid green; padding: 2px; display: inline-block;"> SANS 9001: <i>Quality management systems</i> </div>	Satisfactory When properly implemented, the quality system will ensure that acceptable standards are maintained.	The quality system complies with Agrément South Africa’s requirements. IES Ltd is ISO 9001 accredited.

PART 3: TECHNICAL DESCRIPTION

General description

IES Virtual Environment Software (version VE 2016) is an integrated software system for environmental performance assessment of buildings. Dynamic thermal simulation is carried out using ApachemSim calculation methods and software.

It is made up of modules which enable:

- model buildings
- checks for compliance with various international energy regulations
- measurements against various global environmental ratings systems
- access to climate data
- modelling of energy requirements of buildings and assess the impact of low energy systems and strategies
- modelling of different solar options
- assessment of various lighting solutions
- simulation of various airflows
- sizing and modelling of HVAC equipment
- simulation of occupant movement
- undertaking of life-cycle cost analysis.

It is intended to assist designers, operators and owners to meet current and future environmental challenges.

Air-conditioned and naturally ventilated buildings

IES Virtual Environment Software may be used to model large commercial, industrial as well as small domestic buildings. Buildings may be air-conditioned or naturally ventilated.

Methods of assessment used in the software

The simulation engine - ApacheSim (VE 2016) is a dynamic thermal simulation program based on first-principles mathematical modelling of the heat transfer processes occurring within and around a building. The program provides an environment for the detailed evaluation of the building and system designs, allowing them to be optimised with regard to comfort criteria and energy use.

Among the issues that can be addressed are:

- Type and placement of thermal insulation
- Building dynamics and thermal mass
- Building configuration and orientation
- Climate
- Glazing properties
- Shading, solar gain and solar penetration
- Casual gains
- Air-tightness
- Natural ventilation
- HVAC systems
- Mixed-mode system.

Output from simulations includes:

- Comfort statistics
- Energy consumption
- Carbon emissions
- Room load statistics
- Plant sizes
- Detailed performance measures including hourly room temperatures (air, mean radiant and dry resultant), humidities, plant loads, casual gains and air exchanges
- Surface temperatures for comfort studies or CFD boundary conditions.

The simulation is driven by real weather data and may cover any period from a day to a year. The evolution time of the building's thermal conditions is traced at intervals as small as a minute.

Thermal properties of materials utilised in the software

IES Virtual Environment users will need to edit generic material property data files or create their own data files.

Climate file format and compatibility of the reference climate files covering the six climate zones in South Africa

Climate files are ASCII text-based weather, input and output files that include hourly or sub-hourly environmental conditions and standard and user-defined reports, respectively. As such the reference climate files for the six climatic zones as defined in **SANS 10400 Part XA** may be used as input.

Technical support and training

Technical support is available online from a 'Knowledge Base' or comprehensive 'User Guides'. IES Internet 'User forum' and *YouTube* channel have been set up to assist users. Integrated Environmental Solutions (IES) Ltd may also be contacted in Scotland via telephone or email, should further support be necessary.

Training is available online in the form of e-training. Interactive and 'hands-on' training is available in South Africa on request.