# GEMS Air Conditioner Simulator Authorisation Form

## 1. Purpose

## This document is to be used by companies wishing to submit software to the Greenhouse and Energy Minimum Standards (GEMS) Act 2012 Regulator for authorisation under the Greenhouse and Energy Minimum Standards (Air Conditioners up to 65kW) Determination 2019 and (Air Conditioners above 65kW) Determination 2022, Schedule 2.3 (5).

## 2. Instruction

To complete this form, you will need to provide details as to the capabilities of the simulation software seeking authorisation. Once the form below is complete you are required to upload the attached form using link below to the GEMS contact form. Please include the text ‘Simulation Software Authorisation Request’ in the Details box:

<https://reg.energyrating.gov.au/application/contact/>

## 3. Detailed Information (Please fill in below)

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| --- |
| Administrative Information  |
| Your Company |  |
| Software Name and Version (referred to as **The Package**) |  |
| Please **either** select the kind of air conditioner product The Package is seeking authorisation for in Table 1, **or** select the product classes The Package is seeking authorisation for in Table 2.*Notes:* 1. *Simulation software may not be used to demonstrate compliance with the GEMS Act, Determination 2019 for product classes 3, 4, 22 or 23.*
2. *Simulation software must not be used to test noise (sound power), average true power factor or performance at temperature conditions H2 and H3.*
3. *Simulation software may only be used for models of under 30kW capacity if; they are not in product classes 1 or 2 and total sales of the model have been, or will be, less than 10 in the financial year which registration occurred and each subsequent financial year.*
4. *All models that use simulation software to demonstrate compliance may not display an energy rating label or icon.*

*\*R in Table 2 is taken as the rated standard cooling full capacity or for heating only products the rated standard heating full capacity.* **Table 1**

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| □ Seeking authorisation for **all** available kinds of product; product classes 1 to 27, excluding 3, 4, 22 & 23. *(Note, if this option is selected, there is no need to select any other category in Table 1)*  |
| □ Seeking authorisation for **non-ducted** **air-to-air unitary air conditioners**, product classes 1, 2, 5, 6, 7 & 24. |
| □ Seeking authorisation for **ducted** **air-to-air unitary air conditioners**, product classes 1, 2, 5, 6, 7 & 24. |
| □ Seeking authorisation for **air-to-air single non-ducted split systems**, product classes 8, 9, 11, 12 & 25. |
| □ Seeking authorisation for **air-to-air single ducted split systems**, product classes 8, 9, 10, 11, 12 & 25. |
| □ Seeking authorisation for **air‑to‑air non-ducted single‑split outdoor units**, product classes 13, 14, 16, 17 & 26. |
| □ Seeking authorisation for **air‑to‑air ducted single‑split outdoor units**, product classes 15, 16, 17 & 26. |
| □ Seeking authorisation for **air‑to‑air multi-split outdoor units**, product classes 18, 19, 20, 21 & 27. |

**Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
| Kind of product | Product class | Characteristics & Value of R\* | Seeking Authorisation |
| Air-to-air unitary air conditioners | 1 | Wall mounted unitary double duct air conditionersR ≤ 65kW | □ Yes □ No |
| 2 | Portable unitary double duct air conditionersR ≤ 65kW | □ Yes □ No |
| 3 | Wall mounted unitary single duct air conditionersR ≤ 65kW | Not applicable  |
| 4 | Portable unitary single duct air conditionersR ≤ 65kW | Not applicable |
| 5 | Ducted or non‑ducted, excluding product classes 1 to 4 R < 10kW | □ Yes □ No |
| 6 | Ducted or non‑ducted, excluding product classes 1 to 4 10kW ≤ R ≤ 39kW | □ Yes □ No |
| 7 | Ducted or non‑ducted, excluding product classes 1 to 4 39kW ≤ R ≤ 65kW | □ Yes □ No |
| 24 | Ducted or non‑ducted, excluding product classes 1 to 4 65kW < R | □ Yes □ No |
| Air-to-air single split systems | 8 | Non-ducted R < 4kW | □ Yes □ No |
| 9 | Non-ducted 4kW ≤ R < 10kW | □ Yes □ No |
| 10 | Ducted R < 10kW | □ Yes □ No |
| 11 | Ducted or non-ducted 10kW ≤ R ≤ 39kW | □ Yes □ No |
| 12 | Ducted or non-ducted 39kW < R ≤ 65kW | □ Yes □ No |
| 25 | Ducted or non-ducted 65kW < R | □ Yes □ No |
| Air‑to‑air single‑split outdoor units(not supplied or offered for supply as part of a single‑split system) | 13 | Supplied or offered for supply to create a non-ducted system R < 4kW | □ Yes □ No |
| 14 | Supplied or offered for supply to create a non-ducted system 4kW ≤ R < 10kW | □ Yes □ No |
| 15 | Supplied or offered for supply to create a ducted system R < 10kW | □ Yes □ No |
| 16 | Whether supplied or offered for supply to create a ducted or a non-ducted system 10kW ≤ R ≤ 39kW | □ Yes □ No |
| 17 | Whether supplied or offered for supply to create a ducted or a non-ducted system 39kW < R ≤ 65kW | □ Yes □ No |
| 26 | Whether supplied or offered for supply to create a ducted or a non-ducted system 65kW < R | □ Yes □ No |
| Air‑to‑air multi-split outdoor units(whether or not supplied or offered for supply as part of a multi-split system) | 18 | R < 4kW | □ Yes □ No |
| 19 | 4kW ≤ R < 10kW  | □ Yes □ No |
| 20 | 10kW ≤ R < 39kW | □ Yes □ No |
| 21 | 39kW ≤ R ≤ 65kW | □ Yes □ No |
| **27** | 65kW < R | □ Yes □ No |
| Water-to-air air conditioners | 22 |  | Not applicable |
| 23 |  | Not applicable |

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| Demonstrating the ability to simulate required test conditions  |
| It is essential that The Package is capable of simulating air conditioner performance at the required operating parameters described in the GEMS Air Conditioners up to 65kW Determination 2019 and GEMS Air Conditioners above 65kW Determination 2022.  |
| Is The Package capable of simulating the performance of air-conditioners at the required operating temperatures (both dry and wet bulb, inside and outside), appropriate for the product classes for which the authorisation is being sought? (See Table 3 for guidance) □ Yes □ No |
| **Table 3** |
| Inside Conditions | Outside Conditions |
| Dry Bulb (Degrees C) | Wet Bulb (Degrees C) | Dry Bulb (Degrees C) | Wet Bulb (Degrees C) |
| Condition 1 (H1) [Mandatory for units that provide heating] |
| 20 | 15 | 7 | 6 |
| Condition 2 (T1) [Mandatory for units that provide cooling] |
| 27 | 19 | 35 | 24 |
| Condition 3 (Low Temperature Cooling – two stage compressors only) |
| 27 | 19 | 29 | 19 |
|  |
| Technical Capability |
| The following questions are used to determine the capability of the simulation software. If the answer to all Technical Capability questions is yes, it is likely The Package is simulating air conditioners with a level of complexity that would allow any make or model of air conditioner to be accurately simulated.  |
| Does The Package allow the user to define all the components of the refrigeration system? I.e., the evaporator coil, the condenser coil, compressor(s), connecting pipework and thermal expansion device?  □ Yes □ No |
| Can The Package simulate different fin thicknesses and fin densities on evaporator and condenser coils? □ Yes □ No |
| Can The Package simulate different tube and fin patterns on evaporator and condenser coils? □ Yes □ No |
| Can The Package simulate different tube circuit arrangements on evaporator and condenser coils? □ Yes □ No |
| Is The Package capable of simulating a variety of commercially available refrigerants?  □ Yes □ No |
| Does The Package allow the user to add additional refrigerants should the user desire?  □ Yes □ No |
| Can The Package simulate heat loss from the compressor shell? □ Yes □ No |
| Is The Package capable of simulating fixed, multiple and variable speed compressors? □ Yes □ No |
| Does The Package allow user defined compressor input data in the form of the AHRI 540 standard (or equivalent alternative) to simulate compressor performance? □ Yes □ No |
| Is The Package capable of simulating the energy consumption of the indoor and outdoor unit fan(s) at a user defined duty point? □ Yes □ No |
| Does The Package allow the user to define the heat transfer correlations used in the analysis? □ Yes □ No |
| Does The Package allow the user to define the pressure drop correlations used in the analysis? □ Yes □ No |
| Is The Package capable of simulating air conditioners containing multiple compressors? □ Yes □ No |
| Is The Package capable of simulating air conditioners which contain multiple indoor units?  □ Yes □ No |
| Does The Package require the user to define correction factors in order to achieve accurate simulation results to within + or - 5 % of laboratory test results?  □ Yes □ No |
| Does The Package allow the user to define correction factors at the component level? I.e., the ability to adjust the simulated performance of a specific thermodynamic property of a component, for example the airside heat transfer correlation of the evaporator may be specifically adjusted.  □ Yes □ No |
| Does The Package allow the user to define correction factors at the global or unit level? I.e., the ability to adjust the simulated performance of the entire air-conditioner through a single factor. For example, the user may wish to increase the simulated cooling capacity by factor of 5%.  □ Yes □ No |
| Addendum 1 – Generalised Engineering Software Technical Capability |
| The following questions are required only when The Package seeking authorisation is not specifically designed to model the performance of Air-conditioners. |
| Please describe the principal calculation method that the software employs: (*for example the software may employ a control volume finite element method.)* |
| Please describe the air and refrigerant side pressure drop correlations used: *(for example the software may employ the Chang-Wang Louver Fin air side correlation and Blasius refrigerant side correlation)*  |
| Please describe the air and refrigerant side heat transfer correlations used for both the evaporator and condenser: *(for example the software may employ the Wang-Chi-Chang Plate Fin air side heat transfer correlation and Dittus-Boelter refrigerant side correlation)* |