



# **Building Template Manager User Guide**

**IES Virtual Environment 6.4**

General

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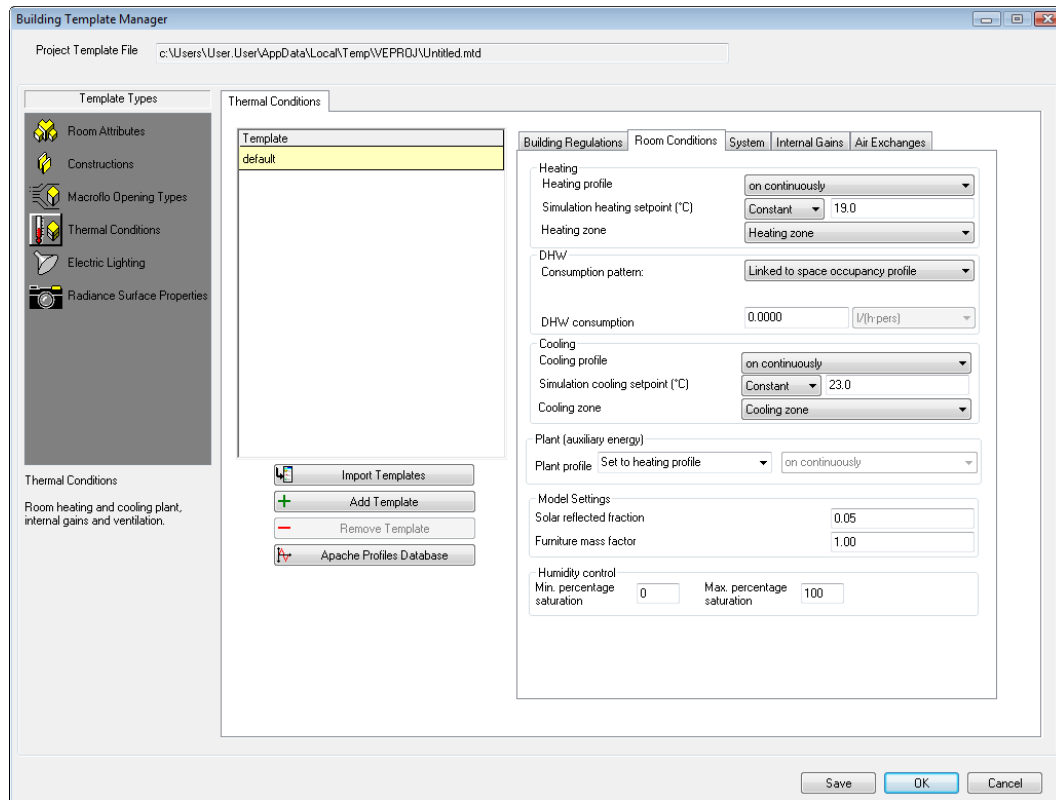
# 1 Introduction

The Building Template Manager (BTM) is the room template manager for the <Virtual Environment> programs. It allows for easy designation of common zone features and conditions when constructing a <Virtual Environment> model.

VE 6.4	Building Template Manager	3
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## 2 BTM Window

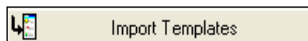
The Building Template Manager window can be opened by selecting Templates > Building Template Manager from the <VE> menus. The following window will then be displayed:



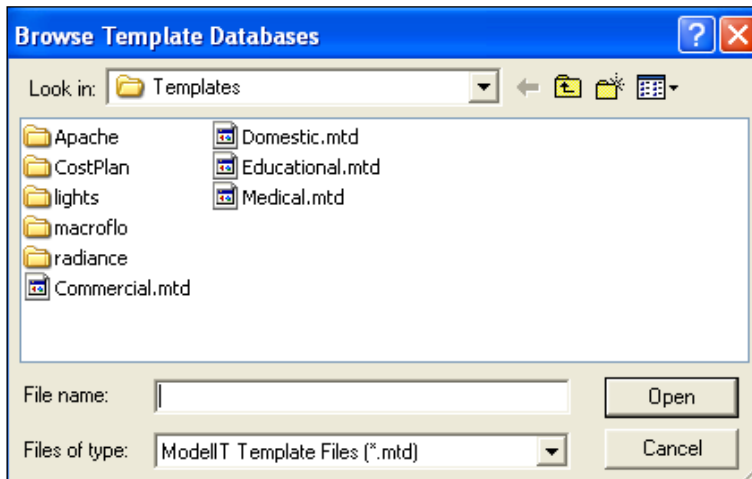
### 2.1 Project Template File

For each modelling project, a project specific template file is created with the extension \*.mtd. This holds the template(s) used by the modelling project. The Project Template File is read-only here as the mtd file is created automatically for each project and is shown only for information.

## 2.2 Import Templates



This button produces the following window which allows the user to browse the template database



There are currently four template database files:

- Commercial
- Domestic
- Educational
- Medical

When a database file is opened, the following window will appear:

Imported Template - Commercial.mtd

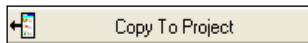
Thermal Conditions

Template	Building Regulations	Room Conditions	System	Internal Gains	Air Exchanges
Call Centre	<p><b>Heating</b></p> <p>Heating profile: Occupancy type 2</p> <p>Simulation heating setpoint (°C): Constant 22.0</p> <p>Heating zone: Heating zone</p> <p><b>DHW</b></p> <p>Consumption pattern: Linked to space occupancy profile</p> <p>DHW consumption: 0.0000 l/(h pers)</p> <p><b>Cooling</b></p> <p>Cooling profile: Occupancy type 2</p> <p>Simulation cooling setpoint (°C): Constant 24.0</p> <p>Cooling zone: Cooling zone</p> <p><b>Plant (auxiliary energy)</b></p> <p>Plant profile: Set to heating profile on continuously</p> <p><b>Model Settings</b></p> <p>Solar reflected fraction: 0.05</p> <p>Furniture mass factor: 1.00</p> <p><b>Humidity control</b></p> <p>Min. percentage saturation: 0 Max. percentage saturation: 100</p>				
Circulation					
General Office					
Meeting Room					
Roof-space					

Copy To Project

Browse Template Databases Close

### 2.2.1 Copy To Project



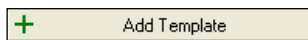
Use this button to copy the selected template to the project.

### 2.2.2 Browse Template Databases



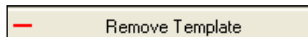
Press this button to begin browsing the template databases again.

### 2.2.3 Add Template



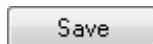
This button adds a template to the project model template type currently active. It is then available for editing.

## 2.3 Remove Template



This button removes a template from the project model template type currently active.

## 2.4 Save



Click the save button to save any changes made in the BTM.

## 2.5 OK



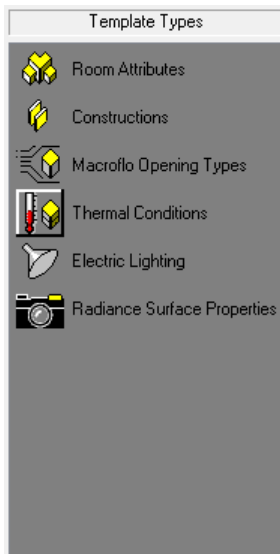
Click the OK button to exit the BTM once changes have been made and saved.

## 2.6 Cancel



Click the cancel button to exit from the BTM without saving any changes.

### 3 Template Types



The Building Template Manager is split up into 6 template types:

- Room Attributes
- Constructions
- MacroFlo Opening Types
- Thermal Conditions
- Electric Lighting
- Radiance Surface Properties

Each is described in detail below.



### 3.1 Room Attributes

This contains data relating to lettable area.


Room Attributes


Template
default


Include in building floor area?


Lettable Floor Area (%)

Circulation Floor Area (%)

 Import Templates

 Add Template

 Remove Template

 Apache Profiles Database

#### 3.1.1 Lettable Floor Area

This is the percentage of the floor area that is lettable.

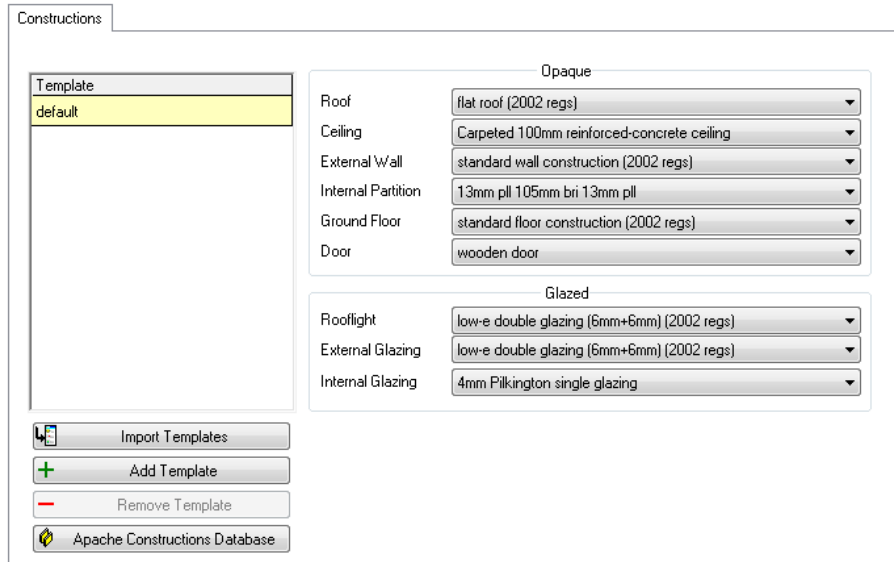
#### 3.1.2 Circulation Floor Area

This is the percentage of the floor area that is classed as circulation.

## 3.2 Constructions

This section is where the opaque and glazed constructions are specified for templates.

It should be noted that the constructions template can only be used when drawing new geometry or importing from file. We cannot apply a construction template to existing rooms within the model.



### 3.2.1 Opaque

This section contains drop down lists for the following which are used to select the desired construction:

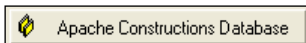
- Roof
- Ceiling
- External Wall
- Internal Partition
- Ground Floor
- Door

### 3.2.2 Glazed

This section contains drop down lists for the following which are used to select the desired construction:

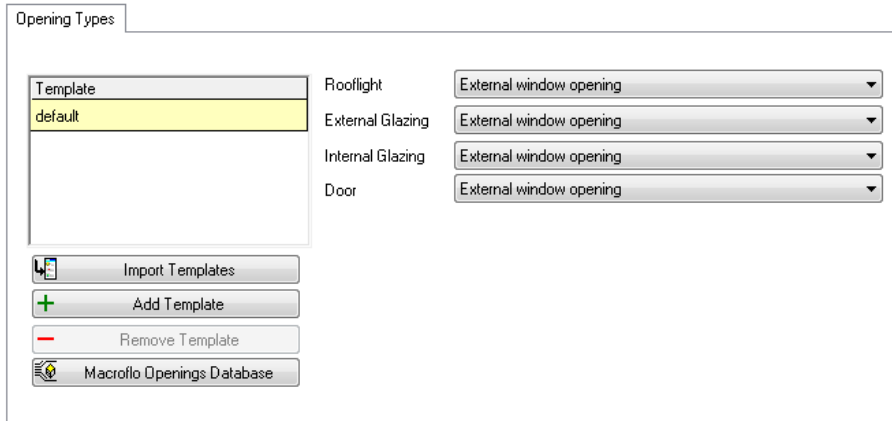
- Rooflight
- External Glazing
- Internal Glazing

### 3.2.3 Apache Constructions Database



Pressing this button opens up APcdb to allow for creation / removal / editing of constructions. See the APcdb User Guide.

## 3.3 MacroFlo Opening Types



The screenshot shows a dialog box titled "Opening Types". On the left, there is a list of templates with "default" selected. Below the list are four buttons: "Import Templates", "Add Template", "Remove Template", and "Macroflo Openings Database". On the right, there are four dropdown menus labeled "Rooflight", "External Glazing", "Internal Glazing", and "Door", each currently set to "External window opening".

This section is where the MacroFlo opening types are assigned to templates. The opening types available are:

- Rooflight
- External Glazing
- Internal Glazing
- Door

### 3.4 Thermal Conditions

This section is where room thermal conditions are assigned to templates.

The screenshot shows the 'Thermal Conditions' window with the following settings:

- Building Regulations:** (tabbed)
- Room Conditions:** (active tab)
  - Heating profile: on continuously
  - Simulation heating setpoint (°C): Constant, 19.0
  - Heating zone: Heating zone
- DHW:**
  - Consumption pattern: Linked to space occupancy profile
  - DHW consumption: 0.0000 l/(h pers)
- Cooling:**
  - Cooling profile: on continuously
  - Simulation cooling setpoint (°C): Constant, 23.0
  - Cooling zone: Cooling zone
- Plant (auxiliary energy):**
  - Plant profile: Set to heating profile
  - Plant profile: on continuously
- Model Settings:**
  - Solar reflected fraction: 0.05
  - Furniture mass factor: 1.00
- Humidity control:**
  - Min. percentage saturation: 0
  - Max. percentage saturation: 100

There are five tabs for thermal conditions data:

- Building Regulations - *for VE Compliance module*
- Room Conditions - *Heating & Cooling*
- System - *Apache Systems data*
- Internal Gains - *Casual Gains*
- Air Exchanges - *Infiltration & Ventilation*

### 3.4.1 Building Regulations

Building Regulations	Room Conditions	System	Internal Gains	Air Exchanges
Room type	Heated or occupied room			
NCM building type	B1: Office or Workshop (Office)			
NCM activity	NCM Office: Office			
<p>Note: Rooms with this template will be assigned this NCM building type and activity (unless overridden). If no building type is selected, they will be assigned the model NCM building type set in &lt;VE&gt; compliance (and its default activity).</p>				

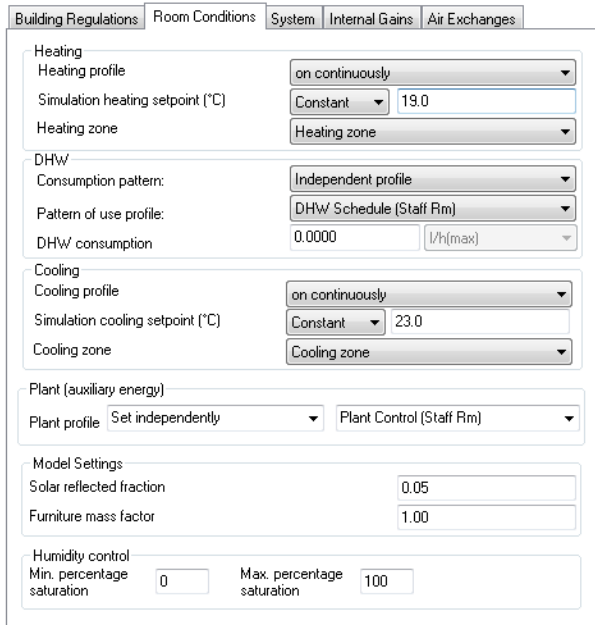
This tab allows the template to be associated with an NCM activity template for Building Regulations compliance. Data entered here will only affect VE Compliance and other thermal modules (ApacheCalc, ApacheSim) will remain unchanged.

See the VE Compliance / Building Regulations user guides for more information.

Please note that this tab may not be visible as it is dependent on which building regulations are included in your license.

### 3.4.2 Room Conditions

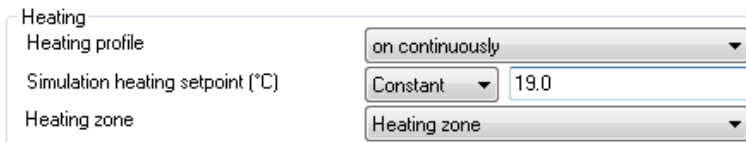
This tab contains controls for setting default room heating attribute data.



The screenshot shows the 'Room Conditions' tab with the following settings:

- Heating:** Heating profile: on continuously; Simulation heating setpoint (°C): Constant 19.0; Heating zone: Heating zone.
- DHW:** Consumption pattern: Independent profile; Pattern of use profile: DHW Schedule (Staff Rm); DHW consumption: 0.0000 l/h(max).
- Cooling:** Cooling profile: on continuously; Simulation cooling setpoint (°C): Constant 23.0; Cooling zone: Cooling zone.
- Plant (auxiliary energy):** Plant profile: Set independently; Plant Control (Staff Rm).
- Model Settings:** Solar reflected fraction: 0.05; Furniture mass factor: 1.00.
- Humidity control:** Min. percentage saturation: 0; Max. percentage saturation: 100.

#### 3.4.2.1 Heating



The close-up shows the following settings:

- Heating profile:** on continuously
- Simulation heating setpoint (°C):** Constant 19.0
- Heating zone:** Heating zone

#### **Heating Profile**

This user can set the percentage profile group that defines the operation of the heating system.

Note that for heating to operate, the percentage profile must exceed 50%.

In most cases, prior to creating a template, the user should define profiles using **APpro**. These profiles will then appear in this and any other Percentage Profile Group dialogue box.

#### **Simulation Heating Setpoint**

This is the setpoint for heating control. This value must be less than or equal to the Simulation Cooling Setpoint at all times. The heating setpoint can be constant or it can follow a timed profile which can be defined using APpro.

#### **Heating Zone (INACTIVE)**

This allows you to set a default heating zone to which spaces will be assigned for the purposes of thermal calculations.

**\*\*\* Room grouping schemes provide this functionality \*\*\***

### 3.4.2.2 DHW

Here we defined the DHW using either the occupancy profile or another predefined controlling scheduling profile.

DHW		
Consumption pattern:	Independent profile	
Pattern of use profile:	DHW Schedule (Staff Rm)	
DHW consumption	0.0000	l/h(max)

#### **Consumption pattern**

Here we can chose to control the DHW by either:

- Linked to space occupancy profile (default)

OR

- Independent profile

#### **Pattern of use profile**

If “Independent profile” selected above then this is where we specify the scheduling profile that describes the pattern.

#### **DHW consumption**

The actual DHW consumption we want to define.

### 3.4.2.3 Cooling

Cooling		
Cooling profile	on continuously	
Simulation cooling setpoint (°C)	Constant	23.0
Cooling zone	Cooling zone	

#### **Cooling Profile**

Here you can set the percentage profile group that defines the operation of the cooling system.

Note that for cooling to operate, the percentage profile must exceed 50%.

In most cases, prior to creating a template, the user should define profiles using APro. These profiles will then appear in this and any other Percentage Profile Group dialogue box.

#### **Simulation Cooling Setpoint**

This is the setpoint for cooling control. This value must be greater than or equal to the Simulation Heating Setpoint at all times. The cooling setpoint can be constant or it can follow a timed profile which can be defined using APro.

#### **Cooling Zone (INACTIVE)**

This allows you to set a default cooling zone to which spaces will be assigned for the purposes of thermal calculations.

**\*\*\* Room grouping schemes provide this functionality \*\*\***

### 3.4.2.4 Plant (auxiliary energy)

The plant (auxiliary energy) can be linked to either the heating or cooling profiles or indeed set independently by assigning a controlling profile.

Plant (auxiliary energy)	
Plant profile	Set independently ▼
	Plant Control (Staff Rm) ▼

#### ***Plant profile (control)***

Here we set whether we want to link the control to one of the following:

- Set to heating profile
- Set to cooling profile
- Set independently

#### ***Profile schedule***

Only active when “Set independently” above. This allows the selection of any profile weekly modulating profile.

### 3.4.2.5 Model settings

Model Settings	
Solar reflected fraction	0.05
Furniture mass factor	1.00

#### ***Solar Reflected Fraction***

This is the fraction of solar radiation which, once transmitted by the glazing room, is then re-reflected out of the window. The value of solar fraction lost depends primarily on internal surface emissivity and room geometry. As a general rule, windows which have a high room view factor will have higher solar re-reflected fractions. For ApacheCalc only.

#### ***Furniture Mass Factor***

In ApacheSim the thermal mass of the air in a room is calculated as the product of the room volume, the air density and the air specific heat capacity at the room conditions. See the Apache User Guide for more information.



### 3.4.2.6 Humidity control

Humidity control			
Min. percentage saturation	<input type="text" value="0"/>	Max. percentage saturation	<input type="text" value="100"/>

#### ***Min. percentage saturation***

The minimum percentage saturation level to be maintained in the room during periods of plant operation, as specified by the Cooling profile on the Room Conditions tab. If the percentage saturation in the space falls below the value entered here during plant operation, humidification will occur to meet this limit. Setting this parameter to 0% disables humidification control.


#### ***Max percentage saturation***

The maximum Percentage Saturation level to be maintained during periods of plant operation, as specified by the Cooling profile on the Room Conditions tab. If the percentage saturation in the space rises above the value entered here during plant operation, dehumidification will occur to meet this limit. Setting this parameter to 100% disables dehumidification control.

### 3.4.3 System

This tab contains controls for setting default room cooling attribute data

**System**

HVAC system: Indoor packaged cabinet (VAV) 

Auxiliary vent.  
 Use same as HVAC: Indoor packaged cabinet (VAV)

DHW system  
 Use same as HVAC: DHW System

---

**Heating**

Heating plant radiant fraction: 0.20      Simulation heating unit capacity:  Unlimited

---

**Cooling**

Cooling plant radiant fraction: 0.00      Simulation cooling unit capacity:  Unlimited

---


System outside air supply ('system air supply' in Vista)

Min. flow rate: 0.8000 l/s.m<sup>2</sup>      Variation profile: off continuously

Additional free cooling flow capacity: 0.0000 ach

#### 3.4.3.1 System

**System**

HVAC system: Indoor packaged cabinet (VAV) 

Auxiliary vent.  
 Use same as HVAC: Indoor packaged cabinet (VAV)

DHW system  
 Use same as HVAC: DHW System

#### ***HVAC System***

This is where the system that controls the room and supply air condition (set in Apache Systems) is chosen for the current template. This choice dictates the efficiency and primary energy use of the system chosen for heating, cooling, air supply, extraction and any auxiliary mechanical ventilation.

#### ***Auxiliary System***

This is where the system that controls the supply air condition for any auxiliary ventilation (set in Apache Systems) is chosen for the current template. This choice dictates the efficiency and primary energy use of the system chosen for heating, cooling, supplying and extracting the auxiliary system air.

#### ***DHW System***

This is where the system that controls the domestic hot water (set in Apache Systems) is chosen for the current template. This choice dictates the efficiency and primary energy use of the system chosen for heating.

### 3.4.3.2 Heating

Heating	
Heating plant radiant fraction	0.20
Simulation heating unit capacity	<input checked="" type="checkbox"/> Unlimited

#### **Heating Plant Radiant Fraction**

This is the fraction of radiant heat given out by the heat emitter, e.g. 0.0 for forced warm air heaters and 0.9 for high temperature radiant heaters.

#### **Simulation Heating Unit Capacity**

This is used in dynamic thermal simulation only and the user can choose either unlimited plant capacity or can set a limit.

### 3.4.3.3 Cooling

Cooling	
Cooling plant radiant fraction	0.00
Simulation cooling unit capacity	<input checked="" type="checkbox"/> Unlimited

#### **Cooling Plant Radiant Fraction**

The Cooling Device Radiant Fraction is the cooling that is seen as radiant energy, e.g. 0.0 for an air system.

#### **Simulation Cooling Unit Capacity**

This is used in dynamic thermal simulation only and the user can choose either unlimited plant capacity or can set a limit.

### 3.4.3.4 System outside air supply

System outside air supply ('system air supply' in Vista)		
Min. flow rate	0.8000	l/(s·m <sup>2</sup> )
Additional free cooling flow capacity	0.0000	ach
Variation profile	off continuously	

#### **Minimum Flow Rate**

The supply air condition is set in the Apache Systems dialog. It is the air supply that will be tempered by the system plant and the results will be seen separately from the room load.

#### **Variation Profile**

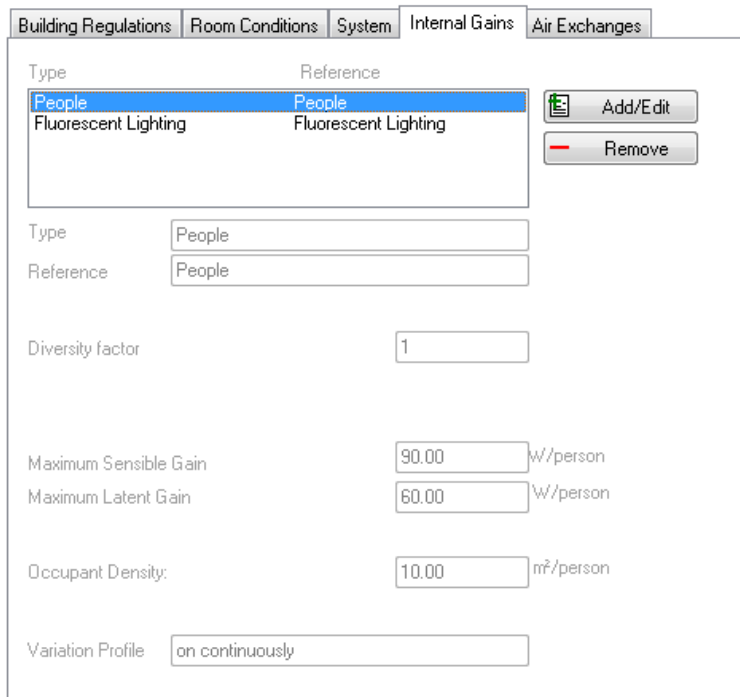
This is the variation profile that will be applied to the system air supply. The modulating profile can be set in APro.

### **Additional Free Cooling Flow Capacity**

This indicates the maximum intake of outside air that is available for free cooling. In the case of a naturally ventilated room, a value of 5 ach would be typical to model ventilation by window opening. In the case of an air conditioned room, where the outside air is brought in via the system, it would be usual to express the value in  $l/(s \cdot m^2)$  and a value of 0.5 in  $l/(s \cdot m^2)$  would be typical. Note that this figure represents the additional outside air intake over and above the minimum ventilation level.

### **3.4.4 Internal Gains (Casual Gains)**

This tab is used for entering default room casual gain settings such as people (occupancy), tungsten lighting, fluorescent lighting, machinery, miscellaneous, cooking and computers.



Type	Reference
People	People
Fluorescent Lighting	Fluorescent Lighting

Type:

Reference:

Diversity factor:

Maximum Sensible Gain:  W/person

Maximum Latent Gain:  W/person

Occupant Density:  m<sup>2</sup>/person

Variation Profile:

The data shown here will depend on the type of casual gain currently selected.

#### **3.4.4.1 Internal Gain Parameters**

##### **Type**

There are seven types of casual gains available for selection:

- Fluorescent lighting
- Tungsten Lighting
- Machinery

- Miscellaneous
- Cooking
- Computers
- People

Clicking on the column header will allow the column to be sorted alphabetically or reverse alphabetically.

### ***Reference***

The reference name which the user can enter for a casual gain. Clicking on the column header will allow the column to be sorted alphabetically or reverse alphabetically.

### ***Gain Units***

The units by which internal gains are defined. W/m<sup>2</sup> or W for all gains other than People which is set a W/P or W. Lighting gains have the additional option of lux. Holes and windows added on a surface will reduce the floor area to be used in a W/m<sup>2</sup> calculation. Using the W option can be used to bypass this procedure, specifically for high level zones where a floor may be set as a 100% hole.

### ***Maximum Illuminance***

When lux is specified as the gain units, the maximum illuminance can be specified in lux.

### ***Installed Power Density***

The W/m<sup>2</sup>/100lux figure used to specify a maximum sensible lighting gain and maximum power consumption in conjunction with maximum illuminance.

### ***Maximum Sensible Gain***

This is the value used to calculate the sensible heat gain per square metre of floor area for the casual gain type. Typical values can be found in CIBSE Guide A7. Clicking on the column header will allow the column to be sorted numerically or reverse numerically.

### ***Maximum Latent Gain***

This is the value used to calculate the latent heat gain per square metre of floor area for the casual gain type. Typical values can be found in CIBSE Guide A7. Clicking on the column header will allow the column to be sorted numerically or reverse numerically.

### ***Occupant Density***

This value is used to calculate the number of people per room. Clicking on the column header will allow the column to be sorted numerically or reverse numerically.

### ***Maximum Power Consumption***

This is the default peak rate of energy (or fuel) consumption of the device being described. Most casual gains (such as lights and small machines) consume energy (or fuel) as well as emitting heat. Clicking on the column header will allow the column to be sorted numerically or reverse numerically.

### ***Radiant Fraction***

This represents the amount of sensible gain that is released as radiant heat (the remainder is assumed to be convective). Typical values are listed in CIBSE Guide A7. Clicking on the column header will allow the column to be sorted numerically or reverse numerically.

### ***Fuel***

Where the default casual gain being defined has an associated power, or fuel consumption, this item defines the type of fuel that it uses. For example, lights would normally use electricity, but cooking might use gas or electricity. There are a number of choices. The fuel carbon emission factor can be viewed within the Apache View.

### ***Variation Profile***

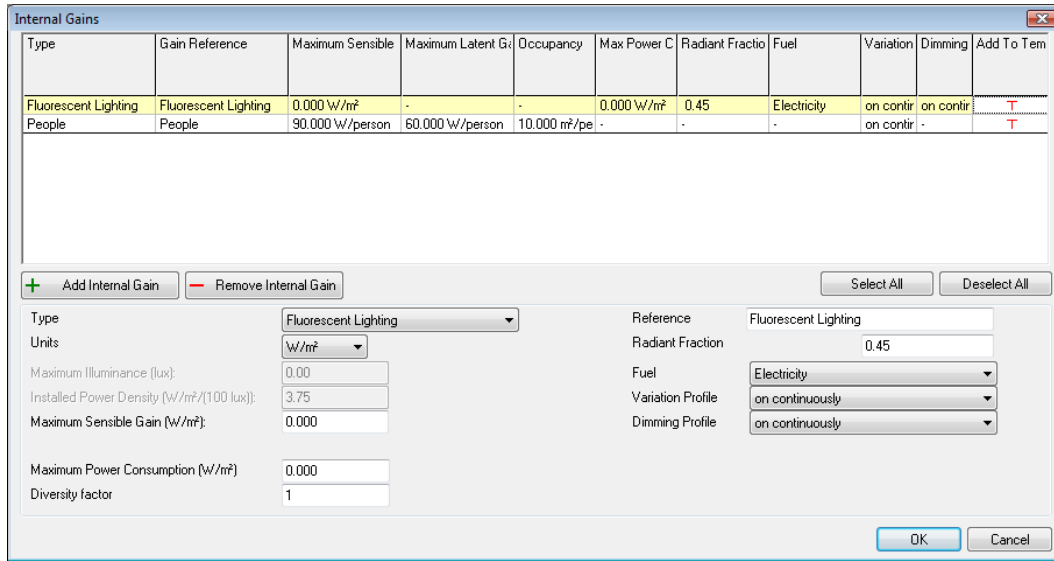
This contains a control to set the modulating profile group reference that describes the variation of the heat gain throughout the year.

### ***Dimming Profile***

This contains a control to set the modulating profile group reference that describes the dimming operation of the lighting gain throughout the year.

### 3.4.4.2 Adding an Internal Gain

To add a casual gain click the Add/Edit button and the following window will appear:



Type	Gain Reference	Maximum Sensible	Maximum Latent G	Occupancy	Max Power C	Radiant Fractio	Fuel	Variation	Dimming	Add To Tem
Fluorescent Lighting	Fluorescent Lighting	0.000 W/m <sup>2</sup>	-	-	0.000 W/m <sup>2</sup>	0.45	Electricity	on contri	on contri	T
People	People	90.000 W/person	60.000 W/person	10.000 m <sup>2</sup> /pe	-	-	-	on contri	-	T

+ Add Internal Gain
- Remove Internal Gain
Select All
Deselect All

Type:

Units:

Maximum Illuminance (lux):

Installed Power Density (W/m<sup>2</sup>/(100 lux)):

Maximum Sensible Gain (W/m<sup>2</sup>):

Maximum Power Consumption (W/m<sup>2</sup>):

Diversity factor:

Reference:

Radiant Fraction:

Fuel:

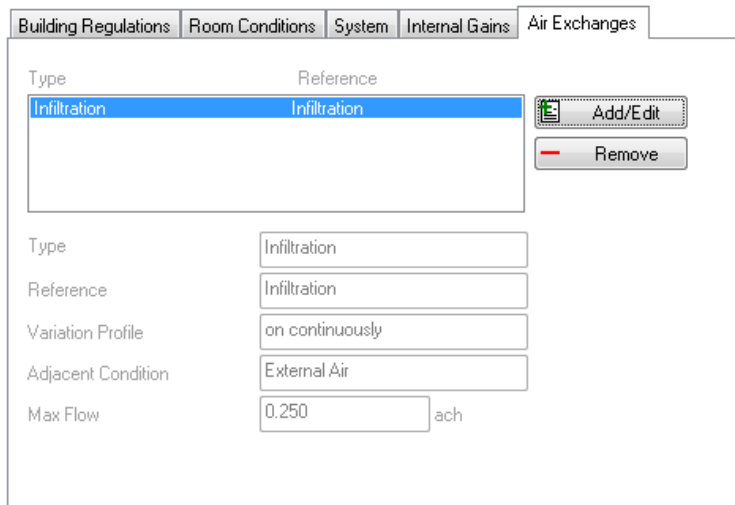
Variation Profile:

Dimming Profile:

This window lists all the casual gain types that have been created for a project. To add a casual gain to a template, for that gain click on the cell in the column Add To Template. A green tick will appear and click OK. The window will close and the casual gain will appear in the Casual Gains tab list. More than one gain can be added at a time by selecting the appropriate cells to display a green tick. The Select All and Deselect All buttons can be used to make this process easier.

### 3.4.5 Air Exchanges

This tab is used for entering default room air exchange settings (infiltration, natural ventilation and mechanical ventilation).



Type	Reference
Infiltration	Infiltration

Buttons: Add/Edit, Remove

Form fields:

- Type: Infiltration
- Reference: Infiltration
- Variation Profile: on continuously
- Adjacent Condition: External Air
- Max Flow: 0.250 ach

#### 3.4.5.1 Air Exchange Parameters

##### **Type**

There are three types of air exchange available for selection:

- Infiltration
- Natural Ventilation
- Auxiliary Ventilation

Clicking on the column header will allow the column to be sorted alphabetically or reverse alphabetically.

##### **Exchange Reference**

The reference name which the user can enter for an air exchange. Clicking on the column header will allow the column to be sorted alphabetically or reverse alphabetically.

##### **Variation Profile**

This contains a control to set the modulating profile group reference that describes the variation of the selected air exchange type throughout the year.

##### **A/C Rate Units**

The units of an air exchange can be selected by the user from the drop down list.

##### **Maximum A/C Rate**

This value is the maximum number of air changes for a given profile group, i.e. the air-change rate assumed at those times when the defined profile has a value of 100%, or when there are no profiles used (as in Apache Heat Loss calculations).



**Adjacent Condition**

This sets the default adjacency condition for the current air exchange type. The condition may be set to either:

- External Air – air at outside temperature.
- External Air + Offset Temperature – air at outside temperature plus a temperature offset.
- Temperature From Profile – a fixed temperature defined by a temperature profile.

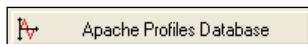
**Temperature Offset**

This sets the offset temperature to be used in conjunction with the outside air temperature for the associated adjacent condition. This setting is only displayed if the adjacent condition is set to External Air + Offset Temperature.

**Temperature Profile**

This contains a control to set the absolute temperature profile group for the associated adjacent condition. This setting is only displayed if the adjacent condition is set to Temperature From Profile. A pull-down menu enables the required absolute profile for the ventilation air temperature to be selected.

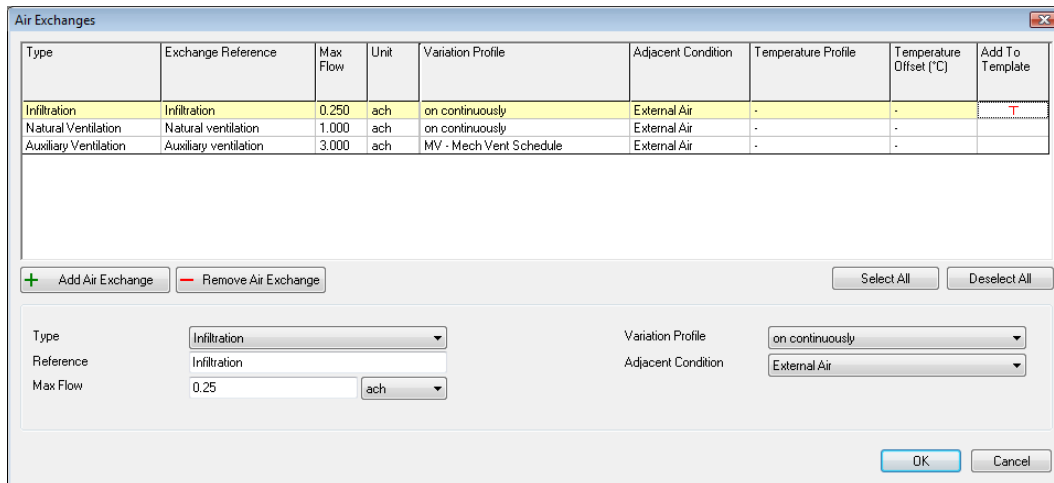
**Apache Profiles Database**



Pressing this button opens APro allowing for creation/removal/editing of project profiles. See the APro User Guide.

**3.4.5.2 Adding an Air Exchange**

To add an air exchange click the Add/Edit button and the following window will appear:



To add an air exchange to a template, for that air exchange click on the cell in the column Add To Template. A green tick will appear and click OK. The window will close and the air exchange will appear in the Air Exchanges tab list. More than one air exchange can be added at a time by selecting the appropriate cells to display a green tick. The Select All and Deselect All buttons can be used to make this process easier.

## 3.5 Electric Lighting

This section allows electric lighting data to be assigned to templates used by programs within the <VE> Lighting section: LightPro, FlucsPro and IES-Radiance.

### 3.5.1 Lighting General

Lighting General	Lighting Luminaires
Illuminance Level (lux)	500.00
Limiting Glare Index	19
Working Surface Height (m)	0.85
Mounting Height (m)	2.70
Luminaire Maintenance Factor (LMF)	0.90
Room Surface Maintenance Factor (RSMF)	0.90
Lamp-Lumen Maintenance Factor (LLMF)	
<input checked="" type="checkbox"/> Obtain LLMF from curve using replacement period	
Replacement Period	5000.00
Lamp Survival Factor (LSF)	
<input checked="" type="checkbox"/> Obtain LSF from curve using replacement period	
Replacement Period	5000.00

#### 3.5.1.1 Illuminance Level

This is the standard maintained illuminance to be provided on the working plane. Units are in lux. Recommended illuminance levels are included in Part 2 of the CIBSE Interior Lighting Code.

#### 3.5.1.2 Limiting Glare Index

If you enter a value for the limiting glare index then the program will perform a glare check, provided that glare data exists for the luminaire. Recommended values for limiting glare index may be found in the CIBSE Interior Lighting Code.

#### 3.5.1.3 Working Surface Height

The working surface height is the level of the illuminated plane.

#### 3.5.1.4 Mounting Height

This is the vertical distance between a luminaire and the working plane.

#### 3.5.1.5 Luminaire Maintenance Factor (LMF)

The lumen output from a luminaire decreases with time because of dirt deposition on and in the luminaire. The luminaire maintenance factor quantifies this decline, being a proportion of the initial light output from the luminaire that occurs after a set time, allowance having been made for the decline in light output from the lamp.

### **3.5.1.6 Room Surface Maintenance Factor (RSMF)**

The room surface maintenance factor is the proportion of the illuminance provided by the lighting installation in a room, after a set time, compared with that which occurred when the room was clean. Allowance is made for the depreciation in lumen output of lamps and the effect of dirt deposition on the luminaires.

### **3.5.1.7 Lamp-Lumen Maintenance Factor (LLMF)**

This category is used to assess the depreciation in light output from the lamp over a given time. This has a two-fold functionality. Either the LLMF can be obtained from the curve using the replacement period which can be defined or by entering the LLMF itself as a value no greater than 1 by unticking the box in this section.

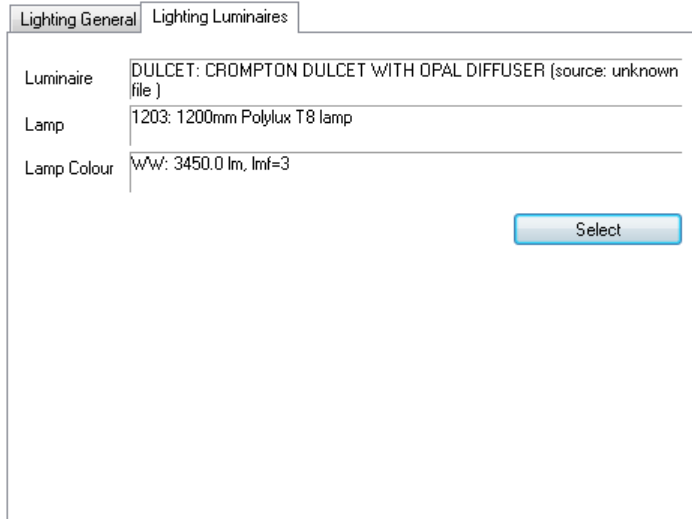
### **3.5.1.8 Lamp Survival Factor (LSF)**

This category is used to assess the proportion of lamps that have not failed after a set time. This has a two-fold functionality. Either the LSF can be obtained from the curve using the replacement period which can be defined or by entering the LSF itself as a value no greater than 1 by unticking the box in this section.

Lamp-survival factors may be obtained from manufacturers' data. Typical lamp survival factors are shown in the CIBSE Code for Interior Lighting.

### 3.5.2 Lighting Luminaires

This contains controls for setting luminaire, lamp and lamp colour combinations. The Select button opens the Light Fitting dialogue box. The user can only select data which is held in the system database or has from a custom database which has had its path already defined within the lighting program which will be used. See the Lighting user guides for more information.



The Light Fitting dialogue box contains three list boxes for the selection of luminaires, lamps and lamp colours:

- Luminaire - used to select the required luminaire.
- Lamp - used to select the required lamp.
- Lamp Colour - used to select the required lamp colour.

The lists are linked so that only valid lamps are listed for the currently selected luminaire and similarly only valid lamp colours are listed for the selected lamp. After modifying the light fitting settings, click on Save to update the settings or Cancel to keep the current settings.

## 3.6 Radiance Surface Properties

This section is where the Radiance surface properties are assigned to templates.

### 3.6.1 Opaque

Opaque	
Roof	Roof
Ceiling	Floor/Ceiling
External Wall	External Wall
Internal Partition	Internal Partition
Ground Floor	Ground
Door	Door

This section contains drop down menus for the following which are used to select the desired surface:

- Roof
- Ceiling
- External Wall
- Internal Partition
- Ground Floor
- Door

### 3.6.2 Glazed

Glazed	
Rooflight	External Glazing
External Glazing	External Glazing
Internal Glazing	Internal Glazing

This section contains drop down menus for the following which are used to select the desired surface:

- Rooflight
- External Glazing
- Internal Glazing