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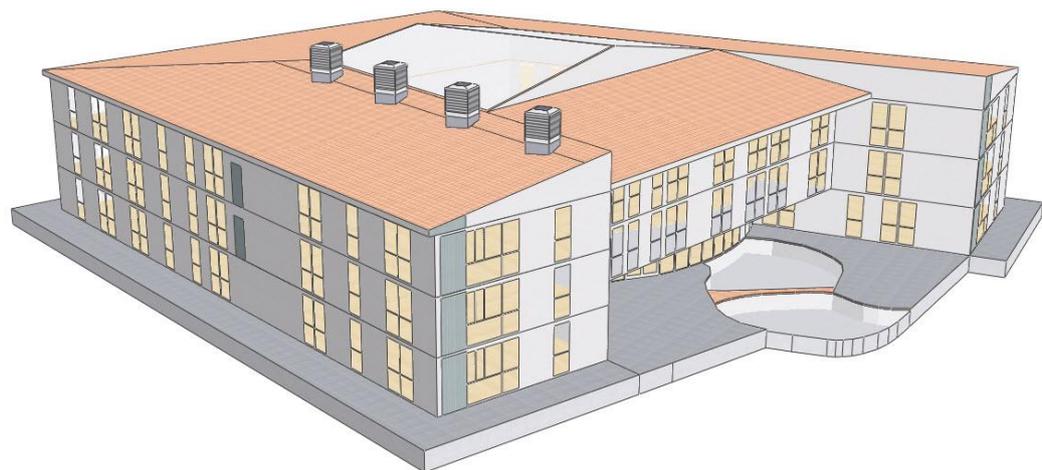
# Performance Components

## VE 2012 User Guide

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Integrated Environmental Solutions Limited  
Developers of the IES **Virtual Environment**

**June 2012**



GLASGOW, SCOTLAND | DUBLIN, IRELAND | BOSTON, MA  
VANCOUVER, CANADA | PUNE, INDIA | MELBOURNE, AUSTRALIA



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# 1 - Introduction

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## 1 - Introduction

Performance components help architects and consultants deliver low maintenance, energy efficient designs within the built environment. Pre-built manufacturer assemblies, such as 'Monodraught Windcatchers', can be imported to the Virtual Environment, providing a mix of geometry and thermal data as per manufacturer specification. Components fall into three distinct categories:

- Object
- Space
- Panel

**Object Components** are components that can be placed within rooms. Traditionally these have been used for visualisation purposes within applications such as Radiance and also as CFD heat sources for use in MicroFlo.

**Space Components** are components that when placed and finalised, become part of the actual building model; Windcatchers being the prime example of this. The user places the Windcatcher component accordingly and chooses the option 'Finalize'. It's at this point that the component geometry is merged/formed into the building model. This pre-built Windcatcher has been assembled in accordance with manufacturer specification and can now be simulated without further user intervention. Essentially, this drag and drop feature allows the user to quickly model items, such as Windcatchers efficiently and accurately.

**Panel Components (not available until late 2012)** are components that can be placed on a surface. An example would be a PV panel. As with space components, these can be built as per manufacturer or user specification and then placed onto a selected surface in a similar manner to that of the window placement tool already available in the VE.

# 2 Importing components from library

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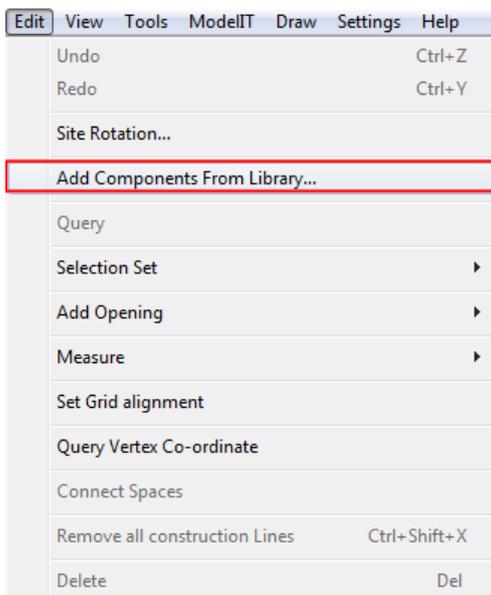
## 2 - Importing components from library

The Virtual Environment contains many pre-built components including Monodraught’s Windcatcher range. These components are readily available to be used within any given project, the user is simply required to select and import into their project.

### 2.1 – Accessing the ‘Add Components from Library’ dialog

There are several routes available to the user to import pre-built performance components.

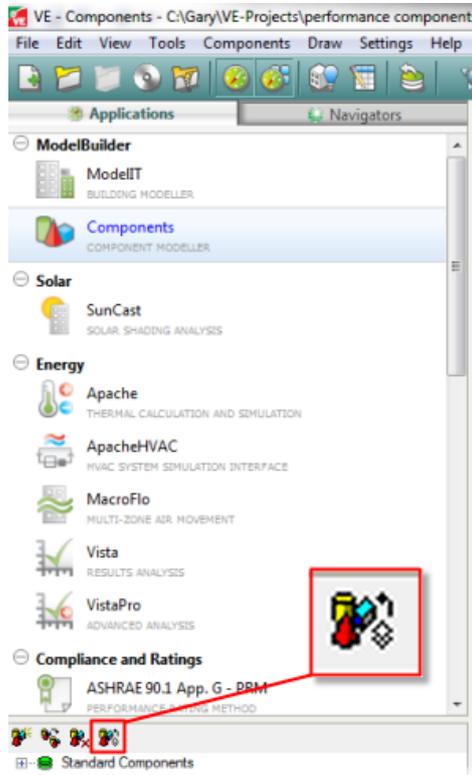
#### 2.1.1 – Main VE Toolbar and Menu



Both these options behave identically and invoke the “Add Components from Library” dialog.

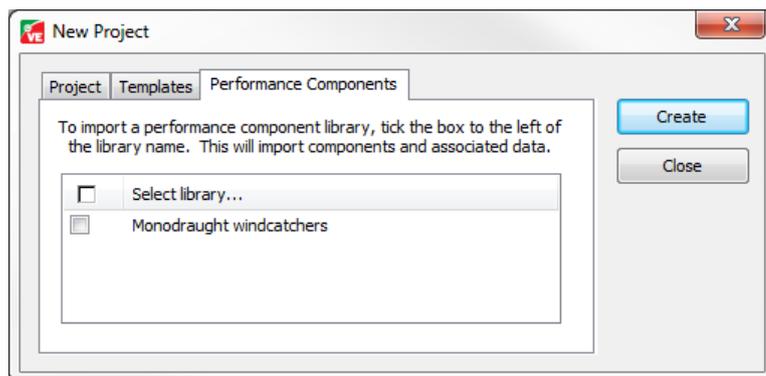
# 2 Importing components from library

## 2.1.2 – Component Modeller



This option also opens “Add Components from Library” dialog.

## 2.1.3 – Creation of a new project (File Menu: New)

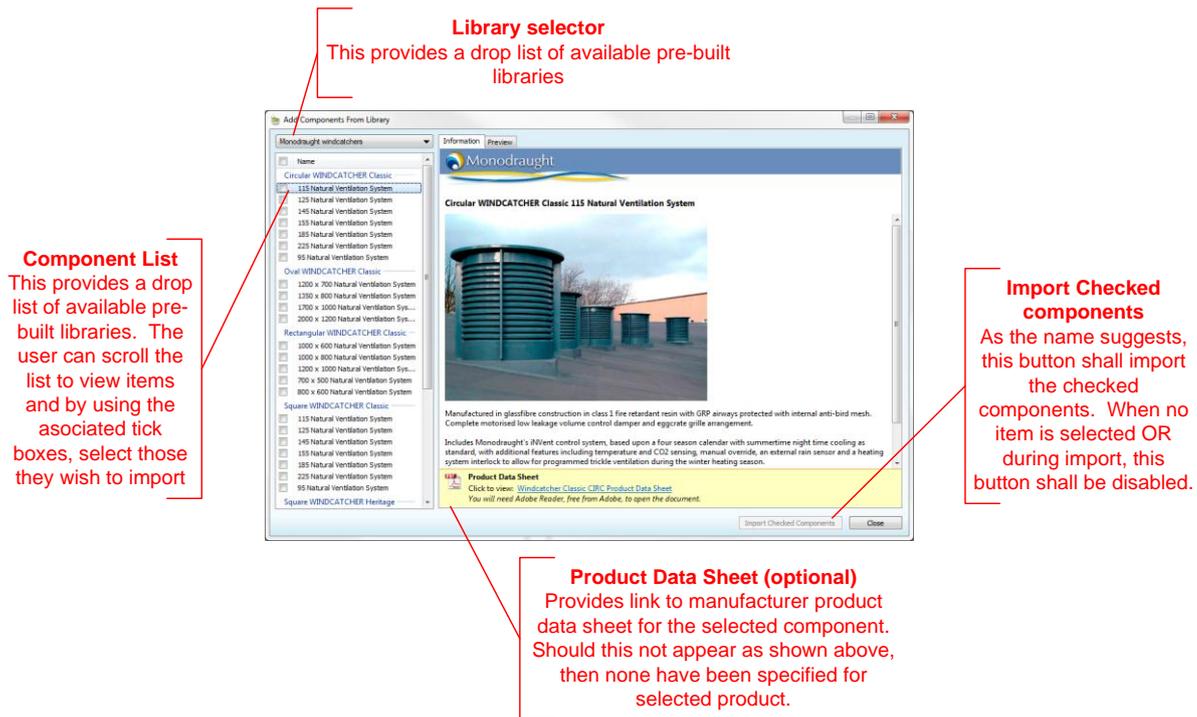


Note: this option differs from those above as this does not give the user the option of being selective (unlike the options above). Instead, this option imports the entire selected library.

# 2 Importing components from library

## 2.2 – Add components from library

The “Add components from library” enables the user to import pre-built components from one or more libraries.



The preview tab provides an option to view the component in 3D wire frame mode.

*Note: Importing a performance component from will also import associated data such as constructions, schedules/profiles, templates, systems etc.*

## 2.3 – Placing components in the model

Once the user has added components to their library, either by importing (as shown above), or by manually creating them, these can then be added to the building model.

There are two buttons on the main toolbar used for component operations, both highlighted below.



## 2 Importing components from library

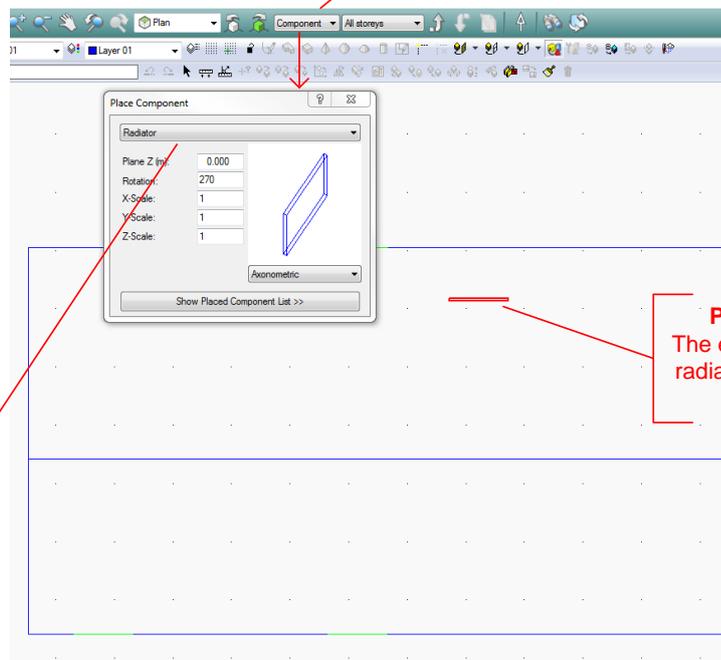
Left to right...

- **Place component** – available when the user has selected component to place (detailed below)
- **Finalize component** – available when the user has selected a place component. This option forms properly bound spaces from the component and should only be used for “Space Components”. In other words, for a component that is to become part of the building model geometry. An example of this would be Monodraught Windcatchers.

### 2.3.1 – Placing Object Components

Object components are the traditional VE method for component placement. The user should firstly move into body level of decomposition and then select the component display level.

**Component Display Level**  
User must select component display level. Once selected the 'Place Component' window shall appear



**Place Component**  
The user can choose the desired component and simply drag and drop into the selected room. Any scaling, rotation etc. can be applied using the controls provided prior to placing.

**Placed object**  
The example shows a radiator placed within the room.

## 2 Importing components from library

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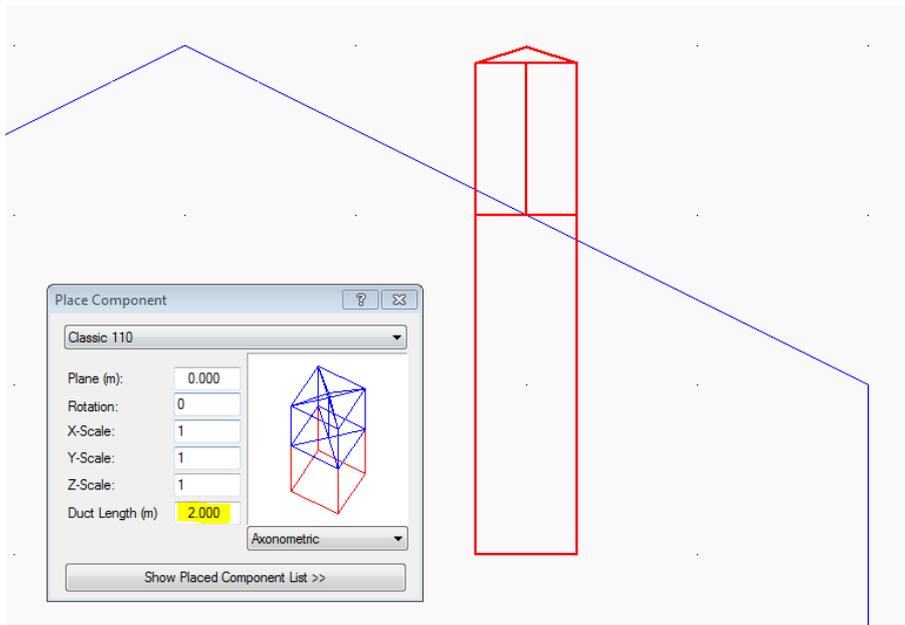
### 2.3.2 – Placing Space Component: Windcatcher

The initial placement of Windcatchers is very similar to that detailed above but do have some crucial differences.

The Windcatcher is essentially formed into two parts.

- The Windcatcher itself
- The Duct (s)

The Windcatcher part should be placed outside the room, whilst it is the duct we wish to penetrate the space and thus, placed within.



Windcatcher components may have variable length ducts; the 'Duct Length' field highlighted above allows the user to vary duct lengths at time of placement.

**Note:** the small component Viewport is now drawn with a white background and the default view is Axonometric – the 'Duct' is drawn in red.

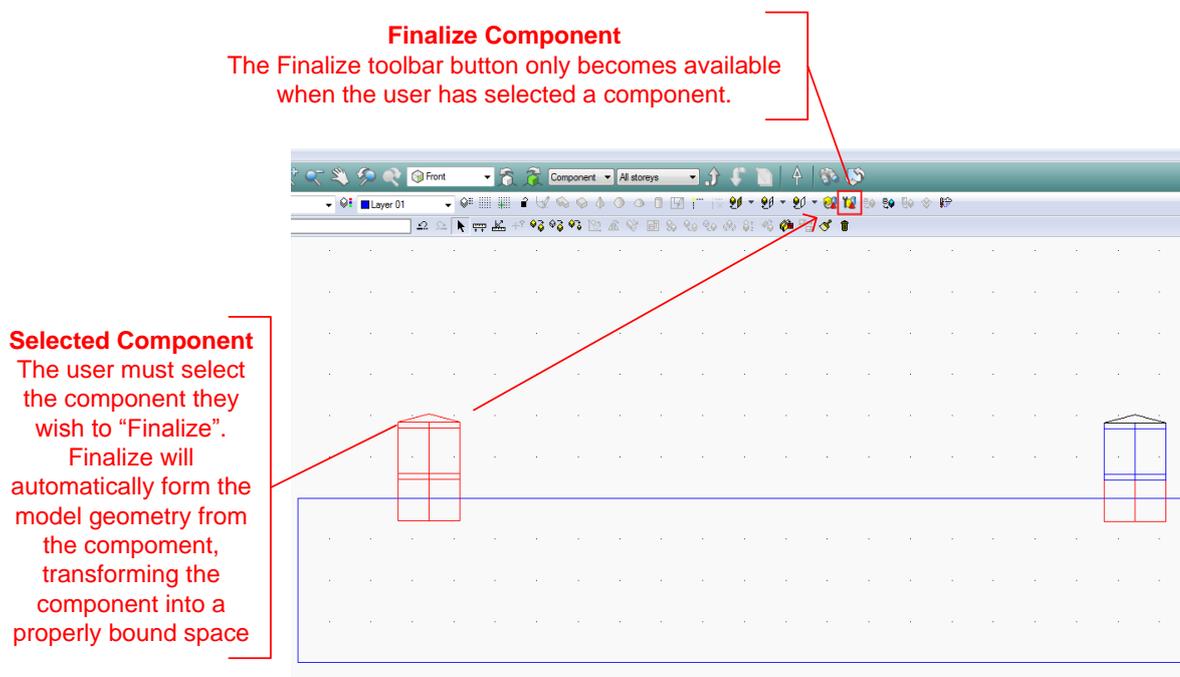
## 2 Importing components from library

If the VE detects that the Windcatcher is not placed correctly, then the user shall be presented with a suitable warning. Typical causes may be that the Windcatcher part is placed within the room (should be fully outside), or the component is not fully over the room. In this scenario, adjusting the 'Plane' accordingly would solve this. However, perhaps the easiest solution would be to use the move operations from within the main toolbar.

**Tip:** Before choosing "Finalize component" (detailed below) ensure that the component is placed correctly. Once finalized, this component automatically becomes part of the model geometry.

### 2.2.3 – Finalizing Space Component: Windcatcher

When the user chooses to finalize the component, the process takes the component and automatically generates the model geometry, cutting the duct through the penetrating space etc. Before performing this action, the user should take care to ensure that they have placed the component in the correct position before continuing.

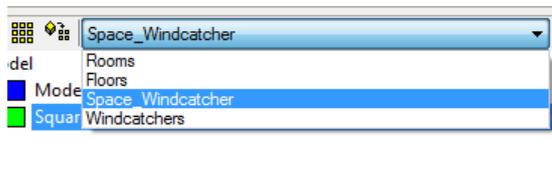


## 2 Importing components from library

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Once finalized, the component is transformed into a group of bounded building model rooms. The rooms that are formed via the 'Finalize' stage contain all thermal data as provided by the manufacturer. MacroFlo openings, control strategy, constructions etc. are all now exposed as part of this process.

### 2.3.4 – Finalize Space Component: Dynamic Room Group Creation



Following the step above, room grouping schemes and associated room groups will automatically be generated as follows:

- 1) A room grouping scheme containing ALL components of given category and type. For example, Windcatchers are defined as having a category “Space” and type “Windcatcher”. In this case the scheme would be name “Space\_Windcatcher”. This scheme would then contain a separate room group for each different type.

*Note: Should the user place and finalize n copies of a particular component, then all rooms of these copies shall be placed within this single room group. This is repeated for each subsequent type.*

- 2) A room grouping scheme containing individual room groups for each component type. For example, type = Windcatcher (as shown above) we therefore, have a room grouping scheme name “Windcatchers”, however unlike item 1 above, this contains room groups for each individual finalized component.

The dynamic grouping detailed above provides mechanism for the user to more easily manage their building models and identify rooms within individual or groups of finalized components.

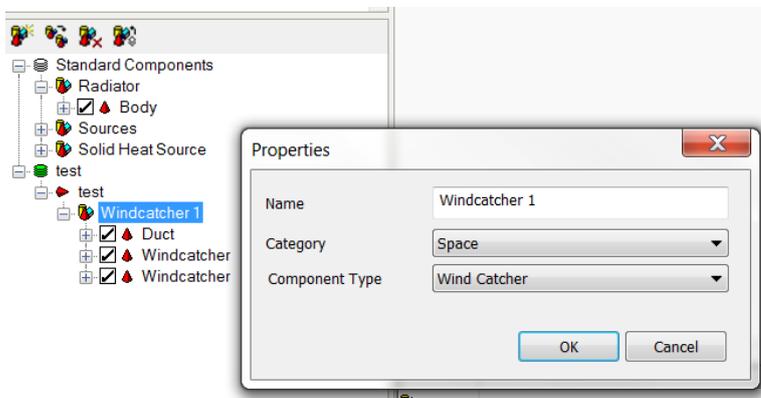
# 3 Manually Defining a Component

## 3 – Manually Defining a Component

The user can manually create components using the component modeller application. The traditional ModelIT drawing tools, also available in component modeller, can be used to create the component geometry.

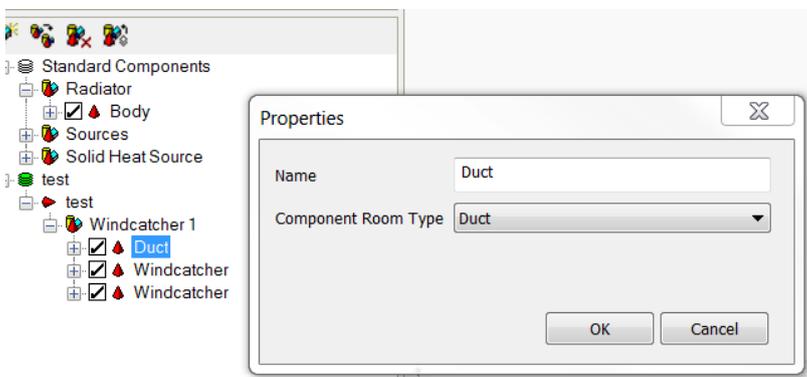
### 3.1 – Defining a Windcatcher

In component library, right click the component and choose “properties”. The category should be set to ‘Space’ and the Component Type should be set to ‘Wind Catcher’.



### 3.2 – Defining Ducts

Select the room of the component; right click and select properties. Set the component room type to be ‘Duct’.



**Note:** Windcatchers **must have defined “duct” zones** as it is these zones that are “trimmed”. For now, we assume that Windcatchers should contain 4 duct zones (this can also be 4 connected duct zones i.e. 1 duct zones containing 4 constituent duct zones).

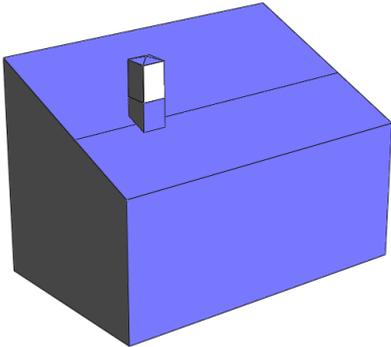
# 4 FAQ

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## 4 – FAQ

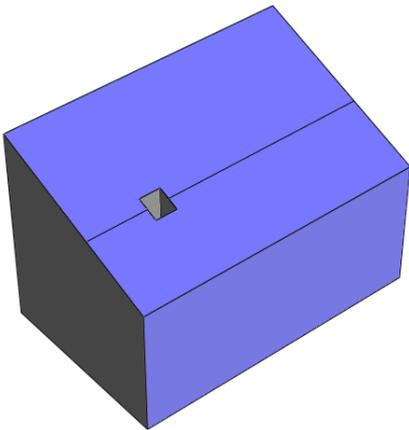
### 4.1 – How do I remove a Windcatcher after it has been finalized?

#### Zone with Windcatcher

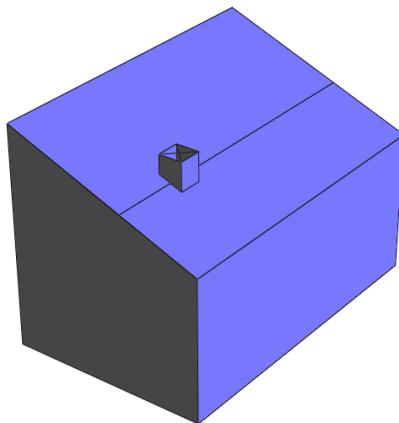


Once the Windcatcher has been added to the zone the geometry of the zone has changed, if this is wrong and the “undo” is not a feasible option, then the next best possibility is to use the “merge” option in the “Connect Spaces” dialog.

#### Zone without Windcatcher



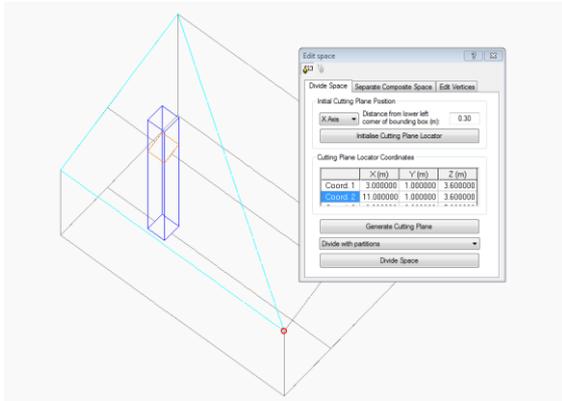
The geometry of the Windcatcher, other than the “Duct” zone, can be deleted.



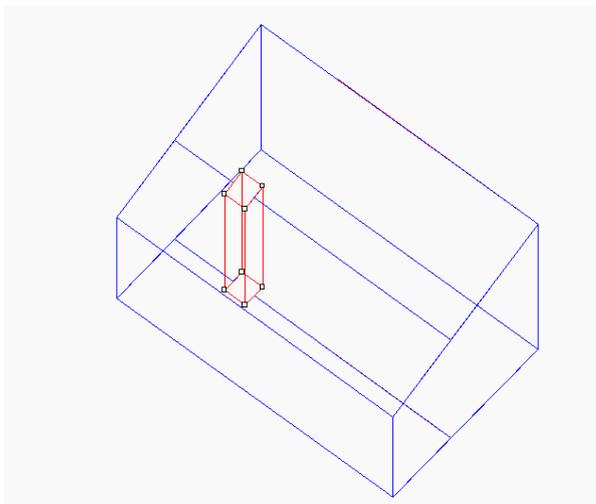
## 4 FAQ

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We now select the “**Duct**” zone and go into the “**Edit Space**” option, we have two possibilities; we can either edit the vertices down to the plane of the roof, or we can cut the zone by selecting cutting points on the roof.



We can now “**Divide Space**” and then “**Separate**” the two composite spaces and delete the part we don’t need to leave us with the trimmed zone.



If we now “**merge**” these two zones, we get back to the original zone.

### 4.2 – How do I define thermal data to a manually created component?

Currently, the user must define this data **after** the component has been finalized. The ability to define this data natively within components will be exposed in a future version.

*Note: performance components imported from pre-defined libraries, such as, Monodraught Windcatchers, come with all thermal data pre-defined.*