

User Guide

 **AUTODESK**
Authorised Developer

FenestraPro Premium for Revit Version 3.0

 **MICROSOL**RESOURCES



FenestraPro
Premium

Efficient Façade Design Software for Architects

Customer Testimonial

What our users say...

*"We constantly seek to integrate innovative and cutting-edge tools...As an Add-in for Revit, FenestraPro Premium offers **flexibility and quickness** to test different forms, and **provides detailed information** about thermal, solar and daylight performance that **helps us make informed decisions** about building orientation, solar shading, and amount, distribution and type of glazing. Getting guidance on these decisions **early in the design process** offers the ability to have **a greater positive impact on the design**, and **avoid cost implications** of design changes later on."*

**- Natalia Quintanilla, Sustainability Specialist and Architect
Adrian Smith + Gordon Gill Architects**

1.0 Introduction	4
1.2 Copyright	5
1.3 Disclaimer	5
1.4 Installation	5
1.5 Troubleshooting	5
1.6 Current Version	5
2.0 Input Work Area	6
2.1 Input Fields	6
2.2 Project Manager	6
2.3 Building Manager	8 - 9
2.4 Performance Manager	9 - 10
2.5 Façade Manager for Conceptual Mass	12
2.5.1 Building Tab	12
2.5.2 Façade Tabs	13
2.5.2.1 Glazing Specifications	13
2.5.2.2 Glazing Dimensions	14
2.5.2.3 Shading Specifications	14
2.5.2.4 Fritting Specifications	15
2.5.2.5 Surrounding Features	15
2.6 Façade Manager for Detailed Model	17 - 19
3.0 Output Work Area	20
3.1 Outputs Field	20
3.2 Glazing	21
3.3 Solar Loads	21
3.4 Daylighting	22
3.5 Reporting	22
4.0 Notifications/Help	23
5.0 Toolbar	24
5.1 Excel Snapshot	25
5.2 Configurations and Settings	26
5.2.1 Common Settings	26
5.2.2 Mass Conceptual Model	27
5.2.3 Detailed Model	27
6.0 Appendices	29
6.1 Massing on Revit	29
6.2 Using FenestraPro Premium on a Conceptual Mass	29 - 30
6.3 Definitions	31 - 33

User Guide

FenestraPro Premium for Revit Version 3.0

1.0 INTRODUCTION

1.1 Preface

FenestraPro Premium for Autodesk Revit is a design software that enables architects to design energy efficient building façades more cost effectively. It integrates building design with performance during design stage and strips away the complexities associated with existing analysis software. This allows the Architect to maintain control of the aesthetic design of the building, eliminating costly late stage redesign, improving the design process, and allowing architects to maintain control over the aesthetic design process.

1.2 Copyright

All content in this User Guide is Copyright 2016 FenestraPro. All Rights Reserved.

1.3 Disclaimer

The outputs generated are for information and design purposes only. The use of FenestraPro at an early stage in the design process does not negate the need for more detailed analysis later in the design process to consider multiple aspects of the building.

1.4 Installation

The latest version of FenestraPro Premium for Revit can be found at:

<http://www.fenestrapro.com/usersupport/>

1.5 Troubleshooting & Support

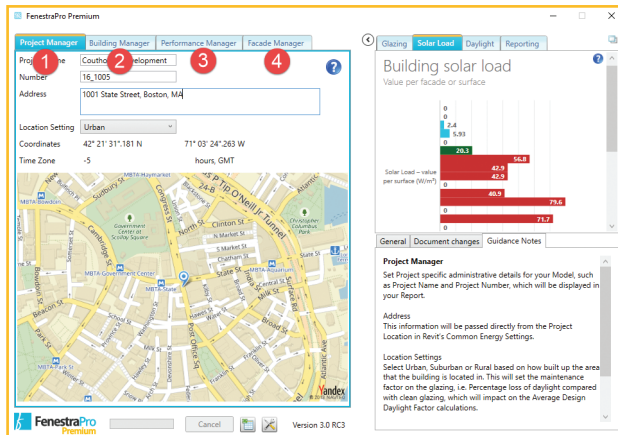
In order to continue to improve our software we ask that you send an Error Report if you experience any difficulties with FenestraPro. This can be accomplished through the options button at the bottom of the window. Log files may also be requested, which can be found at: **C:\Users\<NAME>\AppData\Local\FenestraPro**. Support can also be provided by contacting **support@fenestrapro.com**.

1.6 Current Version

FenestraPro for Revit Version 3.0 | User Guide last revised December 2016.

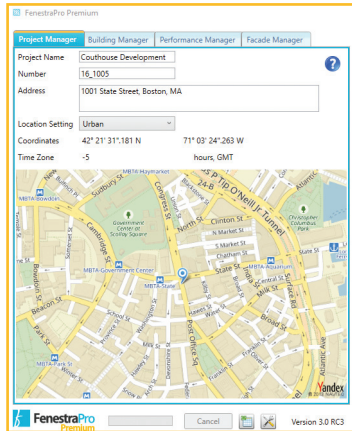
2.0 INPUT WORK AREA

2.1 Input Fields



- 1) **Project Manager** - Input administrative details on your project (name, address, etc.)
This information will be drawn from or write to the project information for the file.
- 2) **Building Manager** - Select detailed information about the building such as its purpose and the yearly, weekly, and hourly usage.
- 3) **Performance Manager** - Set Overall and Elemental U-values for the building (roof, floor, facade performance level, glazing, and wall).
- 4) **Façade Manager** - Set glazing specifications on a building, façade, and/or surface level.

2.2 Project Manager

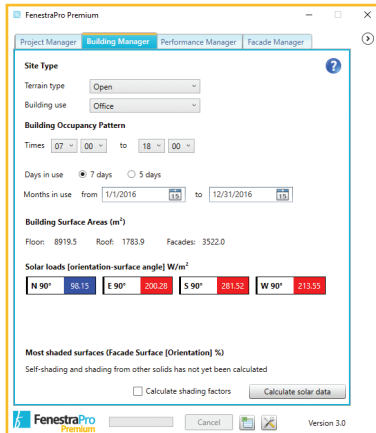


You can enter project name, number, and address here, or it will be populated from what is set in Revit at **Manage > Project Information**.

Location should be set in the **Manage > Project Location**, or via **Analyse > Energy Settings**. This information will be written to the Revit file (or if already populated in the used for documentation later on ([see 3.4 Reporting](#) and [5.1 Excel Snapshot](#)).

Choose the location setting of your building between urban, rural, or suburban. The latitudinal and longitudinal coordinates of your project will be displayed along with its time zone, which will be used to calculate site specific solar data.

2.3 Building Manager



Choose a **Terrain Type** and **Building Use** for your project. Terrain Type will affect ground reflected irradiation on each facade. User should pick the terrain that corresponds the most to the terrain in project. Building Use will affect Building Occupancy Pattern, i.e. when people will occupy your building on a daily, weekly, and monthly basis. Once this is established, click **Calculate Solar Data**. This will draw the geometric and geographical data from your model, and make a web services call to calculate the solar data for each orientation on a monthly and annual basis, and displayed under Solar Loads.

NOTE: Calculate Shading Factor can be unchecked for quicker performance, but this should only be used if you have a simple four sided building, and only on a for information basis.

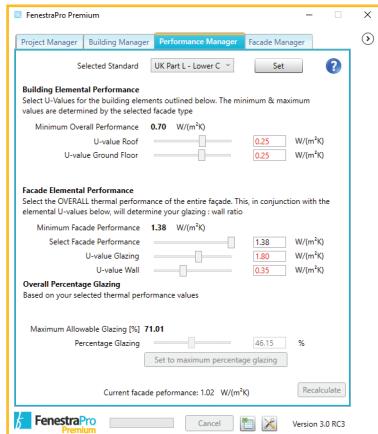
For updates on the progress of your calculations, watch the **General Notifications** ([4.0 Notifications/Help](#)).

TERRAIN TYPES
City
Depression
Open
Sea / Lake
South Incline
South Valley Side
Summit
Valley
West / East Incline
West / East Valley Side

BUILDING USE	TIMES		
Automotive Facility	10.00 - 22.00	Museum	00.00 - 23.00
Convention Centre	09.00 - 23.00	Office	07.00 - 18.00
Dining Bar Lounge	12.00 - 23.00	Parking Garage	09.00 - 23.00
Dining Cafeteria Fast Food	07.00 - 23.00	Penitentiary	00.00 - 23.00
Dining Family	07.00 - 23.00	Performing Arts Theatre	09.00 - 23.00
Dormitory	00.00 - 23.00	Police Station	00.00 - 23.00
Exercise Centre	08.00 - 21.00	Post Office	07.00 - 22.00
Fire Station	08.00 - 22.00	Religious Building	09.00 - 18.00
Gymnasium	08.00 - 22.00	Retail	10.00 - 22.00
Hospital or Healthcare	00.00 - 23.00	School or University	07.00 - 23.00
Hotel	00.00 - 23.00	Single Family	00.00 - 23.00
Library	09.00 - 21.00	Sports Arena	10.00 - 22.00
Manufacturing	08.00 - 18.00	Town Hall	08.00 - 22.00
Motel	00.00 - 23.00	Transportation	00.00 - 23.00
Motion Picture Theatre	10.00 - 23.00	Warehouse	08.00 - 18.00
Multi-Family	00.00 - 23.00	Workshop	08.00 - 18.00
		No Building Type	07.30 - 18.00

NOTE: These assumptions are based on ASHRAE 90.1-2010, ASHRAE 90.2-2010, ASHRAE 62.1, CBECS data, and other building surveys.

2.4 Performance Manager



You can resolve the Wall to Window Ratio (or Maximum Allowable Glazing) for your model based on the Thermal Performance of the building envelope. As you select the **Elemental Thermal Performances**, FenestraPro Premium will dynamically indicate the optimal Wall to Window Ratio.

Minimum Overall Performance remains constant as it is determined by the Form Factor, or a ratio between the Surface Area of the Envelope, and the Volume of the Building. Use the sliders below, or the numerical input fields, to select the **Thermal Performance** (U-values or R-values) of the Roof and Floor of the building. These values will drive the Minimum Façade Performance, or the overall performance of your Walls and Glazing.

Select the **Façade Performance** (the average thermal performance of walls and windows within the given range) and the Thermal Performance (U-values or R-values) of the glazing and walls.

Once all the above steps are taken, you will be given a Maximum Allowable Glazing Percentage. Select a percent glazing within this range or click **Set to Maximum Percentage Glazing** to automatically set the glazing on each façade to the maximum amount. If you are using a Conceptual Mass, this will be written to the model as notional glazing. Setting maximum percentage glazing is not supported for the detailed model. However, the glazing/curtain walling systems will be read from the detailed model and displayed.

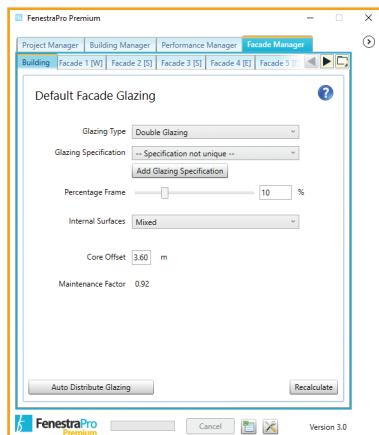
Whenever changes are made, be sure to click **Recalculate** in order to update the charts in the Results Area ([3.0 Outputs Field](#)).

Selected Standard

User can select appropriate building regulations, codes or standards, which will highlight compliance/non-compliance (in red) of elemental thermal performances, and effect on wall to window ratios. Click **Set** to automatically set different elements to required thermal performance of selected standard.

2.5 Façade Manager for Conceptual Mass

2.5.1 BUILDING TAB



Select Single, Double, or Triple Glazing under Glazing Type and select a **Glazing Specification**. Use the drag bar (or text box) to choose the percentage of frame. You can create and save your own Customised Glazing Specification by selecting **Add Glazing Specification**.

The Internal Surfaces drop down box allows you to choose between Light, Medium, or Dark Walls and Floors, which will affect Average Design Daylight Factor. Core Offset allows you to change the depth of the perimeter from the façade (i.e. the area that is directly exposed to solar load and natural daylight). A typical Core Offset is 6 metres (18 feet).

Select **Auto Distribute Glazing** to equalise the Solar Load throughout the all façades. This will redistribute the total glazing to each façade directly to the mass model.

NOTE: This will only equalise solar loads and apply appropriate glazing on enabled façades.

The settings given in this tab are applied to the entire building. If you wish to make changes to a specific façade or surface, you can do this through the Façade Tabs ([2.5.2 Façade Tabs](#)).

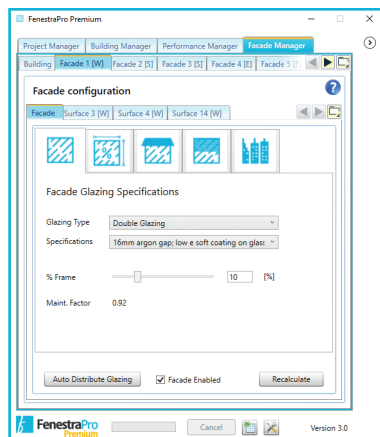
2.5.2 FAÇADE TABS

In the Façade Tabs you can manipulate each façade on an individual basis to achieve the required aesthetic and/or performance levels. Based on how you created your model you can also make selections based on individual surfaces of a façade in the Surface sub-tabs by picking the value of that façade on the chart. To customize your façade or surface names, right click on the desired tab and click **Rename**.

If you wish to lock a specific façade or surface into its current conditions, uncheck the **Façade Enabled** box at the bottom of the window. This prevents any action (e.g. Auto Distribute Glazing) from making any changes to the settings of that façade or surface. Ensure that you always click Recalculate after any modifications.

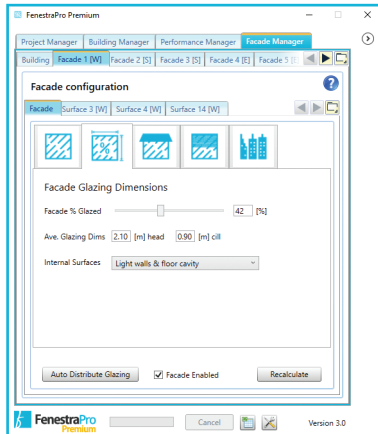
NOTE: Autodistribute can be performed to optimise glazing distribution across the surfaces of a selected façade.

2.5.2.1 Glazing Specifications



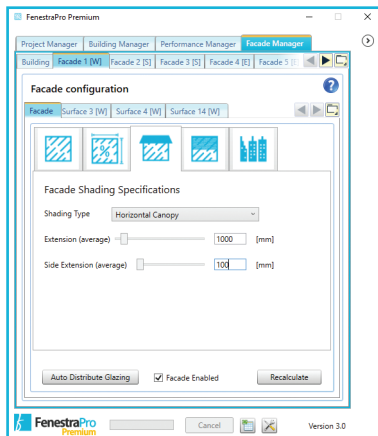
Set glazing type, specifications, and percent frame for an entire façade or a certain surface.

2.5.2.2 Glazing Dimensions



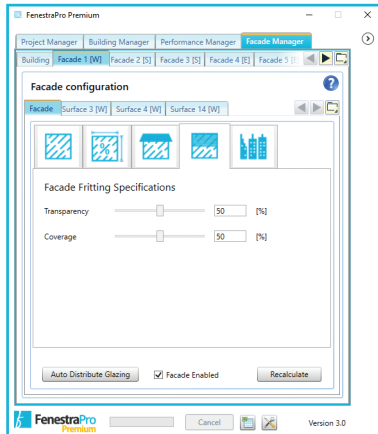
Enter façade/surface specific glazing percentages using the slider or numerical input, and dimensions for the head and cill of the glazing. If the internal surfaces are different than the default set in under the Building Tab (2.5.1 Building Tab) you can change it using the drop down box.

2.5.2.3 Shading Specifications



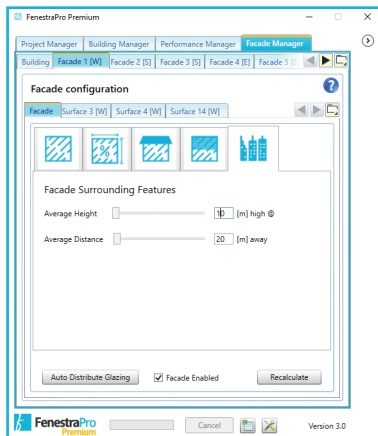
Add shading to a façade or surface and adjust its length and width using the slider or numerical input. Shading device will be automatically drawn to the conceptual mass, to the head of the notional glazing.

2.5.2.4 Fritting Specifications



Apply fritting to any façade or surface by choosing the percent coverage and transparency using the slider or numerical input.

2.5.2.5 Surrounding Features



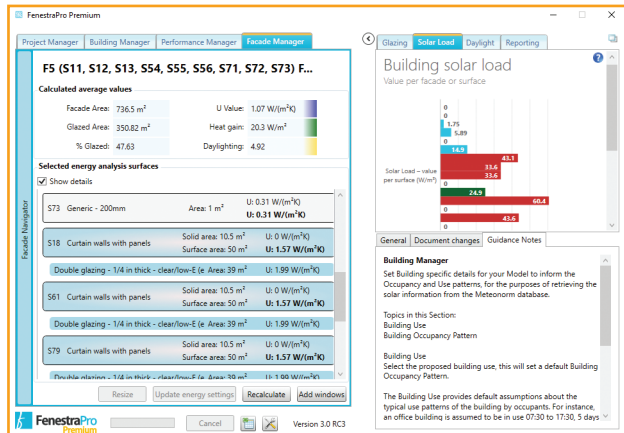
In order to account for the shade of surrounding objects, enter the average height and distance of any large object around your façade.

Build Better Buildings

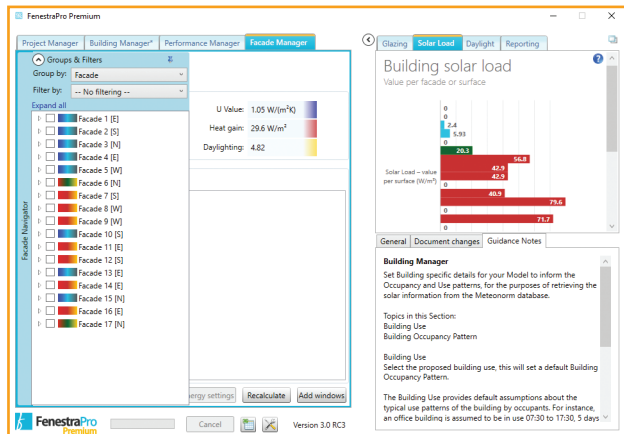
**Create Energy Efficient Buildings
That Enhance Green Building Design.**

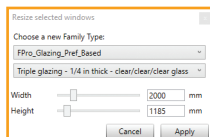
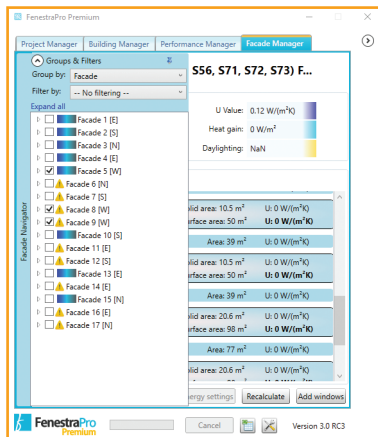
Optimise your building performance by looking at the specific solar, thermal and daylighting performance characteristics to create a more energy efficient façade.

2.6 Façade Manager for Detailed Model



Façade Manager is where users can explore and manipulate the performance and geometric properties of each façade and glazing element. Selection can be made through the Façade Navigator, by clicking on the **Outputs Field**, or by selecting a **Surface/Façade** on the Revit Model. Selection will populate Façade Manager with relevant family data based on user requirements. User can group and filter by: Façade/Orientation/Level/Heat Gain/Daylighting/Glazing Distribution. Selected Façades/Surfaces will highlight on the model. Calculated Values based on these selections will be displayed above accordingly.





Changing or Mapping Analytical Properties/ Energy Settings

Should you wish to change the energy performance characteristics assigned to an instance or family type, or no properties have yet been assigned ([Image to the left](#)), you can navigate to Edit Type and assign a glazing construction in the Analytical Construction ([Image on Page 19](#)) in Revit.

If not using analytical construction values in Revit Families you can use energy settings to:

- 1) Map the values required to other locations if Family Settings or;
- 2) Set your own solar transmittance, diffuse transmittance and thermal performance.

NOTE: For now these values will only be saved locally.

Type Properties

Family: System Panel Load...

Type: Glazed Duplicate... Rename...

Type Parameters

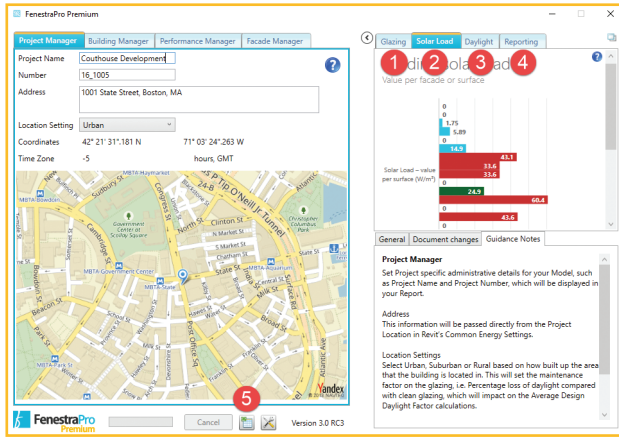
Parameter	Value
Constraints	
Offset	37.0
Construction	
Construction Type	
Materials and Finishes	
Finish	
Material	Glass
Dimensions	
Thickness	25.0
Analytical Properties	
Analytic Construction	None
Visual Light Transmittance	
Solar Heat Gain Coefficient	
Thermal Resistance (R)	
Heat Transfer Coefficient (U)	
Identity Data	
Keynote	
Model	
Manufacturer	
Type Comments	
Type Image	
URL	
Description	

<< Preview OK Cancel Apply

FenestraPro Glazing Families can be inserted and sized directly through FenestraPro, as can the Glazing Specification and associated performance characteristics by clicking **Add Windows**. Existing Instances of FenestraPro glazing Families can also be resized by selecting them in the Façade Manager and clicking **Resize**.

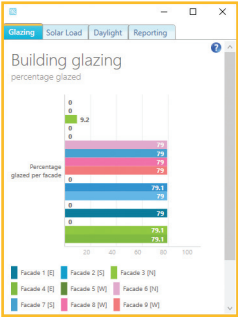
3.0 OUTPUT WORK AREA

3.1 Outputs Field



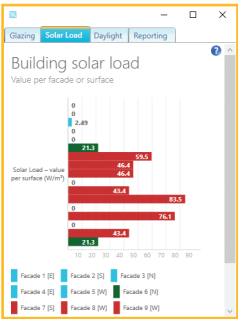
- 1) Glazing - Displays percentage glazing for each façade/surface.
- 2) Solar Load - Displays Solar Load on a specific façade/surface. Also capable of providing a month-by-month solar load breakdown.
- 3) Daylight - Displays percent daylight for each facade/surface.
- 4) Reporting - Generate a report on the current settings of the project.
- 5) Snapshots - Creates an Excel Spreadsheet, with new tab/option created for each Snapshot taken.

3.2 Glazing



This chart displays the percent glazing that is currently applied to a given façade or surface. Clicking on the bar of the desired façade on the Building Glazing graph will take you to a graph that breaks down the percent glazing on each surface of that façade. To navigate back to the Building Glazing graph, click the blue arrow in the top right corner.

3.3 Solar Loads

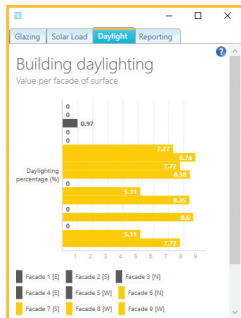


This chart provides information on the solar load in W/m^2 . You can navigate between façade and surface quantities along with a month-by-month breakdown in the same way as discussed in [3.1 Glazing](#).

In order to more easily achieve a comfortable amount of heat gain, bars will appear red when overheating will occur, blue when under-heating will occur, and green when an appropriate range is reached.

	METRIC W/M²	IMPERIAL BTU/FT² HR
Blue	< 15	< 4.75
Green	15 - 25	4.75 - 7.90
Red	> 25	> 7.90

3.4 Daylighting



The daylight tab displays the daylighting percentage of each façade/surface. Once again, navigate between building and façade specific information as explained in [3.1 Glazing](#).

3.5 Reporting

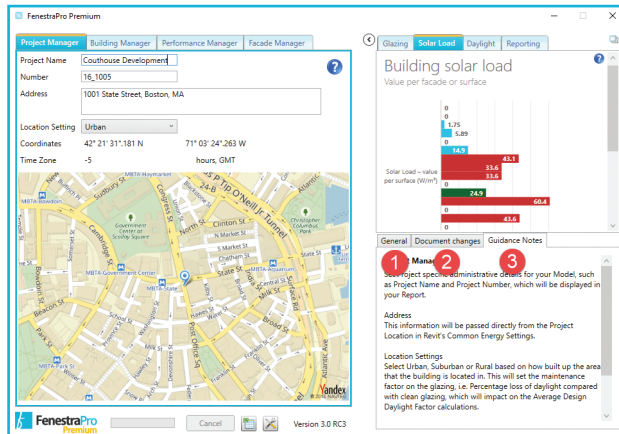
The screenshot shows the 'Reporting' tab in the FenestraPro software. The form contains the following fields:

- Building Info**
 - Building Name:
 - Project Description:
- Designer Info**
 - Report Author:
 - Company Name:
- Buttons**
 - Add Company Logo:
 - Create Report:

Based on all geometric, performance, and occupancy inputs and outputs in FenestraPro, a quantified report can be generated which gives all characteristics for each façade and surface including quantities, thermal, solar, and daylighting performance, shading depths etc.

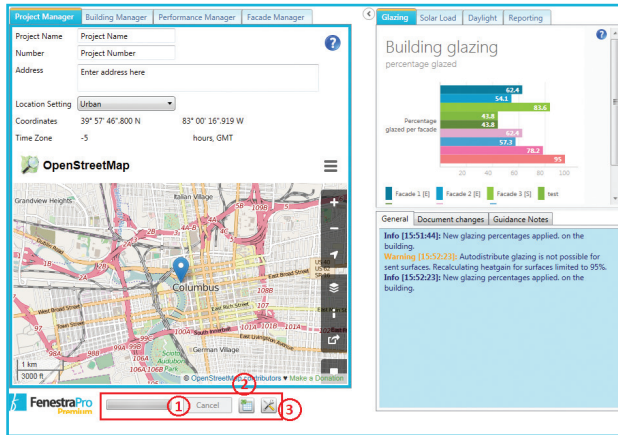
Once on the tab, you can input some further information such as the report author, company name, and logo. Select **Create Report** and then select the file location and name – a PDF will be generated.

4.0 NOTIFICATIONS/HELP



- 1) General - Contains information such as notifications on calculations and any errors that may occur.
- 2) Document Changes - Details any changes that have been made to your project.
- 3) Guidance Notes - Helpful tips on you current window, can be accessed by either clicking on the tab or the blue question mark in the top right corner of the display.

5.0 TOOLBAR

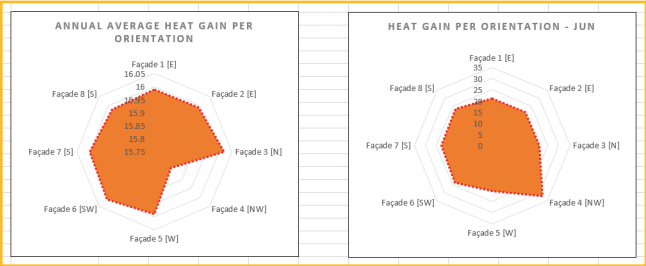


- 1) Calculations - While the green light on the progress bar is in motion, calculations are currently under way. To stop this, click the **Cancel** button.
- 2) Excel Snapshots - Download an excel document that details all current inputs and outputs in multiple charts/graphs ([see 5.1 Excel Snapshots](#)).
- 3) Configuration and Settings - User defined configuration options ([see 5.2 Configuration and Settings](#)).

5.1 Excel Snapshots

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVERAGE
Surface 6 [E]	17.5	26.1	30.1	35.2	37.5	39.4	39.1	38.6	33.6	24.4	18.1	13.5	29.4
Surface 15 [E]	17.5	26.1	30.1	35.2	37.5	39.4	39.1	38.6	33.6	24.4	18.1	13.5	29.4
Surface 29 [E]	17.5	26.1	30.1	35.2	37.5	39.4	39.1	38.6	33.6	24.4	18.1	13.5	29.4
Surface 35 [E]	21.1	35.4	36.2	42.4	45.1	47.4	47.1	46.5	40.4	29.3	21.6	16.3	35.6
Surface 7 [N]	11.3	14.5	17.5	21.2	24.1	26.4	25.7	21.6	18.1	12.6	9.9	8.3	17.6
Surface 16 [N]	11.3	14.5	17.5	21.2	24.1	26.4	25.7	21.6	18.1	12.6	9.9	8.3	17.6
Surface 30 [N]	11.3	14.5	17.5	21.2	24.1	26.4	25.7	21.6	18.1	12.6	9.9	8.3	17.6
Surface 31 [N]	11.2	14.5	17.4	21	24	26.3	25.5	21.5	18.1	12.5	9.9	8.3	17.5
Surface 10 [N]	9.1	11.8	14.2	17.2	19.6	21.5	20.9	17.6	14.7	10.2	8	6.7	14.3
Surface 11 [N]	9.1	11.8	14.2	17.2	19.6	21.5	20.9	17.6	14.7	10.2	8	6.7	14.3
Surface 20 [N]	9.1	11.8	14.2	17.2	19.6	21.5	20.9	17.6	14.7	10.2	8	6.7	14.3
Surface 19 [N]	9.1	11.8	14.2	17.2	19.6	21.5	20.9	17.6	14.7	10.2	8	6.7	14.3
Surface 34 [N]	9.1	11.8	14.2	17.2	19.6	21.5	20.9	17.6	14.7	10.2	8	6.7	14.3
Surface 18 [N]	11.3	14.5	17.5	21.2	24.1	26.4	25.7	21.6	18.1	12.6	9.9	8.3	17.6
Surface 8 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 17 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 32 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 12 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 21 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 38 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.4	23.6	18.6	37.2
Surface 37 [W]	24.3	31.2	37.8	42.2	47.9	46	52.5	48.8	41.4	31.3	23.5	18.6	37.1
Surface 9 [NW]	11.7	16.6	22.6	30.3	36.7	37.4	39.8	33.8	25.7	16.2	10.8	8.6	24.2
Surface 18 [NW]	11.7	16.6	22.6	30.3	36.7	37.4	39.8	33.8	25.7	16.2	10.8	8.6	24.2
Surface 33 [NW]	11.7	16.6	22.6	30.3	36.7	37.4	39.8	33.8	25.7	16.2	10.8	8.6	24.2
Surface 13 [S]	54.6	62	54.8	45	39.8	37.1	41.2	48.3	54.6	55.9	51.7	46	49.2
Surface 22 [S]	54.6	62	54.8	45	39.8	37.1	41.2	48.3	54.6	55.9	51.7	46	49.2
Surface 25 [S]	54.6	62	54.8	45	39.8	37.1	41.2	48.3	54.6	55.9	51.7	46	49.2
Surface 26 [SW]	44.4	50	50	46.3	47.2	43.5	51	52.7	51.7	47.5	41.5	36.6	46.9
Surface 27 [SE]	40.1	50.4	47.8	47.3	45.8	45.9	47	51.1	50.9	45.4	39	33.7	45.3
Surface 28 [NE]	15.5	16.6	22.5	30.2	36.5	37	36.8	32.2	25.2	15.5	10.6	8.3	23.8

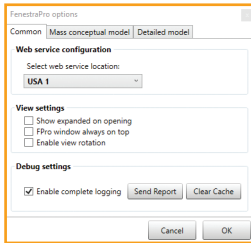
HEAT GAIN PER UNIT FLOOR AREA WITHIN THE PERIMETER ZONE PER SURFACE



This button creates an Excel file that organizes all input and output information including glazing percentage, heat gain, and daylighting for each surface. When clicked, a window will appear prompting you to enter a title and description. When finished, click **Save Snapshot** and the Excel file will be downloaded. Each time thereafter Snapshot is clicked, new option, and related tab is created.

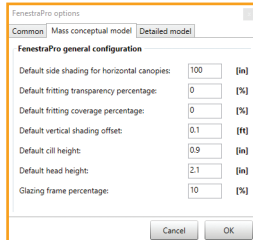
5.2 Configuration and Settings

5.2.1 COMMON SETTINGS



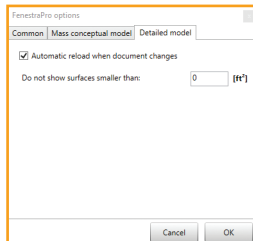
- 1) Select **Web Service Location** - Depending on your location, choose the most appropriate web service location to increase performance. It is recommended that USA 1 is selected for optimum use.
- 2) View **Settings** - Tick to set a number of view configurations including expanded Fenestra Pro interface, maintaining the FenestraPro interface on top, or enabling view rotation based on Façade Manager selections.
- 3) Debug Settings - Should you encounter issues, it can be helpful to send us a report or log file via the Send Report button. For large models Enable Complete Logging should be unticked, so as to not decrease the performance of FenestraPro during excessive logging. Clear Cache can be helpful, and may be requested by the FenestraPro Support Team to clear any cached solar data, which may be causing issues on further builds.

5.2.2 MASS CONCEPTUAL MODEL



Users can give default glazing configuration values for a number of settings outlined in the Façade Manager.

5.2.3 DETAILED MODEL



Automatic reload when document changes - On larger models performance can be improved by deselecting. This will disable the dynamic update to the Revit Energy Model, and improve performance.

Maintain Aesthetic Control

Bringing the Design Back to the Designer.

Giving design benefits to the user by allowing the design to have the max allowable glazing on each surface, eliminating the need for late stage redesign.

6.0 APPENDICES

6.1 Massing on Revit

Create a mass that is specific to the context of the current project. This mass cannot be reused in other projects. Click **Massing & Site** tab in the Conceptual Mass panel (In-Place Mass).

- 1) Enter a name for the in-place mass family, and click OK. The application window displays the conceptual design environment.
- 2) Create the desired shapes using the tools on the Draw panel. For more information, see the following topics: Forms / Profiles / Sketching
- 3) When you are finished, click **Finish Mass**.

6.2 Using FenestraPro Premium on a Conceptual Mass

Create a mass that is specific to the context of the current project. This mass cannot be reused in other projects. Click **Massing & Site** tab Conceptual Mass panel (In-Place Mass).

- 1) Enter a name for the in-place mass family and click OK. The application window displays the conceptual design environment.
- 2) Create the desired shapes using the tools on the draw panel.
- 3) When you are finished, click **Finish Mass**.

Massing & Site Ribbon

Ensure **Show Mass by View Settings** is set to **Show Mass Form and Floors** or **Show Mass Surface Types**. This adjusts your views so you can see the mass.

Mass Floors:

In the Modify Ribbon, select **Mass Floors**, and check the floors you wish to add to the building. Do not include the roof.

Analyze Ribbon

Ensure Conceptual Mass Mode is selected and Enable Energy Model.

Select **Energy Settings**.

Set **Building Type**.

It can be helpful to uncheck **Divide Perimeter Zones** and set **Target Percentage Glazing** to 0%. Hit **OK**.

Launch FenestraPro

First Select the FenestraPro icon, and then select the Mass Model.

6.3 Definitions

THERMAL

Thermal Performance of a Building - The measurement of energy transfer through the Building Envelope, between the internal environment of a building and external environment

Building Envelope - The physical separator between the internal environment of a building and external environment, including the resistance to air, water, heat, light, and noise transfer.

Roof - The element on the uppermost part of a building envelope, which provides resistance to air, water, heat, light, and noise transfer.

Floor - The element on the lowermost part of a building envelope, which provides resistance to air, water, heat, light, and noise transfer.

Façade - The vertical element of a building envelope, between the Floor and the Roof, which provides resistance to air, water, heat, light, and noise transfer. The façade will typically encompass Wall and Glazing.

Wall - The opaque components of the façade.

Glazing - The transparent/translucent components of the façade. This also denotes the framing and structure that supports these components.

U-value - Measurement of thermal transmittance, which relates to a building element, and is a measure of the rate at which heat passes through that element when unit temperature difference is maintained between the ambient air temperatures on each side. It is expressed in W/m^2K or $BTU/ft^2\ ^\circ F\ hr$.

R-value - Measurement of thermal resistance, which relates to a building element, and is a measure of the resistance to heat passing through that element when unit temperature difference is maintained between the ambient air temperatures on each side. It is expressed in m^2K/W or $ft^2 \text{ } ^\circ F \text{ hr}/BTU$.

Overall Heat Loss Method - Maximum acceptable level of transmission heat loss through the building envelope, in terms of the maximum average U-value of all elements contributing to heat loss.

Overall Performance - A benchmark overall thermal performance value for the envelope of entire building, to include walls, glazing, floor and roof.

Façade Performance - A benchmark overall thermal performance value for the façade alone, constituting opaque wall and glazed elements, and excluding the roof and the floor. Provides the option to improve the Overall Thermal Performance of the façade as Selected Façade Performance.

SOLAR

Solar Heat Gain - Solar heat gain is heat from the sun being collected and contained per unit floor area of a space. It is measured in W/m^2 or $BTU/ft^2 \text{ hr}$.

Solar Over Heating - Heat gain that exceeds a benchmarked level that will cause occupant discomfort/increased cooling loads.

Solar Transmittance - Property of glazing that controls the amount of solar heat gains into the space. It is typically represented as a coefficient.

Shading Factor - Value that represents the ratio between the area of glazing that is shaded, and that which is unshaded. It indicates the amount of solar heat gains that will be transferred through the glazing. Shading will typically be provided by a shading device or surrounding feature.

DAYLIGHTING

Average Design Daylight Factor - A ratio of the internal daylight level of a space to the external daylight level, per unit floor area of the perimeter zone. It is calculated at design stage, and is measured as a percentage.

Diffuse Transmittance - Coefficient of daylighting that can be transmitted through a glazing material, which include the effects of dirt (denoted by Maintenance Factor).

Maintenance Factor - Adjustment for % loss of daylighting through dirt on the glazing, compared to clean glazing in Rural/Suburban/Urban environments.

Reflectance - Area weighted average reflectance of internal surfaces (ceiling/floor/walls/windows) depending on their colour (light/medium/dark).

Surrounding Features - Buildings, structures or other obstructions that will reduce the angle of sky, and therefore the amount of daylighting internally.



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