

Carrier System Design Load



Carrier System Design Load User Guide

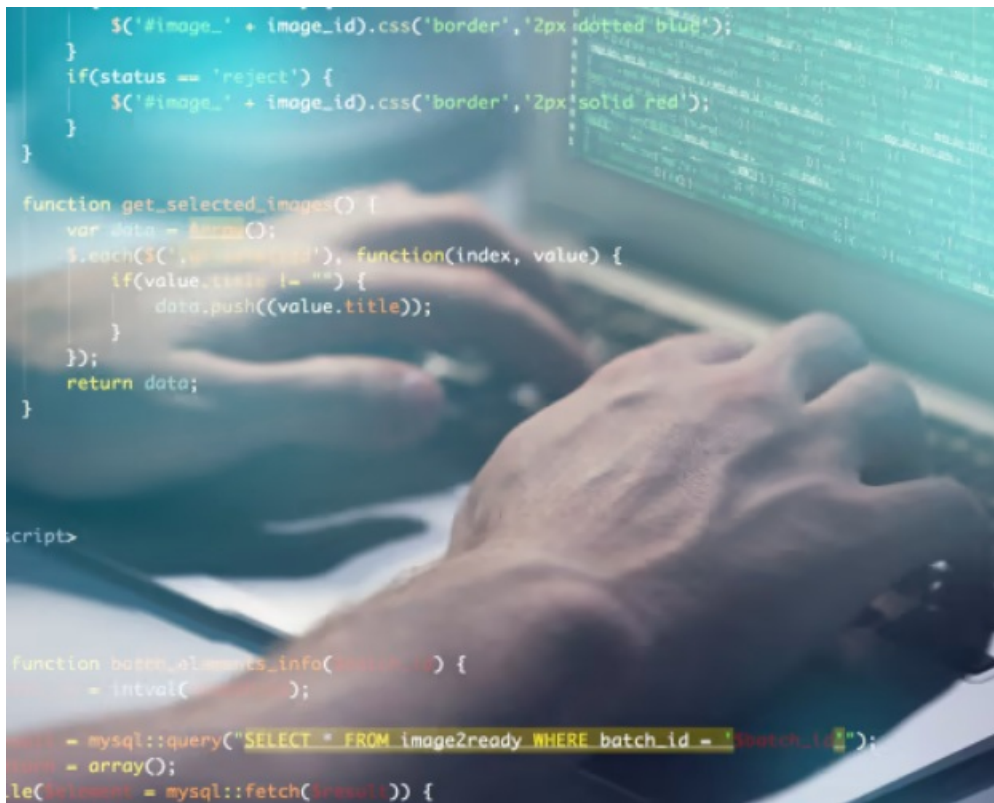
[Home](#) » [Carrier](#) » Carrier System Design Load User Guide 

Contents

- [1 Carrier System Design Load](#)
- [2 Product Usage Instructions](#)
- [3 Overview](#)
- [4 gbXML Import](#)
- [5 Calculation Engine Update](#)
- [6 Other Enhancements](#)
- [7 About Automatic Data Conversion](#)
- [8 FAQ](#)
- [9 Documents / Resources](#)
 - [9.1 References](#)



Carrier System Design Load



Specifications

- **Product:** System Design Load 6.20
- **Manufacturer:** Carrier Software Systems, Carrier Corporation
- **Location:** Syracuse, New York
- **Revision:** April 2024

Product Usage Instructions

gbXML Import

The gbXML Import feature allows integration between System Design Load (SDL) and CAD or Building Information Modeling (BIM) tools to create building models efficiently.

1. Export building plans from BIM or CAD tools in gbXML format.
2. In SDL, use the Import gbXML option in the Project Menu to load data from the gbXML file.
3. SDL imports 3D building geometry data from the file to create a new building model with complete geometry, levels, spaces, surfaces, and openings.
4. Review the model for any corrections or adjustments.

Calculation Engine Update

The calculation engine has been upgraded to Energy Plus version 23.2, resulting in improved calculation times for projects with multiple-space zones.

Calculation Time Reduction: Projects with multiple-space zones will experience decreased calculation times, with significant improvements for projects with many spaces per zone.

Overview

This New Features Guide summarizes enhancements in SDL v6.2 which include:

1. Building Modeling

- Added an “Import gbXML” option to facilitate integration between System Design Load and BIM or CAD tools.

2. Calculation Engine

- Updated the calculation engine to EnergyPlus version 23.2 which resolves certain calculation problems, updates calculations, and in some cases delivers a calculation speed increase.

3. Other Enhancements and Problem Fixes

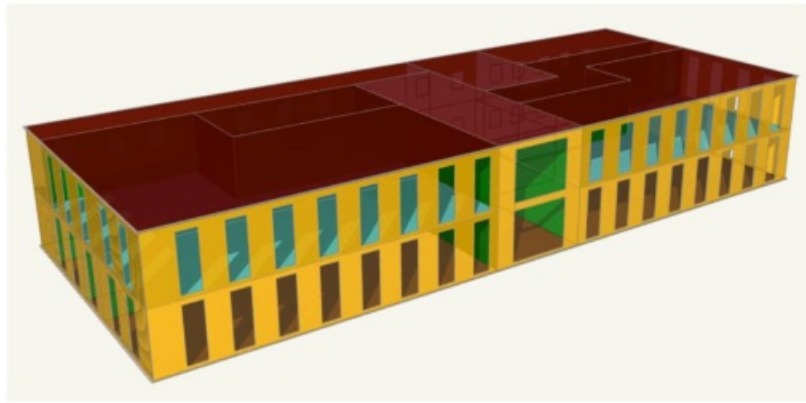
- Made other enhancements involving project data management, building modelling, space models, and documentation
- Corrected problems identified in System Design Load v6.1

The remainder of this Guide explains these enhancements in more detail. Additional information is found in the System Design Load help system in section 1.2

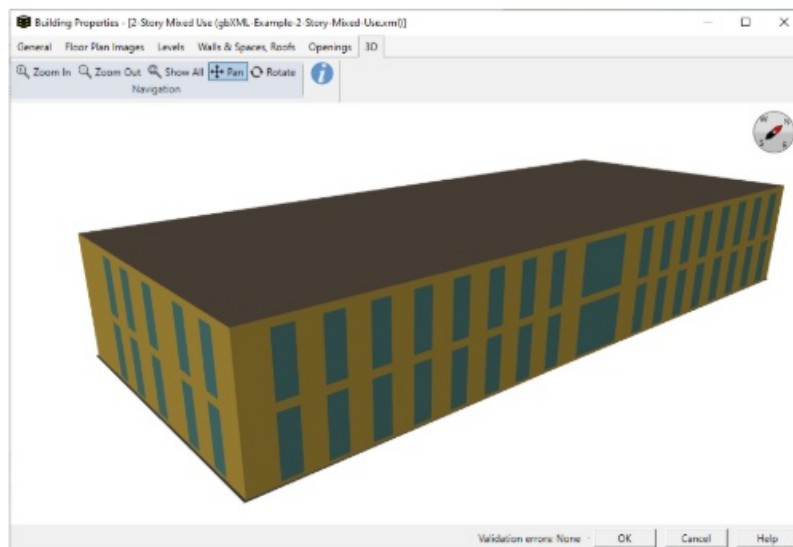
gbXML Import

Added an “Import gbXML” option to the Project Menu. This option facilitates integration between System Design Load (SDL) and CAD or Building Information Modeling (BIM) tools. It can greatly reduce time and labor to create the building model. The workflow for using gbXML is as follows:

1. The BIM or CAD tool is used to export the building plans into a gbXML-format file.
2. In System Design Load, data from the gbXML file is loaded using the “Import gbXML” option on the Project Menu.
3. System Design Load imports the 3-dimensional building geometry data from the file and uses it to create a new building model in the project. This produces complete building geometry including levels and spaces, with all wall, floor, ceiling, and roof surfaces defined, and with window, door and skylight openings positioned in the envelope.
4. The model is then reviewed by the user and any needed corrections or adjustments are made.



**BEFORE: Rendering of gbXML Contents for
2-Story, Multi-use Example Building
using Spider gbXML File Viewer**



**AFTER: Rendering of building model in SDL
after being imported**

Successful creation of a building model in SDL requires the original BIM or CAD building drawing to be of sufficient quality and a gbXML file that is compliant with the gbXML data schema. Drawing quality involves complete geometry with closed volumes for all spaces (surfaces connected), and all surfaces associated with spaces. The example at right shows a sample building rendering of gbXML data using external software before the file was imported and the equivalent rendering after data was imported to SDL. The help system provides further information about gbXML workflow, troubleshooting models, replacing models when architectural plans change, and data scope. See section 1.5.1 in the help system. The help system is accessed by pressing F1 or pressing the Help button on the main window toolbar.

Calculation Engine Update

Upgraded the calculation engine to use EnergyPlus version 23.2, released in October 2023. This upgrade brings with it corrections to a number of calculation problems and an important change to how loads for HVAC zones containing multiple spaces are calculated.

HVAC Zones with Multiple Spaces

In the EnergyPlus version used in System Design Load (SDL) 6.1, load calculations for system sizing and for energy modelling for an HVAC zone containing multiple spaces required first merging all the spaces into one large enclosed volume representing the zone. That process resulted in an enclosed volume comprised of many individual floor, wall, and ceiling surfaces. The greater the number of surfaces, the slower the calculation. Frequently users performed preliminary load estimates by sketching over floor plans in detail to define all individual spaces and then placing all the spaces on each level into an HVAC zone. That could result in extremely long

calculation times. In EnergyPlus version 23.2, that space merging process is no longer necessary. EnergyPlus calculates loads for individual spaces within a zone for system sizing and energy modelling applications rather than on a whole zone basis. Even though it is calculating more enclosed volumes (spaces), the overall calculation can run faster. This has several important consequences:

1. **Calculation Time Reduction.** For any project containing multiple-space zones, calculation times should decrease. For projects with only a few multiple-space zones, or zones containing only a few spaces, the improvement in calculation time may be relatively small. However, for projects where each zone contains dozens or even hundreds of spaces, calculation time improvements can be very significant. In extreme cases we have seen calculation time reductions on the order of 10x.
2. **Differences between Zone Load and Zone Conditioning.** This calculation change also eliminates the differences between total zone load and zone conditioning seen on the Air System Heat Balance Summary report for projects having zones containing very large numbers of spaces.

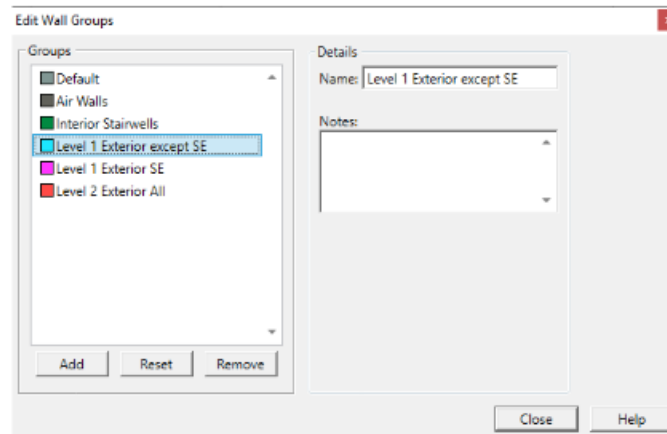
Other Enhancements

Program Operation

1. **Work-In-Progress Project Data Storage Location** – Changed the storage location used for data files while a project is open and work is in progress. The location was changed from the configured Windows TEMP folder to a subfolder under C:\Users\userid.
Importance: While the Windows TEMP folder is the Microsoft-recommended location for work-in-progress files, some customers encountered situations where Windows Storage Sense or anti-malware software were performing file cleanup very aggressively and were erasing project data while a project was in use. In some cases, the erased project data could not be recovered. Field testing of the new work-in-progress storage location indicates such problems have been eliminated.
2. **Running Multiple Instances of System Design Load** – Modified the software to allow multiple instances of the program to be run at the same time. This can be useful if you want to work on two or more projects at the same time. For example, inputting data in one project while waiting for calculations in another project to finish.

Building Model

1. **Resetting Wall Group** – Added a Reset button to the Edit Wall Groups window. This button resets all wall segments assigned to a selected wall group to the Default wall group. It can also be used to reset all Air Walls to the Default wall group.
2. **Area Display** – The display of building area on the main window was revised to show only floor area of modeled spaces. Previously the total also included the area of spaces designated as unmodeled. In addition, if the building model has validation errors, the floor area will be shown as zero since validation errors prevent accurate calculation of building floor area. Floor area display will reappear when validation errors are corrected.



Wall Group Reset Feature

Space Model

1. **Window-to-Wall Ratio** – Added building window-to-wall ratio information at the end of the Windows and Doors section of the Space Model input report.
2. **Grid Sort I** – Enhanced the space grid sort feature to perform multi-level sort for level and space name. When you sort on the Level column, the software will automatically perform a two-level sort with Level as the primary sort and space name as the secondary sort. This results in space names being alphanumerically sorted on each level.
3. **Grid Sort II** – Improved the space grid sort feature for data columns using option list selections and schedules. Previously columns containing option lists like lighting space usage type, lighting fixture type, and others as well as schedules sorted in an index order. Sorting now arranges the rows alphanumerically according to the item or schedule name.

Program Documentation

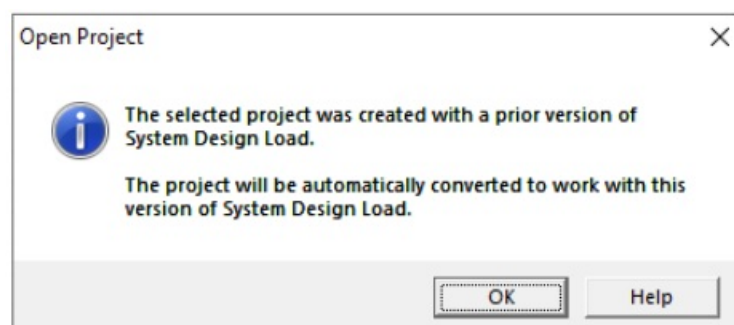
Space Type Defaults – Added documentation explaining the source of program-supplied space type defaults. This new information is found in Chapter 17 in the topic “About Space Type Default Data”.

Problems Fixes

Corrected problems identified in System Design Load v6.1. A list of problem fixes is found in section 1.2 of the help system in the “What’s New in System Design Load” topic. To display program help, press F1 or press the Help button on the main window toolbar.

About Automatic Data Conversion

1. When you open a project created by v6.1 or v6.0 it will be converted to 6.2 format automatically. An informational message appears to make you aware this is happening.



2. **Conversion Process** – The process inserts the word “(converted)” into the project name. This is done so you

don't inadvertently overwrite the original project file. When you save the project for the first time you can choose to save it as a separate file with a different name, or you can choose to overwrite the original project with the original file name.

Note that once you convert a project to 6.2 format, it cannot be opened thereafter in 6.1. Therefore, if you will need to inspect the original project in 6.1, its best to save the converted data in a separately-named file.

3. Will calculation results in 6.2 be different than 6.1 for a converted project?

Typically, yes, due to the following:

1. The calculation engine upgrade described on page 7 affects how space loads are calculated in HVAC zones containing multiple spaces. That can alter results by a small amount for zones with a few spaces, and by larger amounts for zones with larger numbers of spaces.
2. Further, if your 6.1 project contained one of the issues that was corrected in 6.2, that correction could also cause changes in results. In the help system, the "What's New in System Design Load" topic in section 1.2 summarizes the problem fixes. The help system can be displayed by pressing F1 or pressing the Help button on the main window toolbar.

QUESTIONS?

Please contact Carrier Software Systems at software.systems@carrier.com

Thank you!

FAQ

Q: What is the purpose of the gbXML Import feature?

A: The gbXML Import feature facilitates integration between SDL and CAD/BIM tools to streamline building model creation.

Q: How does the Calculation Engine Update impact project calculations?

A: The update to EnergyPlus version 23.2 reduces calculation times, especially for projects with multiple-space zones, leading to improved efficiency in load calculations.

Documents / Resources

	Carrier System Design Load [pdf] User Guide System Design Load, System, Design Load, Load
---	--

References

- [User Manual](#)