THERM 2.1 Enhancements

The following list describes changes to the THERM program in version 2.1. Some of the more complicated changes are described in detail after this brief list.

Program Settings:

- Preferences:
    - All in one menu option now rather than two
    - Settings persist across THERM sessions (T2W files are created when a file is saved and when files are run in Multiple Glazing Options).
    - Added "Automatically display results after simulation"
    - Added "Auto Recover every ___ minutes

Drawing:

- Bucket fill -- click on the bucket fill toolbar, pick a material, and fill the void.
- Toolbar: the following changes have been made to the toolbar:
    - Added "Eye Dropper" toolbar button (explained below)
    - Added "Show Results" toolbar button (toggles the results display)
    - Added "Show U-factors" toolbar button
    - Toolbar "Tips" now display a label explaining the use for each toolbar button.
- Eye Dropper Tool: allows user to select a material in an existing polygon, and then change the material in an existing polygon or fill a void with that material.
- Edit/Undo: it is now possible to undo (one level) a change to a material or boundary condition

Glazing Systems

- Multiple Glazing Options: addition of an option to select multiple glazing options to be associated with a cross section. The other glazing options must have the same glass layer thicknesses (either exact or nominal) and the same overall IG thickness (exact or nominal). When the base file is calculated, THERM makes a separate file for each glazing option, and runs each.
- Nominal Thickness: when importing a glazing system, the option is available to tell THERM to use a nominal thickness rather than the actual thickness. The program will change the glass layer thickness to the nominal thickness (see detailed description), keep the gap width the same, and therefore the overall IG thickness will change. Therefore, you must use glass layers that will fall into the same nominal thickness category if you are using the Nominal Thickness feature with the Multiple Glazing Option.
- Glazing System Import: second screen has lots of changes
    - Checkbox for nominal glass thickness
    - Gap width -- Default or custom allows user specified gap settings for Keff and Gap Thickness
    - Spacer -- Independent spacer for each glazing cavity, or single spacer for entire IG, when using an IG with two or more glazing cavities.
    - Exterior Boundary Conditions -- can specify either glazing system U-factor, SHGC, or other BC
    - Interior Boundary Conditions -- same as Exterior
- Glazing System Library:
    - Faster loading of the library
    - Program detects if the Glazing System Library has been changed since THERM first read it, and asks if it should reread the file. This allows changes made in WINDOW glazing systems to be loaded into THERM without closing the program.
- Glazing System: WINDOW glazing system information is displayed by double clicking on the glazing system.

- Crash after deleting Glazing System cavity: the program no longer crashes after the glazing system cavity is deleted. However, the need for doing this kind of editing of the glazing cavity is greatly reduced because it is now possible to specify a custom cavity Keff value upon importing the glazing system.

Frame Cavities / Solids

- Frame Cavity Emissivities: In the definition of Frame Cavity Materials, a section has been added to Cavity Properties which allows input for Emissivities for Side 1 and Side 2. These are then applied to any cavity defined with this material. Two new Frame Cavity materials have been added to the Material Library, "Frame Cavity (0.2/0.2) NFRC Simplified" and "Frame Cavity (0.2/0.9) NFRC Simplified"
- Temperatures are set to the correct NFRC default values when a material is changed to NFRC Frame Cavity (Simplified)
- Conductivity and emissivity are displayed when you double click on a polygon defined with a solid material.

Boundary Conditions

- Boundary Conditions: NEVER deleted, except by user
- Eye Dropper works for Boundary Conditions
- Edit/Undo works for Boundary Conditions

Calculation/Results

- Results Display Options have been added:
  - Show polygon lines over the color flooded results images
  - Advanced section which allows control of Color IR, Isotherm, Color Flux, and Constant Flux Lines settings
- Color Flux and Color Isotherm Results: Legend added for colors on the color flux and color isotherm results
- U-factor Dialog box:
  - Correct delta T in U-value is now displayed when in IP units
  - Custom choice in pulldown to allow a user specified Length to be input. This provides a solution to the case where frame boundary conditions extend below adiabatic boundaries (this is most likely to happen with certain skylight files).
- Correct DXF file name appears in report
- Simulation Directory: in the previous version, some temporary files were not being deleted after the calculation finished. This has been fixed.

Utility

- FRAME F40 File Converter added in File/Import

Preferences

Click on Options/Preferences. There is now only one "Preferences" choice.
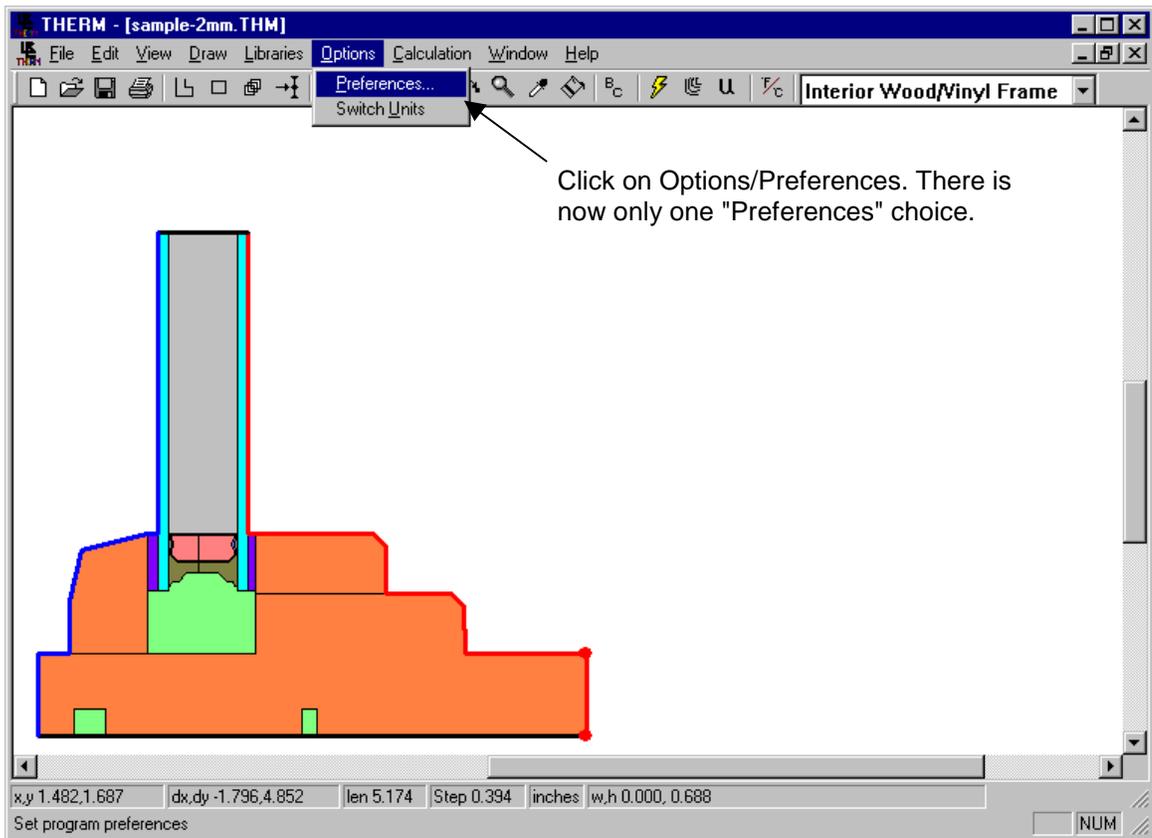
Settings are saved across THERM sessions

T2W files made automatically when file is saved or when Multiple Glazing Options are run if this option is checked.
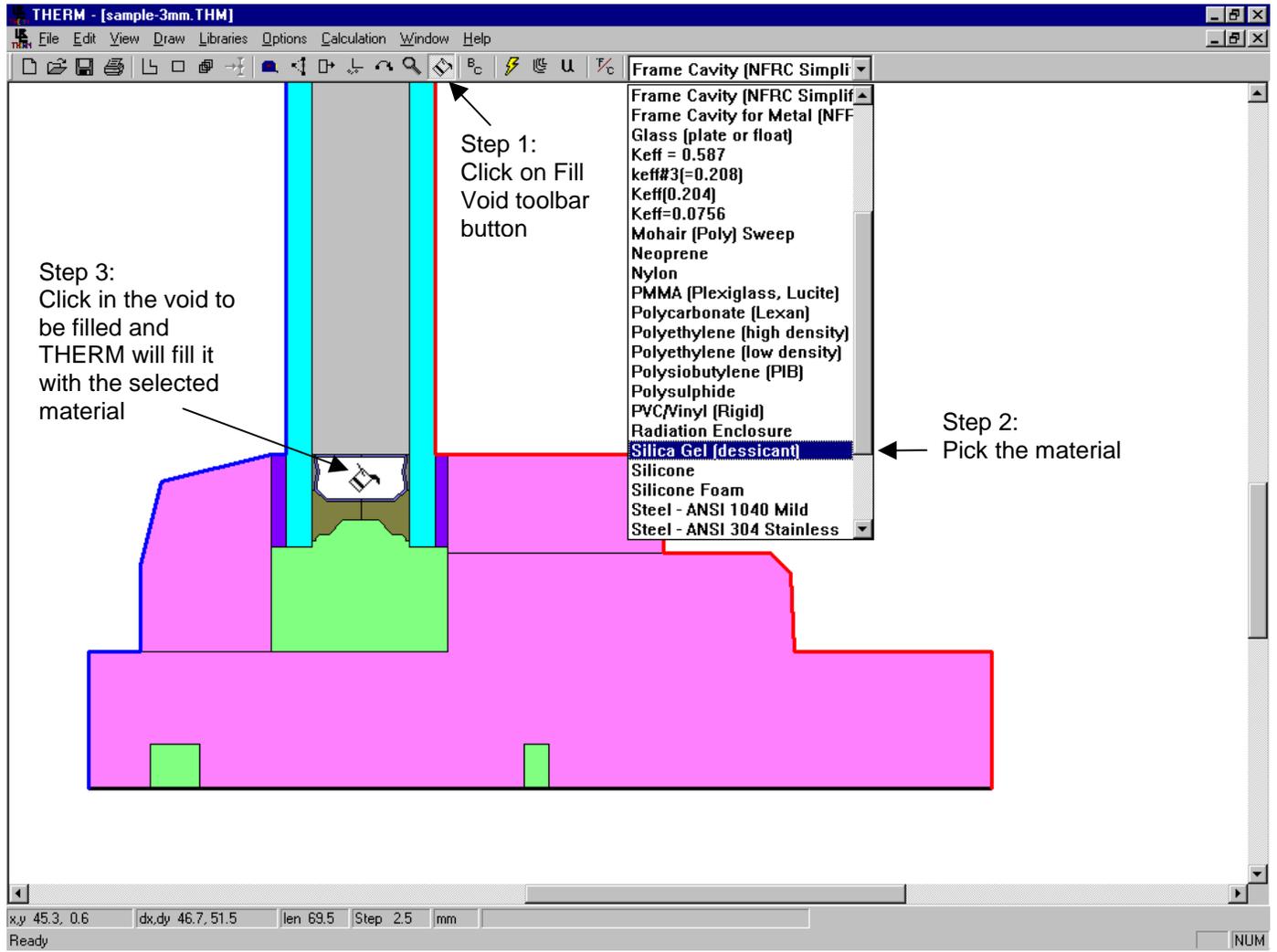
A <filename>.tmp is created which can be opened as a THERM file if the program crashes.

Whether results are automatically displayed after a simulation can be turned on or off.

Specify the default THERM working and simulation directories that the program will start in.
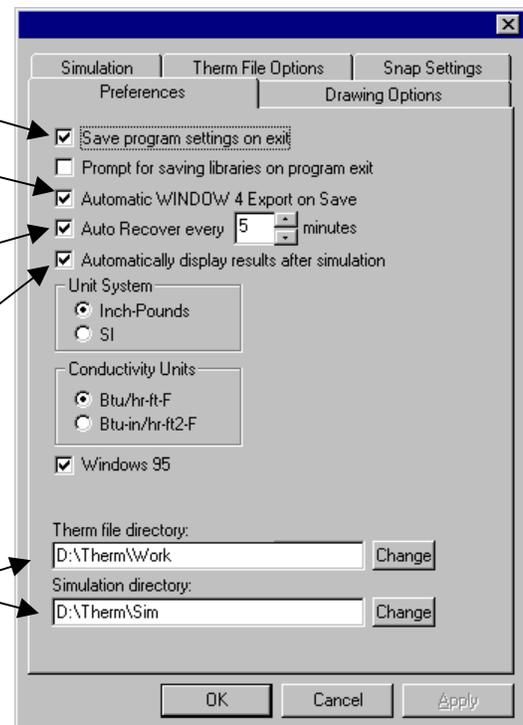
Bucket fill

Toolbar

The following changes have been made to the toolbar:

- Eye Dropper Tool (explained below) added
- Show Results (toggles the results display) added
- Show U-factors added
- Toolbar "Tips" now display a label explaining the use for each toolbar button.
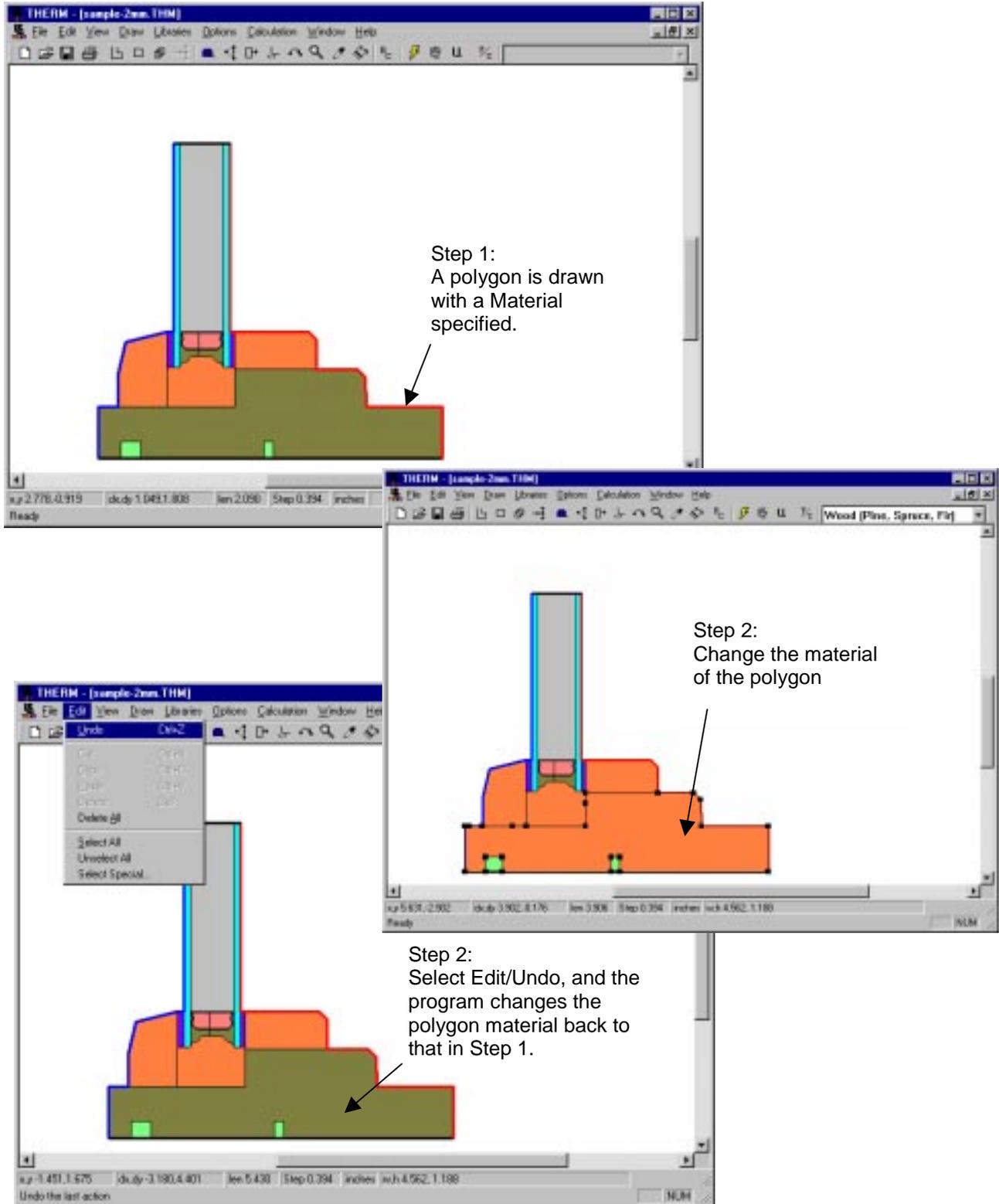
THERM - [sample-2mm.THM]

File   Edit   View   Draw   Libraries   Options   Calculation   Window   Help

Draw polygon

Tool tips display the
toolbar button functions
when mouse moves over
the toolbar button.

Select material/bc

Show Results

Show U-factors
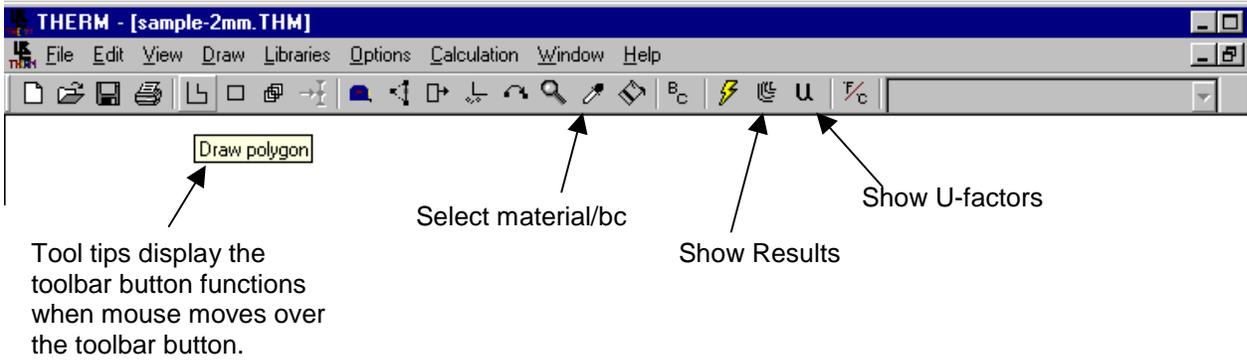
Eye Dropper

The Eye Dropper toolbar button is used to select a material or boundary condition.

Step 1:
Click on the Eye
Dropper tool

Step 2:
Move the Eye Dropper cursor to the material or boundary
condition you would like to select, and click the left mouse
button

Step 3:
The cursor changes to the Fill Void. Move it to the
polygon or void that you want changed to or filled
with the selected material

Step 4:
The polygon or void is now changed
to the selected material.
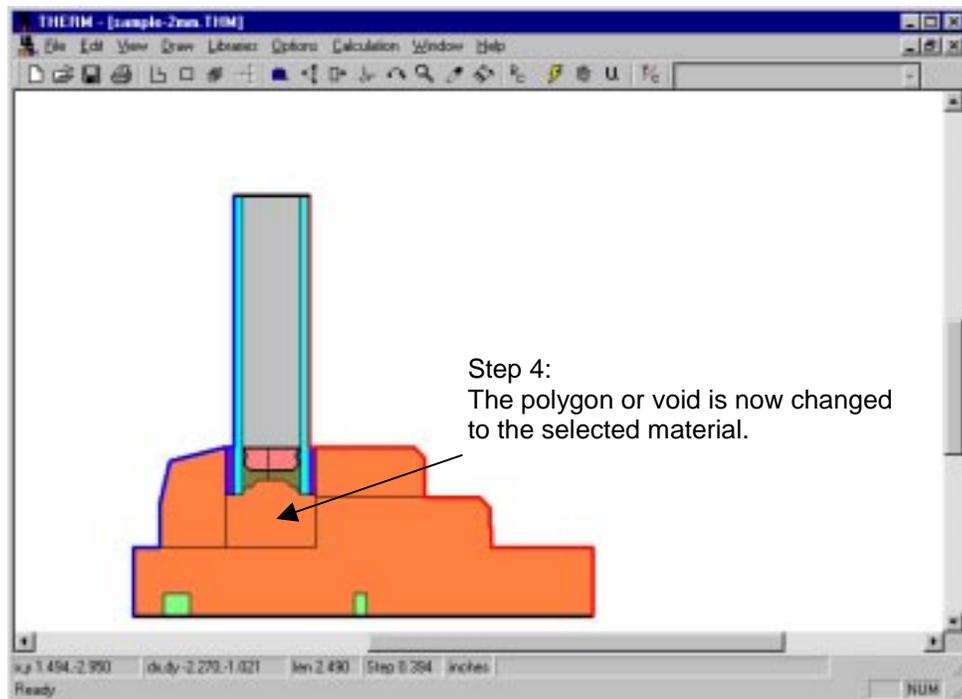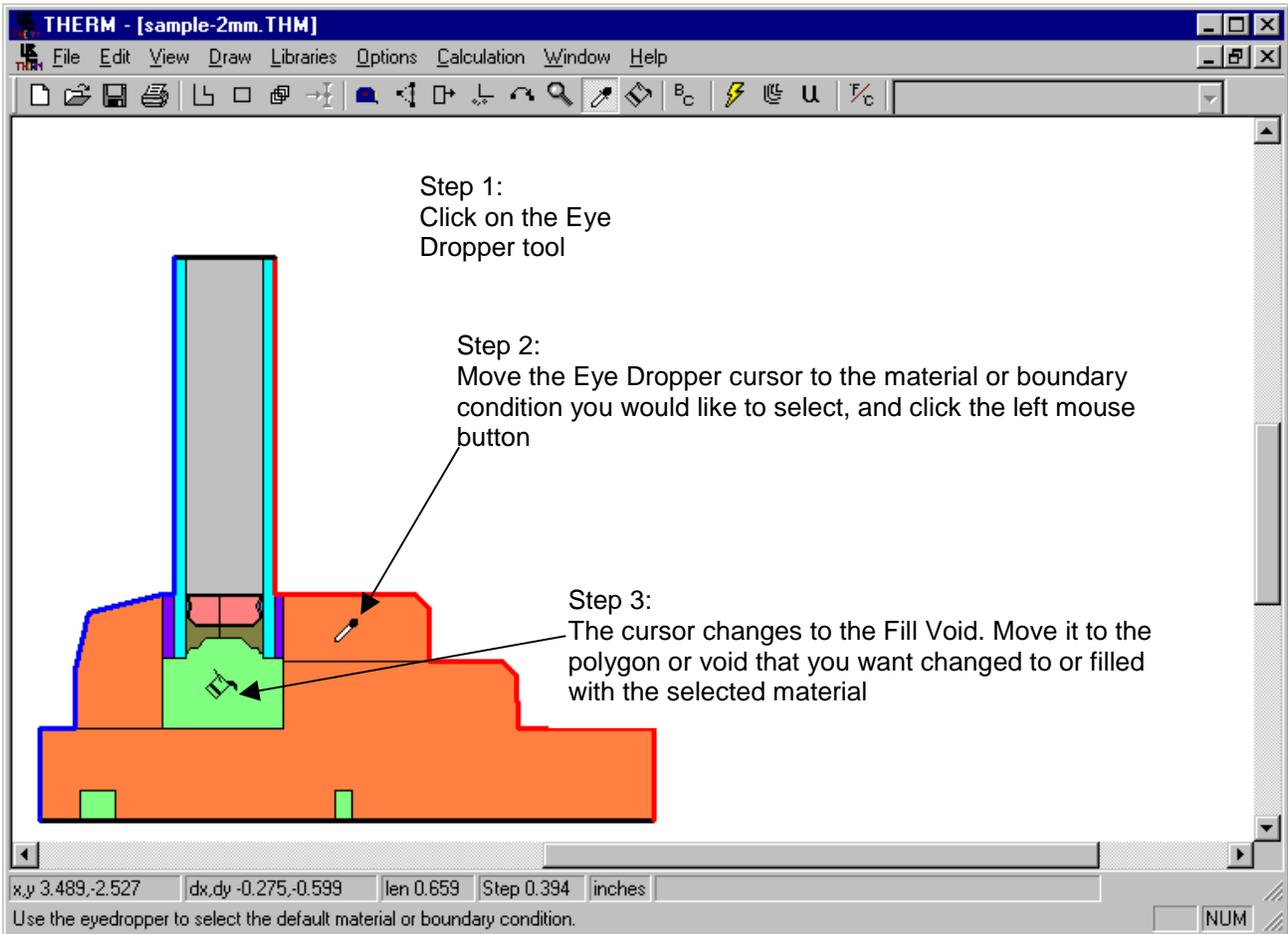
Edit/Undo

If a material or boundary condition is changed, the Edit/Undo menu will reverse the change. This works for just one level.

Step 1:
A polygon is drawn
with a Material
specified.

Step 2:
Change the material
of the polygon

Step 2:
Select Edit/Undo, and the
program changes the
polygon material back to
that in Step 1.

Multiple Glazing Options

THERM allows multiple glazing options to be associated with a file.

Step 1:
Make one cross section that is complete, including the initial glazing system.

Step 2:
Either:
- Click on the Glazing System and then click on the Calculation / Glazing Options menu choice OR
- Double click on the Glazing System
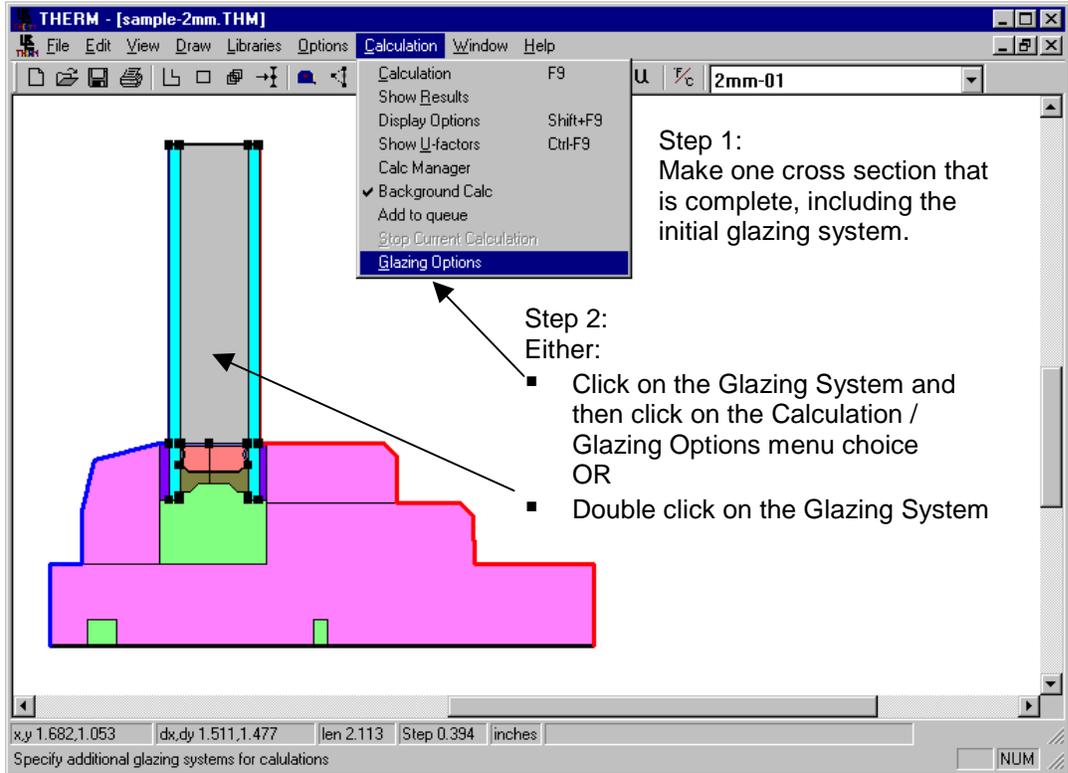
Step 3:
Click on the Add button in the Glazing System Options dialog box.
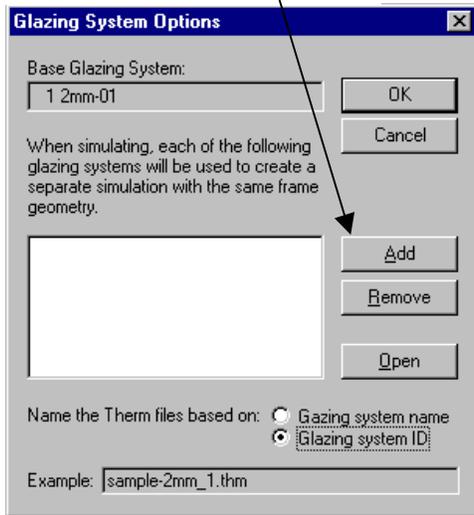
Step 4:
The Add Glazing Option dialog box shows all the glazing systems that match the Base Glazing System in terms of glass layer thickness and overall thickness.
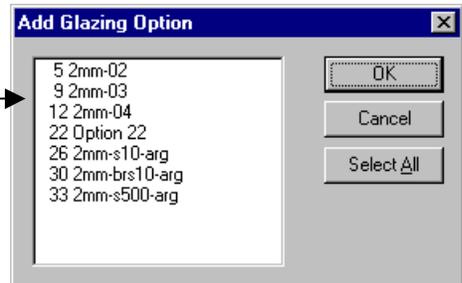
Select individual Glazing Systems and click on OK, or click on Select All

Step 5:
The selected Glazing Systems appear in the Glazing System Options dialog box.
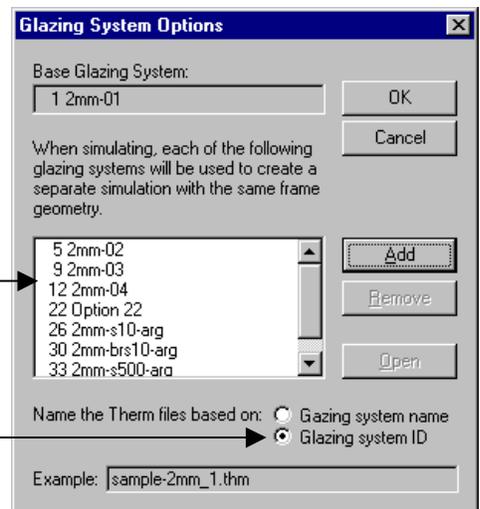
Select "Glazing System ID" for the THERM file naming convention.

Step 6:
Click on the Calc toolbar button, and the Glazing Option Simulation dialog box is displayed. Choose the appropriate option and click on OK. The program will then simulate the file(s).

Glazing Option Simulation

This file has glazing options specified. Would you like to:

● Create the glazing option files and perform all simulations
○ Simulate the current file only
○ Create the glazing option files but do not perform the simulations

OK

Cancel

THERM will create a THM file for each glazing option, giving the file a name based on the naming convention option selected in Step 5, and then will run each file if that option is chosen in Step 6.

Step 7:
To see the status of the simulations, go to Calculation/Calc Manager, click on the Log button, and the status of each file will be displayed (only for this THERM session).

Calculation

Calculation   F9
Show Results
Display Options   Shift+F9
Show U-factors   Ctrl-F9
Calc Manager
✓ Background Calc
Add to queue

Calculation Manager

Status: Idle

Close   Add   Remove
Pause   Interrupt   Log

Calculation Log

... Calculation complete

D:\Therm\2.1.00\sample-2mm_26.thm Fri Apr 28 13:54:52 2000
... Calculation complete

D:\Therm\2.1.00\sample-2mm_22.thm Fri Apr 28 13:54:58 2000
... Calculation complete

D:\Therm\2.1.00\sample-2mm_12.thm Fri Apr 28 13:55:04 2000
... Calculation complete

D:\Therm\2.1.00\sample-2mm_9.thm Fri Apr 28 13:55:10 2000
... Calculation complete

D:\Therm\2.1.00\sample-2mm_5.thm Fri Apr 28 13:55:17 2000
... Calculation complete

OK

Clear Log

Watch out for:

- Filenames: WINDOW 4.1 needs 8 character file names for T2W files, so think about naming the THERM files appropriately. In the Filenaming convention for the multiple glazing runs, specify that THERM add the Glazing System ID, rather than the Glazing System Name, in order to reduce THERM filename size.

Nominal Thickness

When importing a glazing system, it is possible to specify that THERM should use a nominal glass thickness rather than the actual glass thickness when importing a glazing system. Keep in mind the following:

- THERM adjusts the glass layer thickness to the nominal value upon import (see the Nominal Thickness values table on the following page)
- THERM does not change the thickness of the glazing system cavity
- This means that the overall thickness of the IG will change by the amount of the difference between the actual and the nominal thicknesses for each glass layer. So the frame cross section may need to be adjusted to account for this.

Nominal thickness values included in the THERM 2.1.00 Beta version

	Minimum Value (mm)	Maximum Value (mm)	Nominal Thickness (mm)
1	0.10000000	1.25500000	1.0000000
2	1.2550001	1.7900000	1.5000000
3	1.7900001	2.1450000	2.0000000
4	2.1450001	2.5800000	2.5000000
5	2.5800001	2.9100000	2.7000000
6	2.9100001	3.5900000	3.0000000
7	3.5900001	4.3800000	4.0000000
8	4.3800001	5.0650000	5.0000000
9	5.0650001	5.5600000	5.5000000
10	5.5600001	6.8100000	6.0000000
11	6.8100001	8.7250000	8.0000000
12	8.7250001	11.1100000	10.0000000
13	11.1100001	14.2900000	12.0000000
14	14.2900001	17.4600000	16.0000000
15	17.4600001	20.6400000	19.0000000
16	20.6400001	23.8100000	22.0000000
17	23.8100001	27.3850000	25.0000000
18	27.3850001	35.0000000	32.0000000

Glazing System Import: Editing Keff

When importing a WINDOW Glazing System, it is possible to set a custom gap Keff and Width for each gap in the glazing system.

Step 4:
If there are voids that need to be filled with the new Keff value, make a Material with that Keff in the Material Library and fill the void with it.

Step 5:
Double click on the glazing system to verify the Keff values for each gap.
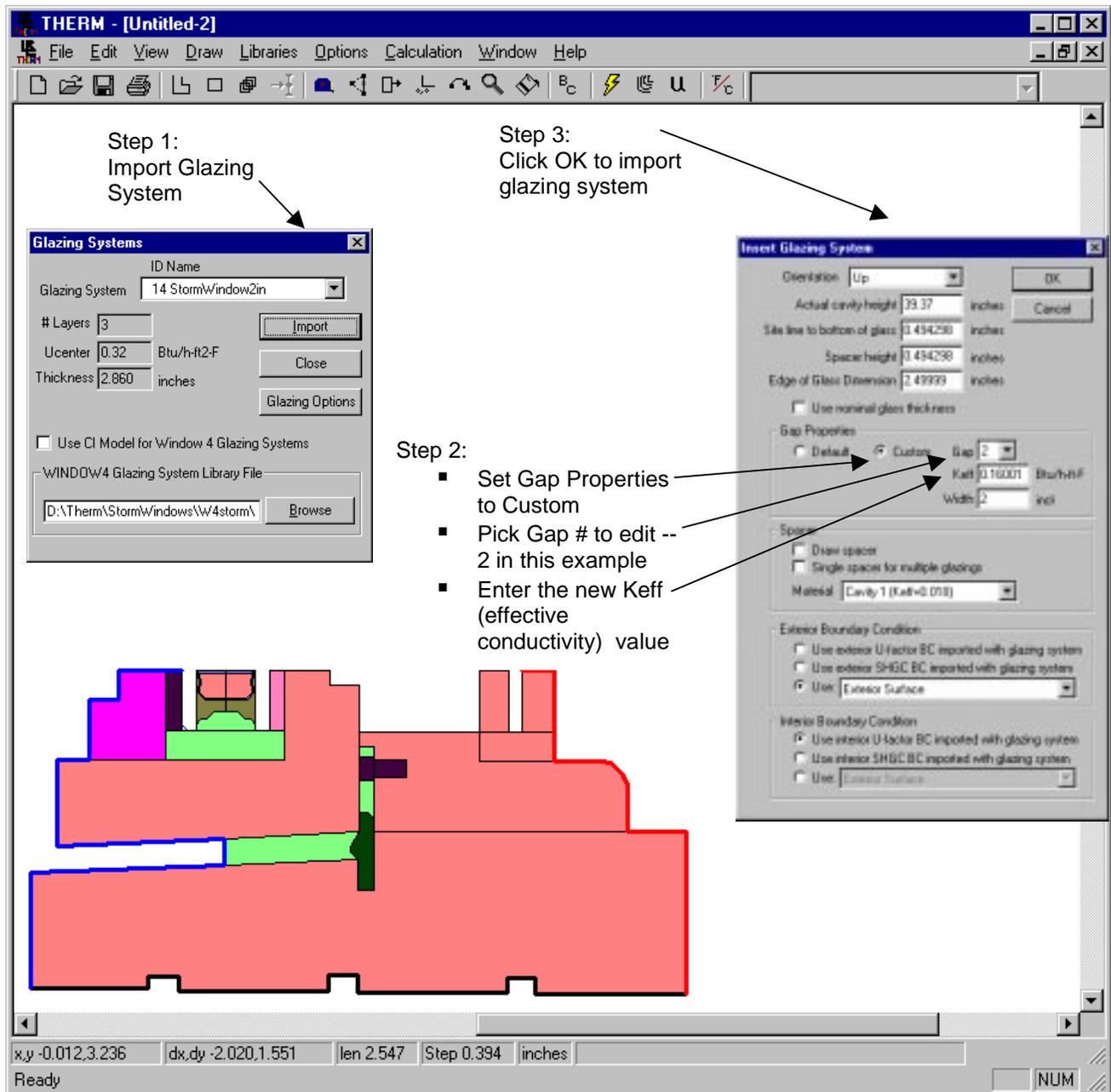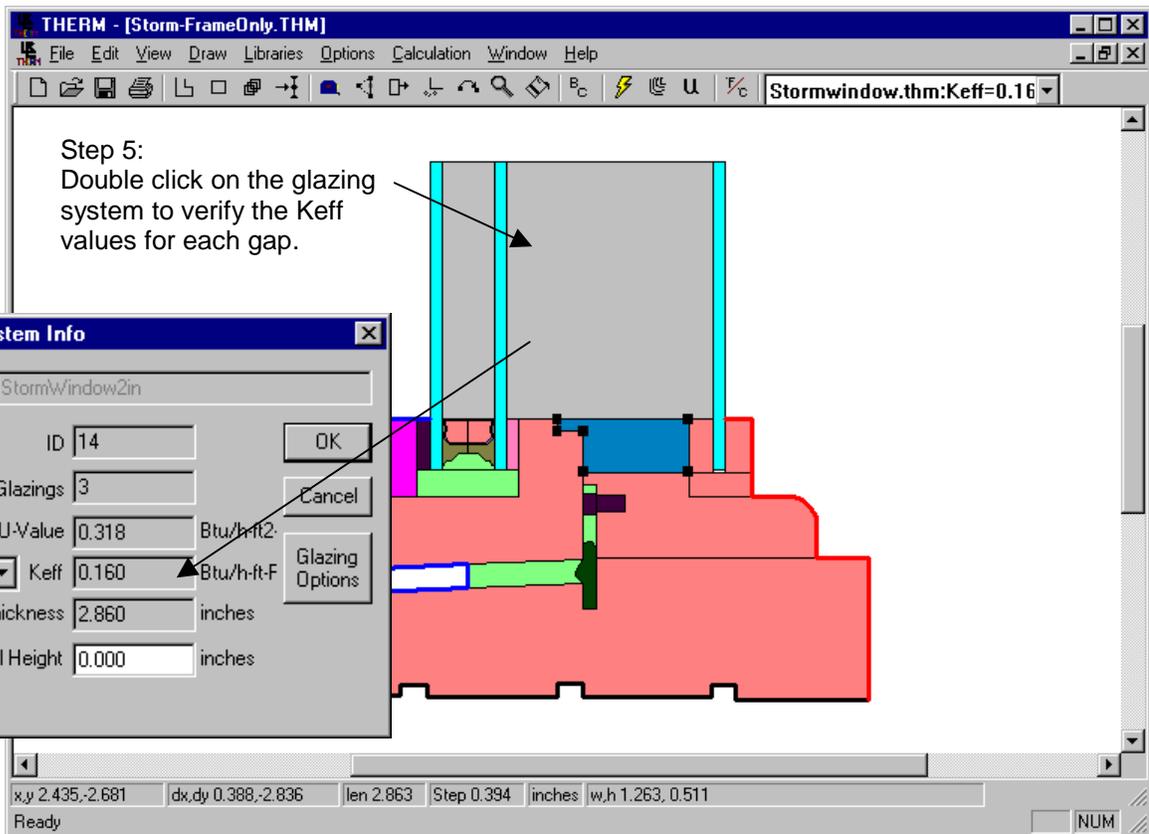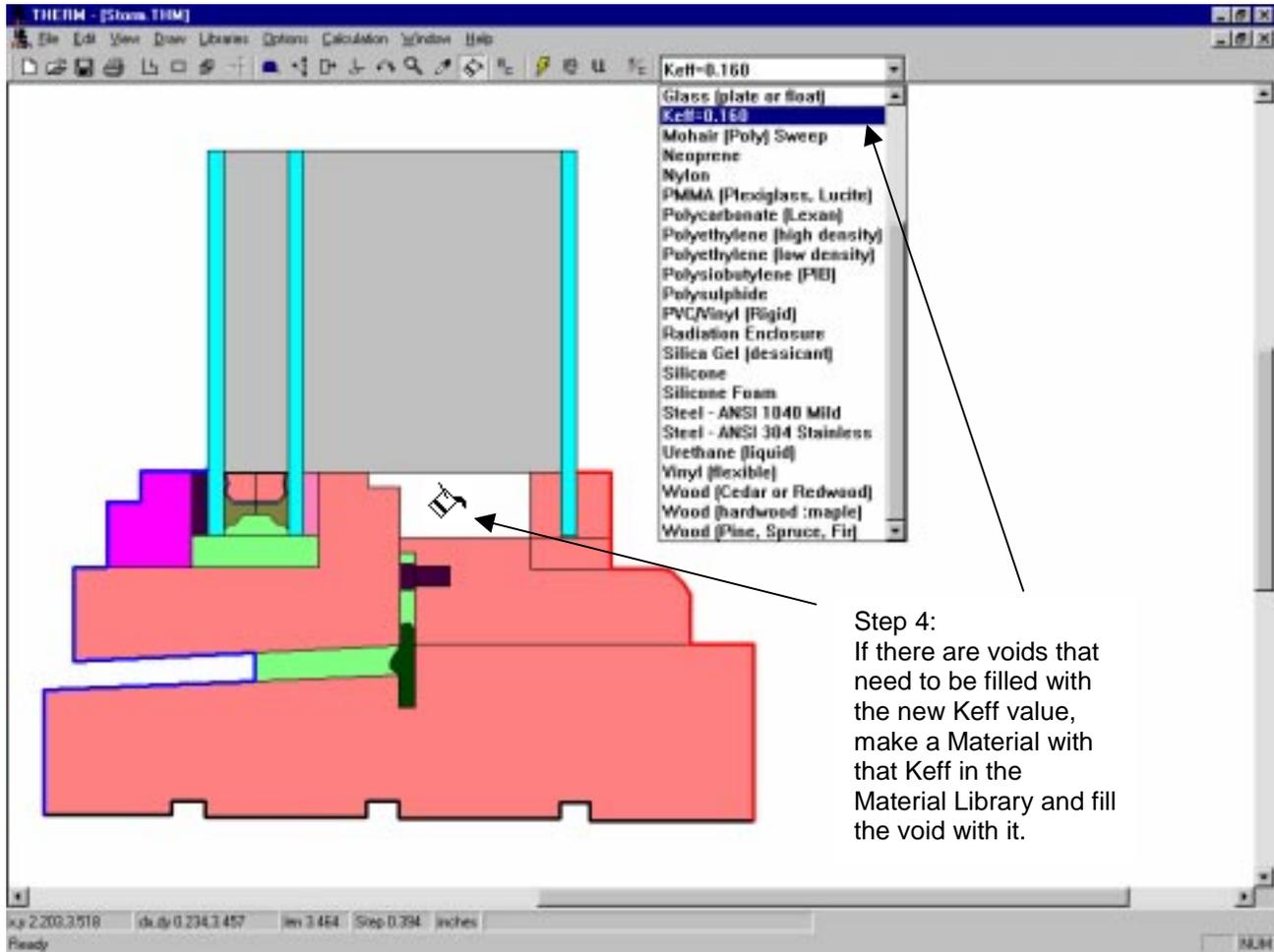
Glazing System: Program detects if glazing system has changed

If you make changes (and Save them) to a glazing system library in WINDOW that is being used in THERM while THERM is open, when you select the Glazing System option from the Libraries menu, THERM detects that the library has changed. The program will ask you if you want it to reload the glazing system library. If you click on the Yes button, THERM will reload the library, and you should see the changes in the glazing system library.

THERM detects if the glazing system library being used in the current THERM file has changed since the program originally loaded it. The program will ask if it should reload the library. Click on the Yes button to reload the library.
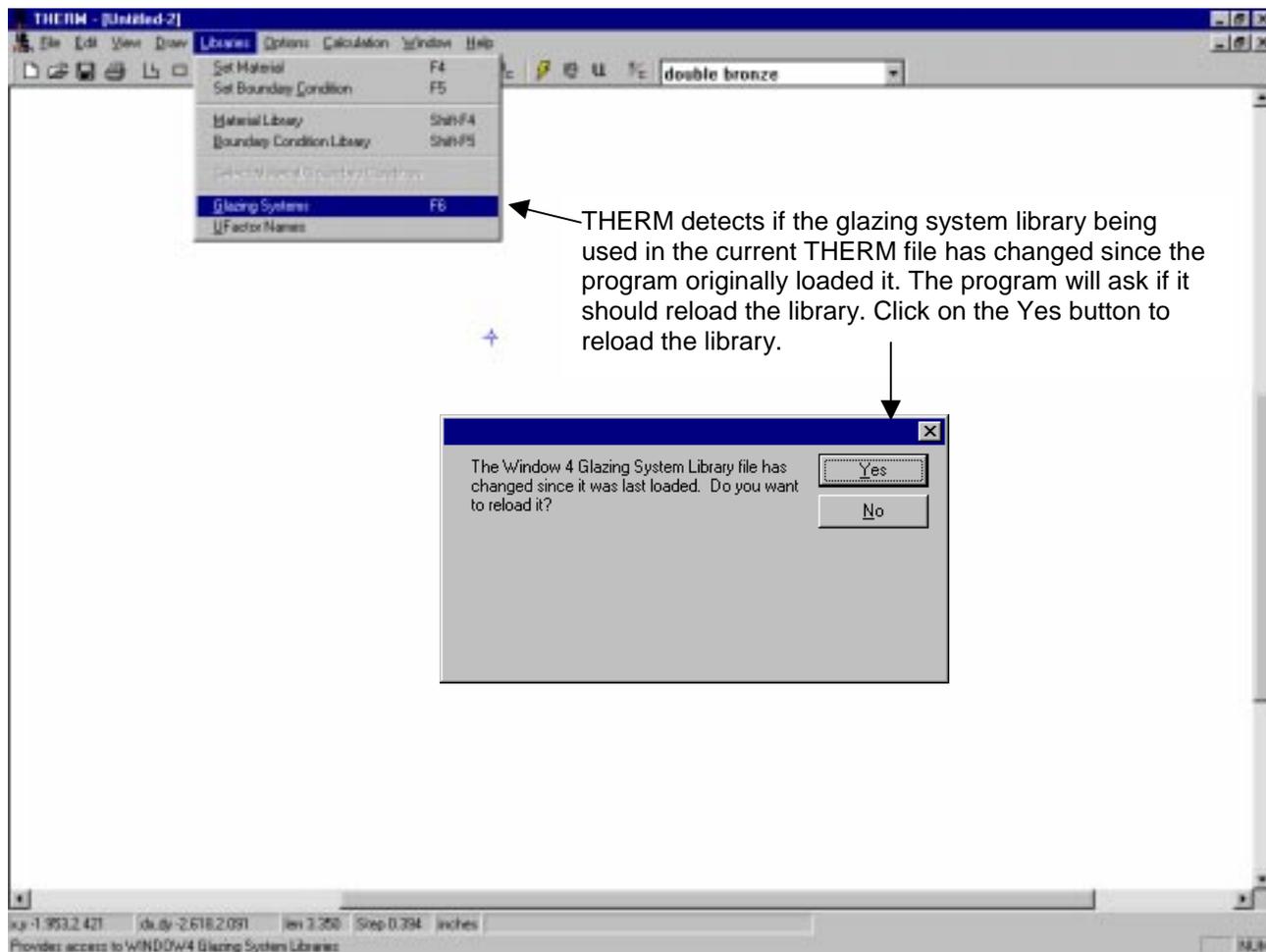
Glazing System: WINDOW information

Information about the glazing system can now be displayed in THERM.

Double click (or click once and press Enter) on a glazing system to see the Glazing System Info dialog box.

Select the Gap to see each Keff. The Keff values can be changed.

The Actual Height of the glazing system can be edited here. This would be used for CI modeling.

Frame Cavity Emissivities

THERM now has emissivities for Side 1 and Side 2 in the Material Library for Frame Cavities. Two new materials have been added:

- Frame Cavity (0.2/0.2) NFRC Simplified
- Frame Cavity (0.2/0.9) NFRC Simplified

Set emissivities for Side 1 and Side 2
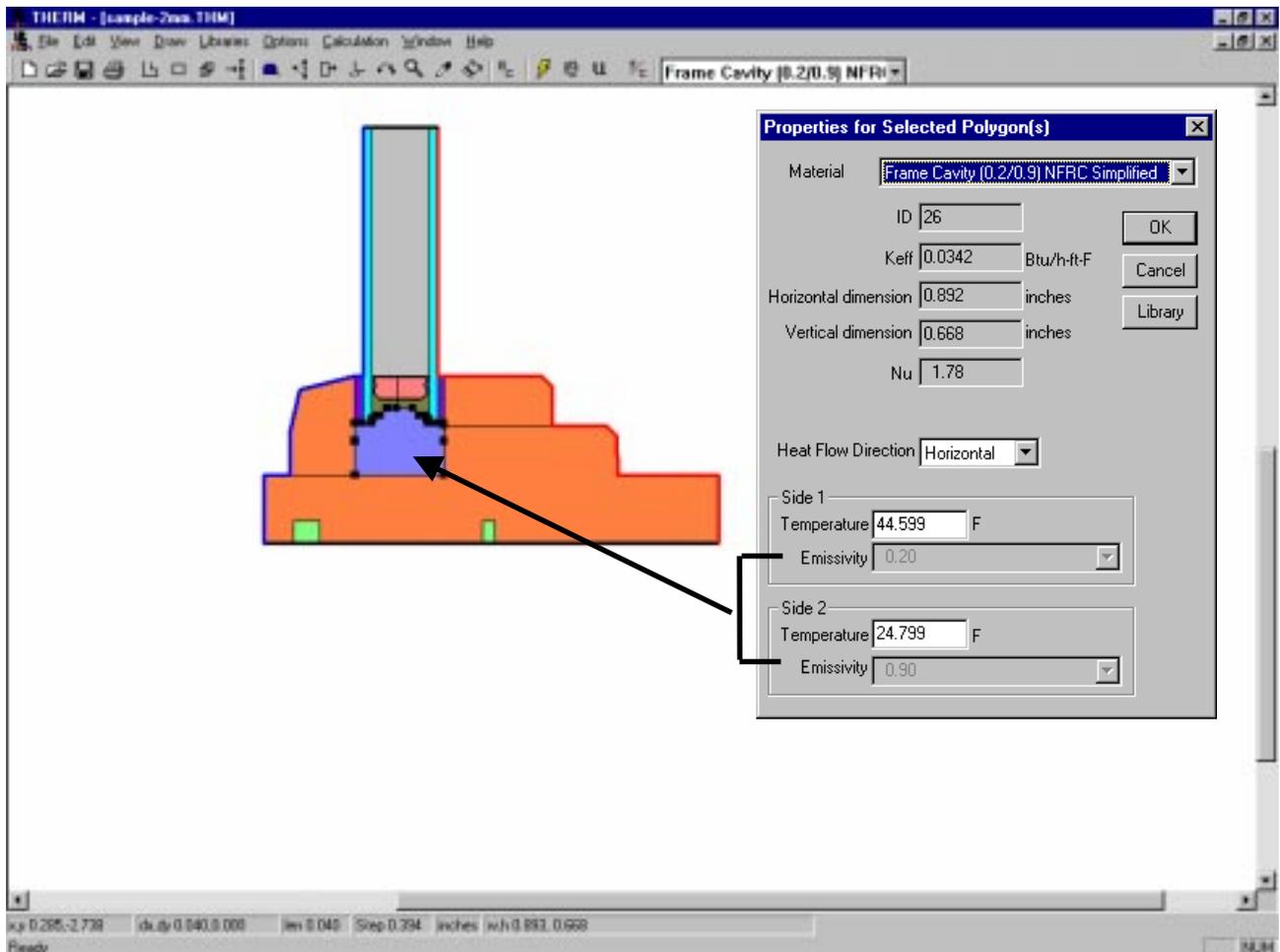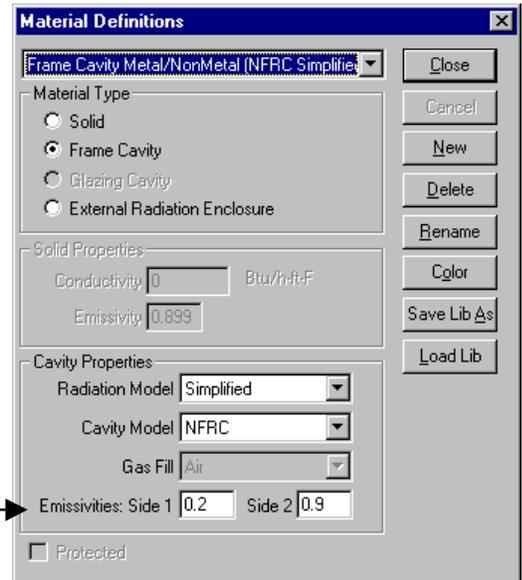
Frame Cavity Temperatures

When you use the Fill Void tool for creating a Frame Cavity, or when you change a material to a Frame Cavity, the default temperatures are always used by the program.

Correct NFRC default temperatures are always used for Simplified Frame cavities.
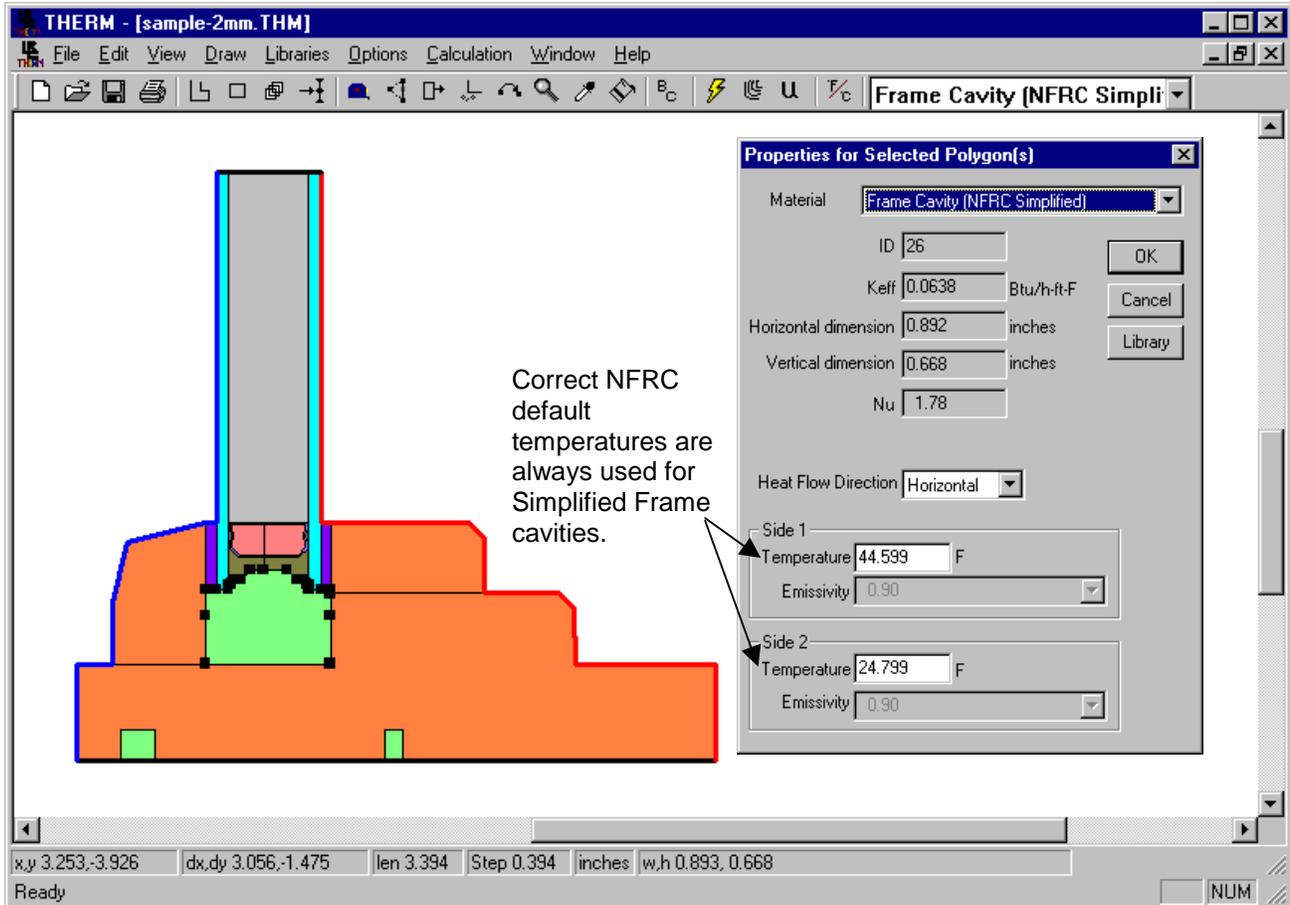
Properties Displayed for Solids

The Conductivity and Emissivity are displayed for solids
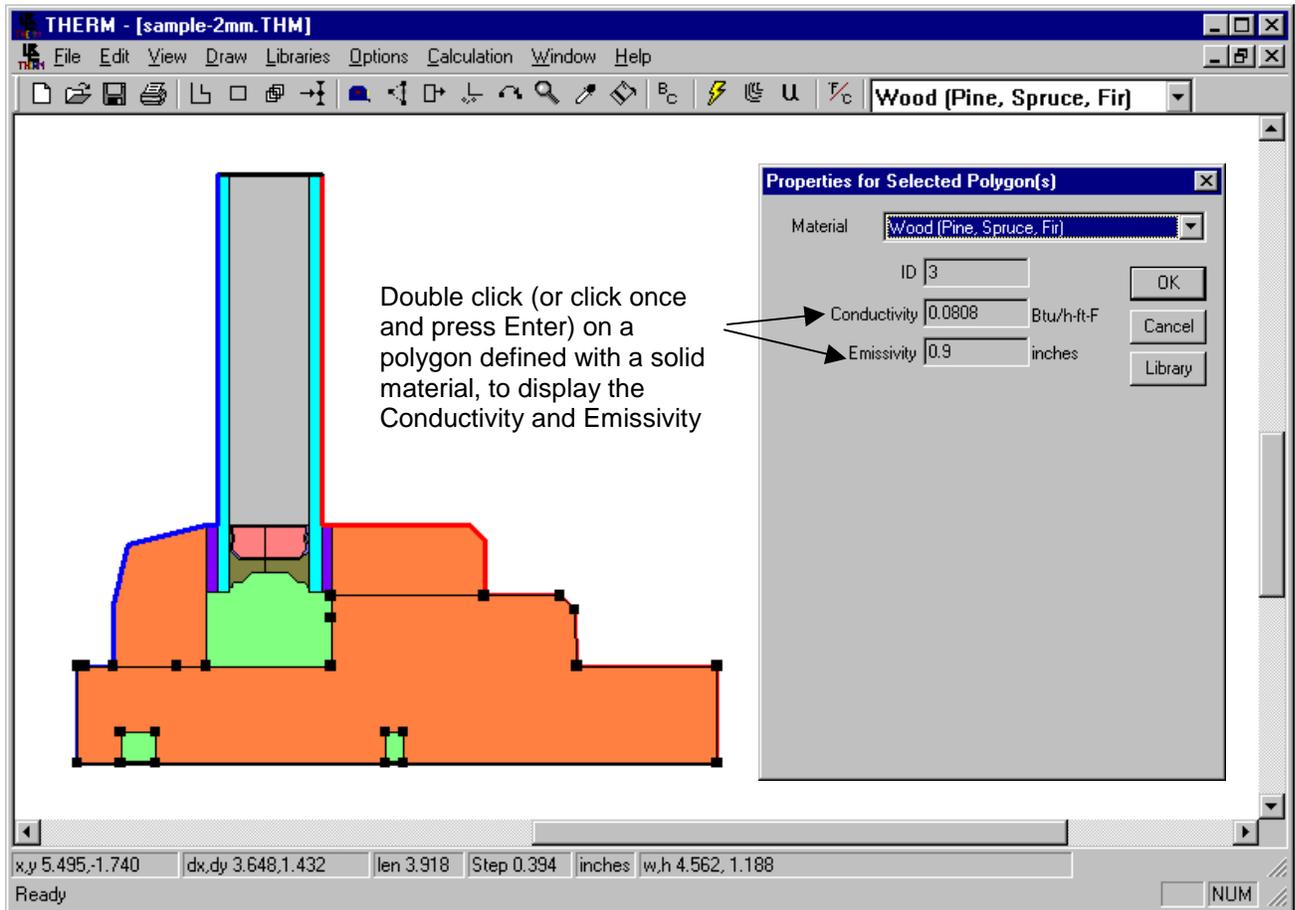
Boundary Conditions

THERM now does not delete boundary conditions automatically when the geometry is edited. The only time that boundary conditions are deleted is if the user clicks on a boundary condition segment and presses the delete key.
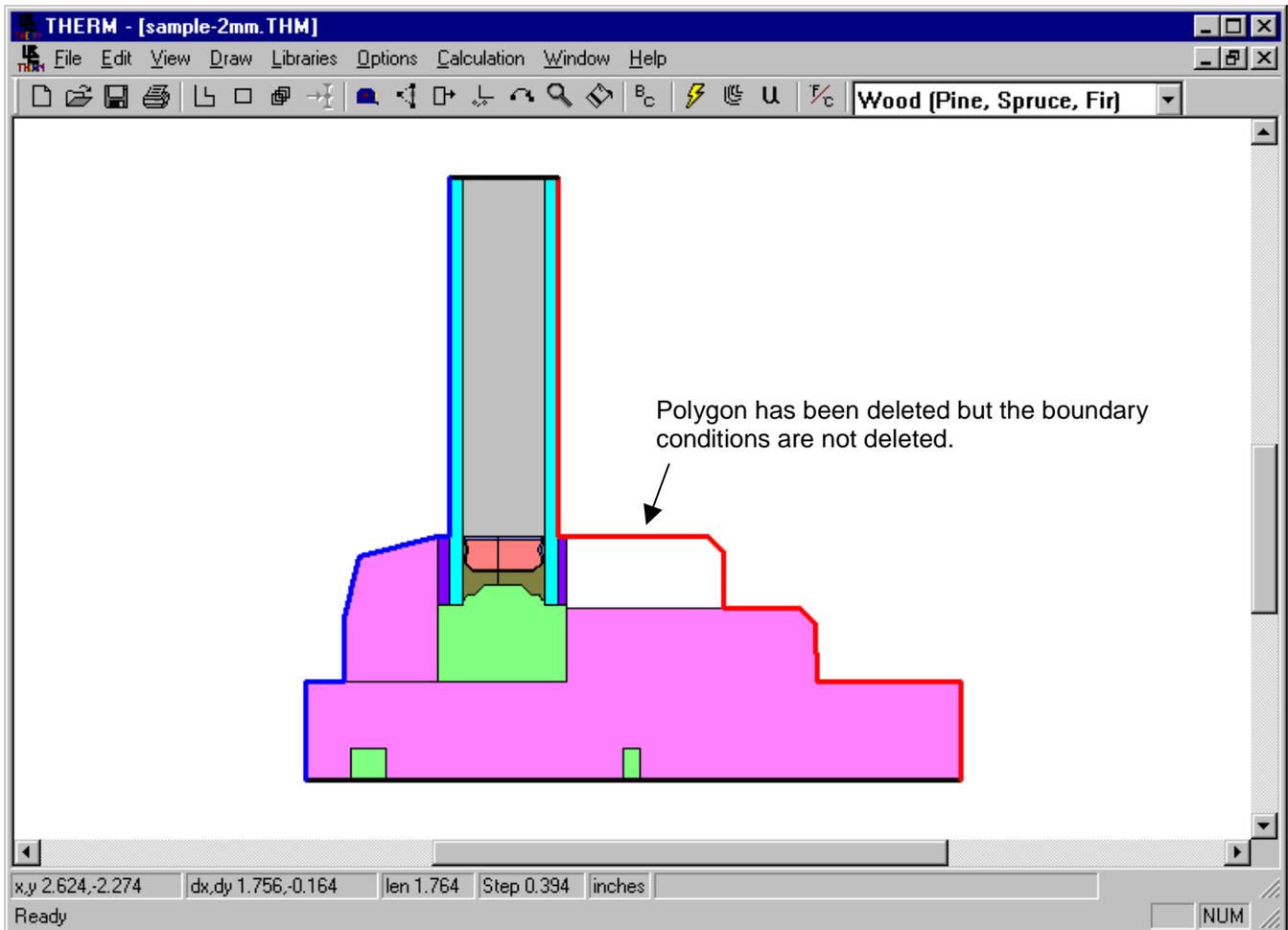
It is also now possible to "undo" a boundary condition definition using the Edit/Undo toolbar button.

The Eye Dropper tool also works for boundary conditions. Click on the Eye Dropper tool, click on the boundary condition segment to select, then click the Fill tool on the boundary condition segment to be changed.

Results Display Options

It is now possible to control the settings for all the results displays.

Color Flux and Color Legend

There is now a legend that displays for the Color Infrared and Color Flux Magnitude results. Also, it is possible to show the polygon outlines on top of these images.
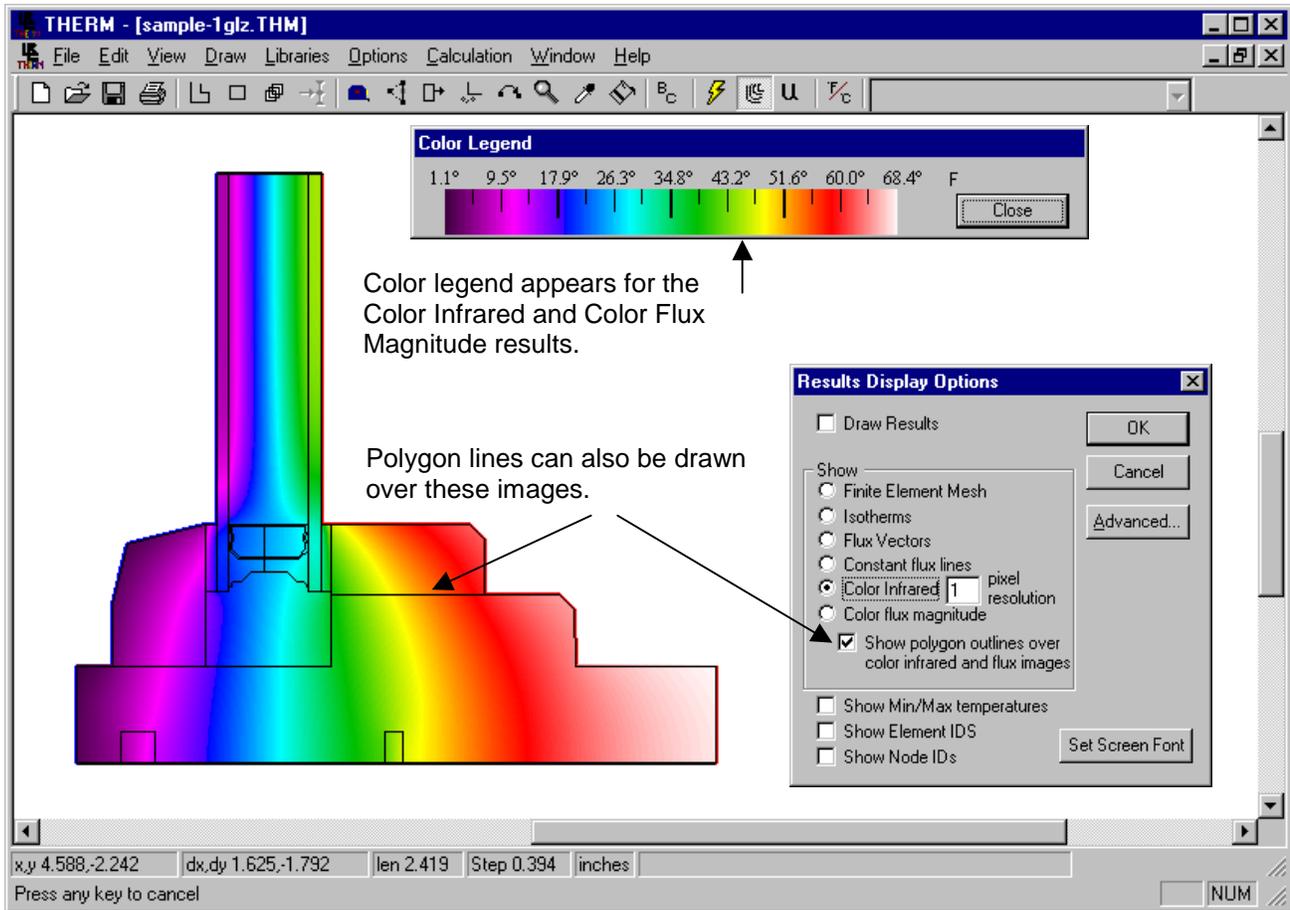
U-factor Dialog Box

U-factor Results dialog box now displays the delta T value properly in IP units, and also allows a Custom length to be entered for either Frame or Edge. This is useful for cases where a Frame boundary condition extends below an Adiabatic boundary, which would result in an incorrect Frame U-factor calculation.
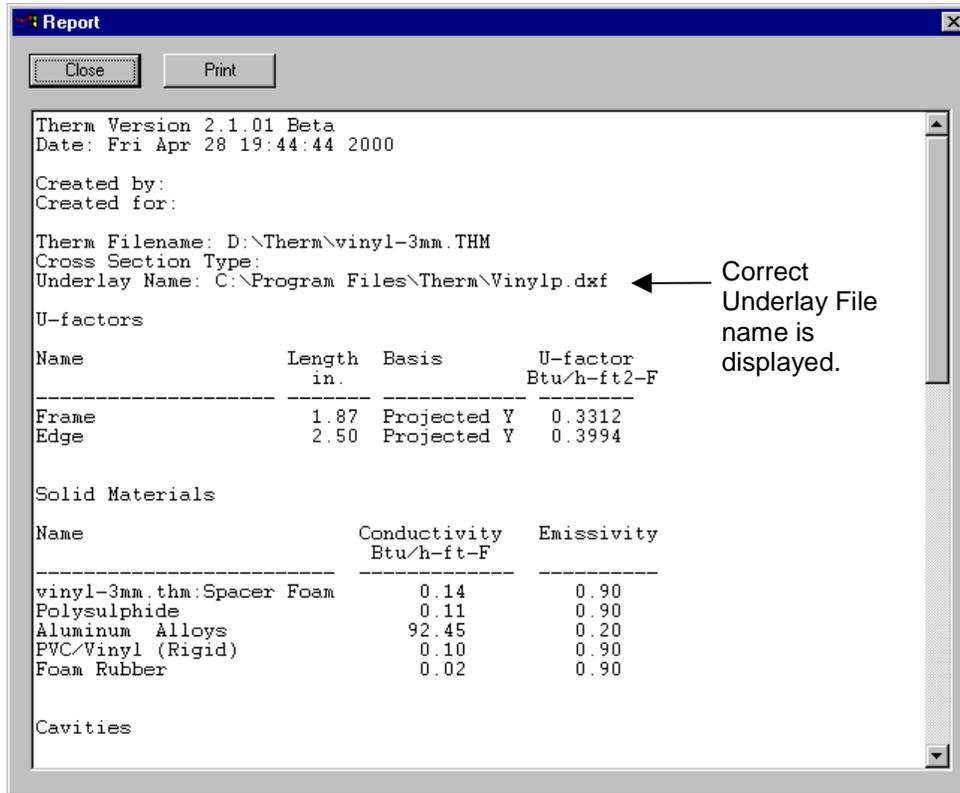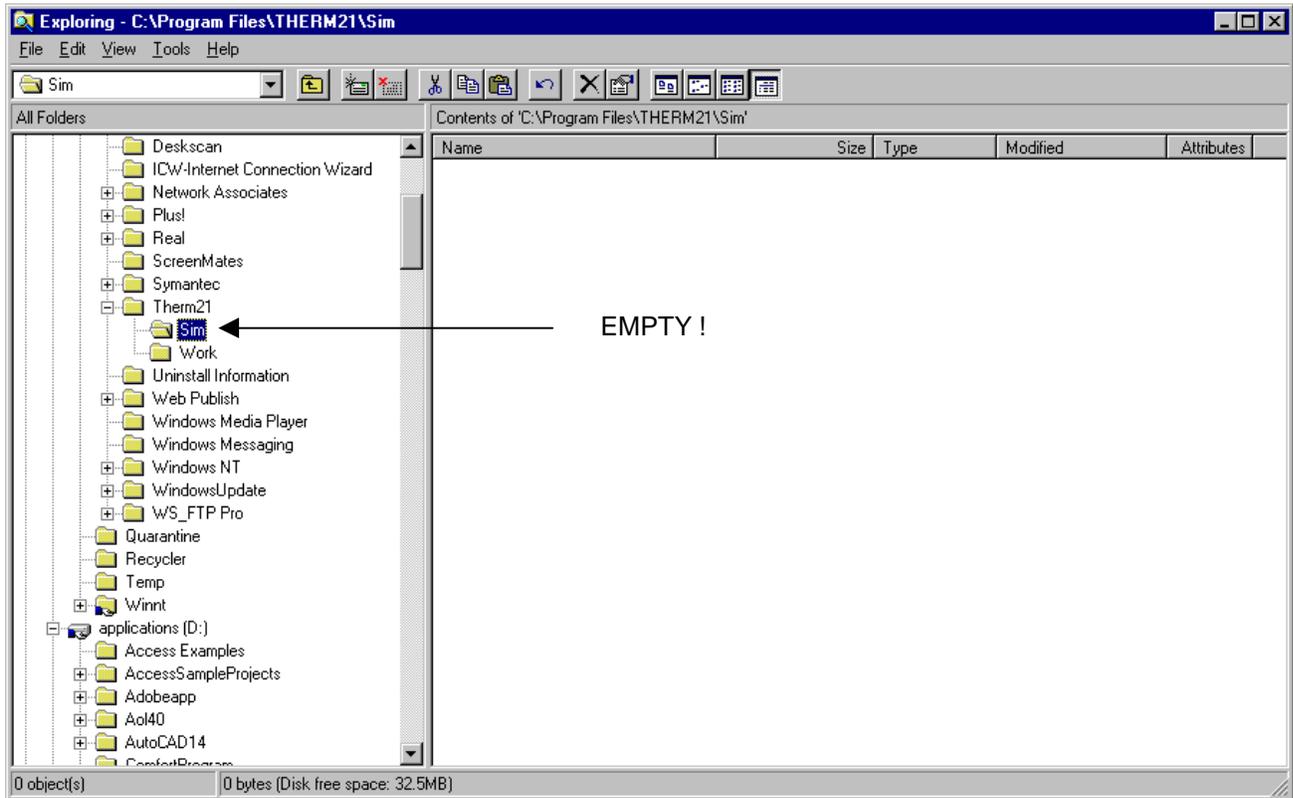
DXF file name in Report

THERM correctly reports the "Underlay Name" and path in the Report

Simulation Directory Files

No temporary files are left in the "Sim" (Simulation) directory.

Frame 40 Converter

To import an F40 file, follow these steps:

- Import F40 file
- Delete Glazing System polygons
- Import new Glazing System from WINDOW
- Use Special Select to select multiple polygons of same material and then change material to THERM material
- Delete all Frame Cavities, and refill with THERM Frame Cavity materials
- Create Boundary Conditions
- Run model