HEAT2

A PC-program for heat transfer in two dimensions.

Update manual for version 6

(Changes since version 5)

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Thomas Blomberg

Lund-Gothenburg Group for Computational Building Physics

Contents

1. What's new in HEAT2 version 6

Blocon is proud to present a new version of HEAT2 (6.0). It has been three years since version 5 was released and many new important features have been added.

Up-to-date information is given on www.buildingphysics.com and www.buildingphysics.de (in German).

The following list shows new features that have been added since version 5.

1.1 Thermal bridges according to EN ISO 10211

HEAT2 automatically calculates the thermal coupling coefficient (L^{2D}) and the thermal transmittance (ψ) according to EN ISO 10211 for a wide variety of problems involving thermal bridges. Also the temperature ratio (f_{Rsi}) for the coldest interior surface point is presented. It is even possible to obtain the lowest value for a yearly/daily outdoor climate variation.

1.2 Report Generator

The Report Generator produces on-the-fly a printable document with optional text and figures with project info, and input/output data.

1.3 Movie Maker

The Movie Maker captures graphical output data, such as temperatures, isotherms, and heat flows and makes a standard AVI-file. The AVI-file may optionally be un-compressed (high quality) or compressed (lower quality but smaller size suitable to send by email).

1.4 Temperatures/heat flow along lines

It is now possible to draw lines in the pre-processor and chart the temperatures (or heat flow intensities) along the lines. There is no practical limitation on the number of lines. The charts can be printed and the data for each line can be exported in different formats (text, Excel, HTML, XML, Metafile, bitmap). A chart of all boundary surface temperatures may also be shown.

1.5 Expansive meshes

An expansive mesh can easily be generated by drawing an expansion point in the pre-processor. A new numerical mesh dialog is also developed.

1.6 Boundary splitter

Boundary split points can be put on any boundary segment in the pre-processor. This will divide the straight boundary segment into multiple segments allowing different boundary conditions.

1.7 Enhancements in the material list

The material list is now searchable. Thermal properties may be shown in the material pick list after the material name. It is possible to have a hierarchical structure with two levels for the material list. The default material file that is used when HEAT2 starts can be changed.

A new material file has been added with over 1200 items from the German standard DIN V 4108-4.

1.8 Increased sizes for data fields

Many data fields have been increased in sizes. E.g. the maximum number of numerical nodes has been doubled from 62.500 (250·250) to 122.500 (350·350), see Section 9 for more info.

HEAT2 6.0 requires only about 13 MB RAM, and less than 5 MB hard disk space.

1.9 Other changes

Hundreds of minor improvements are made, see section 10. The most important are shown below

- Enhancements in pre-processor

- Initial guess of boundary conditions

- New XP-style file open/save dialogue boxes

- New routine for interpolation of temperatures with higher accuracy

- Export data for graphs in different formats (text, Excel, HTML, XML, Metafile, bitmap)

- Resizing post-processor window without updating window contents

- Output flows are shown with higher precision in the recorder (more significant digits – good for e.g. calculating response factors)

- Lengths and boundary condition types are shown in the "Boundary flows" window

- New dialogue window for resetting initial conditions

- Version 6 automatically fixes a wrong decimal separator

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2. Thermal bridges according to EN ISO 10211

HEAT2 automatically calculates the thermal coupling coefficient (L^{2D}) and the thermal transmittance (ψ) according to EN ISO 10211 for a wide variety of problems involving thermal bridges. Also the temperature ratio (f_{Rsi}) for the coldest interior surface point is presented. It is even possible to obtain the lowest value for a yearly/daily outdoor climate variation.

HEAT2 will identify thermal bridges according to EN ISO 10211 for geometry with the following limitations:

1. There must be two boundary conditions with different temperatures (e.g. T=20, T=0). Problems with three different temperatures can be calculated by hand using a matrix of $T(i,j)$ and $g(i,j)$, see EN ISO 10211.

2. If the cut-off planes are parallel, the undisturbed (one-dimensional) U-value at the ends must be the same, see e.g. Figure 1 below.

2.1 Parallel cut-off planes

Figure 1 shows a wall of insulation broken by a concrete slab. The internal boundaries are labeled 2-6, and the external ones 8-12. The cut-off planes (1 and 7) are parallel and have the same U-value. Figure 2 shows the boundary conditions and calculated temperatures.
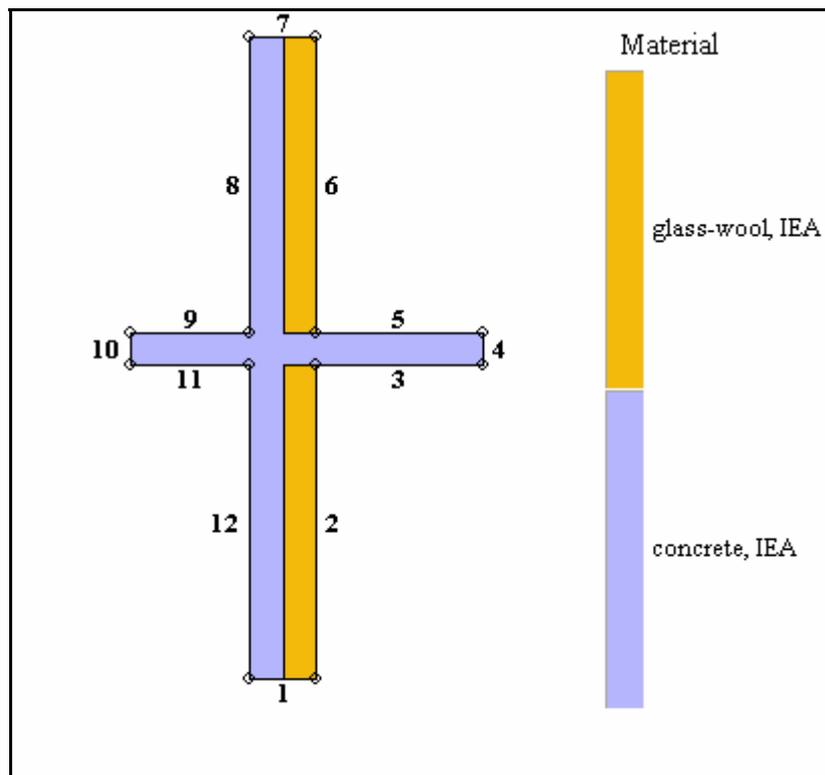

Figure 1: Insulation broken by a concrete slab.
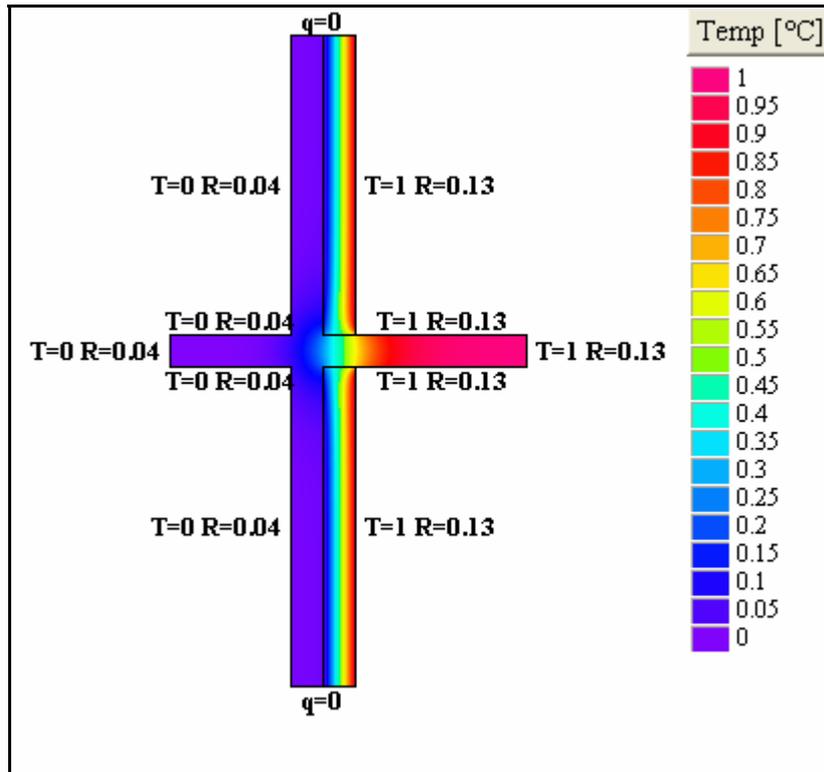
Figure 2. Boundary conditions and calculated temperatures.

HEAT2 will identify internal and external sides.

The following results will be shown in the "Boundary Flows" window (menu item "Calculate thermal bridges (EN ISO 10211-2" under "Output" should be enabled). The thermal coupling coefficient (L^{2D}) is simply calculated as the sum of positive heat flows divided by the temperature difference. The thermal transmittance (ψ) is calculated as the thermal coupling coefficient minus the heat flow through the undisturbed wall (pure insulation) for the height (L). Also, the average U-value for the section is shown. Extreme temperatures (min/max) are shown for both the internal and external sides. The temperature ratio (f_{Rsi}) is shown with location (x, y) for the coldest interior surface point.

```
Bound    q        q       length  BC
        [W/m²]    [W/m]     [m]
 2     0.1647    0.3228    1.96    T=1 R=0.13
 3     0.4685    0.4873    1.04    T=1 R=0.13
 4     0.0175    0.0035     0.2    T=1 R=0.13
 5     0.4685    0.4873    1.04    T=1 R=0.13
 6     0.1651    0.3038    1.84    T=1 R=0.13
 8    -0.3392   -0.624     1.84    T=0 R=0.04
 9    -0.2276   -0.1684    0.74    T=0 R=0.04
10    -0.0036   -0.0007     0.2    T=0 R=0.04
11    -0.2276   -0.1684    0.74    T=0 R=0.04
12    -0.3281   -0.6431    1.96    T=0 R=0.04
Sum flows:         0 W/m
Sum pos flows: 1.6046 W/m


THERMAL BRIDGES ACCORDING TO EN ISO 10211:

Thermal coupling coefficient:
  L^2D=q_in/dT=1.6046/1= 1.6046 W/(m·K)


Thermal transmittance coefficient:
  Psi=L^2D-U_1D*L=1.6046-0.1586*4= 0.9702 W/(m·K)

Average U-value for section:
```

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```
   U_avr=U_1D+Psi/L=0.4012 W/(m²·K)

Horizontal cut-off planes found.

One-dimensional U-values at cut-off planes [W/(m²·K)]:
                   exact    calc    error(%)
  lower boundary:  0.1586   0.1587     <0.5
  upper boundary:  0.1586   0.1587     <0.5

Extreme temperatures and temperature factor f_Rsi:
  Indoor  Min: 0.6629°C f_Rsi=f_0.13=0.6629 at (x, y)=(1.14, 1.96)
          Max: 0.9979°C
  Outdoor Min: 0.0001°C
          Max: 0.0648°C
  Indoor boundaries : 2 3 4 5 6
  Outdoor boundaries: 8 9 10 11 12
```

The exact and calculated U-value at the cut-off planes (in this case the horizontal lower boundary 1, and upper boundary 7) will be shown). If the cut-off planes are too close the central element the exact and calculated U-value will differ from each other. This may lead to incorrect results (e.g. the ψ-value).

The distance between cut-off plane and central element should normally be at least 1 m according to EN ISO 10211.

2.2 Non-parallel cut-off planes

Figure 3 shows a corner with external insulation. The internal boundaries are labeled 2-3, and the external ones 5-8. The cut-off planes (1 and 4) are non-parallel and have different U-values. Figure 4 shows the boundary conditions and calculated temperatures.
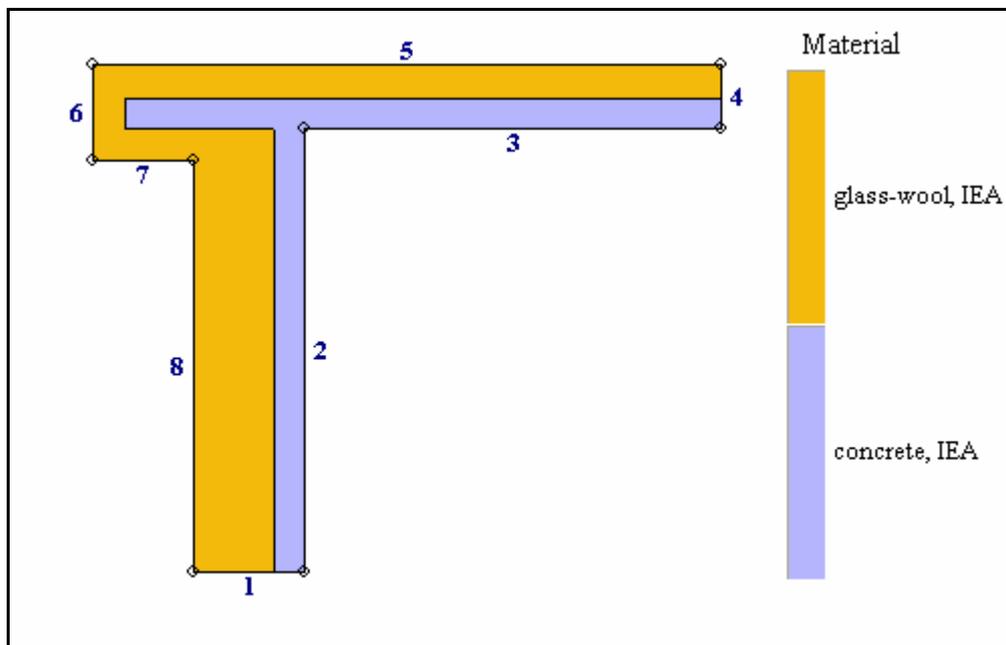

Figure 3: Corner with external insulation.
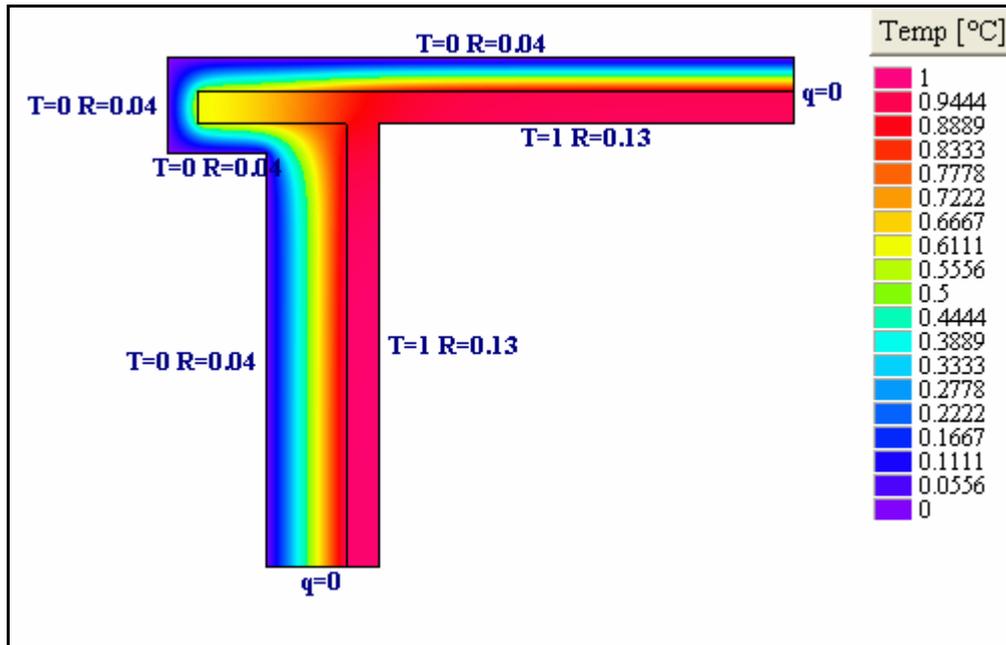
Figure 4. Boundary conditions and calculated temperatures.

The following results will be shown in the "Boundary Flows" window. The thermal transmittance (ψ) is calculated for two different lengths in accordance with EN ISO 10211, see Figure 5. The internal length 1.44+1.34=2.78 m gives ψ=0.2124 W/(m·K). The external length is defined as (0.36+1.34)+(1.44+0.21)=3.35 m. This gives ψ=0.0847 W/(m·K).

The temperature ratio (f_{Rsi}) for the coldest interior surface point (at the corner) is 0.9042.

```
Bound    q          q       length  BC
        [W/m²]     [W/m]     [m]
 2      0.2102     0.3027    1.44    T=1 R=0.13
 3       0.348     0.4663    1.34    T=1 R=0.13
 5       -0.25     -0.505    2.02    T=0 R=0.04
 6     -0.1034    -0.0321    0.31    T=0 R=0.04
 7     -0.1774    -0.0568    0.32    T=0 R=0.04
 8     -0.1306     -0.175    1.34    T=0 R=0.04
Sum flows:       0.0001 W/m
Sum pos flows:   0.769 W/m


THERMAL BRIDGES ACCORDING TO EN ISO 10211:

Thermal coupling coefficient:
  L^2D=q_in/dT=0.769/1= 0.769 W/(m·K)

Corner found with both horizontal and vertical cut-off planes.
Internal and external lengths are not the same:

  L(i)=1.44+1.34=2.78 m gives thermal transmittance coefficient:
  Psi(i)=L^2D-U_1*L1-U_2*L2=0.769-0.1237*1.44-0.2825*1.34=0.2124 W/(m·K)
  Average U-value: U_avr(i)=(U_1*L1+U_2*L2+Psi(i))/L(i)=0.2766 W/(m²·K)

  L(e)=1.65+1.7=3.35 m gives thermal transmittance coefficient:
  Psi(e)=L^2D-U_1*L1-U_2*L2=0.769-0.1237*1.65-0.2825*1.7=0.0847 W/(m·K)
  Average U-value: U_avr(e)=(U_1*L1+U_2*L2+Psi(e))/L(e)=0.2295 W/(m²·K)


One-dimensional U-values at cut-off planes [W/(m²·K)]:
                exact     calc     error(%)
  lower boundary: 0.1237   0.1241    <0.5
  right boundary: 0.2825   0.2829    <0.5
```

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```
Extreme temperatures and temperature factor f_Rsi:
  Indoor  Min: 0.9042°C f_Rsi=f_0.13=0.9042 at (x, y)=(0.68, 1.44)
          Max: 0.9838°C
  Outdoor Min:-0.0010°C
          Max: 0.0571°C
  Indoor boundaries : 2 3
  Outdoor boundaries: 5 6 7 8
```


Figure 5: Boundary lengths.

3. Report Generator

The Report Generator produces on-the-fly a printable document with optional text and figures with project info, and input/output data (see menu item "Output/Report preview F2"). Figure 6 shows the options for the report (menu item "Output/Report options").
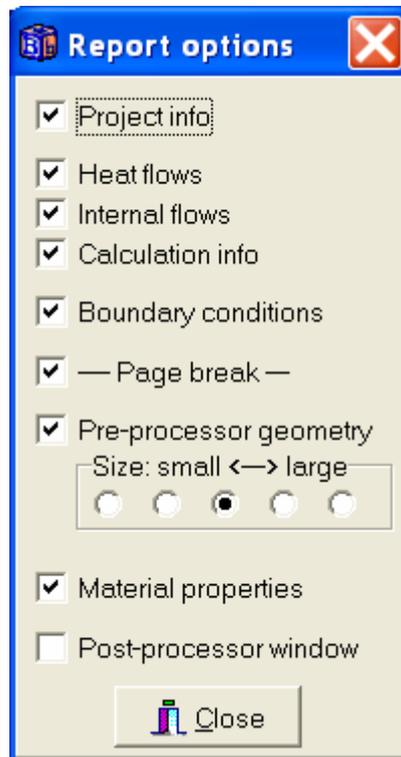
Figure 6: Options for report.

An example of an report is shown below (without graphics).

```
HEAT2 report: ISO2

Input file:   ISO2.DAT (*.H2P), last saved on 9/2/2003 9:01:00 PM

Project info:

Boundary flows Bound    q        q      length  BC
                      [W/m²]    [W/m]     [m]
               2    0.2102   0.3027    1.44    T=1 R=0.13
               3     0.348   0.4663    1.34    T=1 R=0.13
               5     -0.25   -0.505    2.02    T=0 R=0.04
               6   -0.1034  -0.0321    0.31    T=0 R=0.04
               7   -0.1774  -0.0568    0.32    T=0 R=0.04
               8   -0.1306   -0.175    1.34    T=0 R=0.04
               Sum flows:     0.0001 W/m
               Sum pos flows:  0.769 W/m


               THERMAL BRIDGES ACCORDING TO EN ISO 10211:

               Thermal coupling coefficient:
               L^2D=q_in/dT=0.769/1= 0.769 W/(m·K)

               Corner found with both horizontal and vertical cut-off planes.
               Internal and external lengths are not the same:
```

```
        L(i)=1.44+1.34=2.78 m gives thermal transmittance coefficient:
        Psi(i)=L^2D-U_1*L1-U_2*L2=0.769-0.1237*1.44-0.2825*1.34=0.2124 W/(m·K)
        Average U-value: U_avr(i)=(U_1*L1+U_2*L2+Psi(i))/L(i)=0.2766 W/(m²·K)

        L(e)=1.65+1.7=3.35 m gives thermal transmittance coefficient:
        Psi(e)=L^2D-U_1*L1-U_2*L2=0.769-0.1237*1.65-0.2825*1.7=0.0847 W/(m·K)
        Average U-value: U_avr(e)=(U_1*L1+U_2*L2+Psi(e))/L(e)=0.2295 W/(m²·K)


        One-dimensional U-values at cut-off planes [W/(m²·K)]:
                          exact    calc    error(%)
              lower boundary: 0.1237  0.1241    <0.5
              right boundary: 0.2825  0.2829    <0.5

        Extreme temperatures and temperature factor f_Rsi:
             Indoor  Min: 0.9042°C f_Rsi=f_0.13=0.9042 at (x, y)=(0.68, 1.44)
                     Max: 0.9838°C
           Outdoor Min:-0.0010°C
                     Max: 0.0571°C
                   Indoor boundaries : 2 3
        Outdoor boundaries: 5 6 7 8

Calculation:
                  Steady-state simulation, 10898 iterations
                  Stable time step: 0.8902 s
                  Determined at cell (88,108) (dx,dy)=(0.0032,0.0019)
                  Number of cells: 17664 (Nx=197, Ny=161)

Boundary conditions:
                  3 types
                  q=0 W/m
                  T=1°C, R=0.13 m²·K/W
                  T=0°C, R=0.04 m²·K/W


Materials:                    Lx         Ly         C
                          [W/(m·K)]  [W/(m·K)]  [MJ/(m³·K)]
    glass-wool, IEA         0.033      0.033      0.062
    concrete, IEA           2.7        2.7        1.83

Report generated 2/2003 9:30 PM HEAT2 version 6.0
```

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4. Movie Maker

4.1 How to make a movie

The Movie Maker captures graphical output data, such as temperatures, isotherms, and heat flows and makes a standard AVI-file. The AVI-file may optionally be un-compressed (high quality) or compressed (lower quality but smaller size suitable to send by email).

Figure 6 shows the Movie recorder/player window (under menu item "Output").
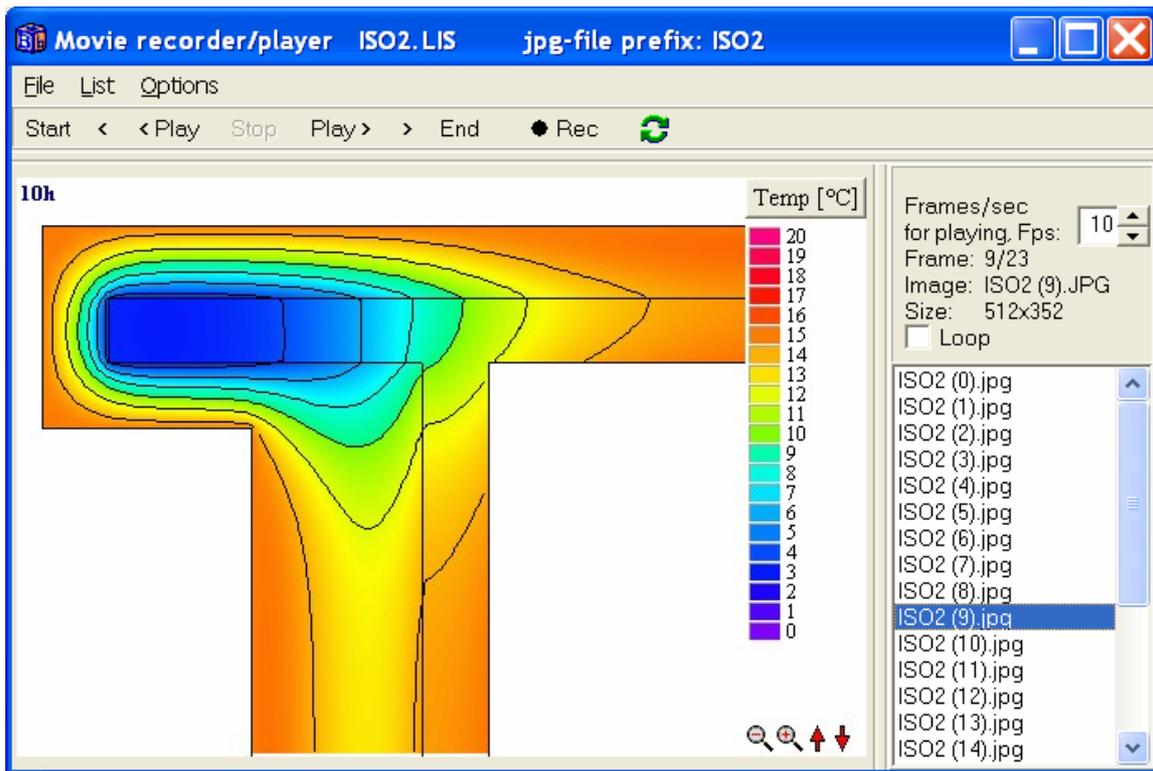
Figure 6: The Movie recorder/player window.

A movie is defined by a list of JPG-files. First, a list file name is chosen (Figure 6 shows a list called "ISO2.LIS"). This file list (*.LIS) may be saved/opened to/from the hard disk.

The Movie recorder captures frames from the post-processor on each screen update (specified in menu item "Solve/Update interval"). The frames are captured and saved to the hard disk as JPG-files beginning with the list file name plus a counter. The list file itself is just a text file with the JPG-files:

```
ISO2 (0).jpg
ISO2 (1).jpg
ISO2 (2).jpg
ISO2 (3).jpg
...
```

The JPG-files and the referring LIS-file must be in the same hard-disk folder.

Making a movie involves the following steps:

1. Prepare the desired content of the post-processor, (e.g. temperatures and isotherms/ zooming of geometry/scale options/isotherms(heat flow arrays/etc). Be careful when choosing the window size for the post-processor: the larger the size, the larger the captured frames (and resulting AVI) will be.

2. For transient cases, the simulation time can be displayed in the upper left corner in the post-processor (menu item "Options/Show simulation time").

3. Give a proper update interval (menu item "Solve/Update interval") between capturing.

4. Open the Movie recorder (menu item "Output/Movie recorder/player"). Choose menu item File/new and give a name for the LIS-file. Tip: place the lis-file in the "Movie folder". There will be many jpg-files created and it might be good to keep them separated from the HEAT2 folder.

5. Press the REC-button (this will turn red on record mode). Note that it is now not possible to change the post-processor window size (exporting to AVI-format requires this). Start the simulation. The frames will now be captured. To stop recording, press the REC-button again.

6. Now the movie can be shown using the "Play"-button. Check the "Loop"-box to have a continuous show. Don't forget your pop-corn.

7. Don't forget to save the list to hard disk (the captured JPG-files are already saved).

The number of frames per second (FPS) for viewing can be adjusted on the right-hand side panel. Note that the performance depends on how fast computer/graphics card is available.

Note: If a captured frame has a name that already exists (already a JPG-file with that name on the hard-disk), a new name will be given to it. E.g. if ISO2 (4).jpg already exists, it will be saved as ISO2 (4_1).jpg instead. Also, this name will be correctly added to the list.

4.2 How to make an AVI-file

A movie can be exported into an AVI-file. In fact, there are 11 different formats that may be used. It may optionally be un-compressed (high quality) or compressed (lower quality but smaller size suitable to send by email), see Figure 7. All formats are playable by ordinary AVI-players (such as Microsoft's Windows Media Player). HEAT2 also have a simple internal AVI-player (menu item Output/AVI-player).
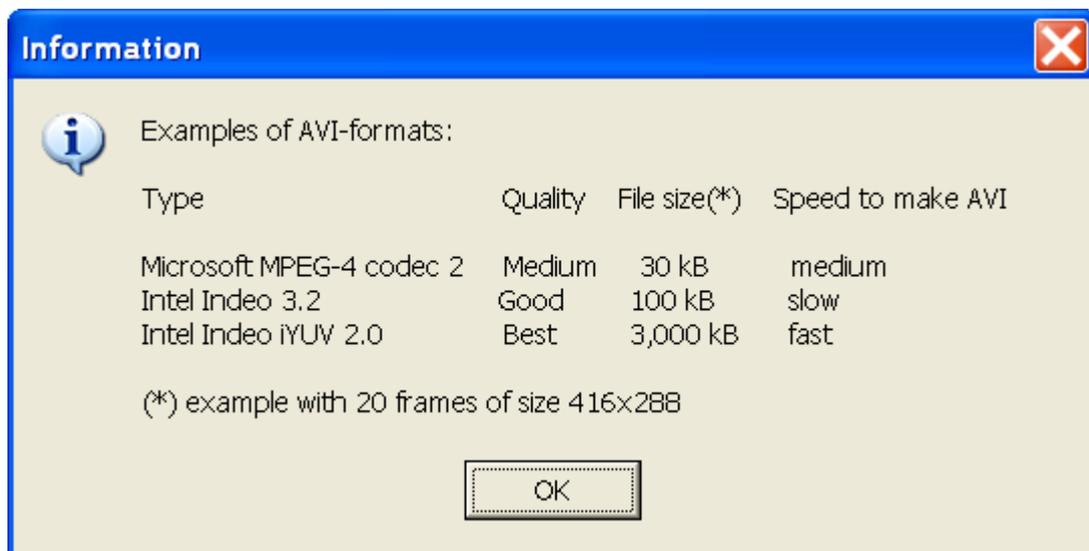

Figure 7: Examples of AVI-formats.

To converting a movie to an AVI use menu item "File/Export to AVI". Note that the given the number of frames per second (FPS) will affect the final AVI-file when it is played.

Note: some AVI-formats may not work due to operating system and size of jpg-files. If a format does not work, please try another one.

5. Temperatures/heat flow along lines

It is now possible to draw lines in the pre-processor and chart the temperatures (or heat flow intensities) along the curves. There is no practical limitation on the number of lines. The charts can be printed and the data for each line can be exported in different formats (text, Excel, HTML, XML, Metafile, bitmap). A chart of all boundary surface temperatures may also be shown.

5.1 Drawing options

The temperature/heat flow window is shown by menu item "Temperature along line/boundaries". Figure 8 shows the drawing options.
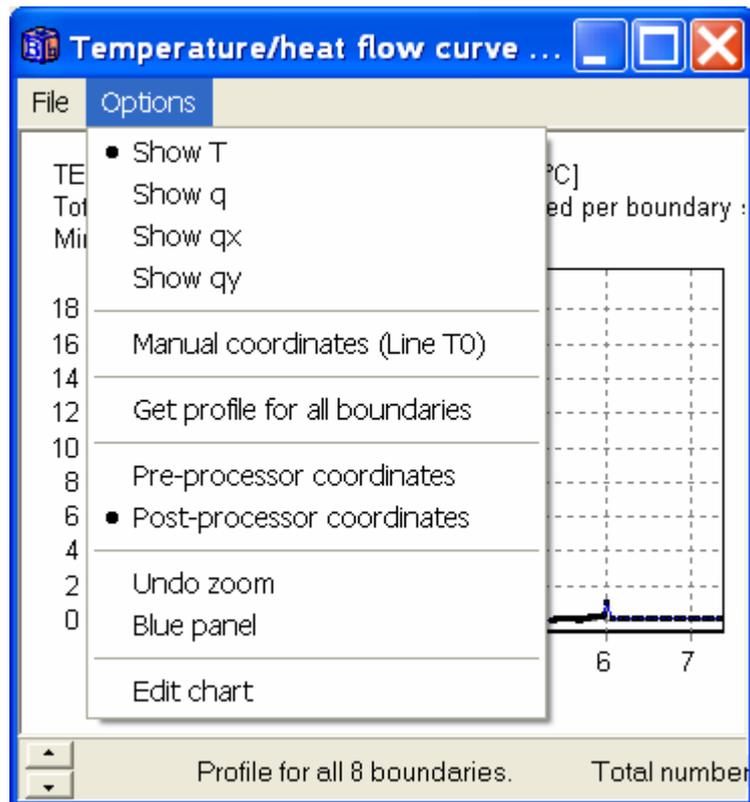
Figure 8: Drawing options.

5.2 Profile for all boundaries

Consider the option "Get profile for all boundaries". Figure 9 shows the surface temperatures for a corner with external insulation, see figure 3. Here, the internal temperature is 20 ºC. The external temperature is 20 ºC. Figure 10 shows the heat flow intensities perpendicular into the 8 boundaries.
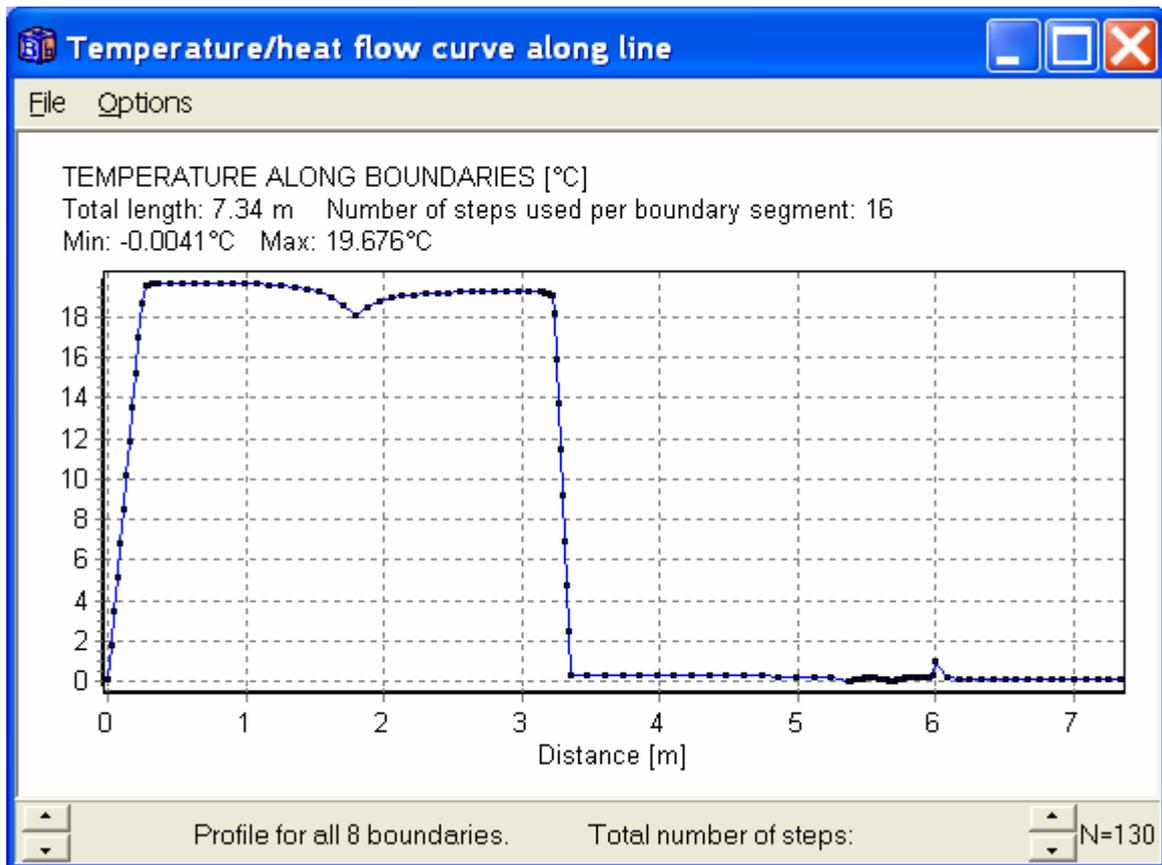
Figure 9: Surface temperatures around the 8 boundaries for a corner with external insulation, see figure 3.
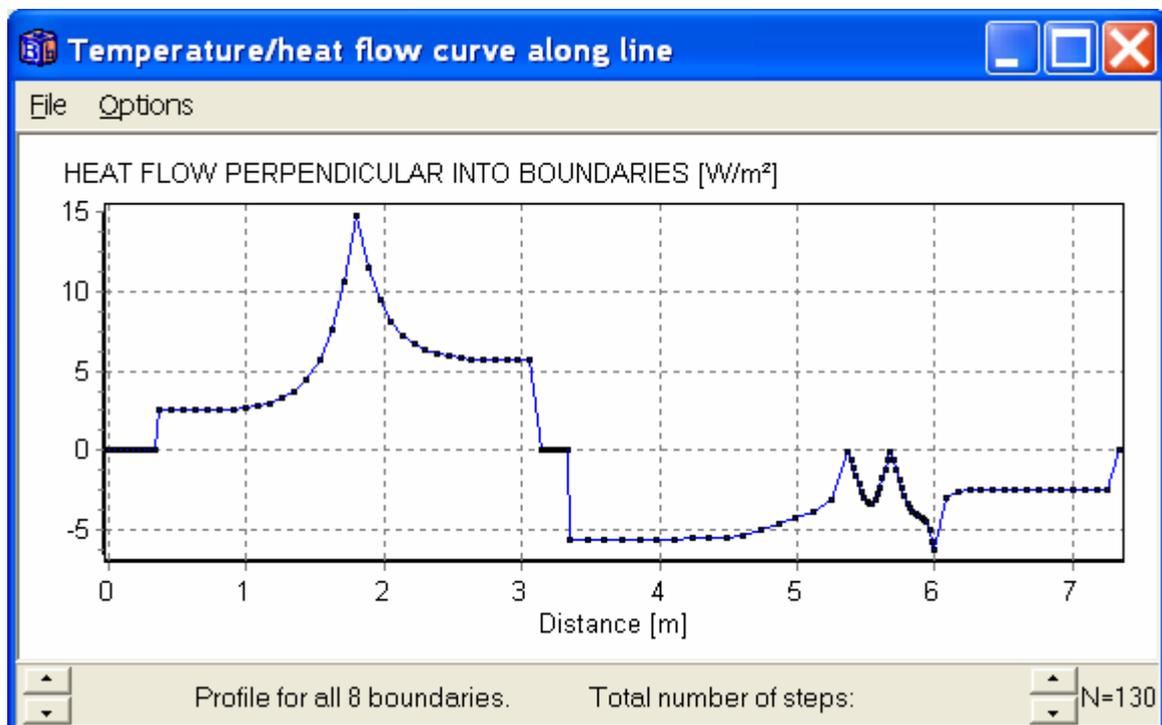

Figure 10: Heat flow intensities perpendicular into the 8 boundaries.

5.3 Drawing a temperature line in the pre-processor

There is a new tool on the upper tool bar that allows "temperature lines" to be drawn (third tool from the right). Figure 11 shows two drawn lines. Figure 12 shows the temperatures along line 1. Press the up-down button in the lower left corner to change to line 2.

Coordinates can be shown for pre-processor coordinates or post-processor coordinates, see drawing options in Figure 8.
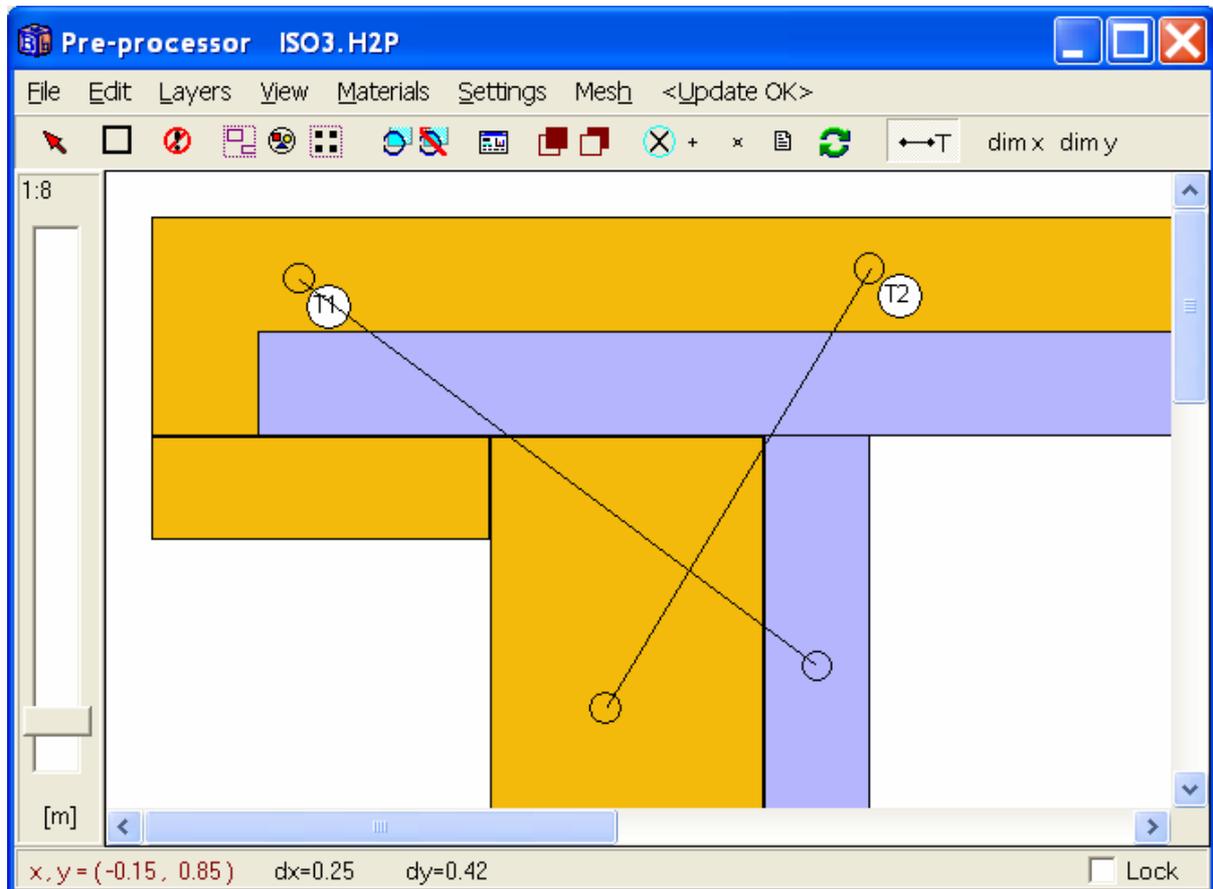
Figure 11: Two temperature lines drawn in the pre-processor.

5.4 Drawing a temperature line using manual coordinates

It is also possible to get data for a line using manual coordinates. This is because geometry can be described using only text input. Another case is when the length mesh has been changed after updating in the pre-processor (e.g. the ground has been extended out from a slab on the ground using text input). Only post-processor coordinates can be used, see Figure 13.
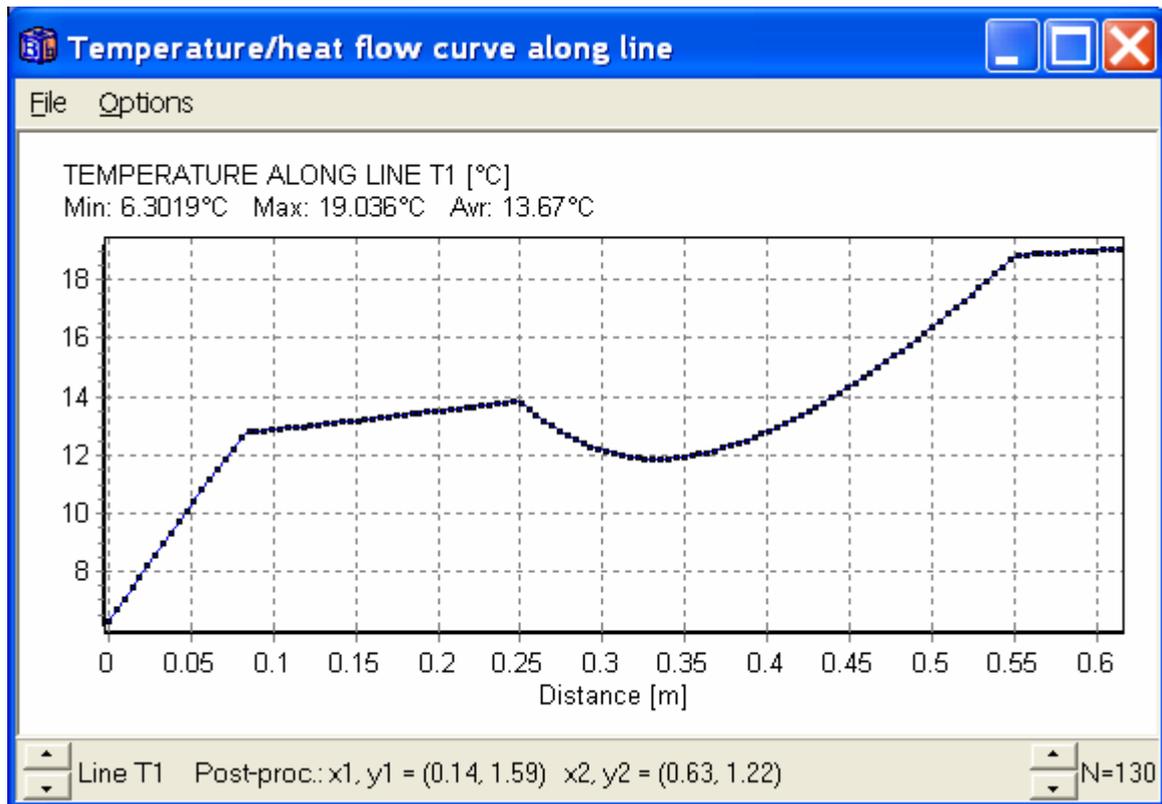
Figure 12: Temperatures along line 1.
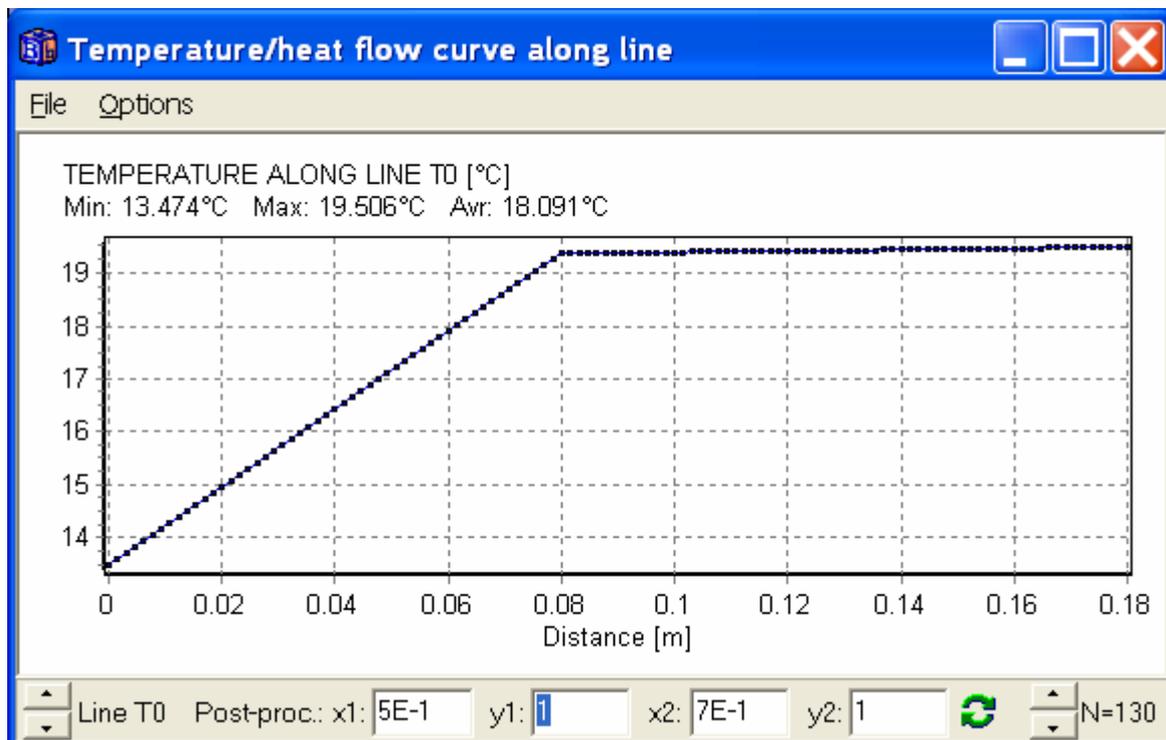
Figure 13: Temperatures along manually given line. The line is shown as T0.

6. Expansive meshes

6.1 The expansion point tool

Expansive meshes can now easier be specified using the expansion point tool in the pre-processor, see Figure 14. Here, one expansion point is placed at the corner. Figure 15 shows an equidistant mesh (top) and the expansive mesh (bottom) due to the expansion point.
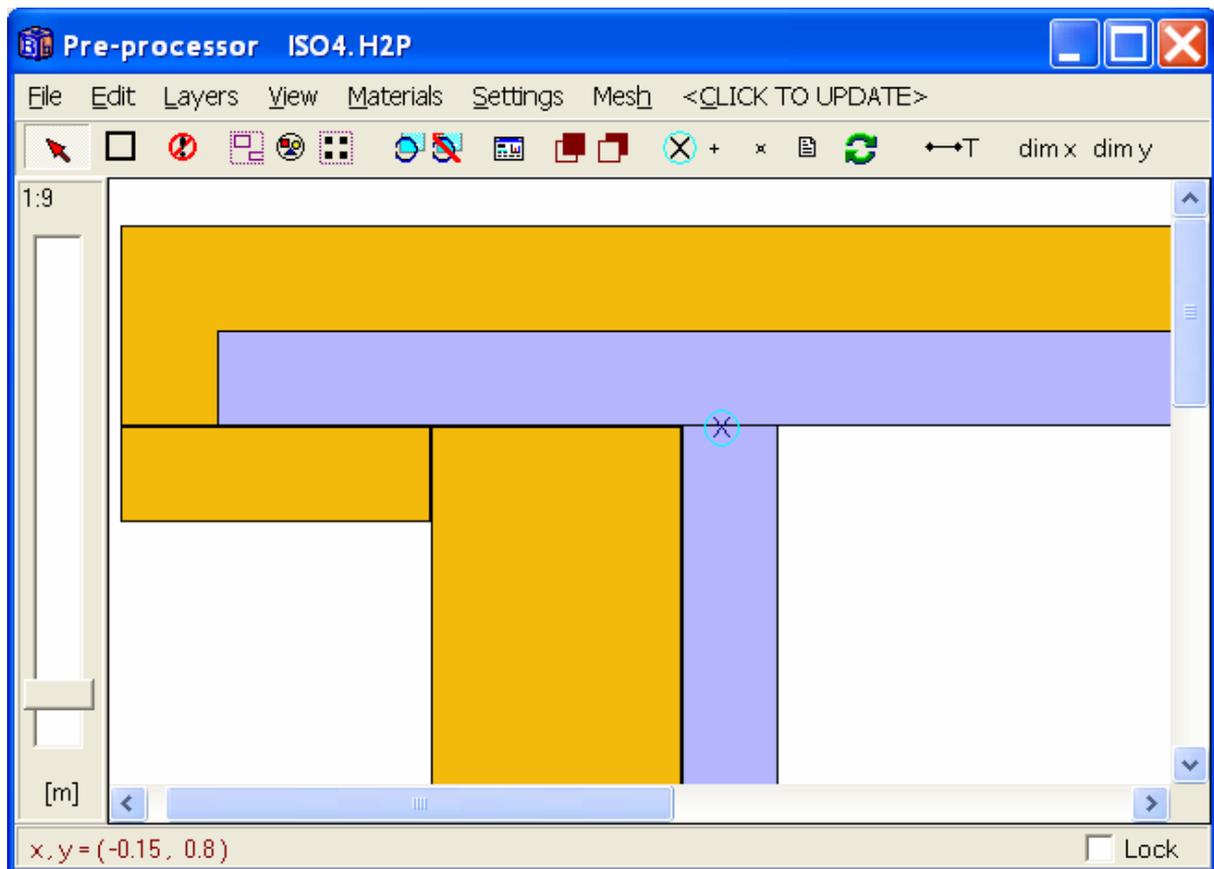

Figure 14: The expansion point tool in the pre-processor.
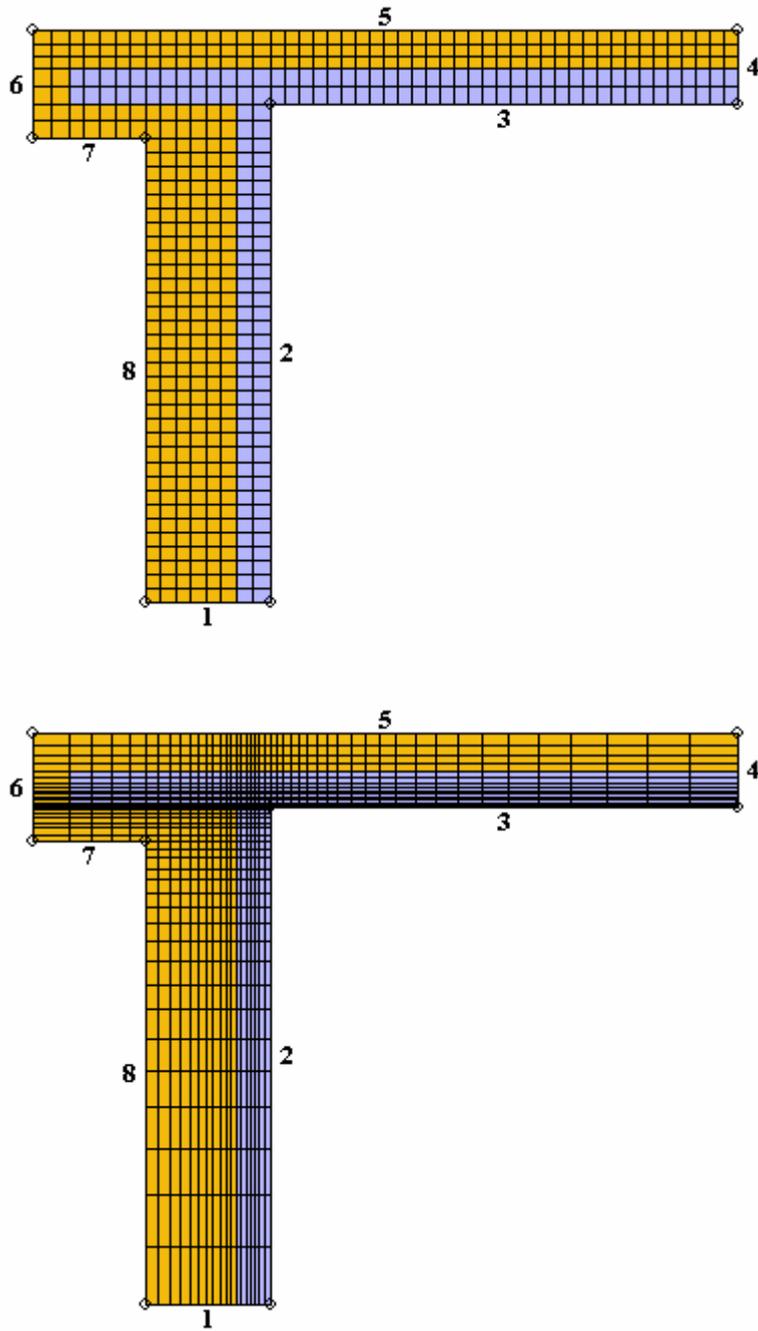
Figure 15: Equidistant mesh (top) and expansive mesh (bottom).

6.2 The mesh dialogue window

Figure 16 shows the new mesh dialogue window. This can be reach by pressing menu item "Mesh" in the pre-processor. Data for the expansion point can also be given here.
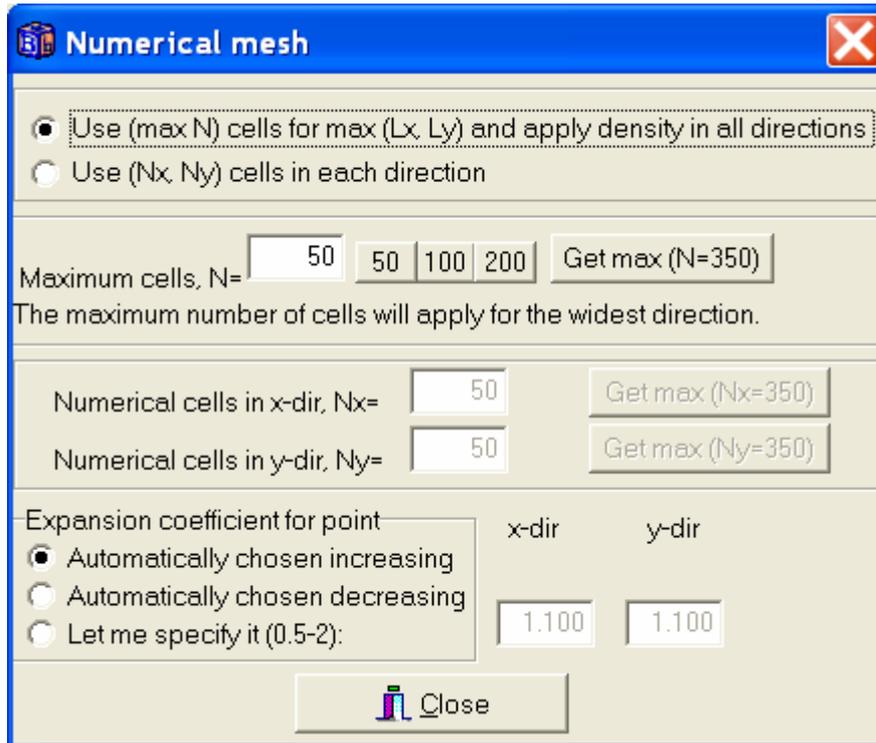
Figure 16. The mesh dialogue window.

7. The boundary split tool

Boundary split points can be put on any boundary segment in the pre-processor. This will divide the straight boundary segment into multiple segments allowing different boundary conditions.

Figure 17 shows four boundary split points. Figure 18 shows the resulting boundary numbers that can be connected to an arbitrary boundary condition (e.g. with different surface resistance).
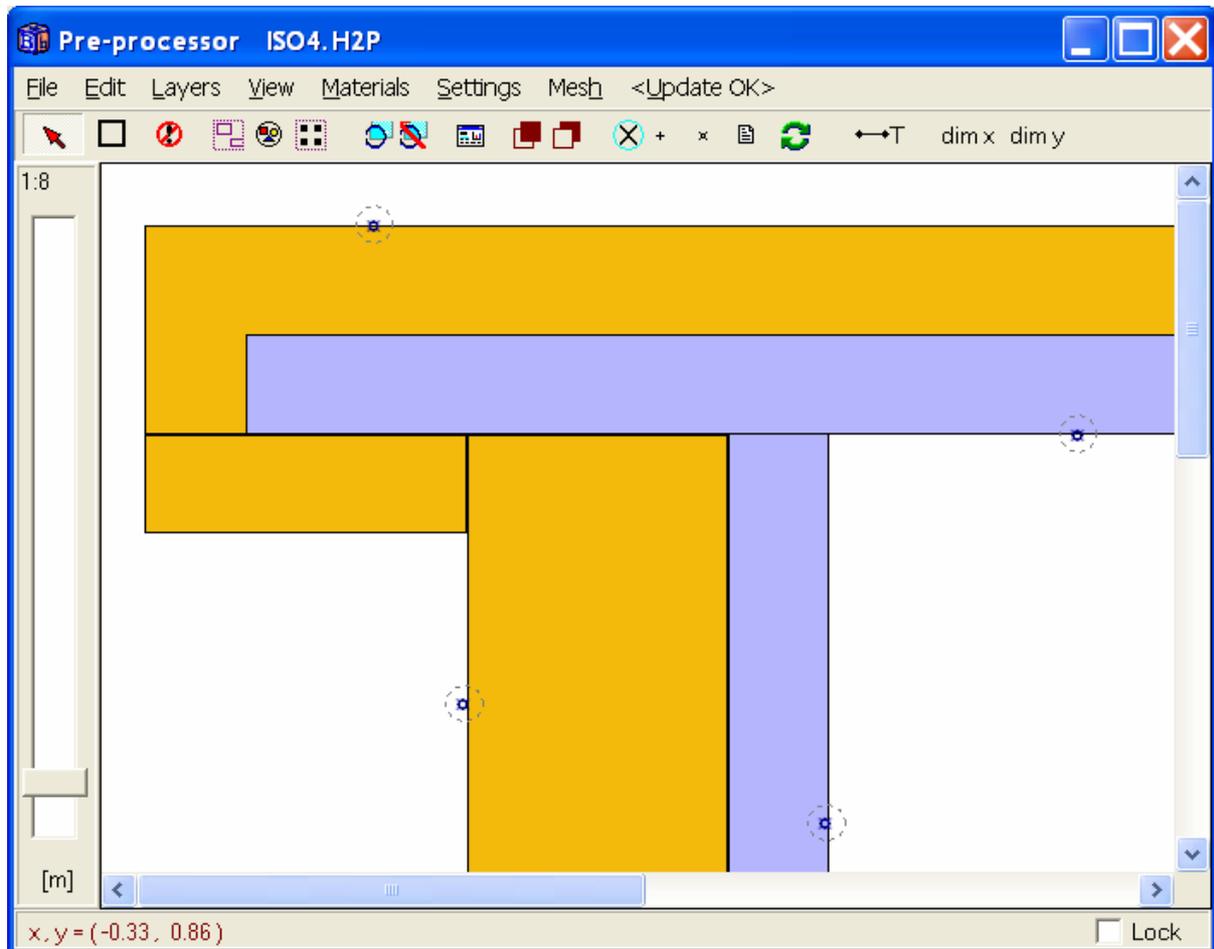

Figure 17: Four boundary split points drawn using the boundary split tool (6:th tool from the right on the upper tool bar).
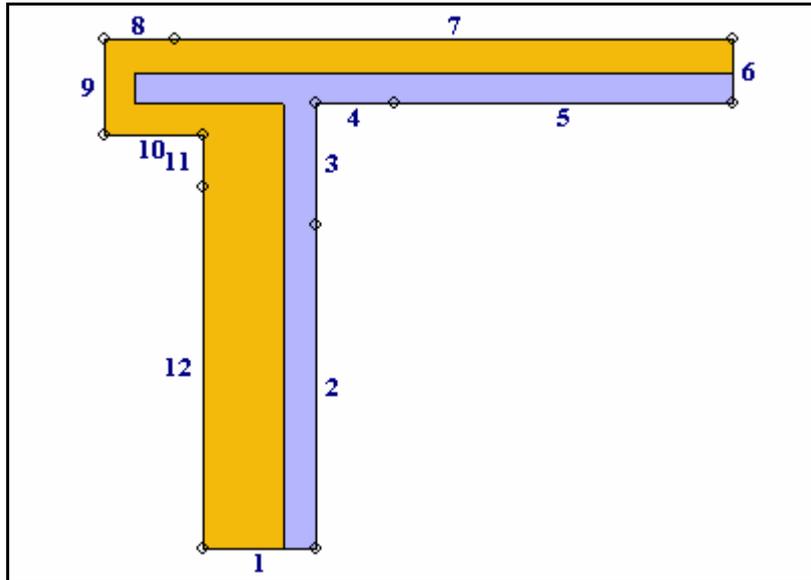
Figure 18: The resulting boundary numbers.

8. Enhancements in material list

8.1 Hierarchical structure

The material list is now searchable. Thermal properties may be shown in the material pick list after the material name (see check-box "Show data" in Figure 19).

It is also possible to have a hierarchical structure with two levels for the material list, see Figure 18.
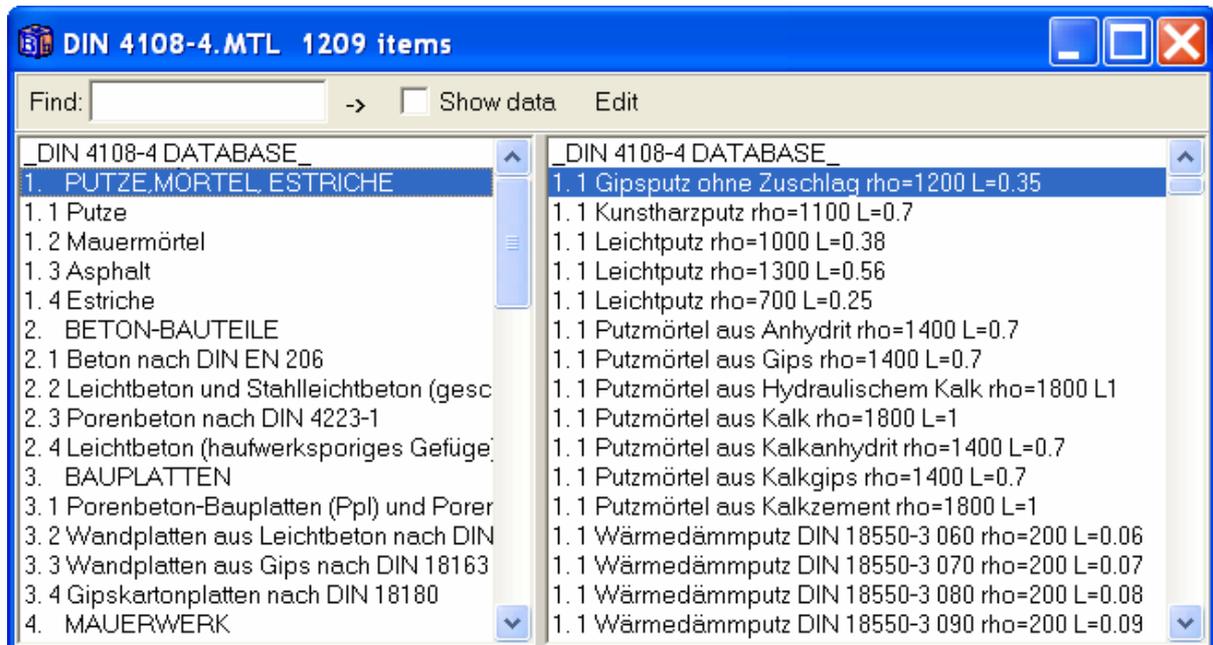

Figure 19: hierarchical structure with two levels for the material list.

A hierarchical structure with a head group (see left pane in Figure 18) can be made using the following rules:

1. First item in the ordinary material list is a reference to an index file "_MyIndexFile_" (should begin and end with "_". The index file is "_DIN 4108-4 DATABASE_" in DIN 4108-4.MTL, see top row in the right pane.

2. The reference file is a text file ("_DIN 4108-4 DATABASE_.txt"), see below.

3. The material names in the ordinary list should have section numbers (e.g: "1. 1 Leichtputz rho=1000 L=0.38") in order to be referenced.

```
_DIN 4108-4 DATABASE_.txt:
------------------------------------------
_DIN 4108-4 DATABASE_
1.     PUTZE,MÖRTEL, ESTRICHE
1. 1 Putze
1. 2 Mauermörtel
1. 3 Asphalt
1. 4 Estriche
2.     BETON-BAUTEILE
2. 1 Beton nach DIN EN 206
2. 2 Leichtbeton und Stahlleichtbeton (geschlossenes Gefüge) nach DIN EN 206 und
DIN 1045-1
2. 3 Porenbeton nach DIN 4223-1
2. 4 Leichtbeton (haufwerksporiges Gefüge)
3.     BAUPLATTEN
3. 1 Porenbeton-Bauplatten (Ppl) und Porenbeton-Planplatten (Pppl) nach DIN 4166
3. 2 Wandplatten aus Leichtbeton nach DIN 18162
3. 3 Wandplatten aus Gips nach DIN 18163
3. 4 Gipskartonplatten nach DIN 18180
4.     MAUERWERK
4. 1 Mauerwerk aus Mauerziegeln nach DIN 105-1 bis E DIN 105-6
4. 2 Mauerwerk aus Kalksandsteinen nach DIN 106
4. 3 Mauerwerk aus Hüttensteinen nach DIN 398
4. 4 Mauerwerk aus Porenbeton-Plansteinen (PP) nach DIN 4165
4. 5 Mauerwerk aus Betonsteinen
5.     WÄRMEDÄMMSTOFFE
5. 1 Mineralwolle nach DIN EN 13162
5. 2 Expandierter Polystyrolschaum nach DIN EN 13163
5. 3 Extrudierter Polystyrolschaum nach DIN EN 13164
5. 4 Polyurethan-Hartschaum nach DIN EN 13165
5. 5 Phenolharz-Hartschaum nach DIN EN 13166
5. 6 Schaumglas nach DIN EN 13167
5. 7 Holzwolleleichtbauplatten nach DIN EN 13168
5. 8 Blähperlit nach DIN EN 13169
5. 9 Expandierter Kork nach DIN EN 13170
5.10 Holzfaserdämmstoff nach DIN EN 13171
6.     HOLZ- UND HOLZWERKSTOFFE
7.     BELÄGE, ABDICHTSTOFFE UND ABDICHTUNGSBAHNEN
7. 1 Fußbodenbeläge
7. 2 Abdichtstoffe (Dichtungsstoffe, Dichtungen und wärmetechnische Trennungen)
7. 3 Dachbahnen, Dachabdichtungsbahnen
8.     SONSTIGE GEBRÄUCHLICHE STOFFE
8. 1 Lose Schüttungen, abgedeckt
8. 2 Fliesen
8. 3 Glas
8. 4 Natursteine
8. 5 Lehmbaustoffe
8. 6 Böden, naturfeucht
8. 7 Keramik und Glasmosaik
8. 8 Metalle
8. 9 Gummi
8.10 Massive Kunststoffe aus DIN 12524
8.11 Gase aus DIN 12524
8.12 Wasser aus DIN 12524
8.13 Dachziegelsteine aus DIN 12524
```

When a material file (*.mtl) is opened (and it has a reference on the first row to a valid index file), the index list file (*.txt) will be opened in the left pane. The two lists use the section numbers (e.g. "1.10") to reference each others. Note that there must be a spacing in order to sort the list correctly ("5.10" comes after "5. 1").

8.2 Default material file

The default material file that is used when HEAT2 starts is the one given on the first row in file "Default_MTL_Filename.txt". It can be changed as follows:

1. Open "Default_MTL_Filename.txt"

2. Write the material file on the first row, e.g: "DIN 4108-4.mtl"

An example of the "Default_MTL_Filename.txt" would be as follows:

```
DIN 4108-4.mtl
Default.mtl
General.mtl
DIN no cap.MTL
```

(The default material file is here DIN 4108-4.mtl).

9. Increased sizes for data fields

The following data fields have been increased in size:

The maximum number of numerical nodes has been doubled from 62.500 (250·250) to 122.500 (350·350.

The maximum number of rectangles that can be drawn in the pre-processor has been doubled from 250 to 500.

The maximum number of boundaries (segments with different boundary conditions) has been doubled from 250 to 500.

The maximum number of radiation surface elements inside cavities has been doubled from 250 to 500.

10. Other changes

Hundreds of minor improvements are made. The most important are shown below.

10.1 Enhancements in pre-processor

Several enhancements in the pre-processor are made, such as

- Dimension tool in the pre-processor to label drawn rectangles with their sizes

- The drawing will now be centered in the pre-processor when "Fit in window" is used

- New tool to go back to the last zoom window is added

10.2 Initial guess of boundary conditions

As long as boundary conditions have not been given (more exactly when the "Boundary conditions"-window has not been opened) for a new problem, HEAT2 will guess boundary conditions as follows:

The lowest horizontal boundary segment and the top horizontal boundary segment will be adiabatic, i.e. zero heat flow. All boundaries between these will be T=1, R=0.13 on the right-hand side, and T=0, R=0.04 on the left-hand side.

When the "Boundary conditions"-window once has been opened, no further guessing will occur. The switch to start guessing can be turned on again by menu item "Settings/Update now and guess boundary conditions" in the pre-processor. Once the "Boundary conditions"-window has been opened again, the guessing is deactivated again.

10.3 Miscellaneous

- New XP-style file open/save dialogue boxes

- New routines for interpolation of temperatures with higher accuracy

- Export data for graphs in different formats (text, Excel, HTML, XML, Metafile, bitmap)

- Resizing post-processor window without updating window contents

- Output flows are shown with higher precision in the recorder (more significant digits – good for e.g. calculating response factors)

- Lengths and boundary condition types are shown in the "Boundary flows" window

- New dialogue window for resetting initial conditions

A few users have reported problems with version 5 regarding reading dat-files (see "bug report" at home page). The reason seemed to be that the decimal separator had been changed from "." to ",". We have not found the cause of this error. It could be that regional settings are changed by another program or by the user. Other types of files, such as climate files were also affected.

A quick fix to this problem is to do as follows: Open the dat file in an editor (such as Write or Word) and change all ',' to '.'.

Version 6 automatically fixes a wrong decimal separator (replaces the wrong decimal separators).