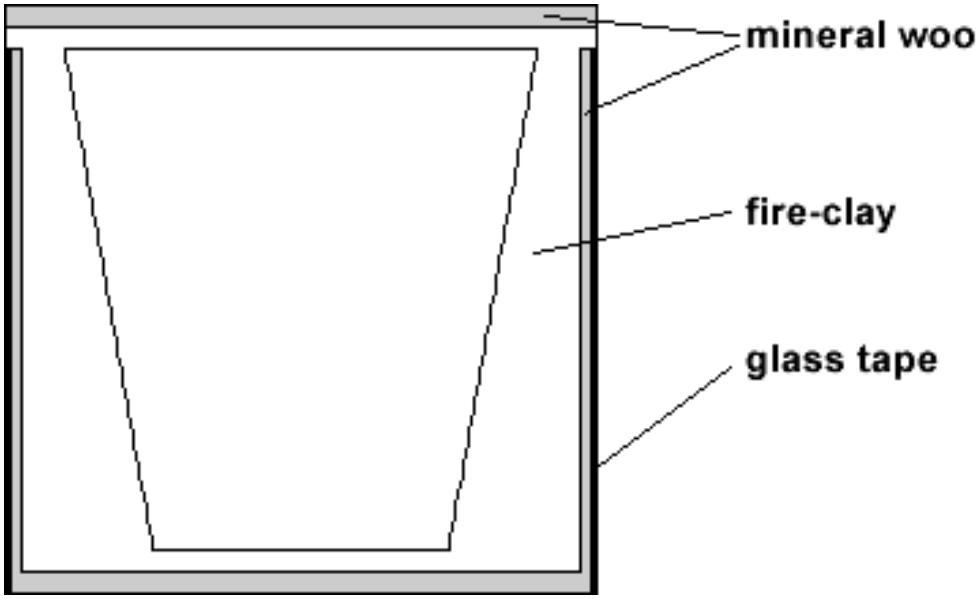
QuickField simulation report

Temperature field inside the crucible stove

Calculate temperature distribution in the crucible stove.



This automatically generated document consists of several sections, which specify the problem setup and finite element analysis simulation results. Navigation links in the top of each page lead to corresponding sections of this report.

Problem description and QuickField simulation files:
https://quickfield.com/advanced/crucible_stove.htm

Problem info

Problem type: Steady-State Heat Transfer
Geometry model class: Plane-Parallel
Problem database file names:

- Problem: *STOVE.PBM*
- Geometry: *Stove.mod*
- Material Data: *Stove.dht*
- Material Data 2 (library): *none*
- Electric circuit: *none*

Results taken from other problems:

- *none*

Geometry model

Table 1. Geometry model statistics

	With Label	Total
Blocks	4	7
Edges	2	26
Vertices	0	20

Number of nodes: 11097.

Labelled objects

There are following labelled objects in the geometry model (Material Data file could contain more labels, but only those labels that assigned to geometric objects are listed)

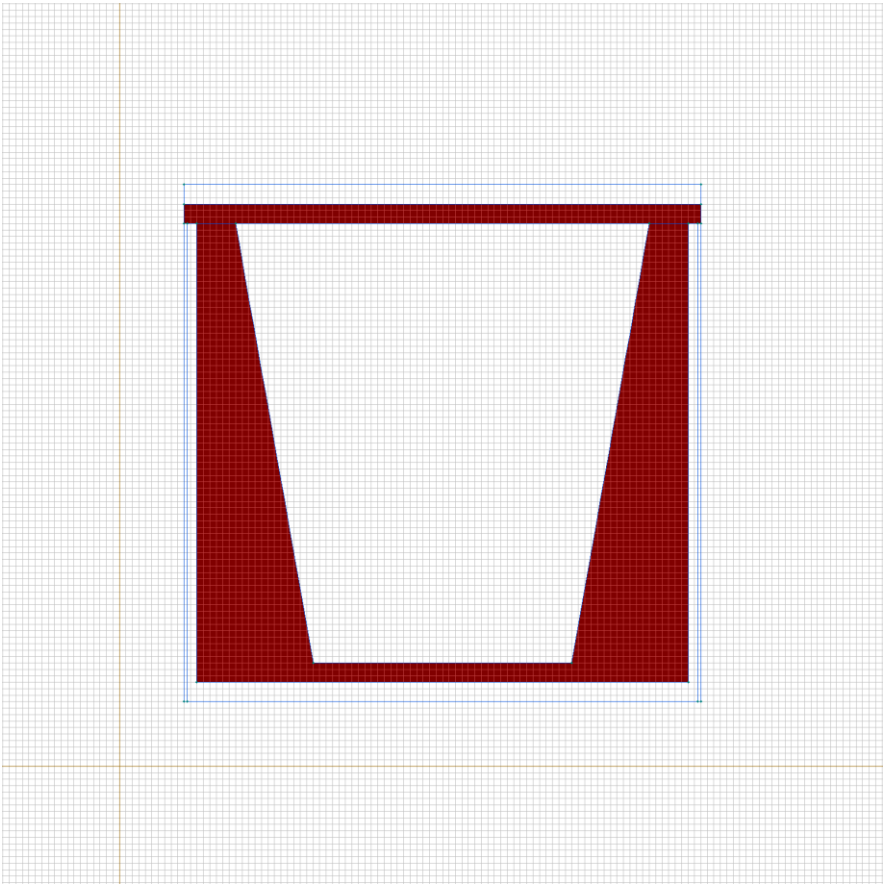
Blocks:	Edges:	Vertices:
• fire-caly • tape • wool • air •	• kr1 • kr2 •	

Detailed information about each label is listed below.

Labelled objects: block "fire-caly"

There are (2) objects with this label

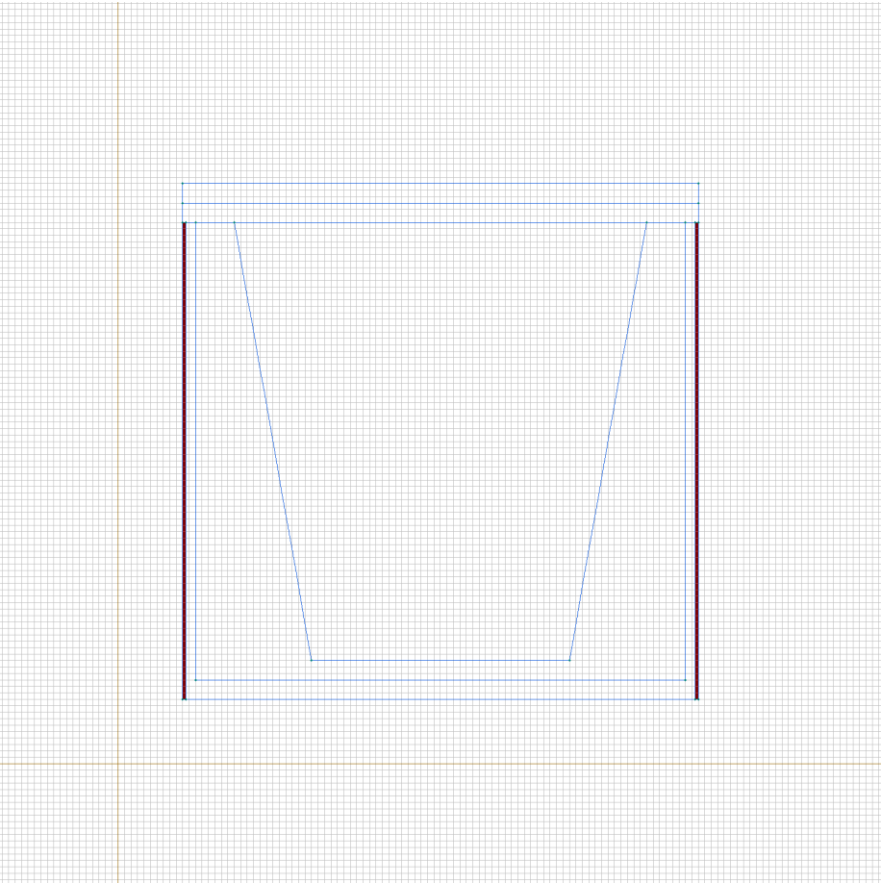
Thermal conductivity: lambda=nonlinear (see Table 2 in the "Nonlinear dependencies" section)



Labelled objects: block "tape"

There are (2) objects with this label

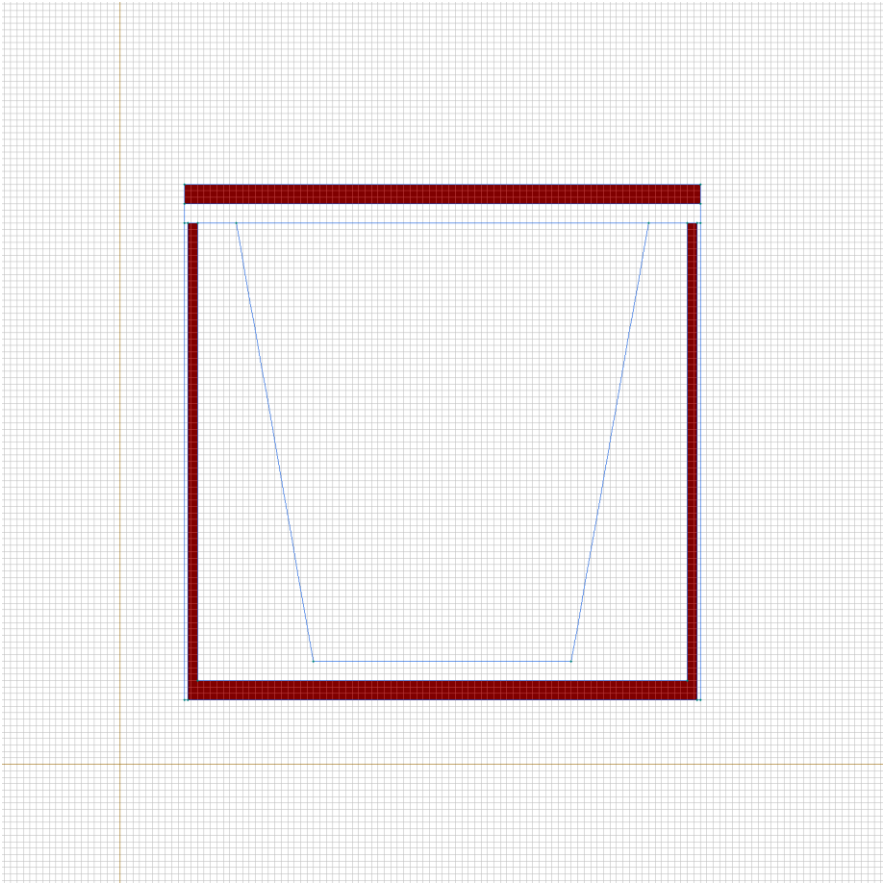
Thermal conductivity: lambda_x=0.058 [W/(K*m)], lambda_y=0.058 [W/(K*m)]



Labelled objects: block "wool"

There are (2) objects with this label

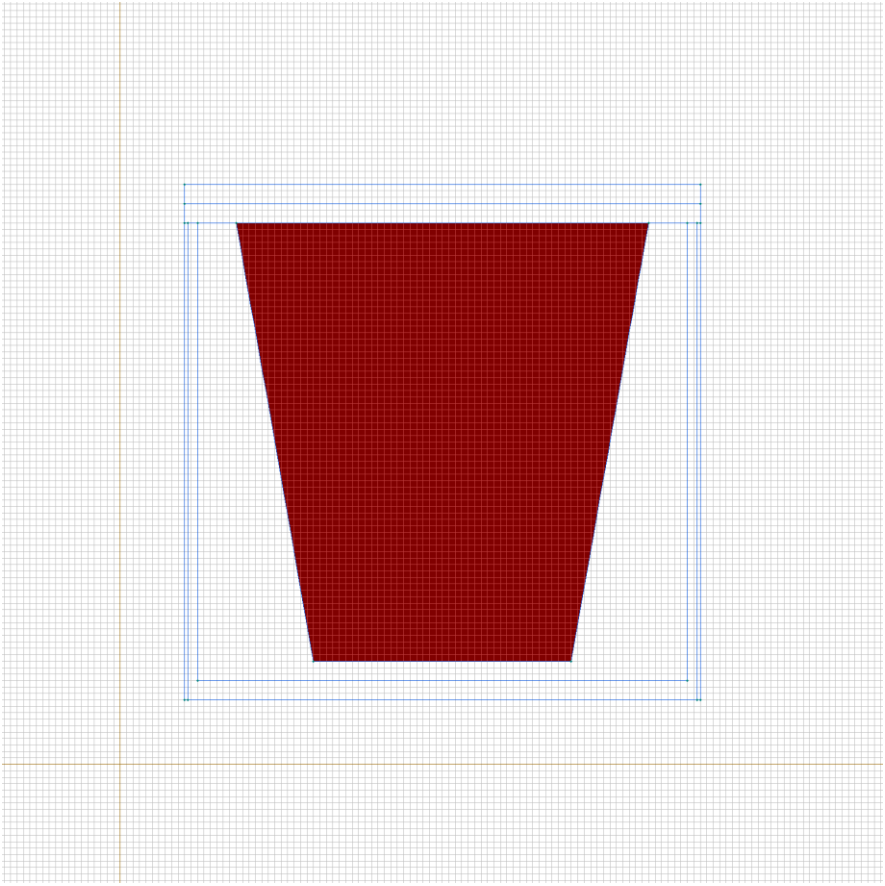
Thermal conductivity: lambda_x=0.05839 [W/(K*m)], lambda_y=0.05839 [W/(K*m)]



Labelled objects: block "air"

There are (1) objects with this label

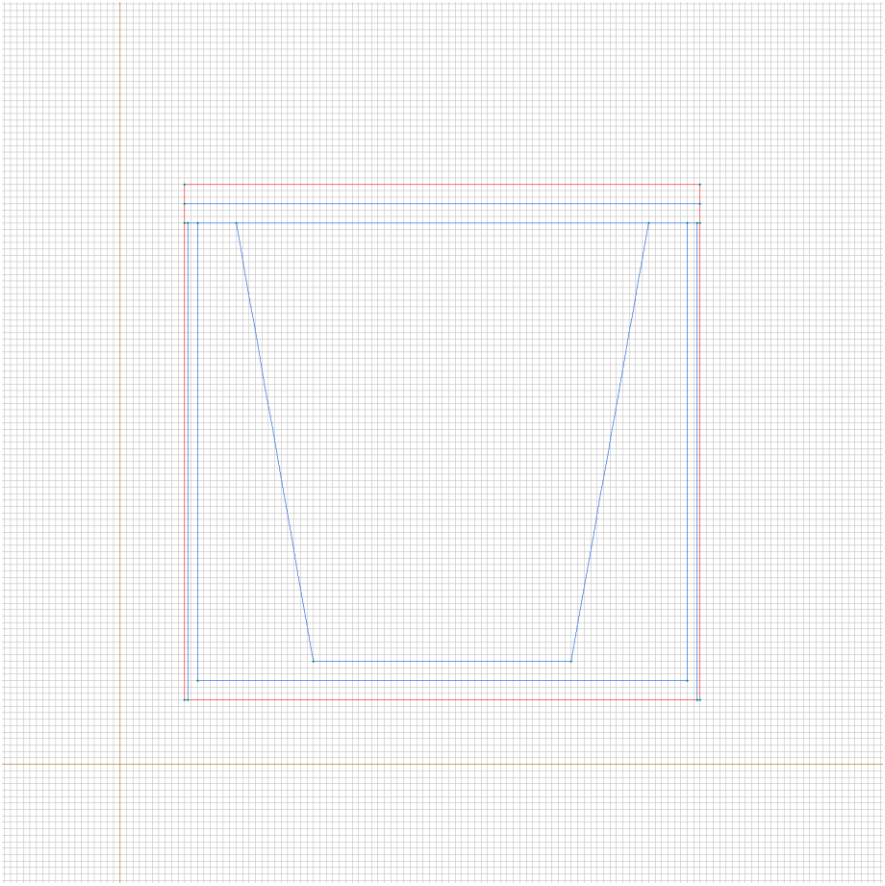
Thermal conductivity: lambda_x=1 [W/(K*m)], lambda_y=1 [W/(K*m)]



Labelled objects: edge "kr1"

There are (8) objects with this label

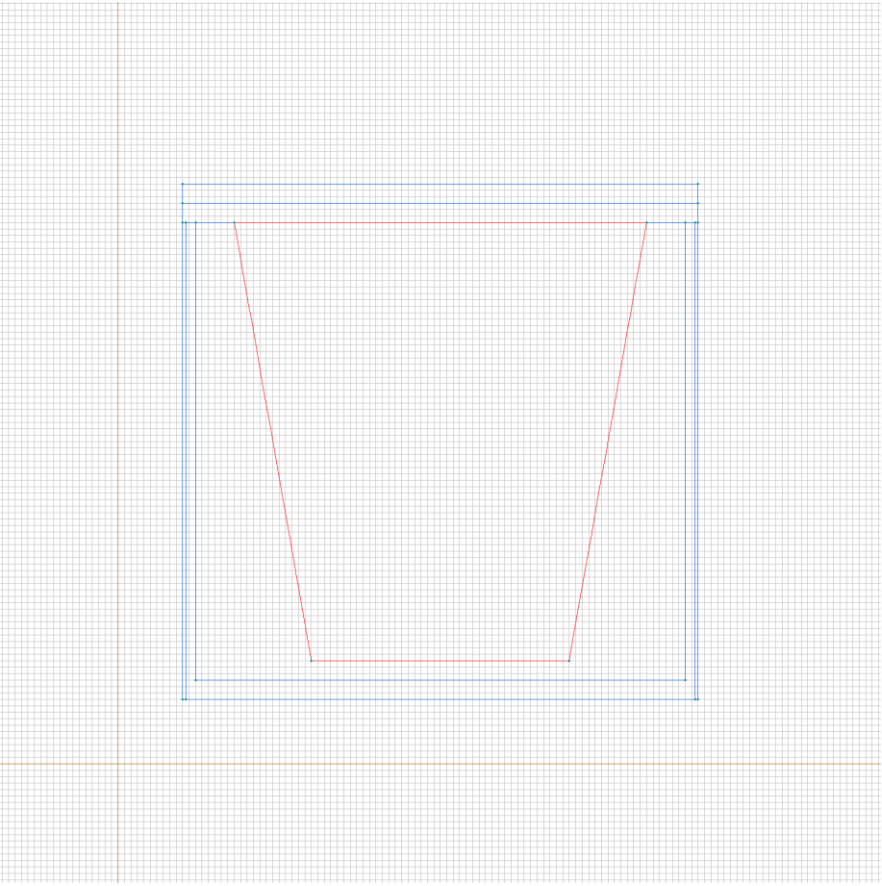
Temperature: T=49.85 [K]



Labelled objects: edge "kr2"

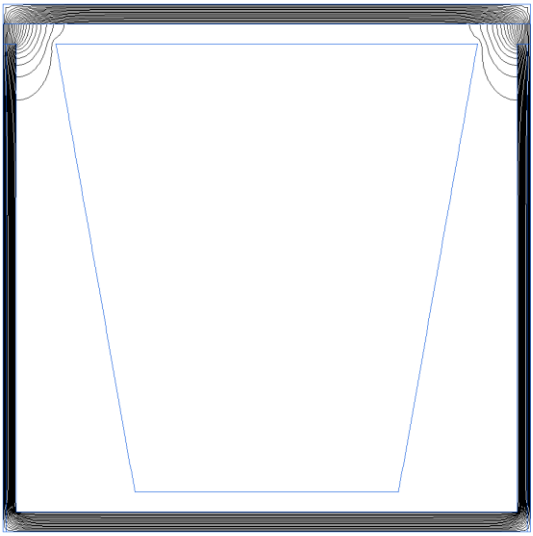
There are (4) objects with this label

Temperature: T=719.8 [K]



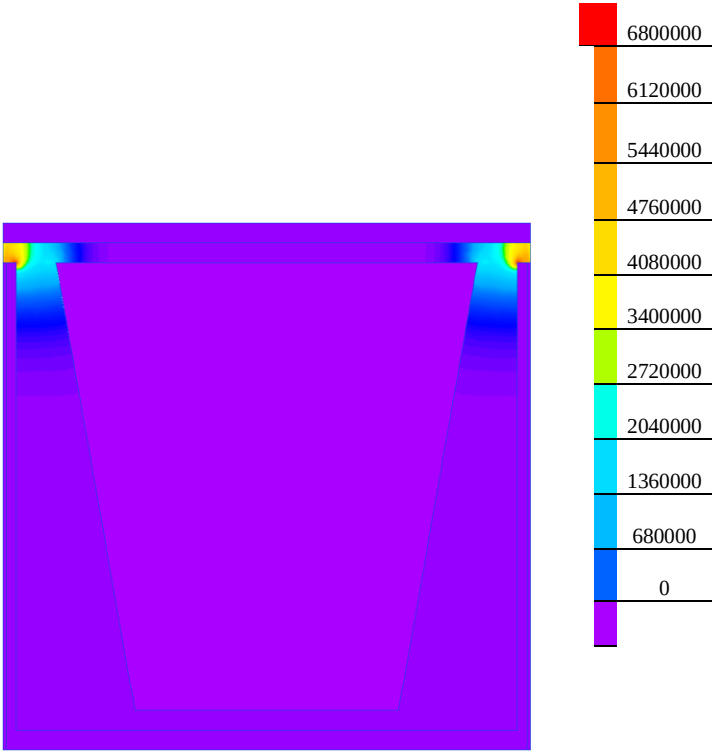
Results

Field lines



Results

Color map of Heat flux |F| [W/m2]



Nonlinear dependencies

Table 2. Thermal conductivity

T [K]	lambda [W/K*m]
0	0.837
10	6.657
100	59.04
1000	582.8