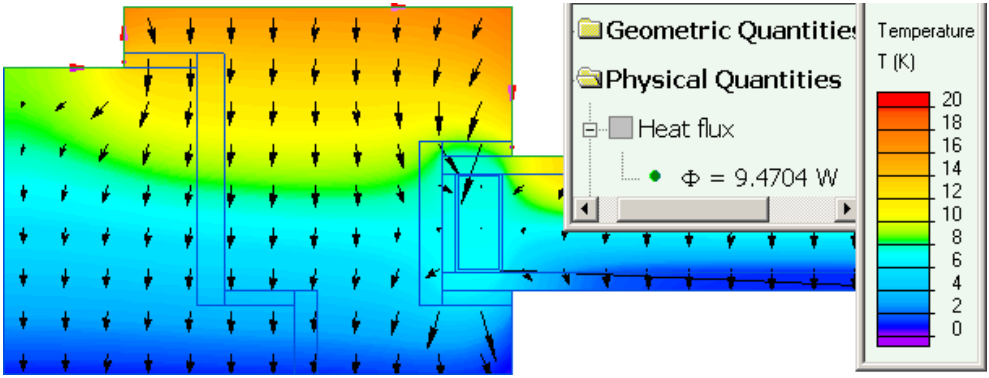
QuickField simulation report

SO 10077-2:2012. D.10. Wood frame section with glazing

EN ISO 10077-2:2012 Thermal performance of windows, doors and shutters - Calculation of thermal transmittance. Numerical method for frames. Test case D.10 validation.



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/iso_10077_case_d10.htm

Problem info

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

- Problem: *Iso10077_d10.pbm*
- Geometry: *Iso10077_d10.mod*
- Material Data: *Iso10077_d10.dht*
- Material Data 2 (library): *none*
- Electric circuit: *none*

Results taken from other problems:

- *none*

Geometry model

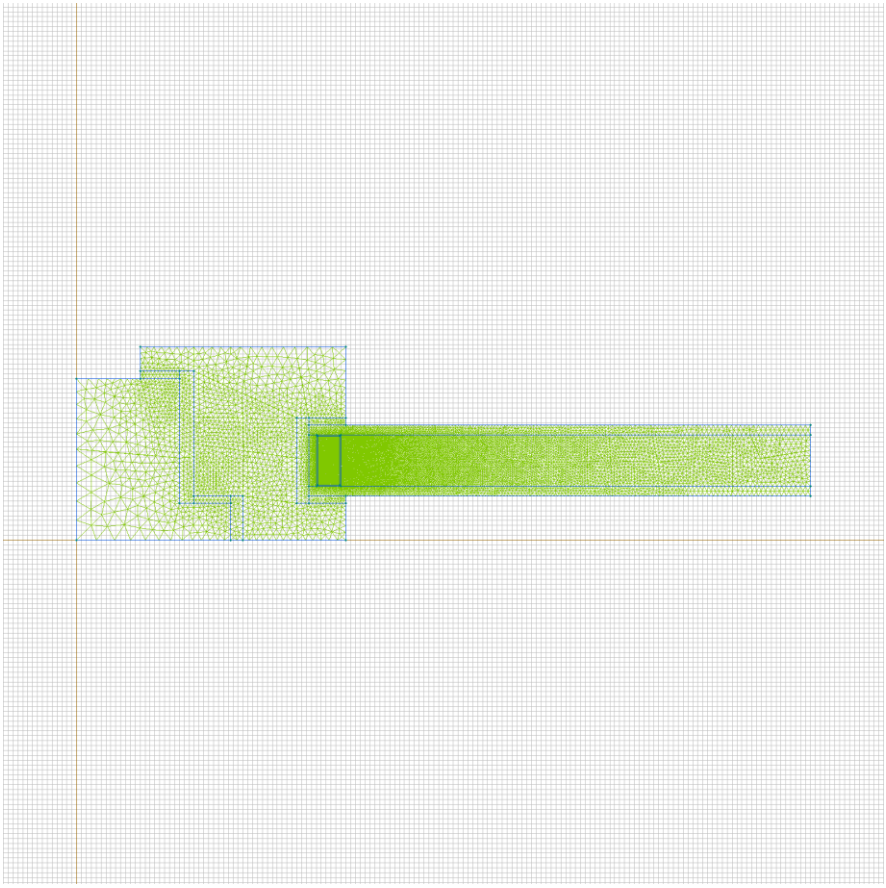


Table 1. Geometry model statistics

	With Label	Total
Blocks	10	15
Edges	4	55
Vertices	0	42

Number of nodes: 16125.

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:

- aluminium
- silica gel
- polysulfide
- EPDM
- glass
- air2
- air3
- soft wood
- air1
- glass filling
-

Edges:

- T=0, R=0.04
- T=20, R=0.2
- T=20, R=0.13
- zero flux
-

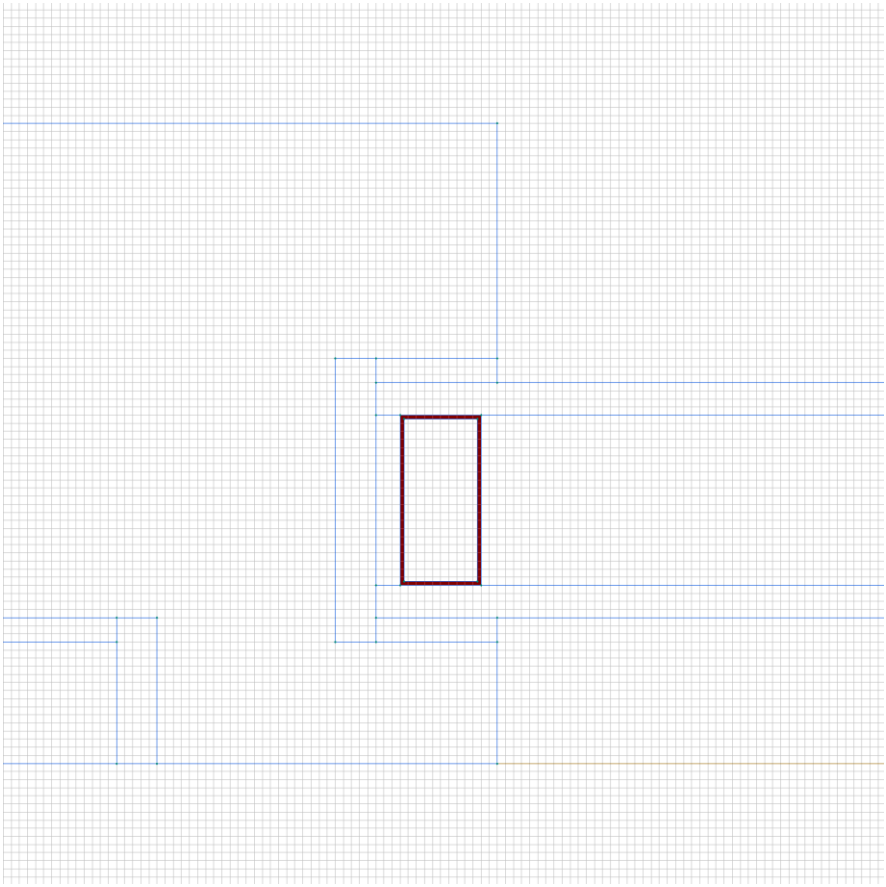
Vertices:

Detailed information about each label is listed below.

Labelled objects: block "aluminium"

There are (1) objects with this label

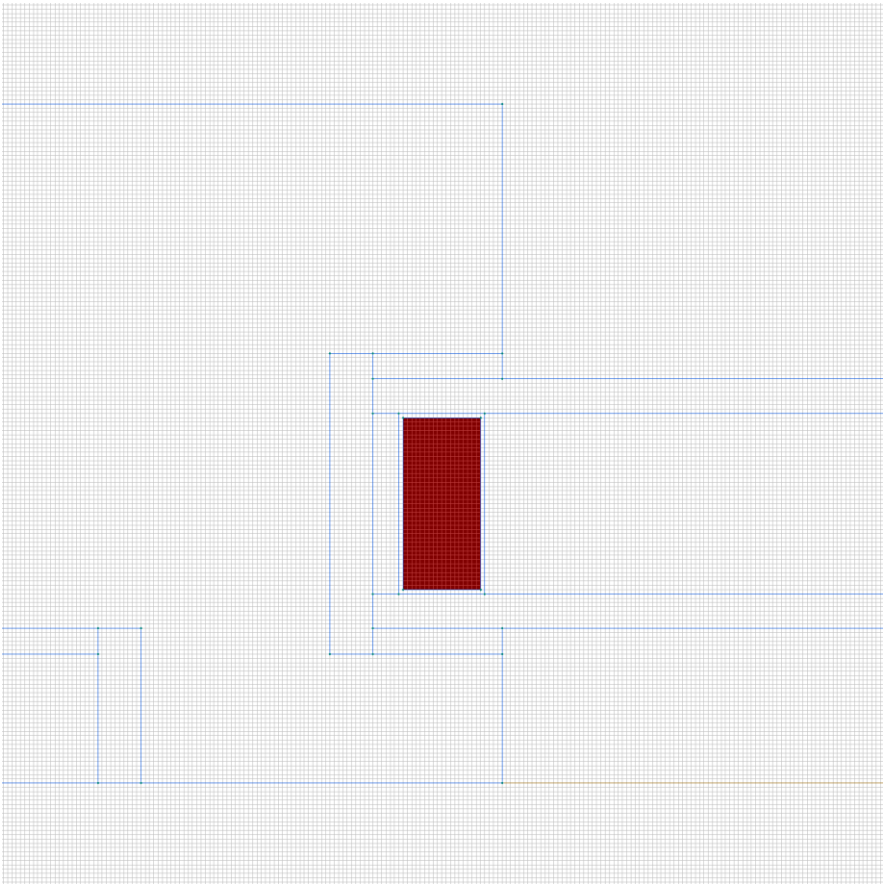
Thermal conductivity: lambda_x=160 [W/(K*m)], lambda_y=160 [W/(K*m)]



Labelled objects: block "silica gel"

There are (1) objects with this label

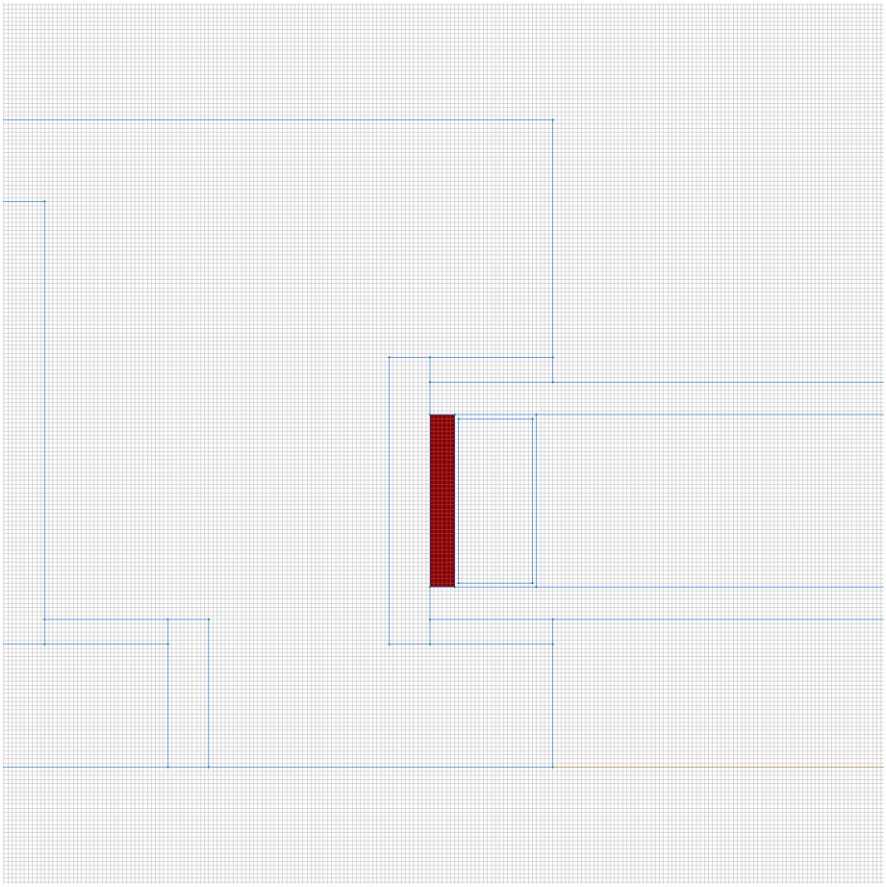
Thermal conductivity: lambda_x=0.13 [W/(K*m)], lambda_y=0.13 [W/(K*m)]



Labelled objects: block "polysulfide"

There are (1) objects with this label

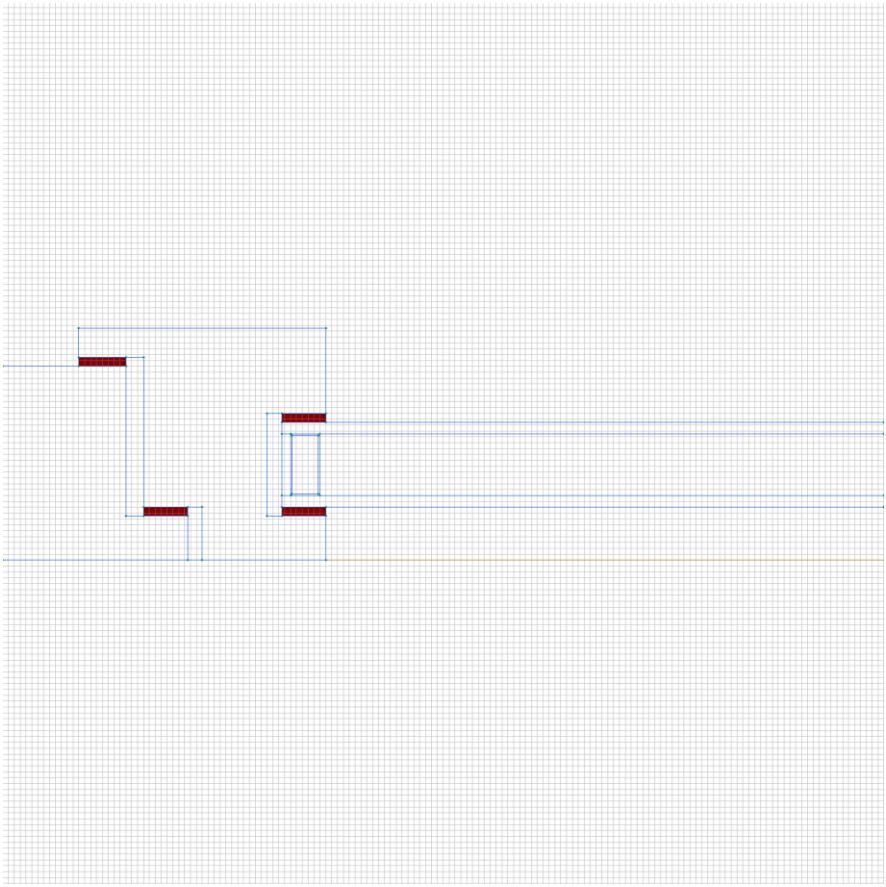
Thermal conductivity: lambda_x=0.4 [W/(K*m)], lambda_y=0.4 [W/(K*m)]



Labelled objects: block "EPDM"

There are (4) objects with this label

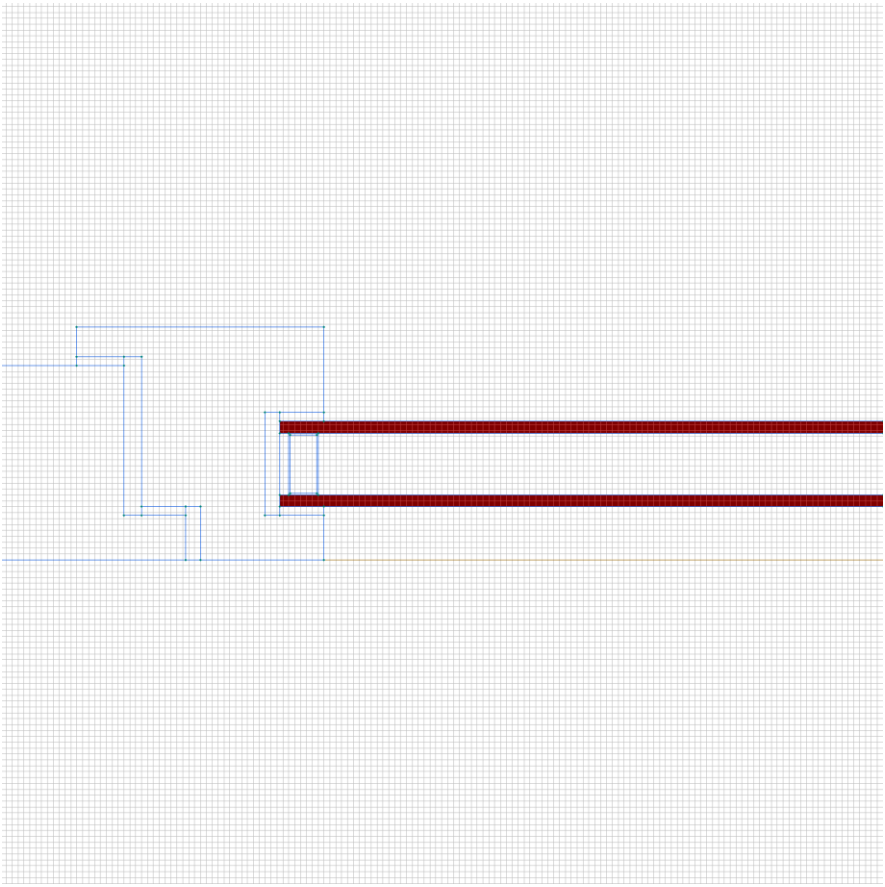
Thermal conductivity: lambda_x=0.25 [W/(K*m)], lambda_y=0.25 [W/(K*m)]



Labelled objects: block "glass"

There are (2) objects with this label

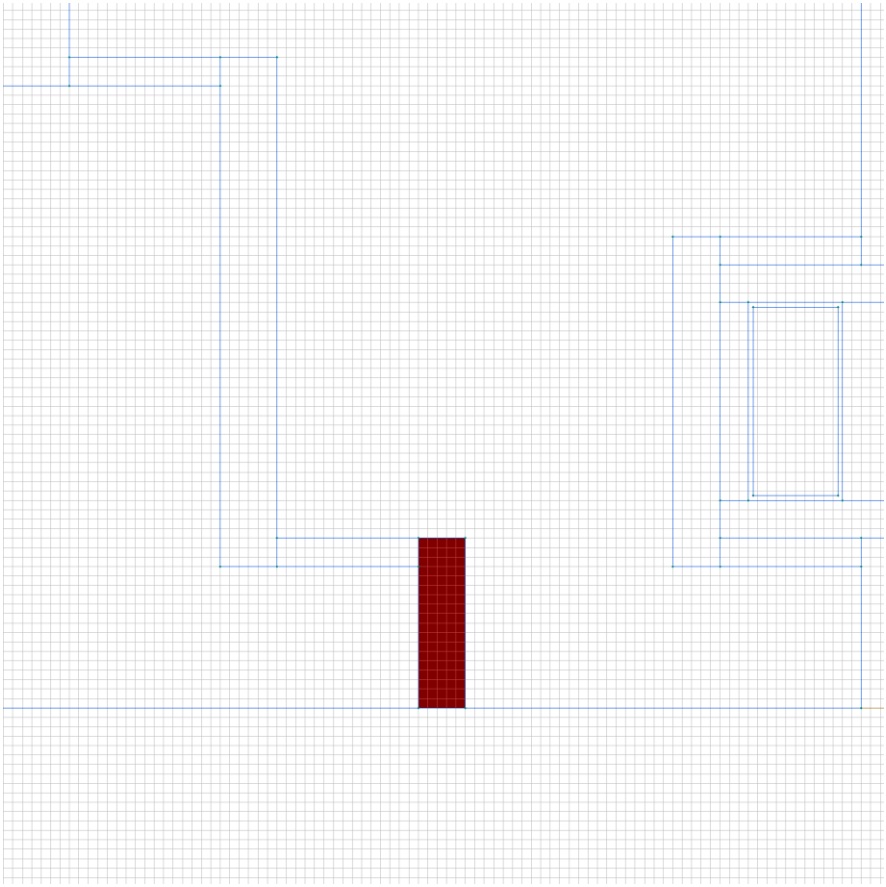
Thermal conductivity: lambda_x=1 [W/(K*m)], lambda_y=1 [W/(K*m)]



Labelled objects: block "air2"

There are (1) objects with this label

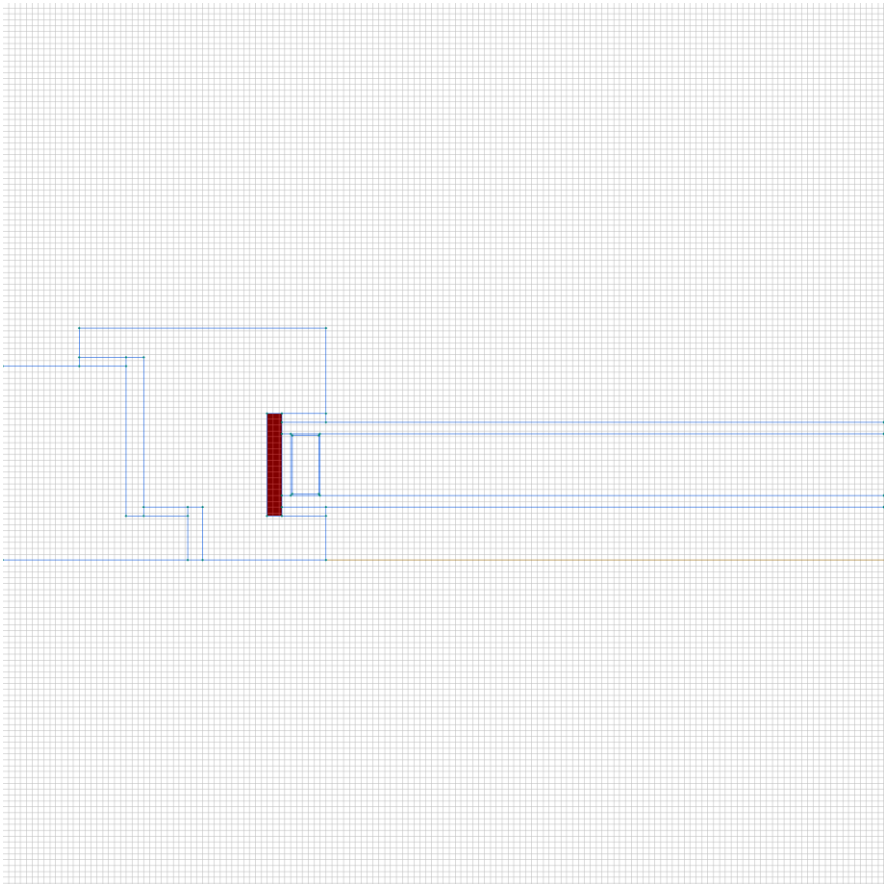
Thermal conductivity: lambda_x=0.12528 [W/(K*m)], lambda_y=0.12528 [W/(K*m)]



Labelled objects: block "air3"

There are (1) objects with this label

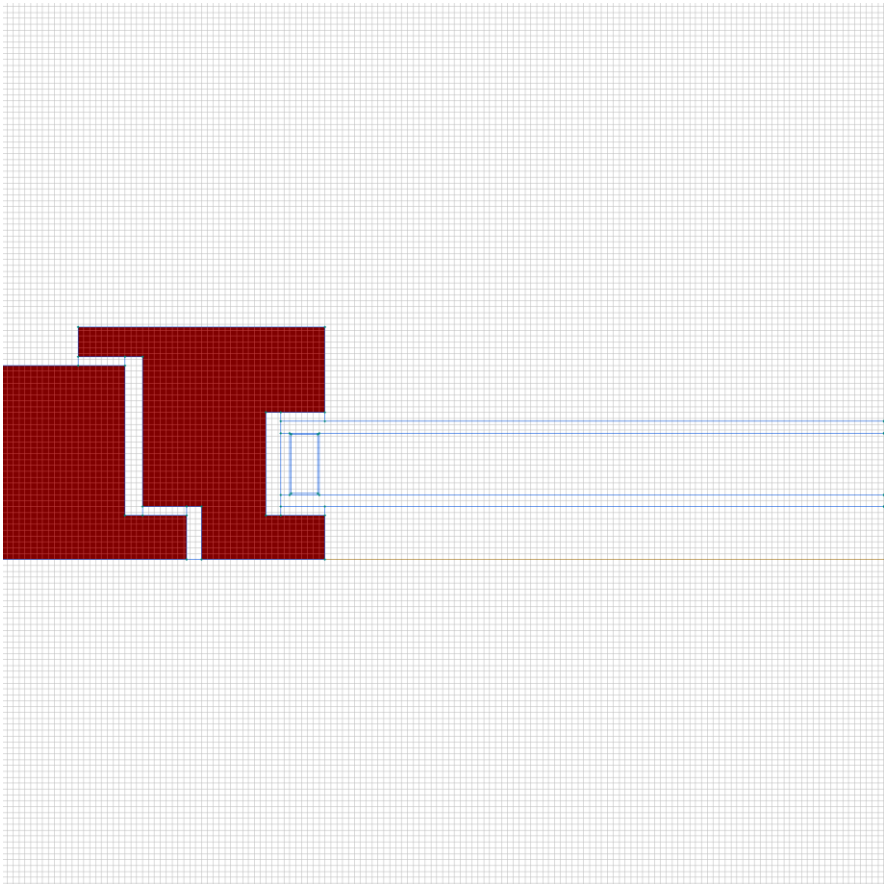
Thermal conductivity: lambda_x=0.11355 [W/(K*m)], lambda_y=0.11355 [W/(K*m)]



Labelled objects: block "soft wood"

There are (2) objects with this label

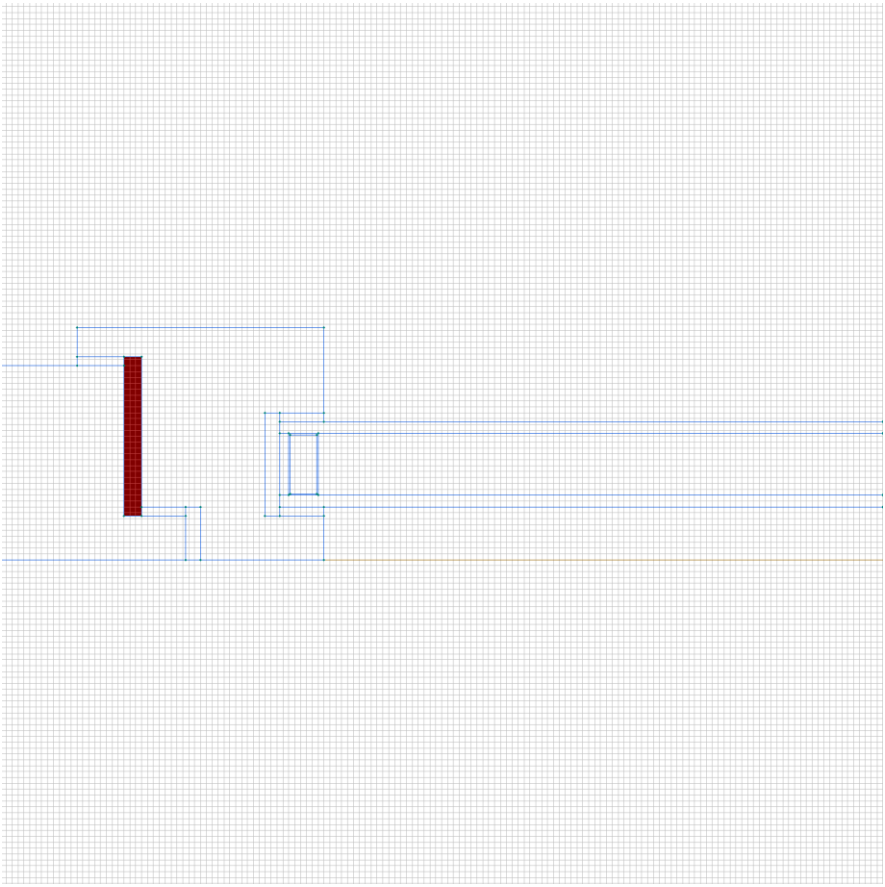
Thermal conductivity: lambda_x=0.13 [W/(K*m)], lambda_y=0.13 [W/(K*m)]



Labelled objects: block "air1"

There are (1) objects with this label

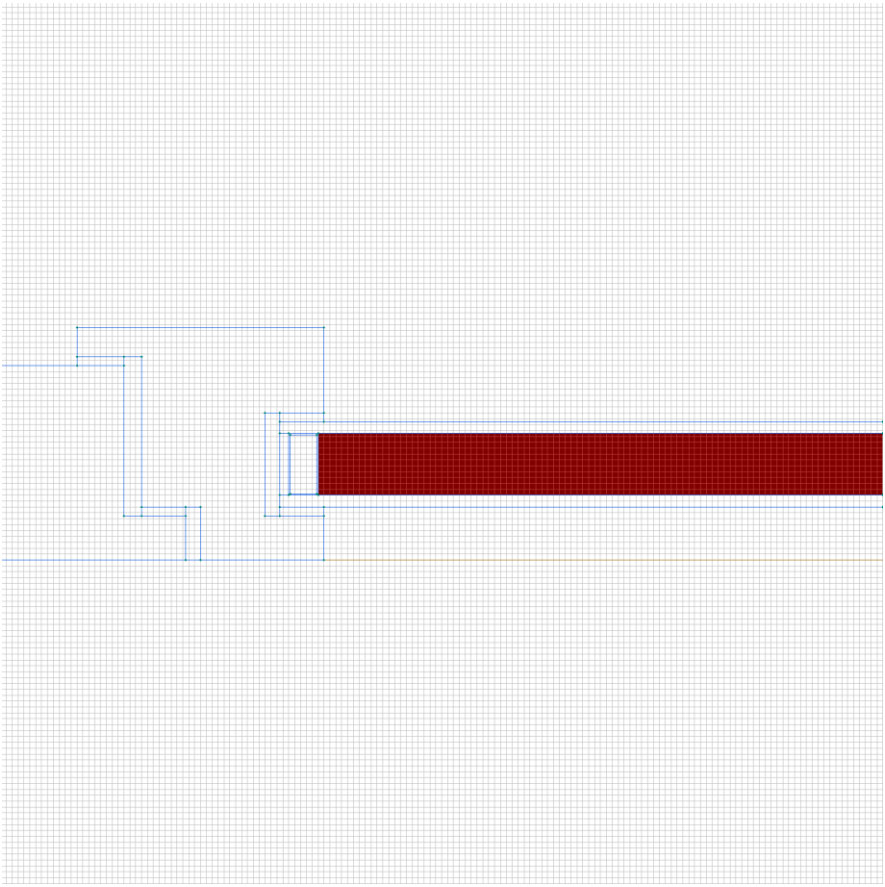
Thermal conductivity: lambda_x=0.15714 [W/(K*m)], lambda_y=0.15714 [W/(K*m)]



Labelled objects: block "glass filling"

There are (1) objects with this label

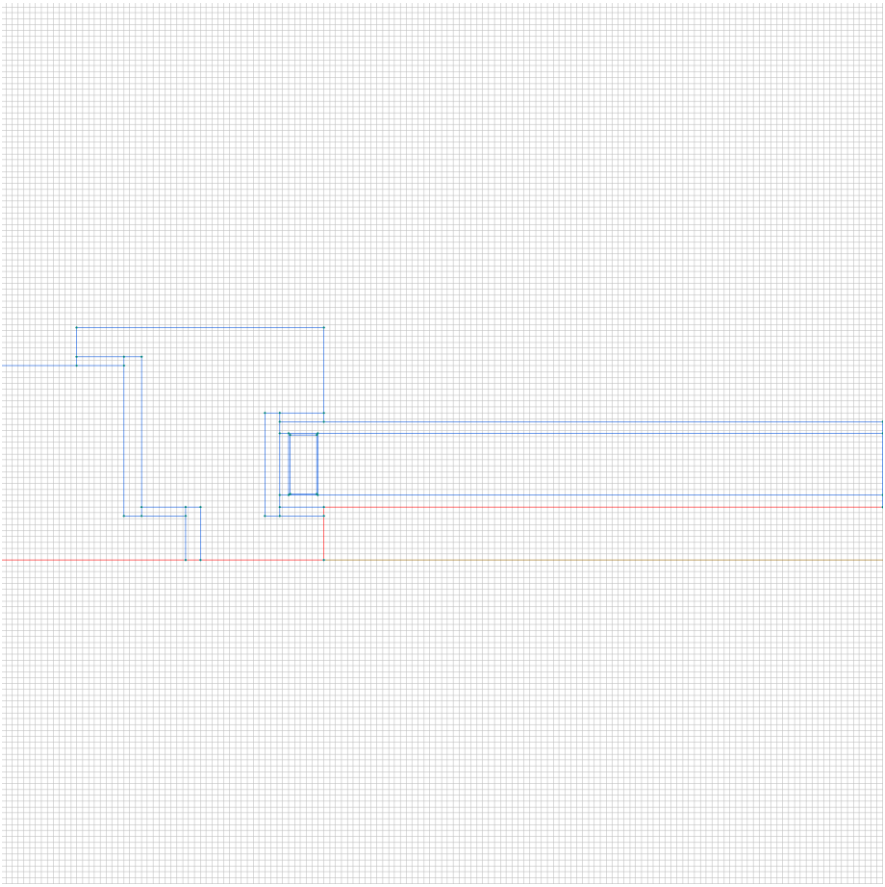
Thermal conductivity: lambda_x=0.034 [W/(K*m)], lambda_y=0.034 [W/(K*m)]



Labelled objects: edge "T=0, R=0.04"

There are (6) objects with this label

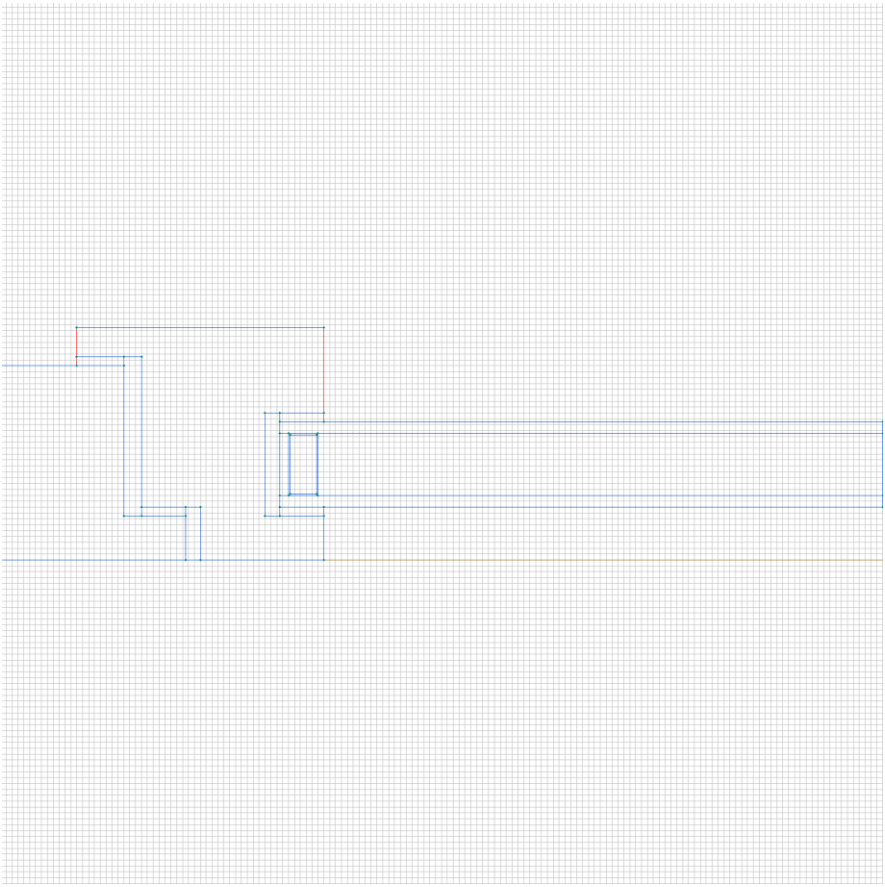
Convection: alpha=1/0.04 [W/(K*m2)], temperature T0=-273.15 [K]



Labelled objects: edge "T=20, R=0.2"

There are (4) objects with this label

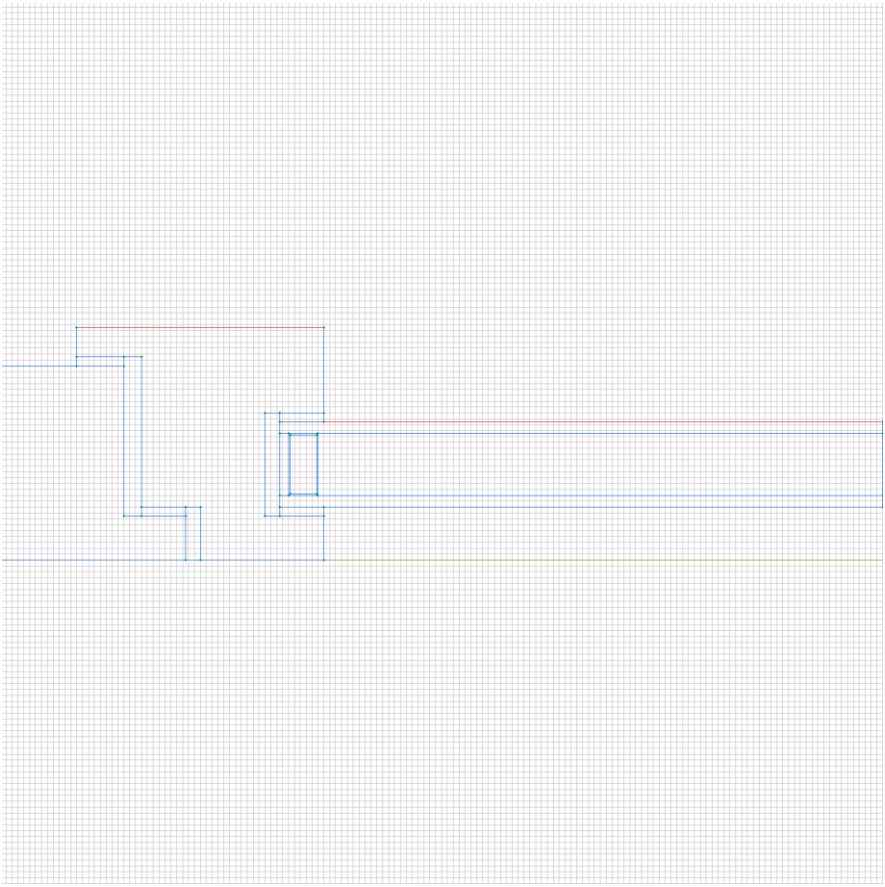
Convection: alpha=1/0.2 [W/(K*m2)], temperature T0=-253.15 [K]



Labelled objects: edge "T=20, R=0.13"

There are (2) objects with this label

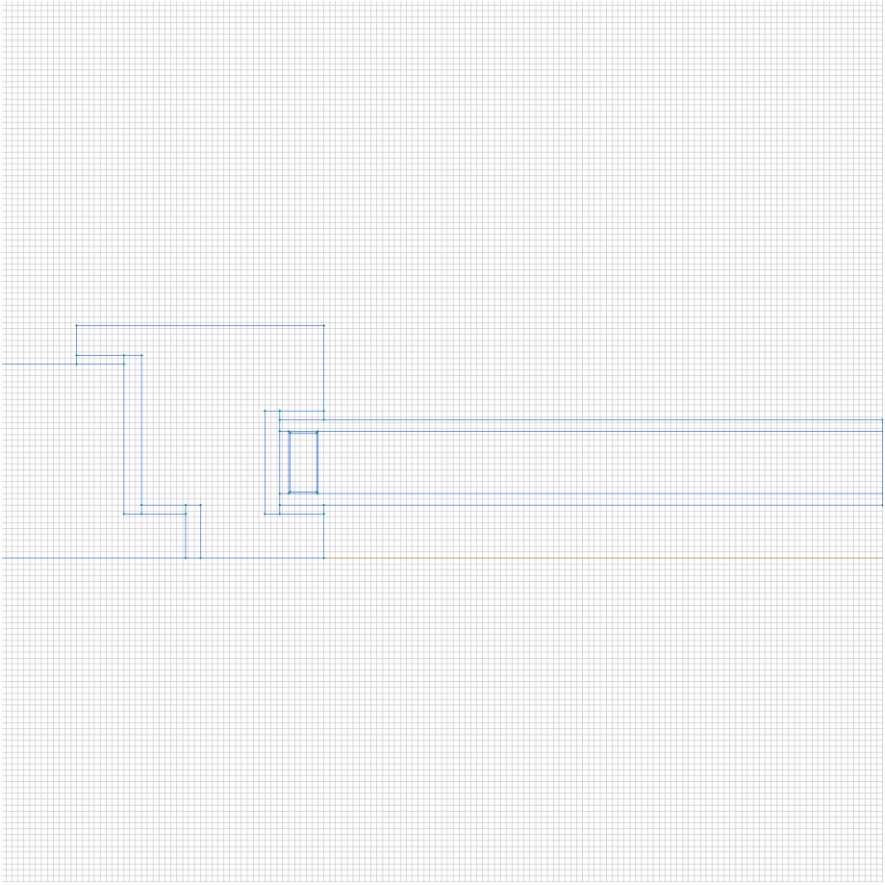
Convection: alpha=1/0.13 [W/(K*m2)], temperature T0=-253.15 [K]



Labelled objects: edge "zero flux"

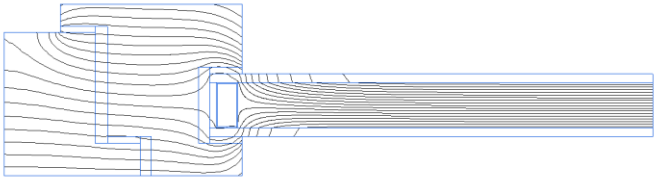
There are (1) objects with this label

Heat flux: F=0 [W/m2]



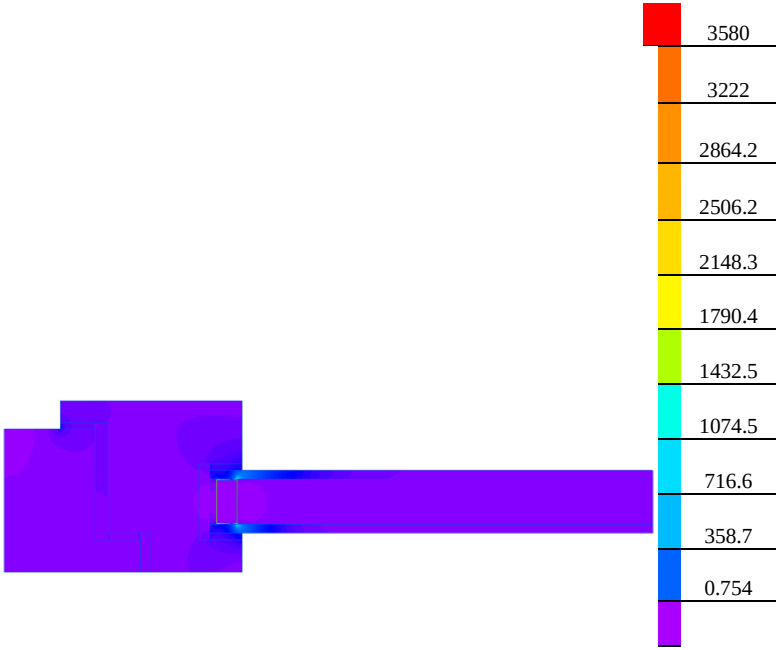
Results

Field lines



Results

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



Nonlinear dependencies

No non-linear dependencies are used in this problem data