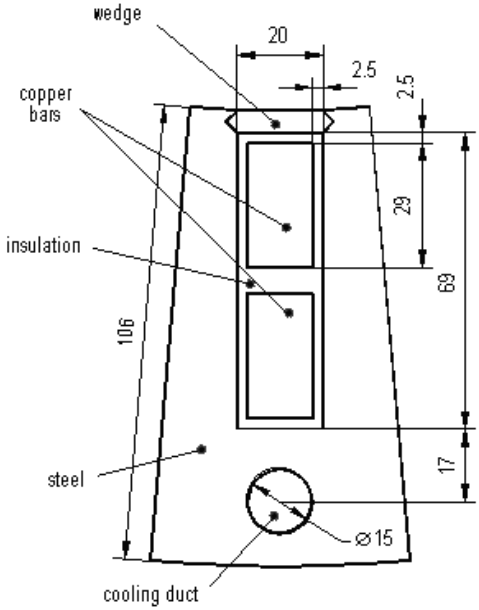
QuickField simulation report

Slot of an electric machine

Calculation of the temperature distribution in the stator tooth zone of power synchronous electric machine



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/heat1.htm

Problem info

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

- Problem: *Heat1.pbm*
- Geometry: *Heat1.mod*
- Material Data: *Heat1.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	6
Edges	3	24
Vertices	0	22

Number of nodes: 1006.

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)

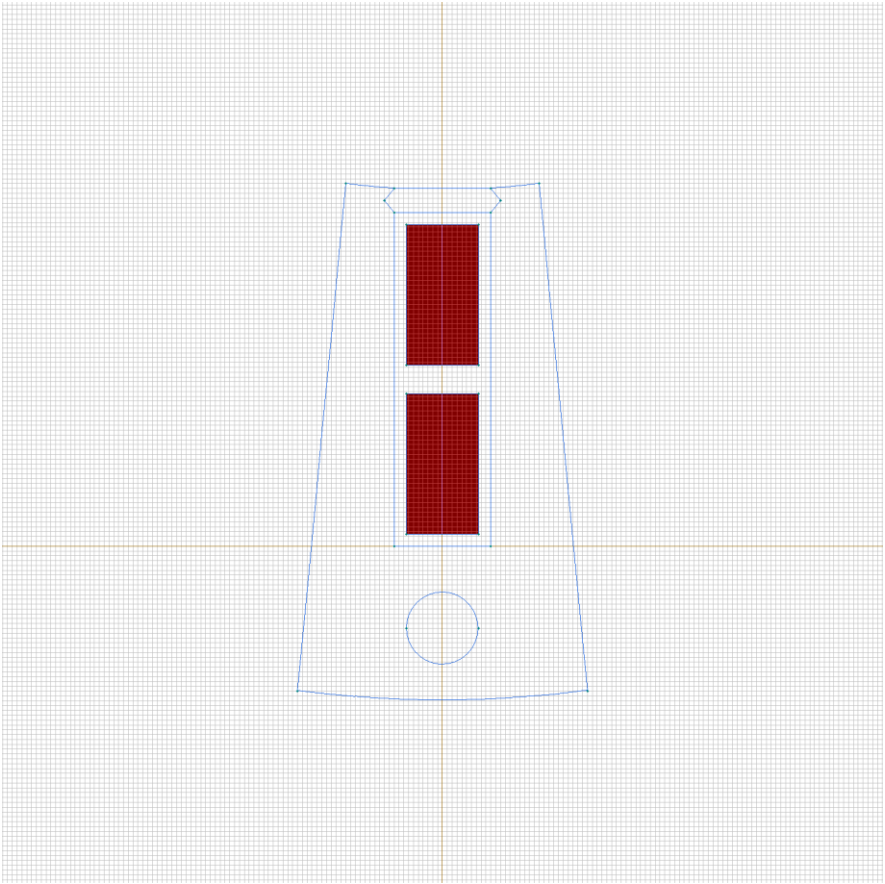
Blocks:	Edges:	Vertices:
• Bar • Insulation • Wedge • Iron •	• Cooling duct • Inner surface • Outer surface •	

Detailed information about each label is listed below.

Labelled objects: block "Bar"

There are (2) objects with this label

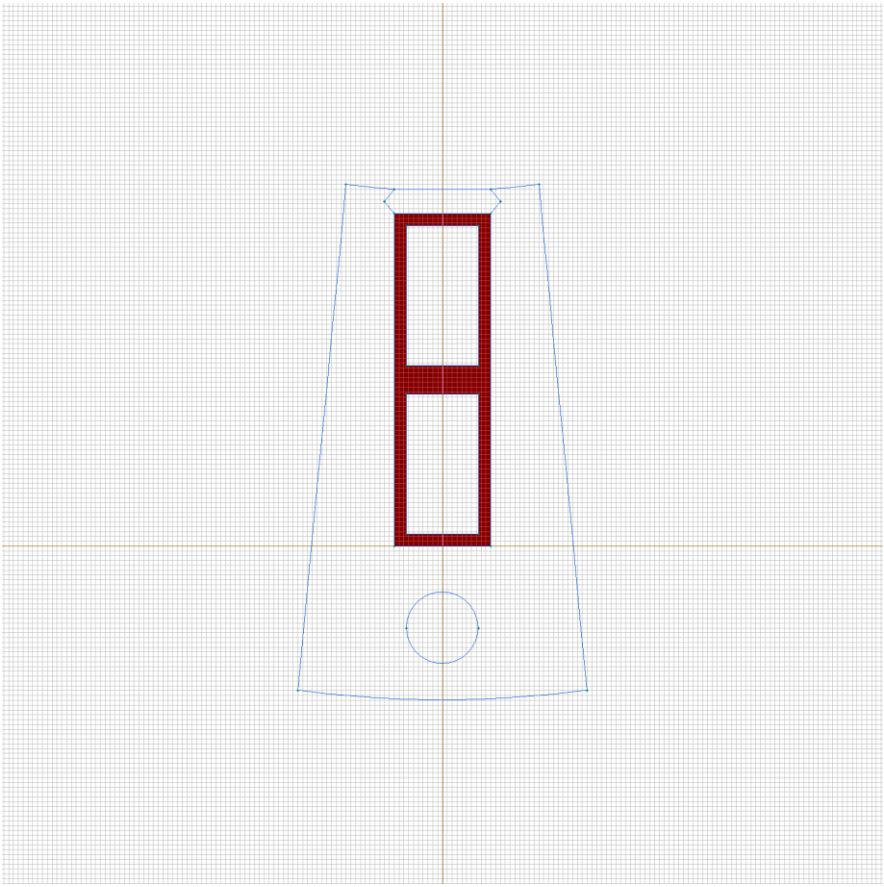
Thermal conductivity: lambda_x=380 [W/(K*m)], lambda_y=380 [W/(K*m)]
Volume heat: Q=360000 [W/m3]



Labelled objects: block "Insulation"

There are (1) objects with this label

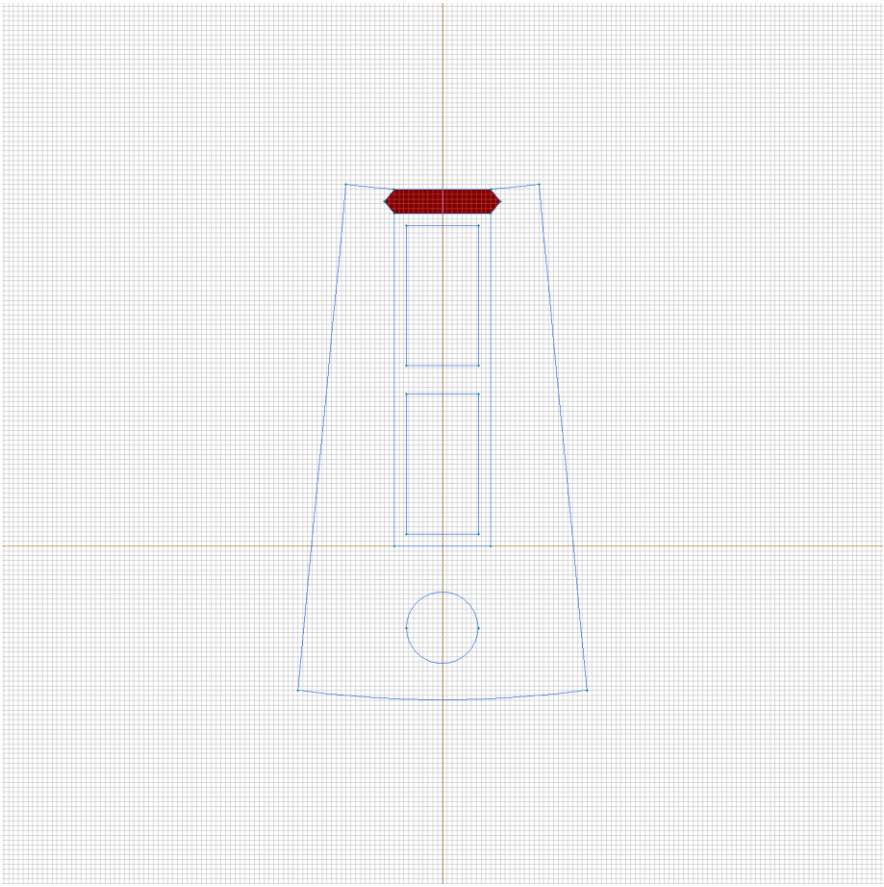
Thermal conductivity: lambda_x=0.15 [W/(K*m)], lambda_y=0.15 [W/(K*m)]



Labelled objects: block "Wedge"

There are (1) objects with this label

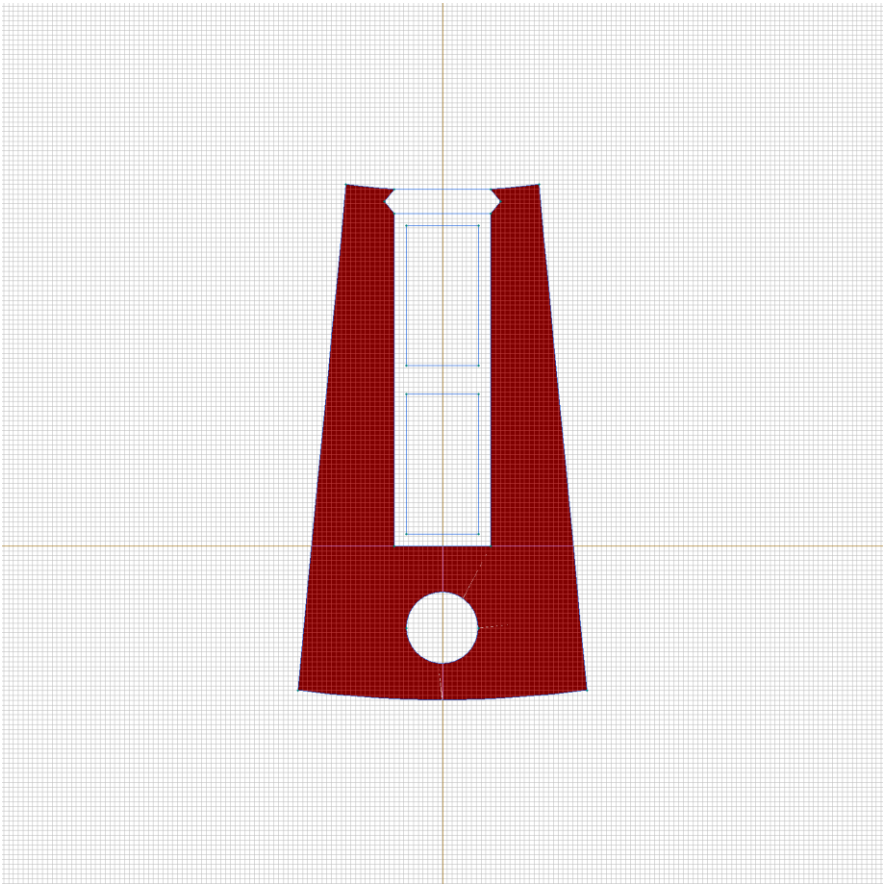
Thermal conductivity: lambda_x=0.25 [W/(K*m)], lambda_y=0.25 [W/(K*m)]



Labelled objects: block "Iron"

There are (1) objects with this label

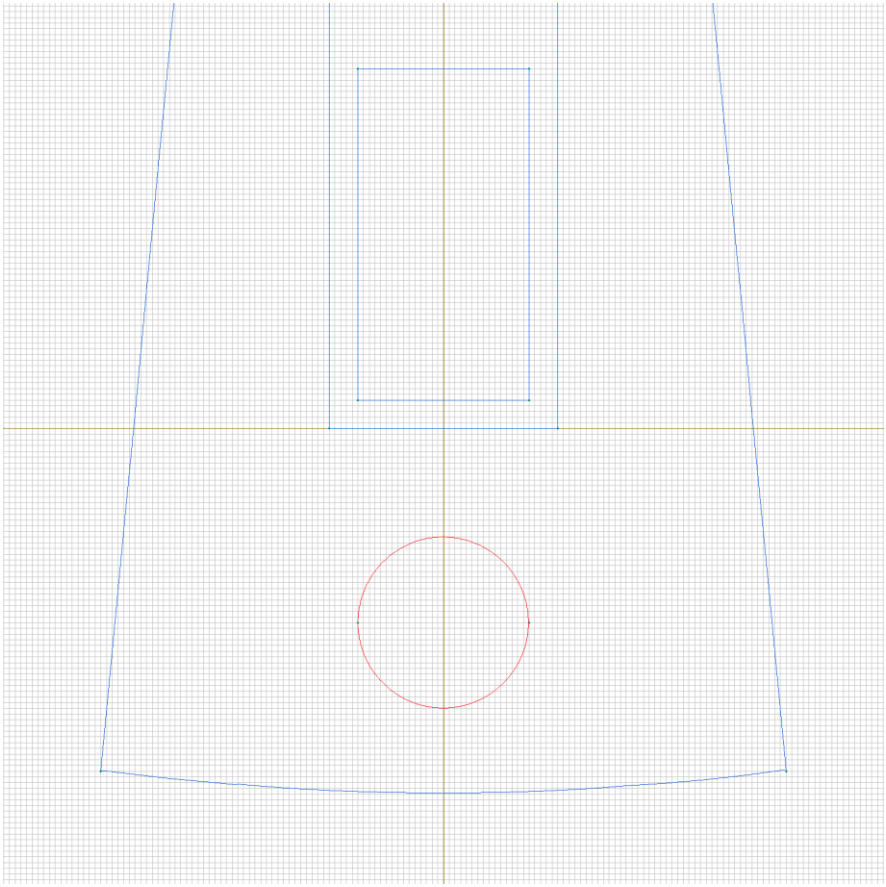
Thermal conductivity: lambda_x=25 [W/(K*m)], lambda_y=25 [W/(K*m)]



Labelled objects: edge "Cooling duct"

There are (2) objects with this label

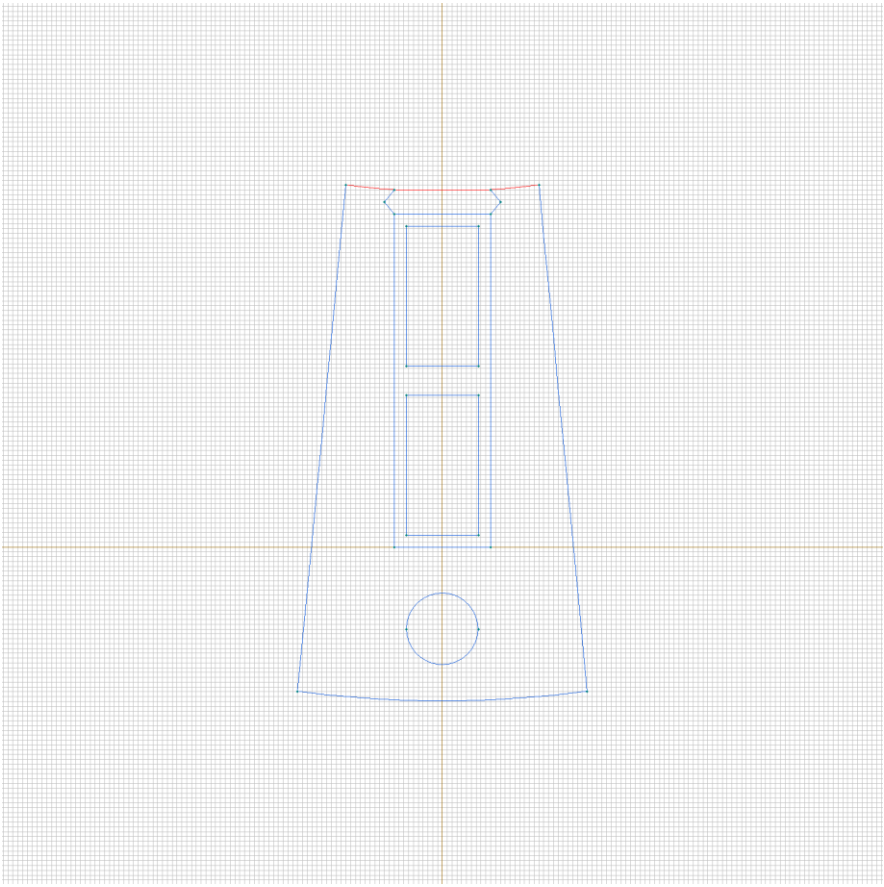
Convection: alpha=150 [W/(K*m2)], temperature T0=-233.15 [K]



Labelled objects: edge "Inner surface"

There are (3) objects with this label

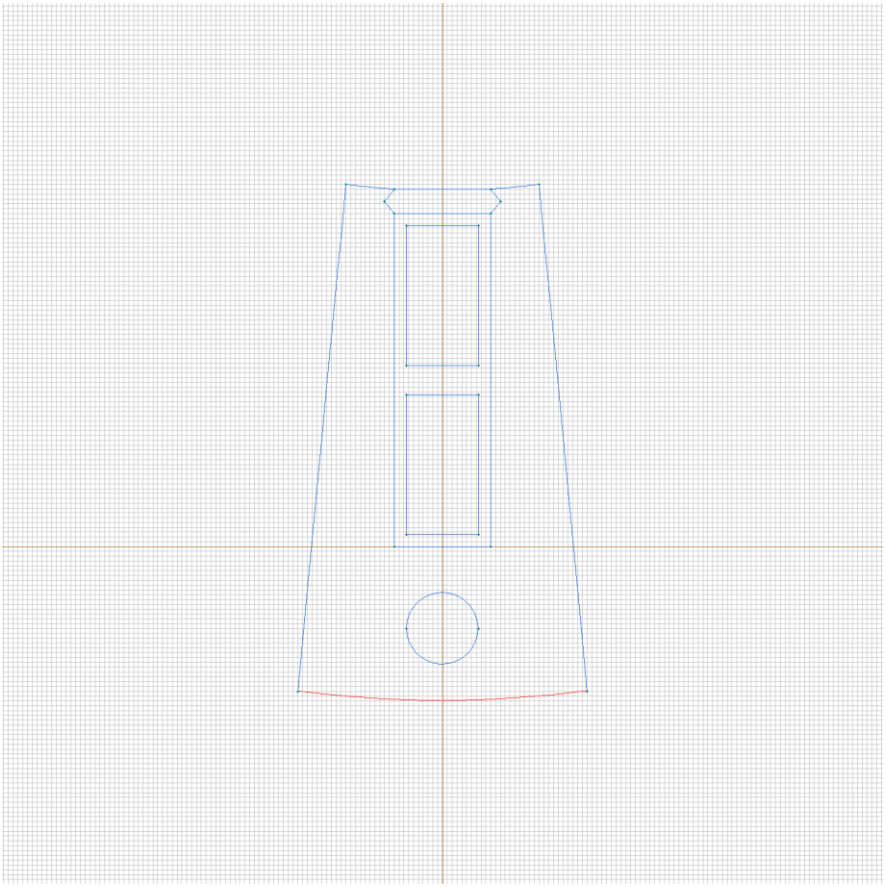
Convection: alpha=250 [W/(K*m2)], temperature T0=-233.15 [K]



Labelled objects: edge "Outer surface"

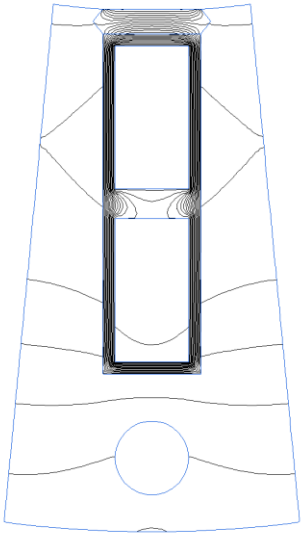
There are (1) objects with this label

Convection: alpha=70 [W/(K*m2)], temperature T0=-253.15 [K]



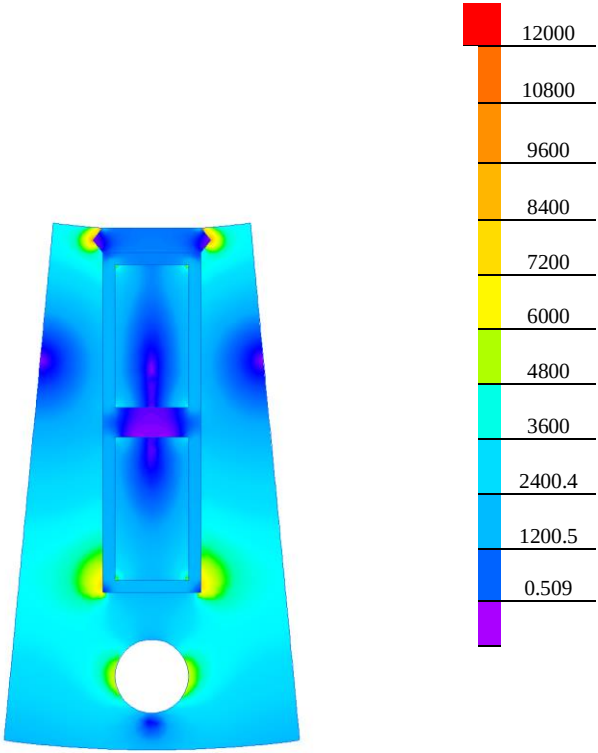
Results

Field lines



Results

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



Nonlinear dependencies

No non-linear dependencies are used in this problem data