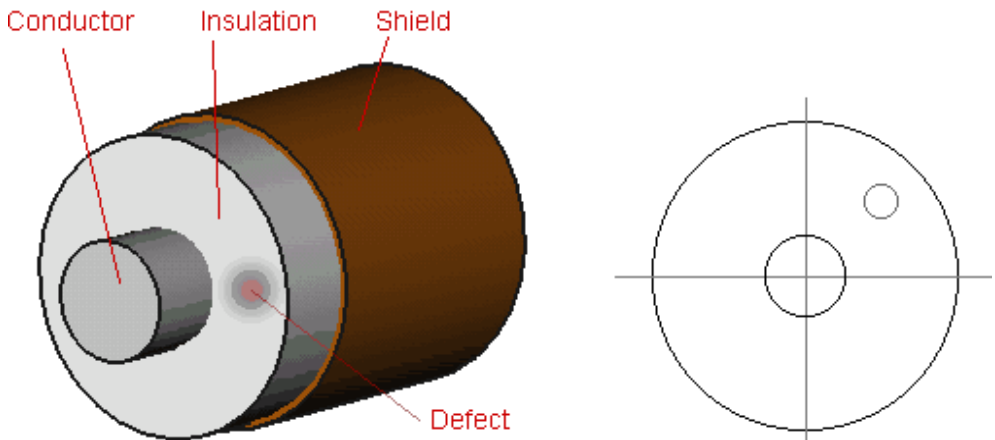


QuickField simulation report

DCCond1: Cable thermal breakdown voltage

Calculation of the electric current in the faulty insulation with small defective area



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/dc_cond1_cable_thermal_breakdown

Problem info

Problem type: DC Conduction

Geometry model class: Plane-Parallel

Problem database file names:

- Problem: *DCCond1.pbm*
- Geometry: *Dccond1.mod*
- Material Data: *Dccond1.dcf*
- Material Data 2 (library): *none*
- Electric circuit: *none*

Results taken from other problems:

- *none*

Geometry model

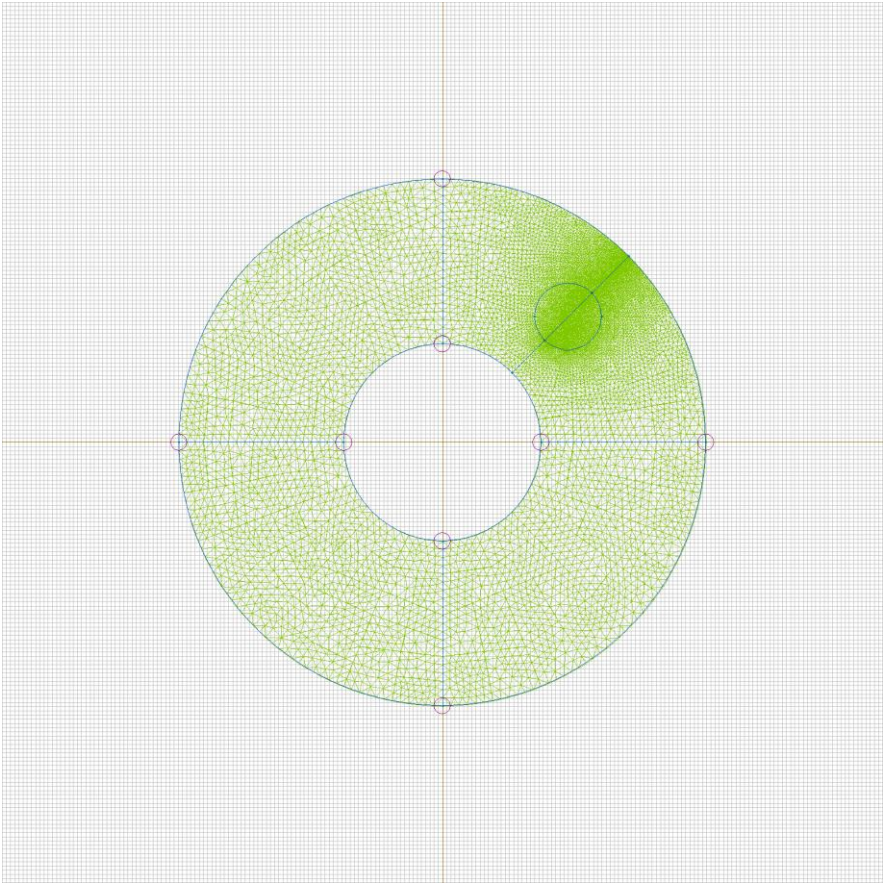


Table 1. Geometry model statistics

	With Label	Total
Blocks	2	8
Edges	2	21
Vertices	0	14

Number of nodes: 10951.

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:

- [insulation](#)
- [defect](#)
-

Edges:

- [conductor](#)
- [shield](#)
-

Vertices:

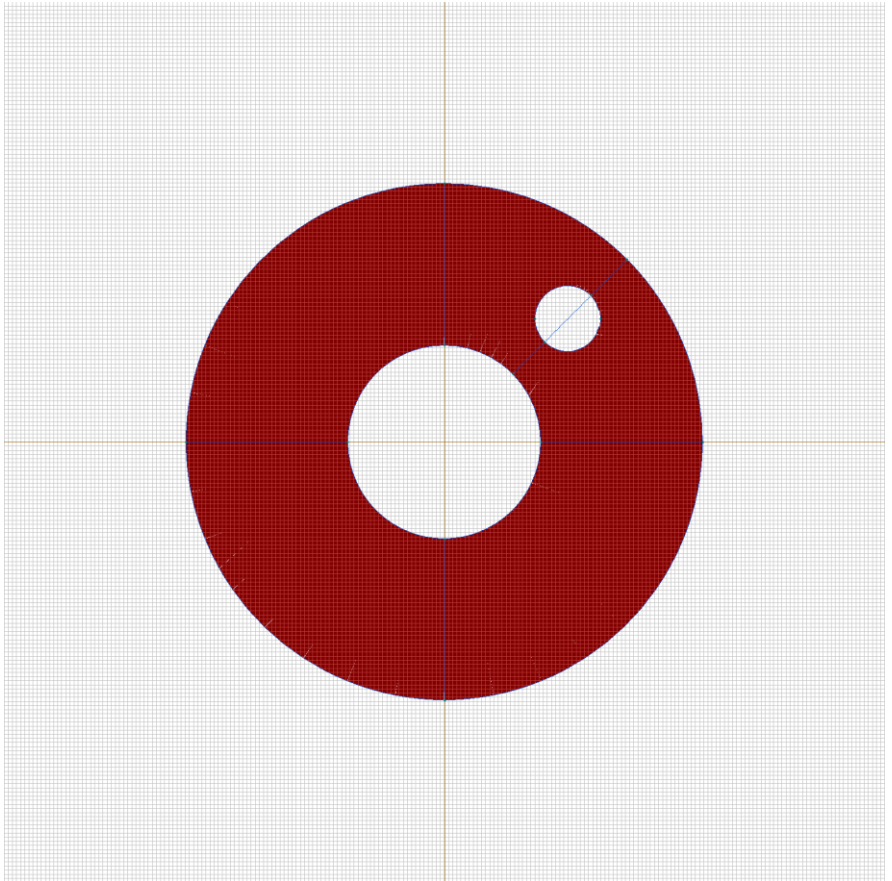
Detailed information about each label is listed below.

Labelled objects: block "insulation"

There are (5) objects with this label

Electrical conductivity: $\sigma = \text{nonlinear}$ (see Table 2 in the "Nonlinear dependencies" section)

Reference temperature: $T = 273 + 80, \text{K}$

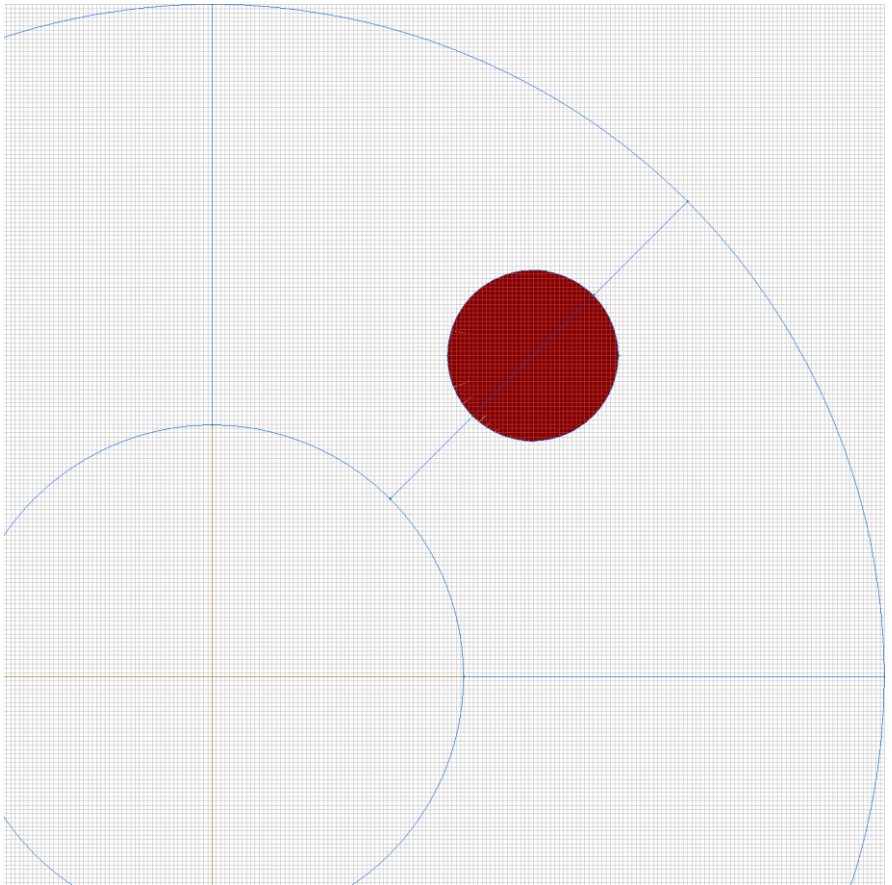


Labelled objects: block "defect"

There are (2) objects with this label

Electrical conductivity: $\sigma = \text{nonlinear}$ (see Table 3 in the "Nonlinear dependencies" section)

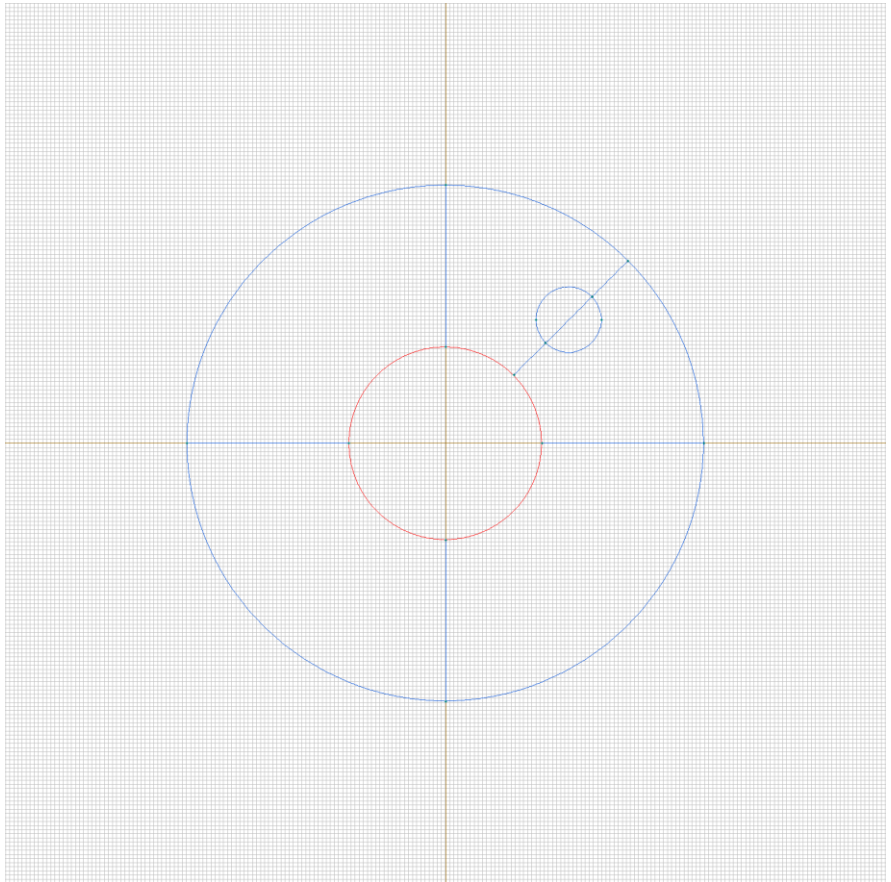
Reference temperature: $T = 393 - 40 * \sin(\sqrt{((100 * x - 1.5)^2 + (100 * y - 1.5)^2)} * 180 / \text{Pi} * 4), \text{K}$



Labelled objects: edge "conductor"

There are (5) objects with this label

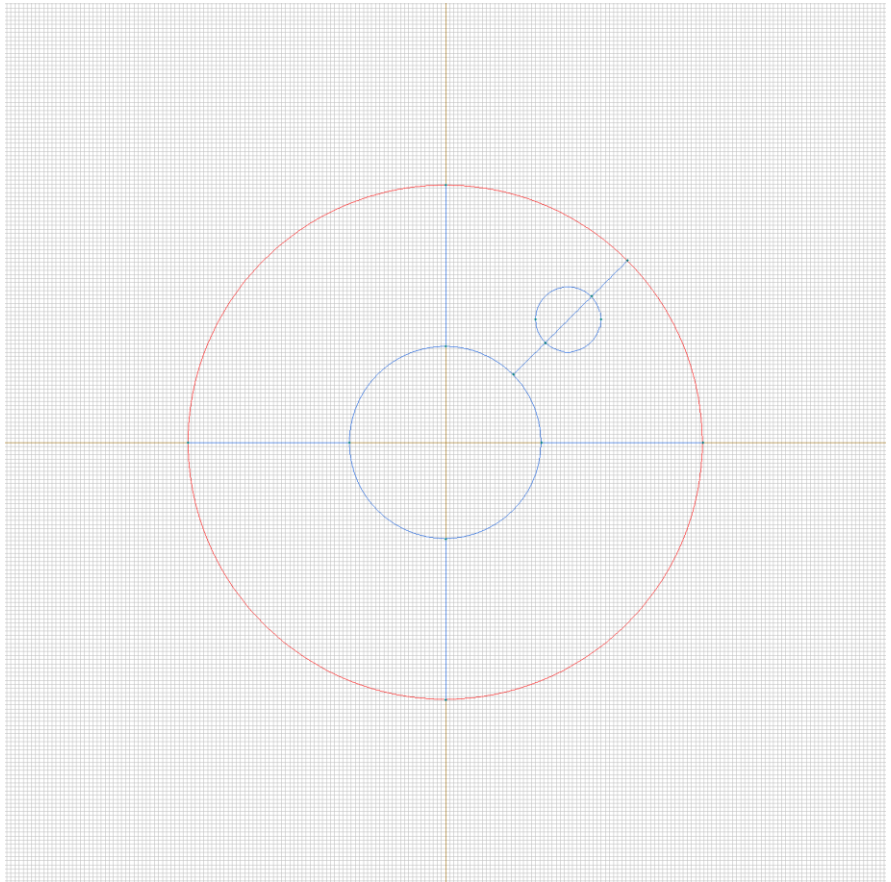
Voltage: $U=10000$ V



Labelled objects: edge "shield"

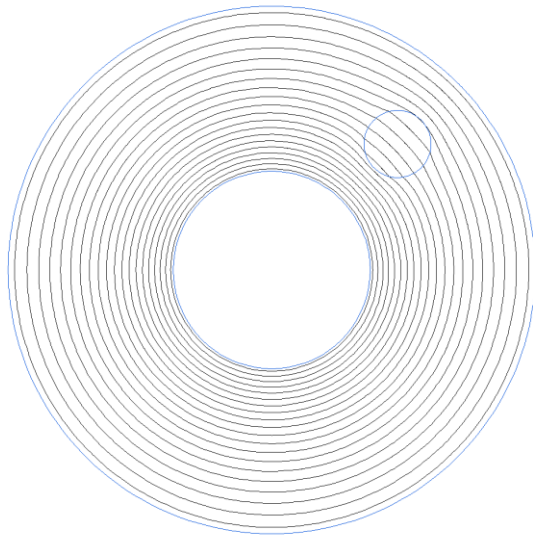
There are (5) objects with this label

Voltage: $U=0$ V



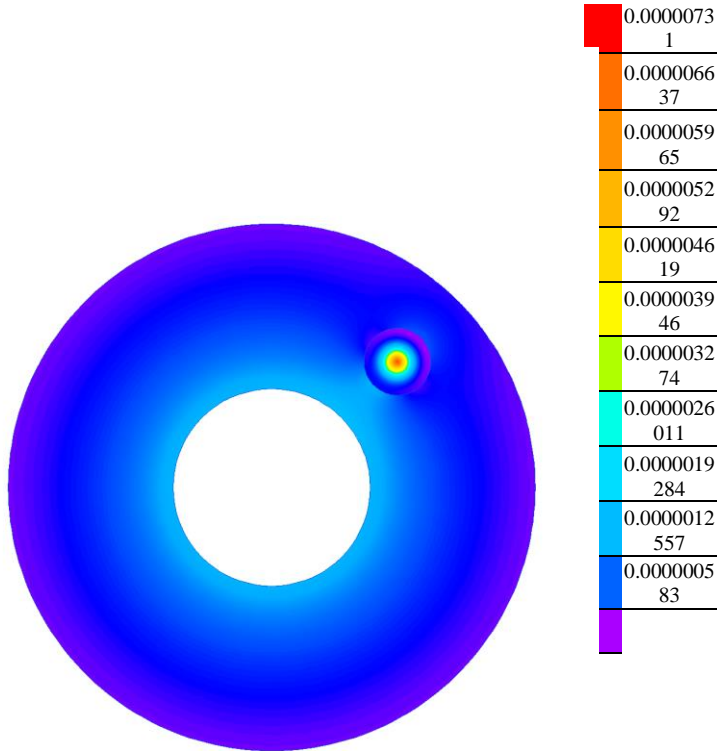
Results

Field lines



Results

Color map of Current density $|j|$ [A/m²]



Nonlinear dependencies

Table 2. Electric conductivity

T [K]	sigma [S/m]
273	0.000000000000008
293	0.000000000000001
333	0.000000000000008
353	0.000000000000002
373	0.000000000000001

Table 3. Electric conductivity

T [K]	sigma [S/m]
273	0.000000000000008
293	0.000000000000001
333	0.000000000000008
353	0.000000000000002
373	0.000000000000001