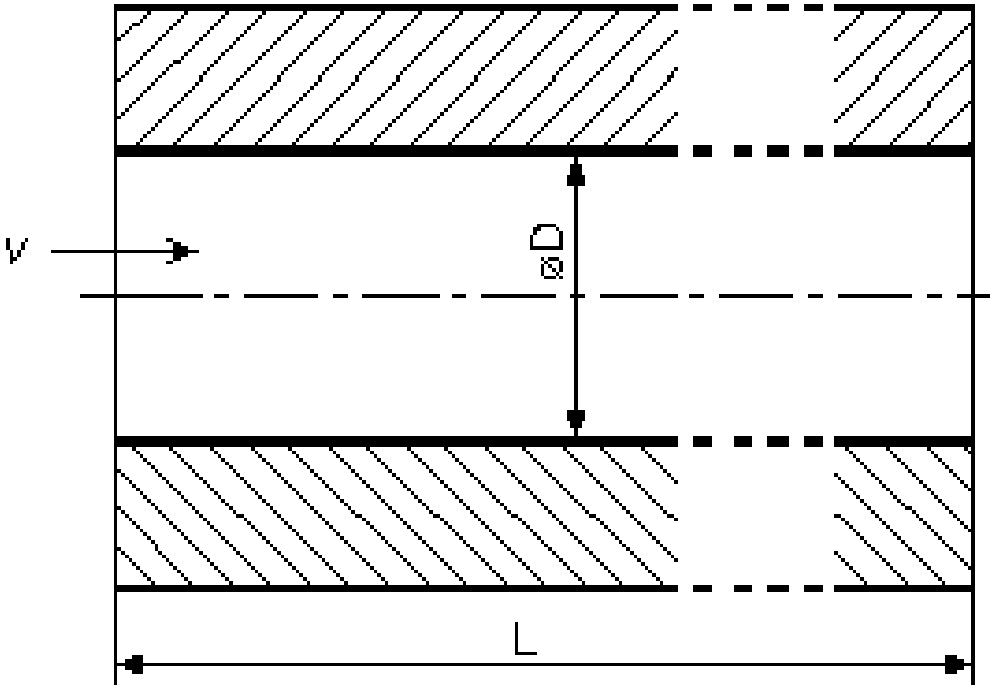
QuickField simulation report

Stator ventilation duct

Calculation of the air temperature rise in long channel



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/vent_duct.htm

Problem info

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

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

Results taken from other problems:

- *none*

Geometry model

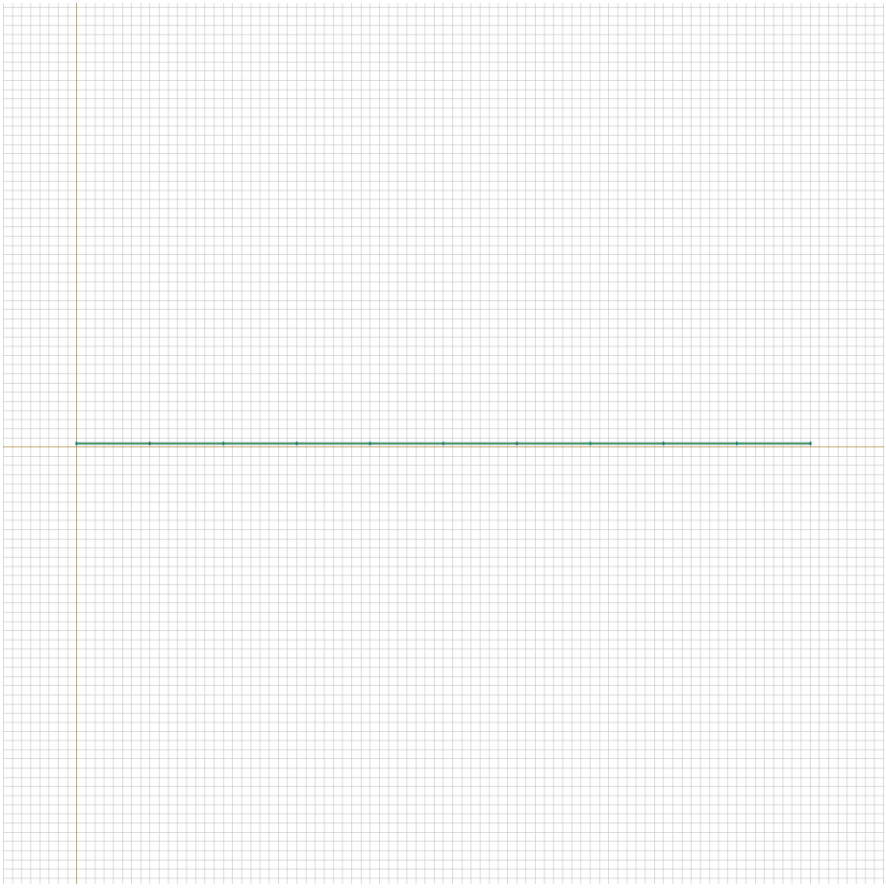


Table 1. Geometry model statistics

	With Label	Total
Blocks	1	10
Edges	11	31
Vertices	0	22

Number of nodes: 18295.

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:
• pipe •	• external part • internal part 1 • internal part 2 • internal part 3 • internal part 4 • internal part 5 • internal part 6 • internal part 7 • internal part 8 • internal part 9 • internal part 10 •	

Detailed information about each label is listed below.

Labelled objects: block "pipe"

There are (10) objects with this label

Thermal conductivity: lambda_x=55 [W/(K*m)], lambda_y=55 [W/(K*m)]

Labelled objects: edge "external part"

There are (10) objects with this label

Heat flux: F=300 [W/m2]

Labelled objects: edge "internal part 1"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=0 + (2.55518-0)/0.4*x,K [K]

Labelled objects: edge "internal part 2"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=2.55518+(4.97139-2.55518)/0.4*x,K [K]

Labelled objects: edge "internal part 3"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=4.97139+ (7.38375-4.97139)/0.4*x,K [K]

Labelled objects: edge "internal part 4"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=7.38375+ (9.79599-7.38375)/0.4*x,K [K]

Labelled objects: edge "internal part 5"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=9.79599 + (12.2081-9.79599)/0.4*x,K [K]

Labelled objects: edge "internal part 6"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=12.2081+ (14.62008-12.2081)/0.4*x,K [K]

Labelled objects: edge "internal part 7"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=14.62008 + (17.03245-14.62008)/0.4*x,K [K]

Labelled objects: edge "internal part 8"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=17.03245+ (19.44136-17.03245)/0.4*x,K [K]

Labelled objects: edge "internal part 9"

There are (1) objects with this label

Convection: alpha=50 [W/(K*m2)], temperature T0=19.44136+ (21.80523-19.44136)/0.4*x,K [K]

Labelled objects: edge "internal part 10"

There are (1) objects with this label

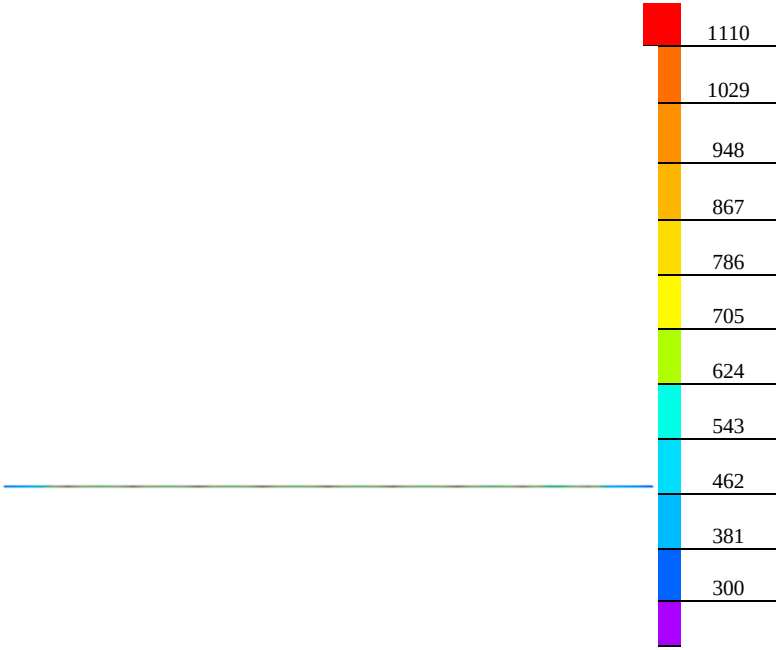
Convection: alpha=50 [W/(K*m2)], temperature T0=21.80523+ (24.12136-21.80523)/0.4*x,K [K]

Results

Field lines

Results

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



Nonlinear dependencies

No non-linear dependencies are used in this problem data