SOLIDWORKS Flow Simulation Project Report

December 5, 2021

[Model Picture here]

Learn more about SOLIDWORKS Flow Simulation

Table of Contents

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1   General Information

Objective of the simulation: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut a pulvinar lacus. Vivamus adipiscing adipiscing eleifend. Pellentesque eget ante in ante suscipit gravida in non lorem. Suspendisse hendrerit sagittis lacus non aliquam. Proin pellentesque, lorem quis consequat porta, lectus nunc vestibulum lectus, nec rhoncus libero dui ut felis. Vestibulum eu aliquet tellus. Curabitur suscipit ornare sem. Suspendisse pulvinar pharetra ultrices. Suspendisse a quam massa

1.1   Analysis Environment

Software Product:	Flow Simulation 2021 SP3.0. Build: 5251
CPU Type:	Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz
CPU Speed:	2208 MHz
RAM:	16190 MB / 9529 MB
Operating System:	Windows 10 (or higher) (Version 10.0.19042)

1.2   Model Information

Model Name:	Assembly_flow.SLDASM
Project Name:	Project(1)

1.3   Project Comments:

Unit System:	SI (m-kg-s)
Analysis Type:	Internal

1.4   Size of Computational Domain

Size

X min	-0.012 m
X max	0.012 m
Y min	0.053 m
Y max	0.147 m
Z min	-0.017 m
Z max	0.039 m
X size	0.024 m
Y size	0.094 m
Z size	0.056 m

1.5   Simulation Parameters

1.5.1   Mesh Settings

1.5.1.1   Basic Mesh

Basic Mesh Dimensions

Number of cells in X	4
Number of cells in Y	18
Number of cells in Z	12

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1.5.1.2 Analysis Mesh

Total Cell count:	8088
Fluid Cells:	8088
Solid Cells:	12732
Partial Cells:	5926
Trimmed Cells:	0

1.5.1.3 Additional Physical Calculation Options

Heat Transfer Analysis:	Heat conduction in solids: Off
Flow Type:	Laminar and turbulent
Time-Dependent Analysis:	Off
Gravity:	Off
Radiation:	
Humidity:	Off
Default Wall Roughness:	0 micrometer

1.5.2 Material Settings

Material Settings

Fluids

Air

1.5.3 Initial Conditions

Initial Conditions

Thermodynamic parameters	Static Pressure: 101325.00 Pa
	Temperature: 293.20 K
Velocity parameters	Velocity vector
	Velocity in X direction: 0 m/s
	Velocity in Y direction: 0 m/s
	Velocity in Z direction: 0 m/s
Turbulence parameters	Turbulence intensity and length
	Intensity: 2.00 %
	Length: 0.001 m

1.5.4 Boundary Conditions

Boundary Conditions

Inlet Mass Flow 1

Type	Inlet Mass Flow
Faces	transfer piston1-1/Chamfer2//Face
Coordinate system	Face Coordinate System
Reference axis	X
Flow parameters	Flow vectors direction: Normal to face
	Mass flow rate: 0.0020 kg/s

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	Fully developed flow: No Inlet profile: 0
Thermodynamic parameters	Approximate pressure: 101325.00 Pa Temperature type: Temperature of initial components Temperature: 293.20 K
Turbulence parameters	Turbulence intensity and length Intensity: 2.00 % Length: 0.001 m
Boundary layer parameters	Boundary layer type: Turbulent

Environment Pressure 2

Type	Environment Pressure
Faces	cylinder-1/Mirror3//Face
Coordinate system	Global Coordinate System
Reference axis	X
Thermodynamic parameters	Environment pressure: 101325.00 Pa Temperature type: Temperature of initial components Temperature: 293.20 K
Turbulence parameters	Turbulence intensity and length Intensity: 2.00 % Length: 0.001 m
Boundary layer parameters	Boundary layer type: Turbulent

1.5.5 Volumetric Heat Sources

1.5.6 Engineering Goals

Goals

Global Goals

GG Average Static Pressure 1

Type	Global Goal
Goal type	Static Pressure
Calculate	Average value
Coordinate system	Global Coordinate System
Use in convergence	On

1.6 Analysis Time

Calculation Time:	7 s
Number of Iterations:	69
Warnings:	A vortex crosses the pressure opening Boundary Condition : Environment Pressure 2 ; Inlet flow/outlet flow=0.440972

2 Results

2.1 Analysis Goals

Goals

Name	Unit	Value	Progress	Criteria	Delta	Use in convergence
GG Average Static Pressure 1	Pa	104497.78	100	59.284519	40.7328765	On

2.2 Global Min-Max-Table

Min/Max Table

Name	Minimum	Maximum
Density (Fluid) [kg/m^3]	1.12	1.56
Pressure [Pa]	92748.88	131415.49
Temperature [K]	277.77	293.38
Temperature (Fluid) [K]	277.77	293.38
Velocity [m/s]	0	178.255
Velocity (X) [m/s]	-49.165	50.157
Velocity (Y) [m/s]	-167.358	37.153
Velocity (Z) [m/s]	-42.951	178.225
Mach Number [ ]	0	0.53
Velocity RRF [m/s]	0	178.255
Velocity RRF (X) [m/s]	-49.165	50.157
Velocity RRF (Y) [m/s]	-167.358	37.153
Velocity RRF (Z) [m/s]	-42.951	178.225
Vorticity [1/s]	4.59e-03	96728.18
Relative Pressure [Pa]	-8576.12	30090.49
Shear Stress [Pa]	0	148.47
Bottleneck Number [ ]	8.1009172e-25	1.0000000
Heat Transfer Coefficient [W/m^2/K]	0	0
ShortCut Number [ ]	2.3276968e-24	1.0000000
Surface Heat Flux [W/m^2]	0	0
Surface Heat Flux (Convective) [W/m^2]	0	0
Total Enthalpy Flux [W/m^2]	-1.223e+07	1.195e+07
Acoustic Power [W/m^3]	0	447.987
Acoustic Power Level [dB]	0	146.51

2.3 Results

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2.4   Conclusion

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3 Appendix
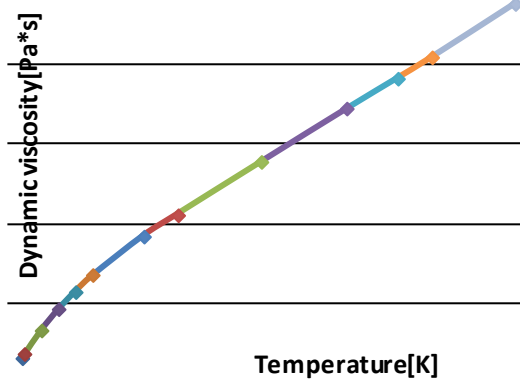
3.1 Material Data

Engineering Database
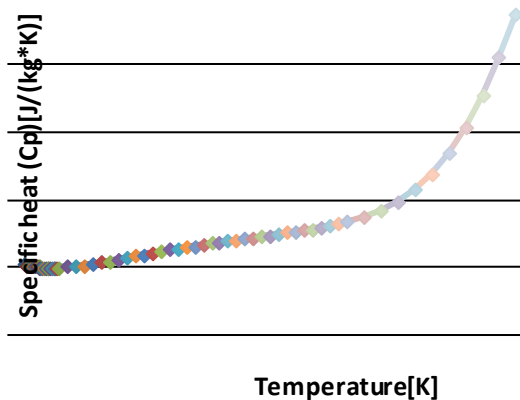
Gases

Air

Path: Gases Pre-Defined
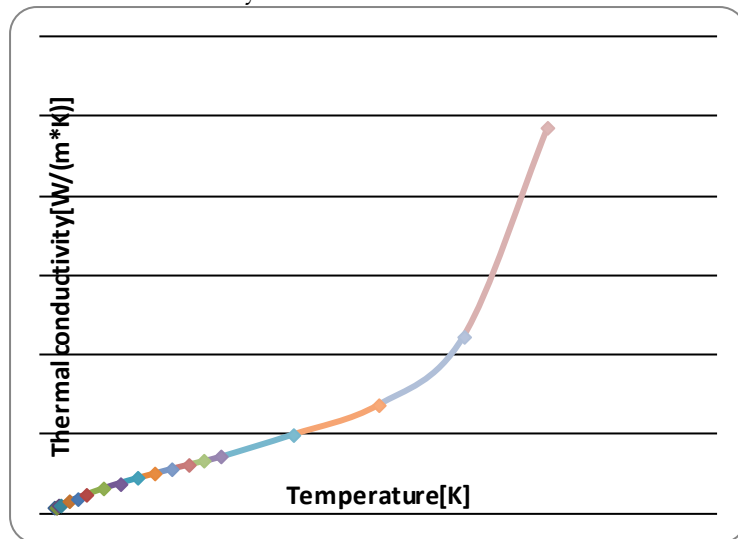Specific heat ratio (Cp/Cv): 1.399
Molecular mass: 0.0290 kg/mol
Dynamic viscosity

Specific heat (Cp)

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Thermal conductivity

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