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| *[Company logo here]* | | | Description: Description: sw_vert_gray_short |
| [company name here] | [city, state here] | [company url here] | Fluid Flow Simulation Project Report |
| |  |  |  |  | | --- | --- | --- | --- | | [name] ∙ | [title] | ∙ ∙ [email address] ∙ | (###) ###-#### | | | | |
| **SOLIDWORKS Flow Simulation**  **Project Report**  December 5, 2021  *[Model Picture here]* | | | |
| [**Learn more about SOLIDWORKS Flow Simulation**](https://www.solidworks.com/sw/products/simulation/flow-simulation.htm) | | | |

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# 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

## 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)

## Model Information

Model Name: Assembly\_flow.SLDASM

Project Name: Project(1)

## Project Comments:

Unit System: SI (m-kg-s)

Analysis Type: Internal

## 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 |

## Simulation Parameters

### Mesh Settings

#### Basic Mesh

Basic Mesh Dimensions

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

#### Analysis Mesh

Total Cell count: 8088

Fluid Cells: 8088

Solid Cells: 12732

Partial Cells: 5926

Trimmed Cells: 0

#### 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

### Material Settings

Material Settings

Fluids

[Air](#B1535F57FA18487E983114E9C508498E)

### 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 |

### 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  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 |

### Volumetric Heat Sources

### 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 |

## 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

# Results

## 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 |

## 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 |

## Results

## Conclusion

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# Appendix

## 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)

Thermal conductivity

