A7q2 comsol

Report date

Oct 16, 2025, 8:21:10 PM

Contents

1 Global Definitions

Date	Sep 19, 2025, 1:26:18 AM

GLOBAL SETTINGS

Name	A7q2 comsol.mph
Path	E:\Comsol codes\a7q2_comsol.mph
Version	COMSOL Multiphysics 6.0 (Build: 318)

USED PRODUCTS

COMSOL Multiphysics

COMPUTER INFORMATION

CPU	Intel64 Family 6 Model 142 Stepping 12, 2 cores
Operating system	Windows 10

1.1 PARAMETERS

PARAMETERS 1

Name	Expression	Value	Description
umax	0.5[m/s]	0.5 m/s	Velocity
t	0[s]	0 s	Time

2 Component 1

2.1 DEFINITIONS

2.1.1 Functions

Piecewise 1

Function name	f
Function type	Piecewise
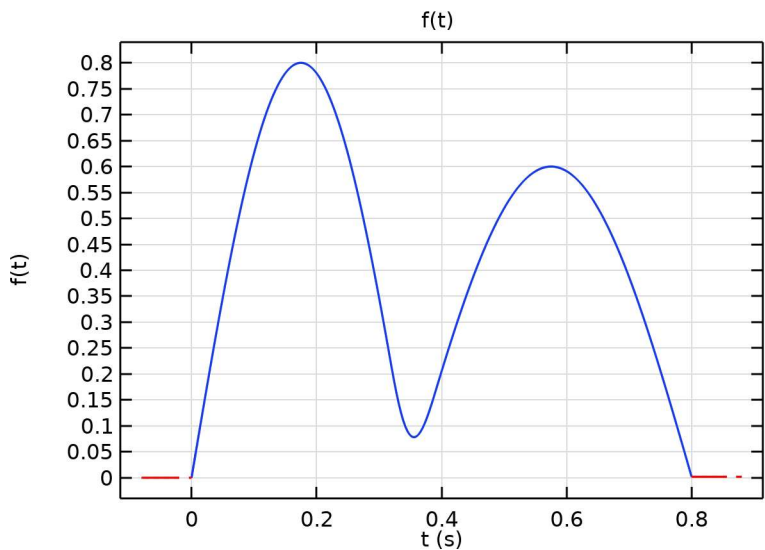
Piecewise 1

2.1.2 Coordinate Systems

Boundary System 1

Coordinate system type	Boundary system
Tag	sys1

COORDINATE NAMES

First	Second	Third
t1	n	to

2.2   GEOMETRY 1
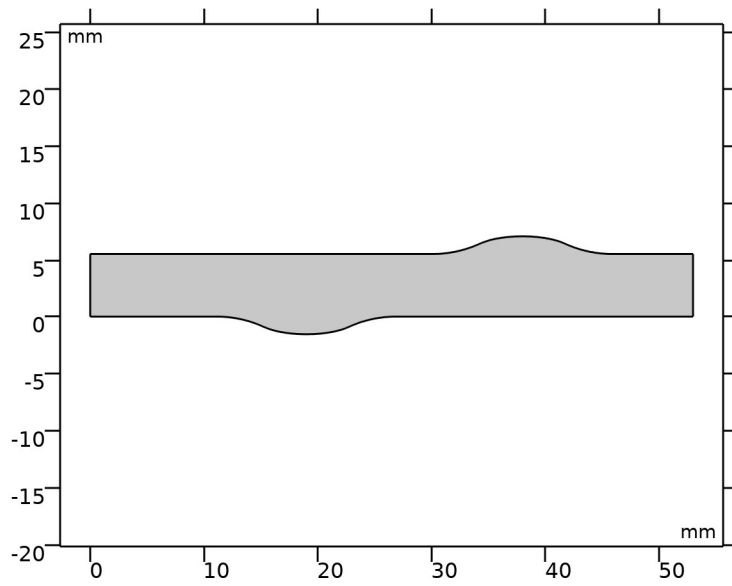
Geometry 1
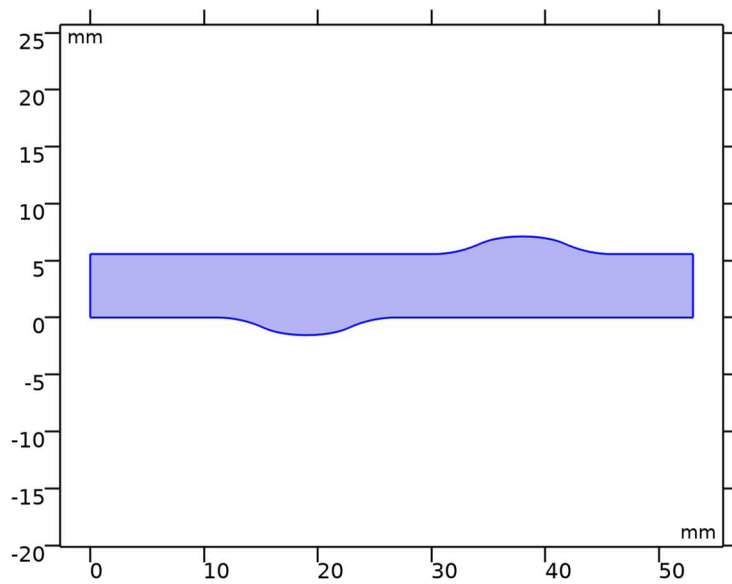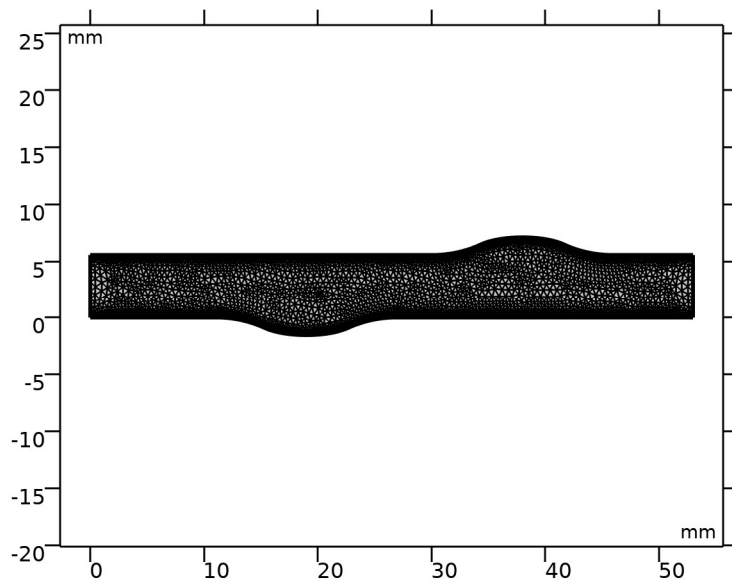
2.3   LAMINAR FLOW

Laminar Flow

EQUATIONS

$$\rho\frac{\partial \mathbf{u}}{\partial t} + \rho(\mathbf{u} \cdot \nabla)\mathbf{u} = \nabla \cdot [-p\mathbf{I} + \mathbf{K}] + \mathbf{F}$$
$$\rho\nabla \cdot \mathbf{u} = 0$$

FEATURES

Name	Level
Fluid Properties 1	Domain
Initial Values 1	Domain
Wall 1	Boundary
Inlet 1	Boundary
Outlet 1	Boundary

2.4 MESH 1

Mesh 1

3 Study 1

Computation time	2 min 39 s

3.1 PARAMETRIC SWEEP

Parameter name	Parameter value list	Parameter unit
umax	0.25 0.45 0.65 0.85	m/s

STUDY SETTINGS

Description	Value
Sweep type	Specified combinations
Parameter name	umax
Unit	m/s

PARAMETERS

Parameter name	Parameter value list	Parameter unit
umax (Velocity)	0.25 0.45 0.65 0.85	m/s

3.2 TIME DEPENDENT

Times	Unit
range(0,0.1,10)	s

STUDY SETTINGS

Description	Value
Include geometric nonlinearity	Off

STUDY SETTINGS

Description	Value
Output times	{0, 0.1, 0.2, 0.30000000000000004, 0.4, 0.5, 0.6000000000000001, 0.7000000000000001, 0.8, 0.9, 1, 1.1, 1.2000000000000002, 1.3, 1.4000000000000001, 1.5, 1.6, 1.7000000000000002, 1.8, 1.9000000000000001, 2, 2.1, 2.2, 2.3000000000000003, 2.4000000000000004, 2.5, 2.6, 2.7, 2.8000000000000003, 2.9000000000000004, 3, 3.1, 3.2, 3.3000000000000003, 3.4000000000000004, 3.5, 3.6, 3.7, 3.8000000000000003, 3.9000000000000004, 4, 4.1000000000000005, 4.2, 4.3, 4.4, 4.5, 4.6000000000000005, 4.7, 4.800000000000001, 4.9, 5, 5.1000000000000005, 5.2, 5.300000000000001, 5.4, 5.5, 5.6000000000000005, 5.7, 5.800000000000001, 5.9, 6, 6.1000000000000005, 6.2, 6.300000000000001, 6.4, 6.5, 6.6000000000000005, 6.7, 6.800000000000001, 6.9, 7, 7.1000000000000005, 7.2, 7.300000000000001, 7.4, 7.5, 7.6000000000000005, 7.7, 7.800000000000001, 7.9, 8, 8.1, 8.200000000000001, 8.3, 8.4, 8.5, 8.6, 8.700000000000001, 8.8, 8.9, 9, 9.1, 9.200000000000001, 9.3, 9.4, 9.5, 9.600000000000001, 9.700000000000001, 9.8, 9.9, 10}

PHYSICS AND VARIABLES SELECTION

Physics interface	Discretization
Laminar Flow (spf)	physics

MESH SELECTION

Geometry	Mesh
Geometry 1 (geom1)	mesh1

4 Results

4.1 DATASETS

4.1.1 Study 1/Solution 1

Description	Value
Solution	Solution 1
Component	Component 1 (comp1)
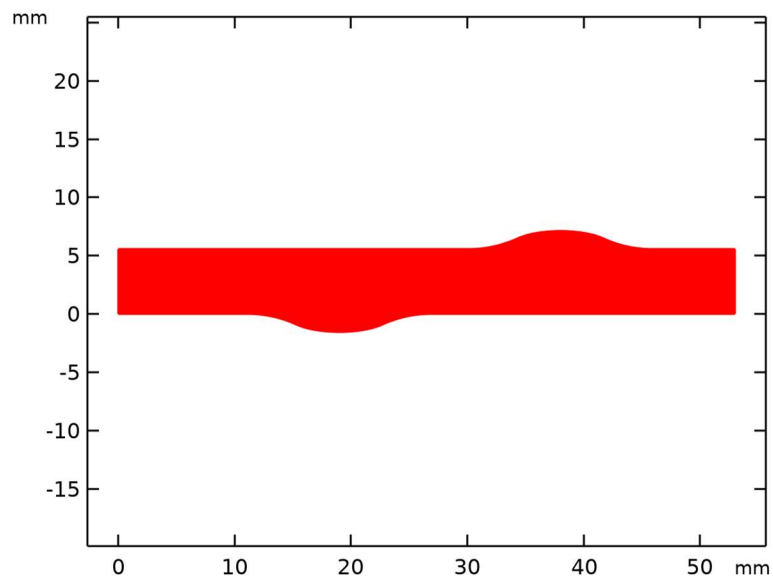
Dataset: Study 1/Solution 1

4.1.2 Cut Point 2D 1

Description	Value
Dataset	Study 1/Solution 1

Description	Value
Entry method	Coordinates
x	range(0, 0.5, 53)
y	0
Snapping	Snap to closest boundary

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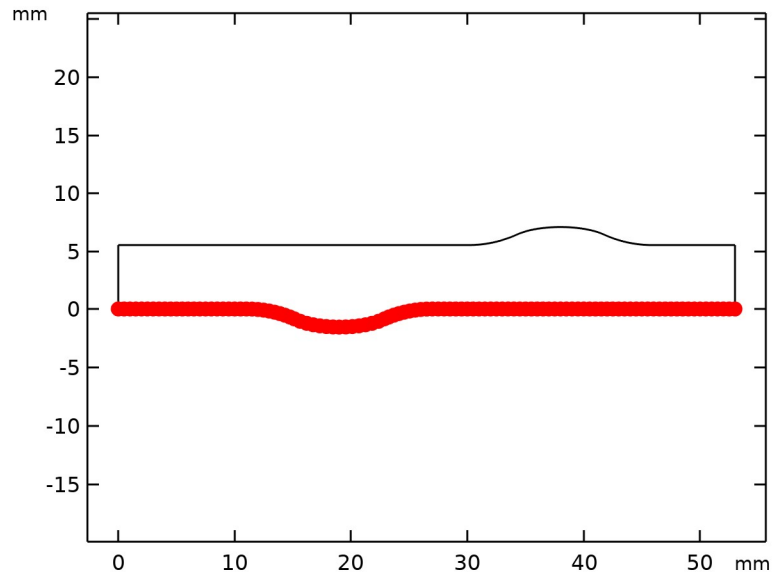
Dataset: Cut Point 2D 1

4.1.3 Cut Line 2D 1

DATA

Description	Value
Dataset	Study 1/Solution 1

LINE DATA

Description	Value
Line entry method	Two points
Points	{{8, 0}, {8, 5.57}}

ADVANCED

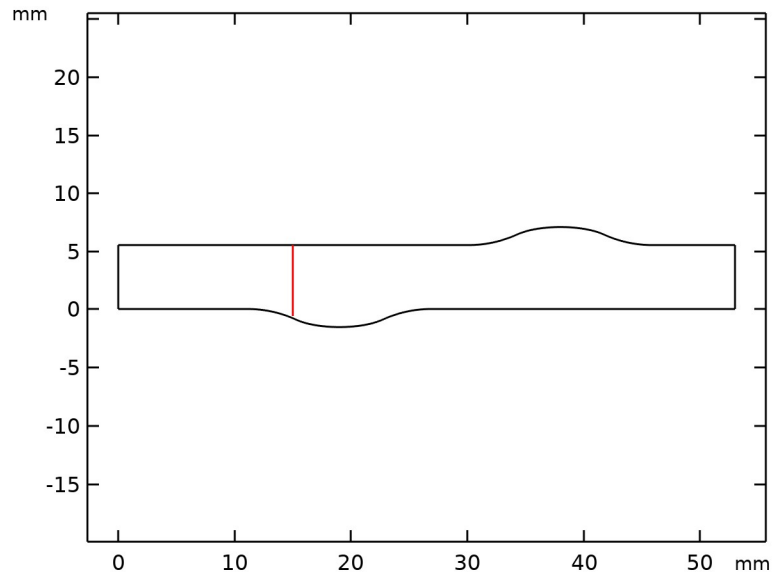| Description	Value
Space variable	cln1x
Normal variables	{cln1nx, cln1ny}
Tangent variables	{cln1tx, cln1ty}
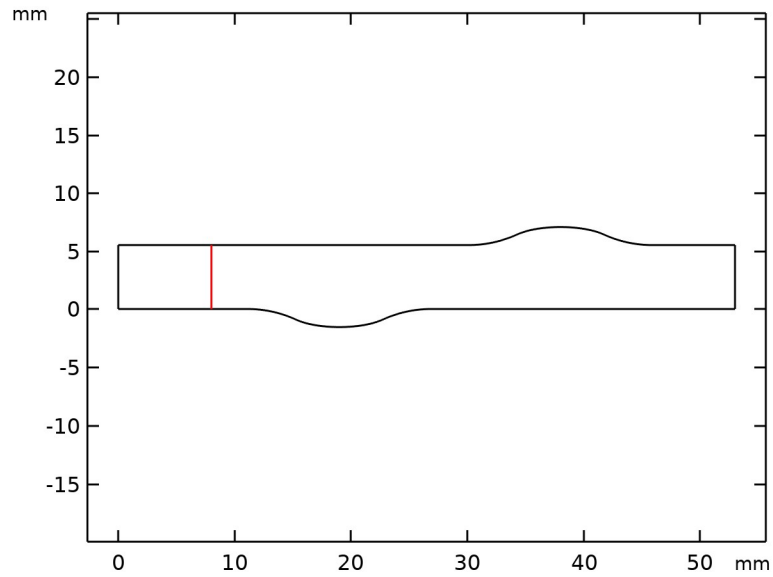
Dataset: Cut Line 2D 1

4.1.4   Cut Line 2D 2

DATA

Description	Value
Dataset	Study 1/Solution 1

LINE DATA

Description	Value
Line entry method	Two points
Points	{{15, -0.6}, {15, 5.57}}

ADVANCED

Description	Value
Space variable	cln1x
Normal variables	{cln1nx, cln1ny}
Tangent variables	{cln1tx, cln1ty}

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Dataset: Cut Line 2D 2

4.1.5 Cut Line 2D 3

DATA

Description	Value
Dataset	Study 1/Solution 1

LINE DATA

Description	Value
Line entry method	Two points
Points	{{19, -2}, {19, 5.57}}

ADVANCED

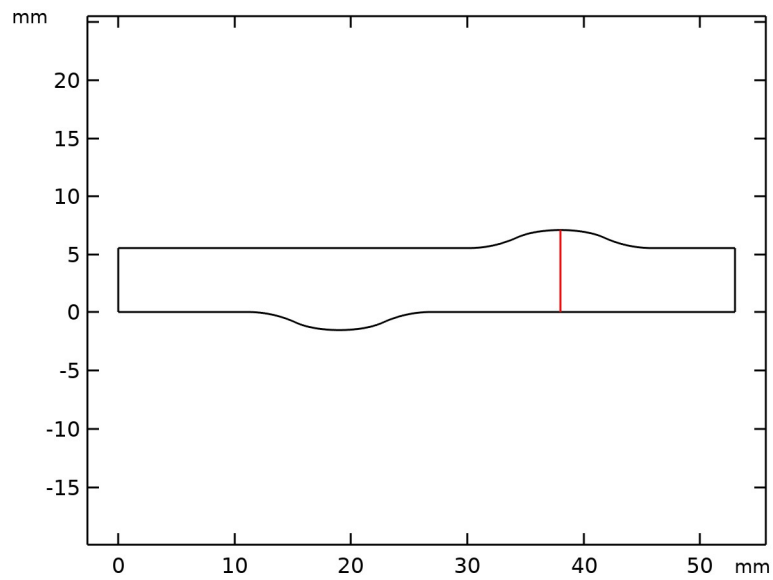| Description	Value
Space variable	cln1x
Normal variables	{cln1nx, cln1ny}
Tangent variables	{cln1tx, cln1ty}
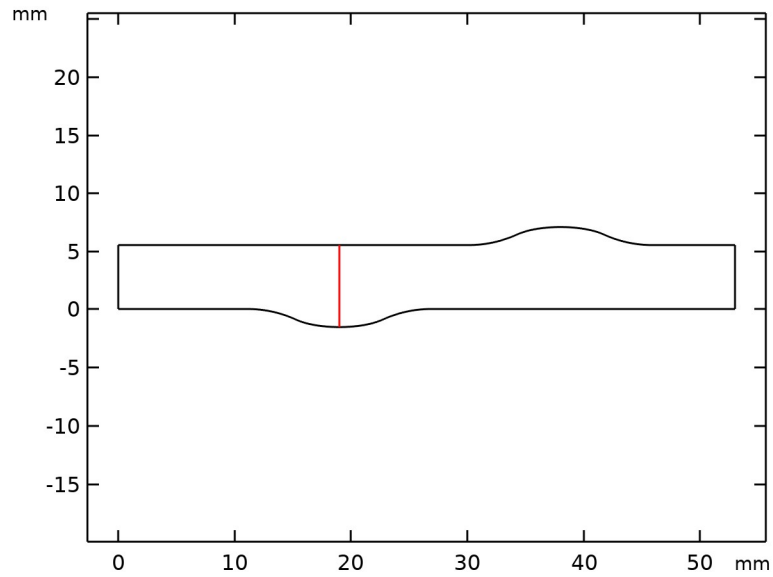
Dataset: Cut Line 2D 3

4.1.6 Cut Line 2D 4

DATA

Description	Value
Dataset	Study 1/Solution 1

LINE DATA

Description	Value
Line entry method	Two points
Points	{{38, 0}, {38, 7.57}}

ADVANCED

Description	Value
Space variable	cln1x
Normal variables	{cln1nx, cln1ny}
Tangent variables	{cln1tx, cln1ty}

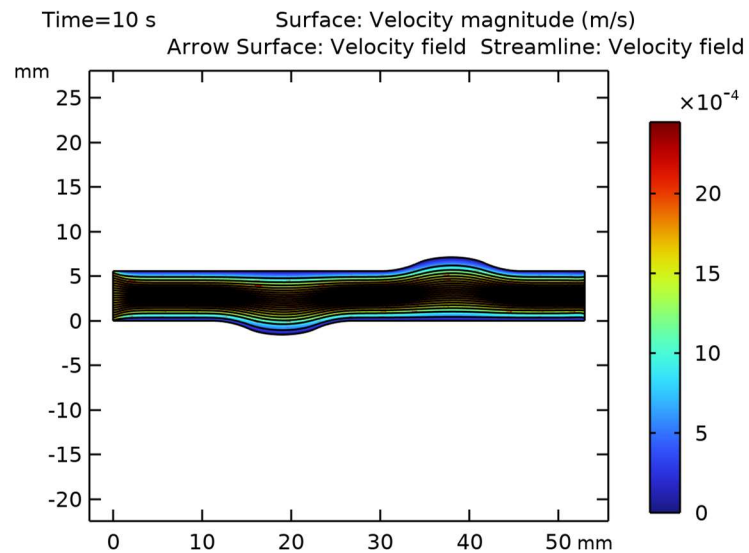*Dataset: Cut Line 2D 4*

4.1.7 Study 1/Parametric Solutions 1

Description	Value
Solution	Parametric Solutions 1
Component	Component 1 (comp1)
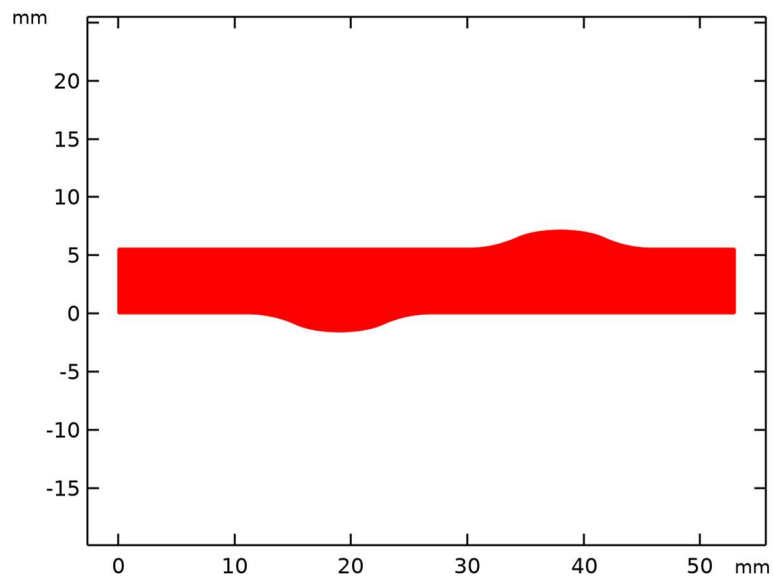
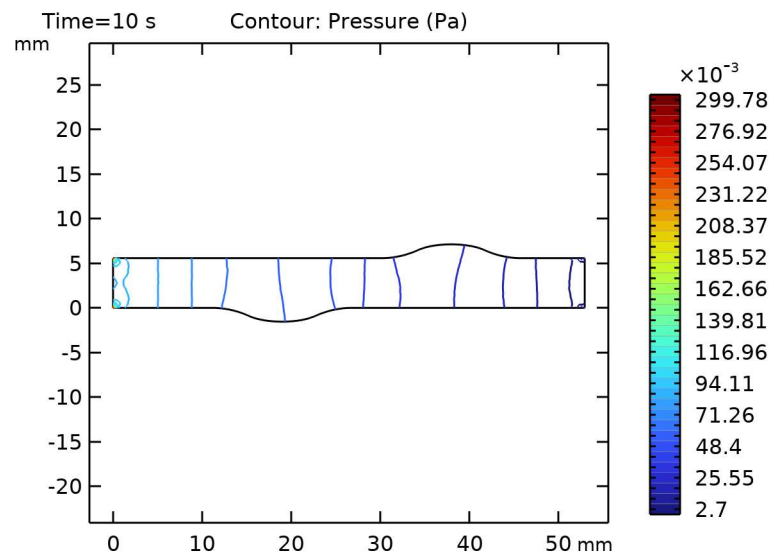*Dataset: Study 1/Parametric Solutions 1*

4.2 PLOT GROUPS

4.2.1 Velocity (spf)

Time=10 s   Surface: Velocity magnitude (m/s)
Arrow Surface: Velocity field   Streamline: Velocity field
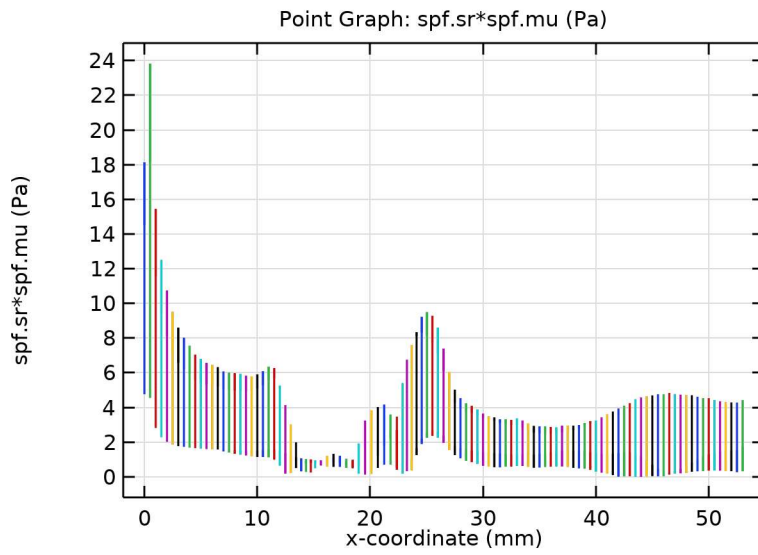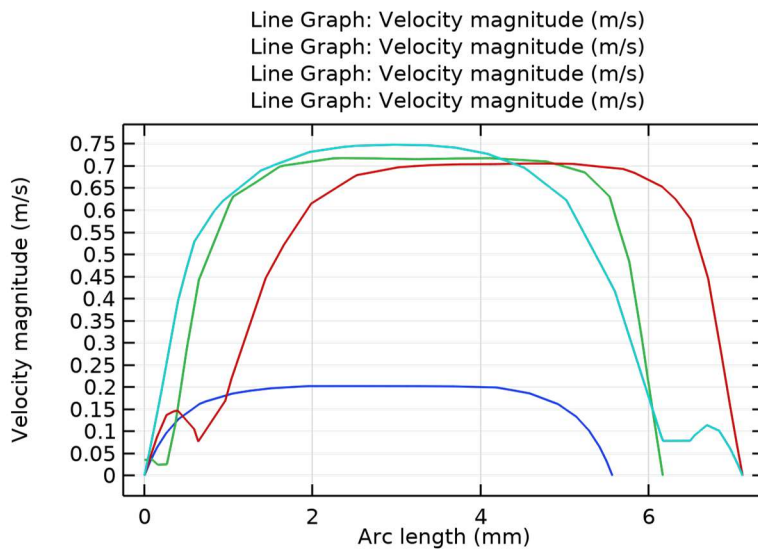

Surface: Velocity magnitude (m/s) Arrow Surface: Velocity field Streamline: Velocity field

4.2.2 Pressure (spf)

Time=10 s   Contour: Pressure (Pa)

Contour: Pressure (Pa)

4.2.3 1D Plot Group 3

Point Graph: spf.sr*spf.mu (Pa)

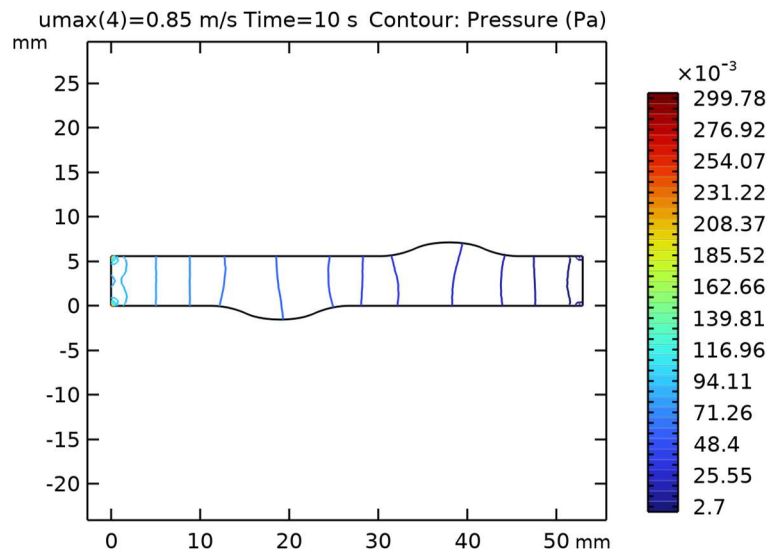*Point Graph: spf.sr*spf.mu (Pa)*

4.2.4 1D Plot Group 4

Line Graph: Velocity magnitude (m/s)
Line Graph: Velocity magnitude (m/s)
Line Graph: Velocity magnitude (m/s)
Line Graph: Velocity magnitude (m/s)

Line Graph: Velocity magnitude (m/s) Line Graph: Velocity magnitude (m/s) Line Graph: Velocity magnitude (m/s) Line Graph: Velocity magnitude (m/s)

4.2.5 Velocity (spf) 1

umax(2)=0.45 m/s Time=3.3 s Surface: Velocity magnitude (m/s)
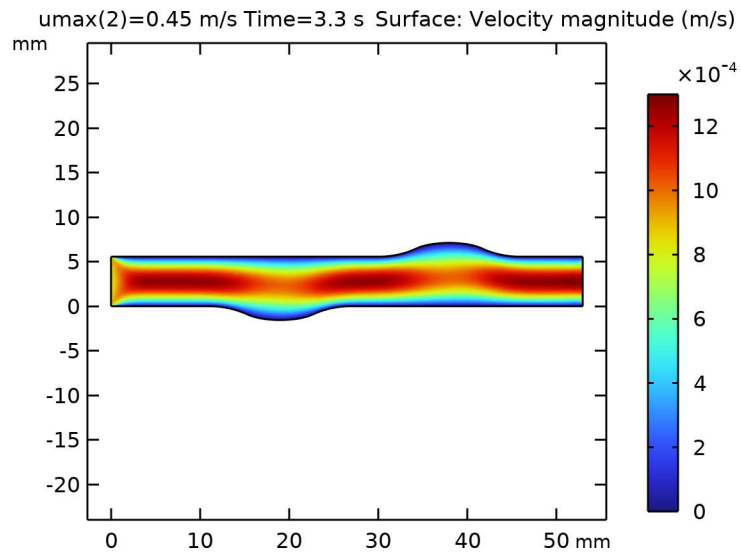
Surface: Velocity magnitude (m/s)

4.2.6 Pressure (spf) 1

umax(4)=0.85 m/s Time=10 s Contour: Pressure (Pa)

Contour: Pressure (Pa)