

# Unsteady Flow Past a Cylinder - Physics Setup

Authors: John Singleton and Rajesh Bhaskaran, Cornell University

[Problem Specification](#)

[1. Pre-Analysis & Start-Up](#)

[2. Geometry](#)

[3. Mesh](#)

[4. Physics Setup](#)

[5. Numerical Solution](#)

[6. Numerical Results](#)

[7. Verification & Validation](#)

[Exercises](#)

[Comments](#)

## Physics Setup

**Launch FLUENT.**

**(Double Click) Setup** in "Unsteady Flow", the duplicate project. Select **Double Precision**, and if using a computer with multiple cores, select parallel, and set the number of cores to be used.



Then click **OK**

## Transient

In this step here we will, tell FLUENT to solve for the unsteady flow. As you can see, by default FLUENT will solve for the steady flow.

**Problem Setup > General.** Set **Time** to **Transient**.

### General

Mesh

Scale... Check Report Quality

Display...

Solver

Type

☒ Pressure-Based ☐ Density-Based

Velocity Formulation

☒ Absolute ☐ Relative

Time

☐ Steady ☒ Transient

2D Space

☒ Planar ☐ Axisymmetric ☐ Axisymmetric Swirl

☐ Gravity Units...

Help

### Specify Material Properties

To achieve a Reynolds number of 120, as required in the problem statement, we will change the material viscosity, to  $8.333 \times 10^{-3}$  kg/m\*s.

**Problem Setup > Materials > Fluid > air > Create/Edit....** Set the **viscosity** to 8.333E-3 (kg/m\*s). Click **Change/Create**.

Properties

Density (kg/m<sup>3</sup>) constant Edit...

1

Viscosity (kg/m-s) constant Edit...

0.008333

Then click **Close**.

### Save Project

[Go to Step 5: Numerical Solution](#)

[Go to all FLUENT Learning Modules](#)