

USER MANUAL

Version 1.0

LIQUID: 2-D FLUID DYNAMIC SIMULATOR

TEAM PRYMM

**Pavan Kumar Gade, Radhika Panchal, Yashraj
Sinha, Minghua Liu and Manoj Mathe**

LIQUID: 2-D FLUID DYNAMIC SIMULATOR
USER MANUAL DOCUMENT

Revision History

Date	Version	Description	Author
12/12/2015	1.0	User Manual Document	Radhika Panchal

Table of Contents

1. Introduction	4
1.1 Purpose	4
2. Getting Started.....	5
2.1 Fluid Setting	4
2.2 Log / SIM replay.....	16
2.3 Control Panel	19
2.3.1 Initial State/ Idle State	19
2.3.2 Running State.....	20
2.3.3 Pause State	21
3. Conclusion.....	22
4. Referance.....	22

Introduction

This section provides User Guide for the project LIQUID which is a 2-D Fluid Dynamics Simulator. The purpose of this document is to present in depth clarity of the requirements associated with the project to its intended audience. And the scope of the project gives a particular focus on what the software will do and it's feature. The complete User Manual of the project is provided here .

Purpose

The User Manual provides simple guide line about 2-D fluid dynamics simulator application. The application will enable users to examine, visualize and obtain measurements about how fluids behave under different conditions and space configurations.

Getting Started

The structure principle of GUI design has been used to put related things together and separating unrelated things, differentiating dissimilar things and making similar things resemble one another. The user input parameters are put together in three major sub-sections named control Panel, Fluid Settings and Log/SIM replay.

2.1 Fluid Setting

This sub-section contains all the configuration parameters which can be set by the user before starting the simulation and this complete Fluid Setting sub-section remains disabled during the simulation run and replay.

- I. **Fluid type:** This is a drop down providing user an option to select fluid type which can be water [Default] or glycerin or User Define.
 - a. **User Define:** This fluid type selection done by the user giving an option to the user to customize fluid based on the viscosity value selected using scroll bar.

Viscosity: This scroll bar value is used for selection of viscosity of the fluid and is used for simulation only when Customize Fluid check box is checked.

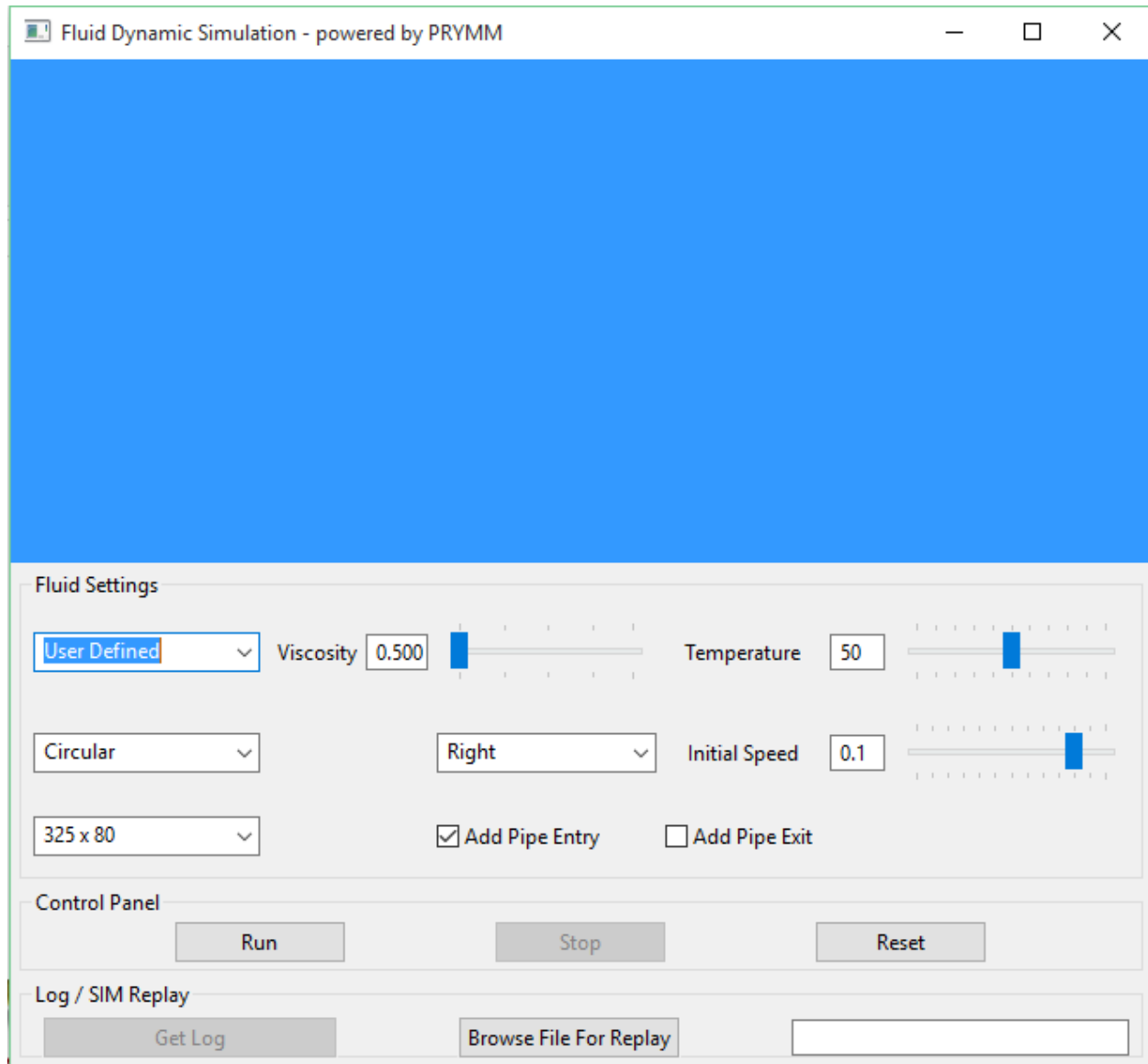


Figure - 1 User Define fluid type

- II. Fluid temperature : User can set Fluid temperature using scrollbar .
- III. Barrier Shape: This drop down provides option of adding circular or rectangular barrier in the 2-D simulation box.
 - a. Rectangular

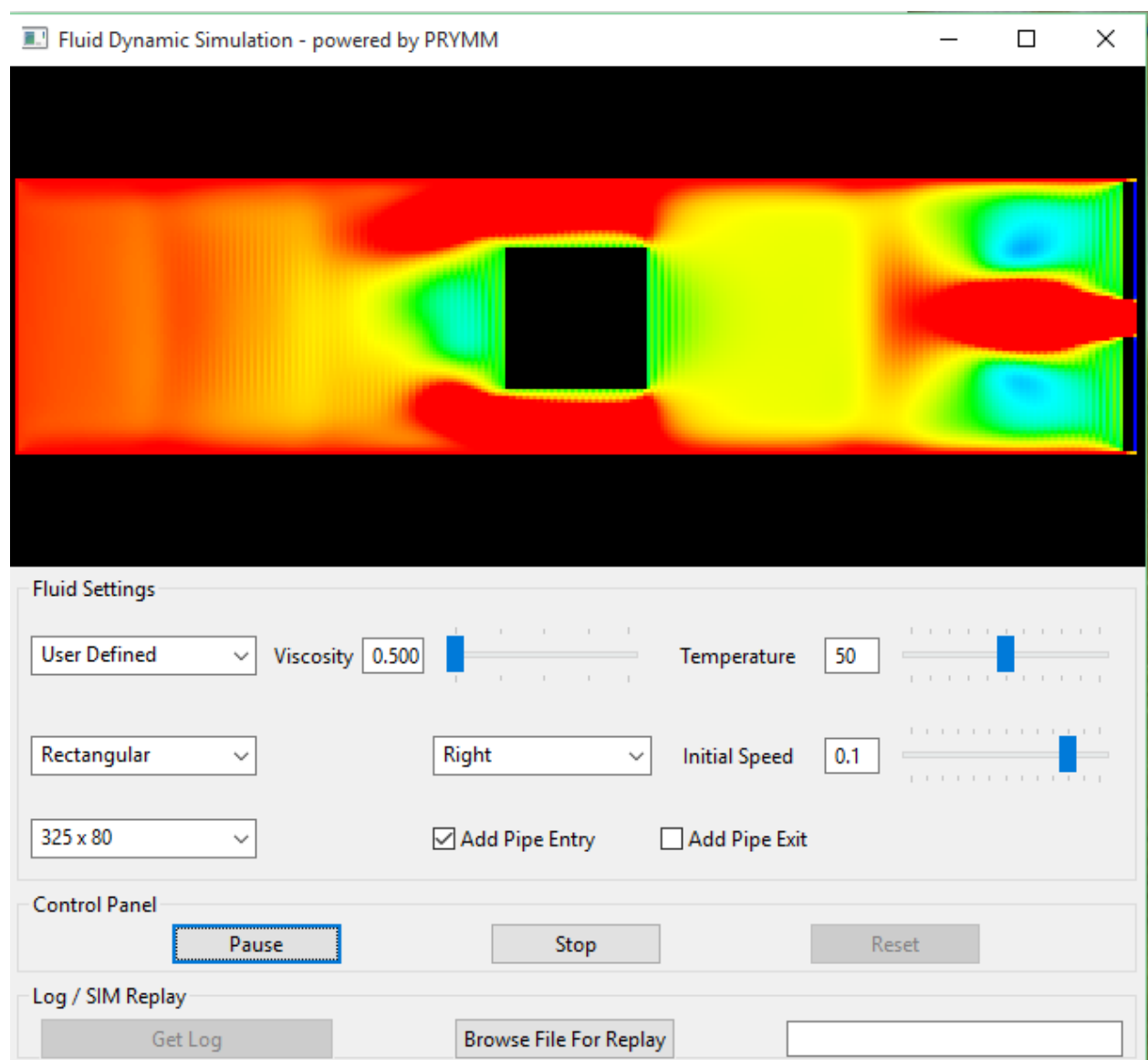


Figure - 2 Barrier shapes - Rectangular

b. Circular

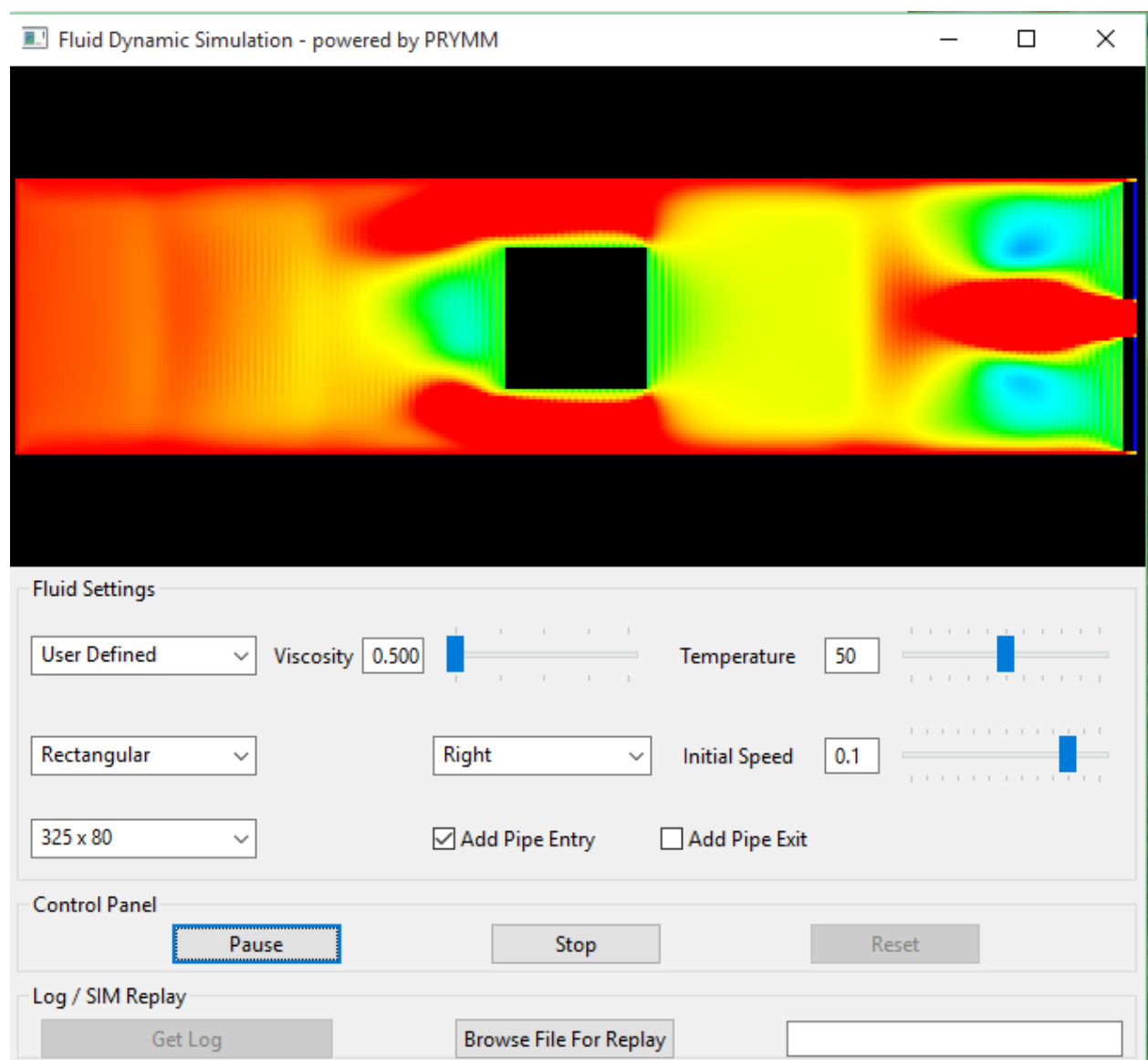


Figure - 3 Barrier shape - Circular

c. Inner Pipe

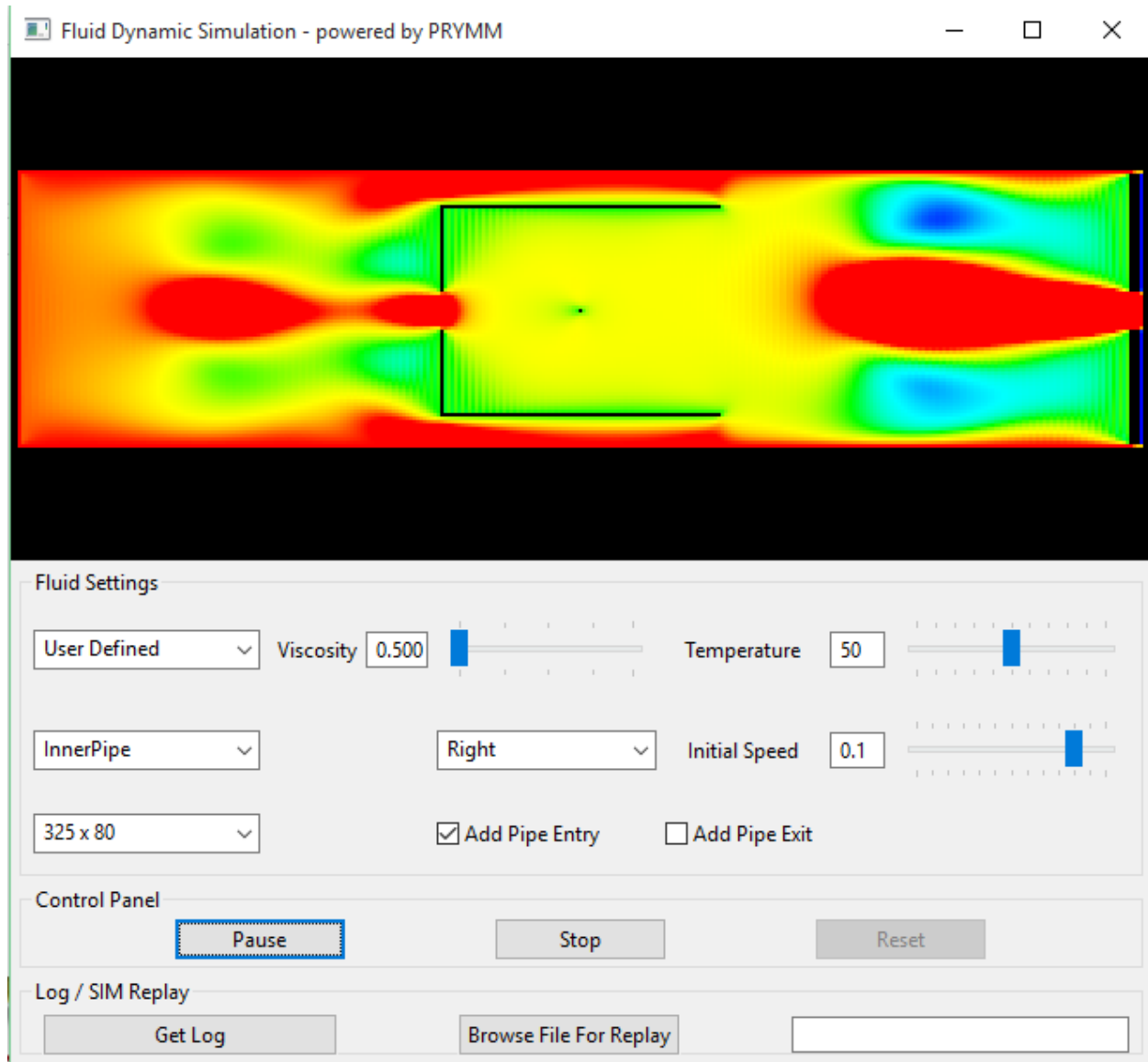


Figure - 4 Setting inner Pipe

- IV. Fluid flow from two different side : This drop down list provides two option for fluid flow from two different side [Left , Right]
- Fluid flow from Left side

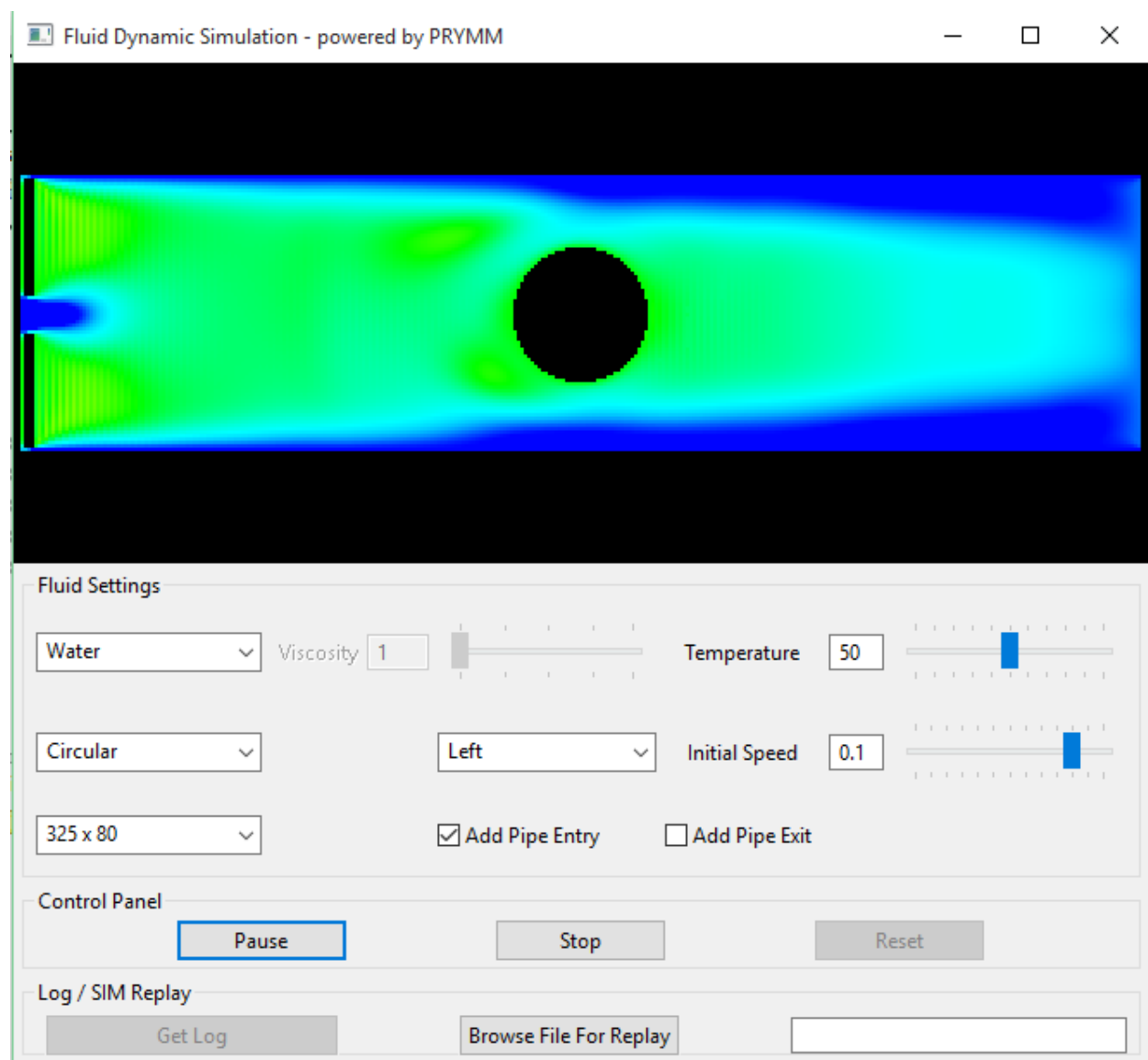


Figure - 5 Setting Fluid Flow from left direction

b. Fluid flow from Right side

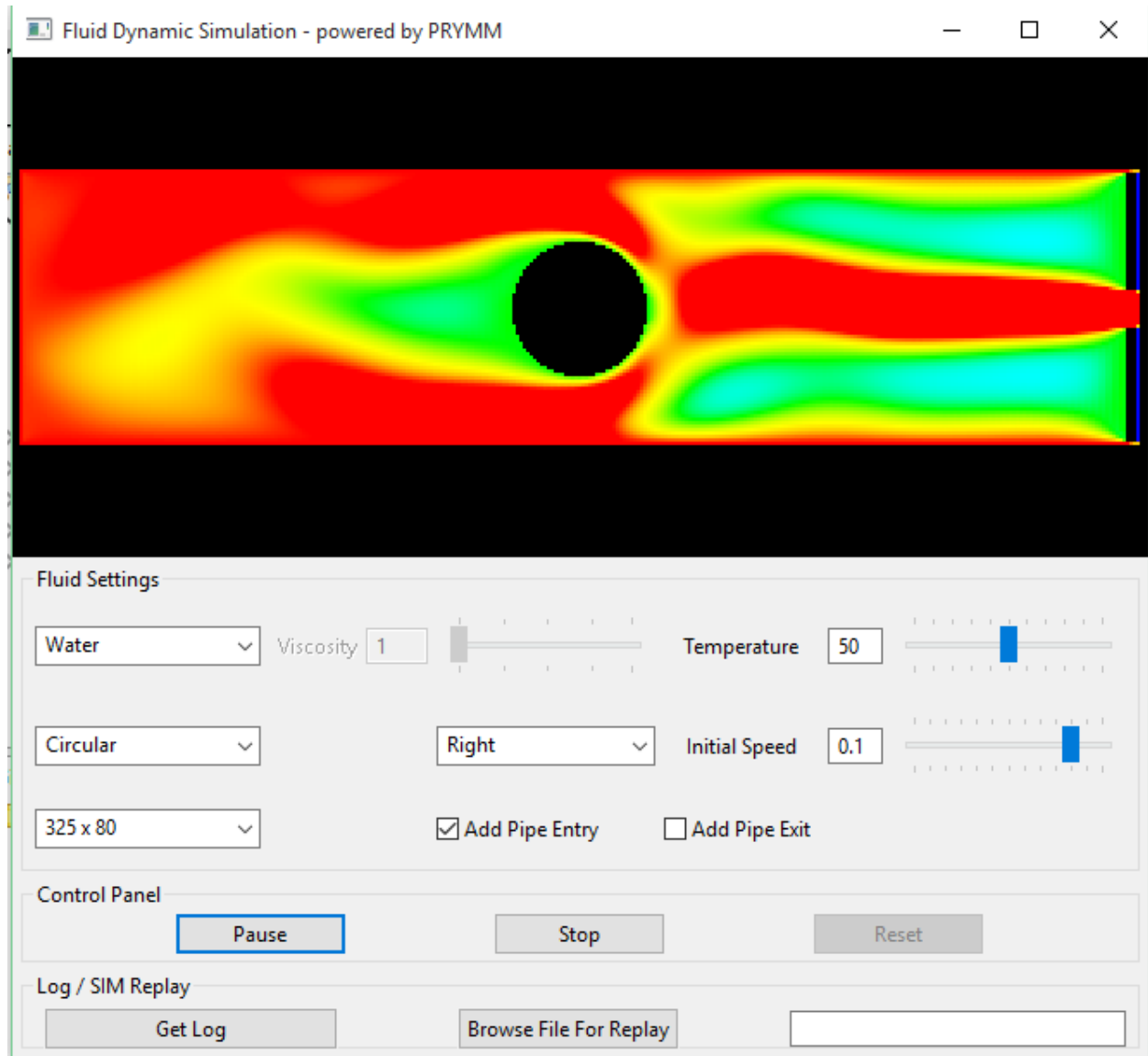


Figure - 6 Setting Fluid Flow from right direction

- V. Fluid Initial speed : Using this scrollbar option user can set the initial velocity of the particles entering the container.
- VI. Container Size: This drop down provides user the option of selecting from a range of container sizes for simulation container and the options are : 325 x 80 , 200 x 80 , 300 x 120 .

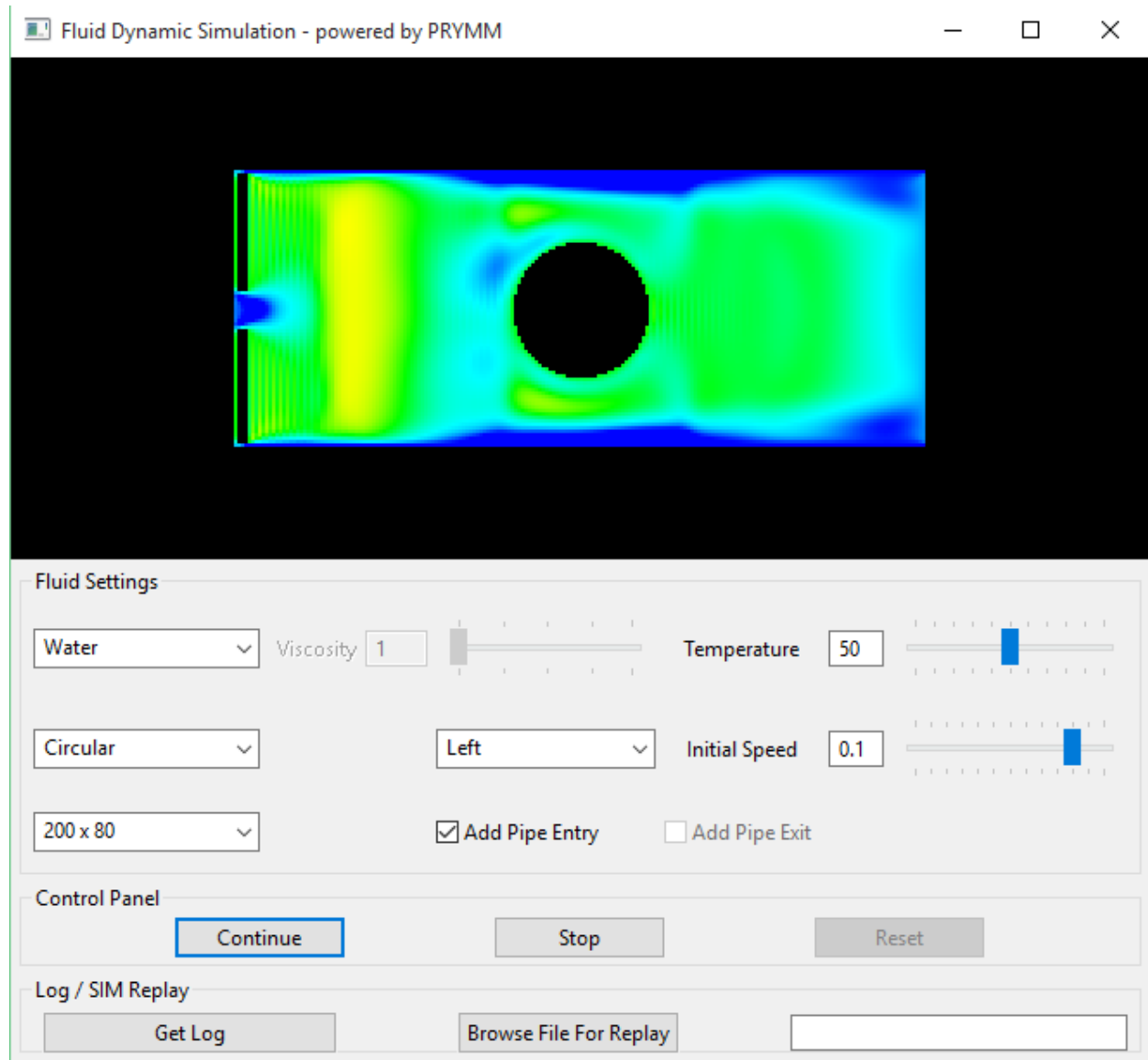


Figure - 7 Setting container size 200 x 80

- VII. Pipe Simulation: This provides user to simulate the entry or exit path from the container to resemble a pipe of smaller diameter.
- Add Pipe Entry : This Check Box change the entry to the container from a pipe .

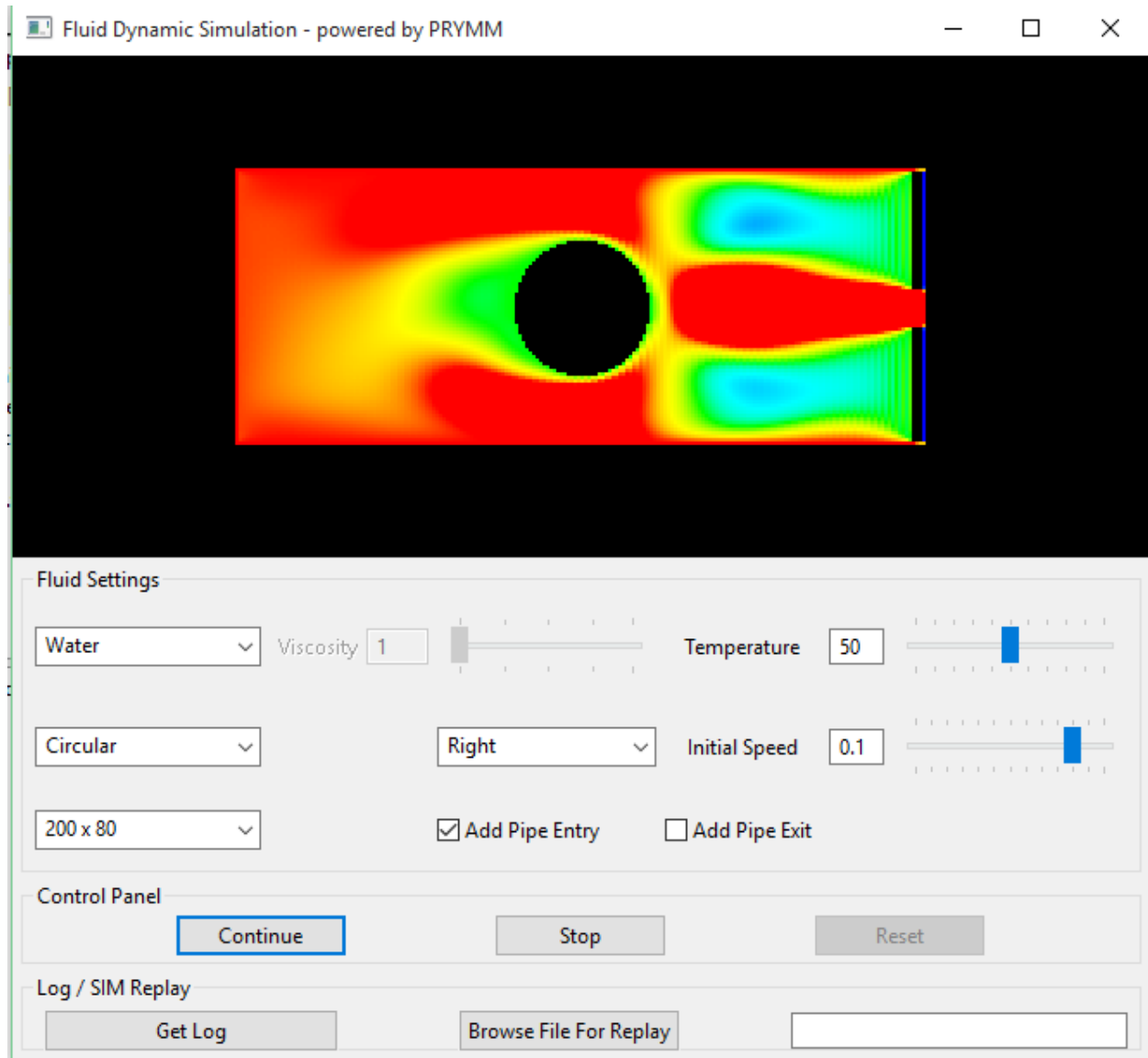


Figure - 8 Adding entry point using pipe

- b. Add Pipe Exit : This check box changes the exit path of the container to resemble an exit path same as that of a pipe.

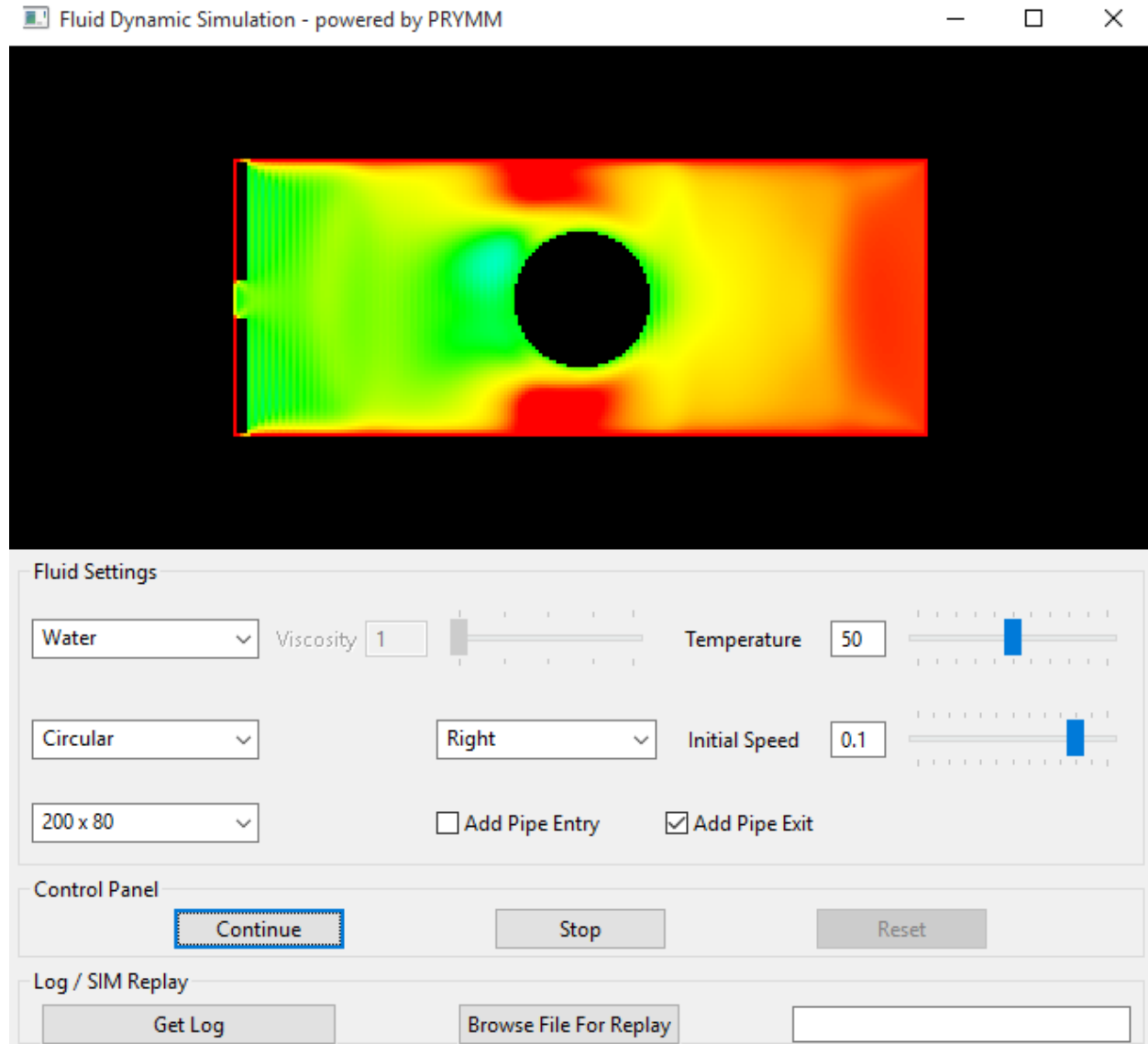


Figure - 9 Adding Exit point using pipe

- c. Adding Pipe in both Direction : By selecting both option user can see the pressure in Fluid .So the entry and exit path is small compared to previous case User can easily measure the pressure in the container.

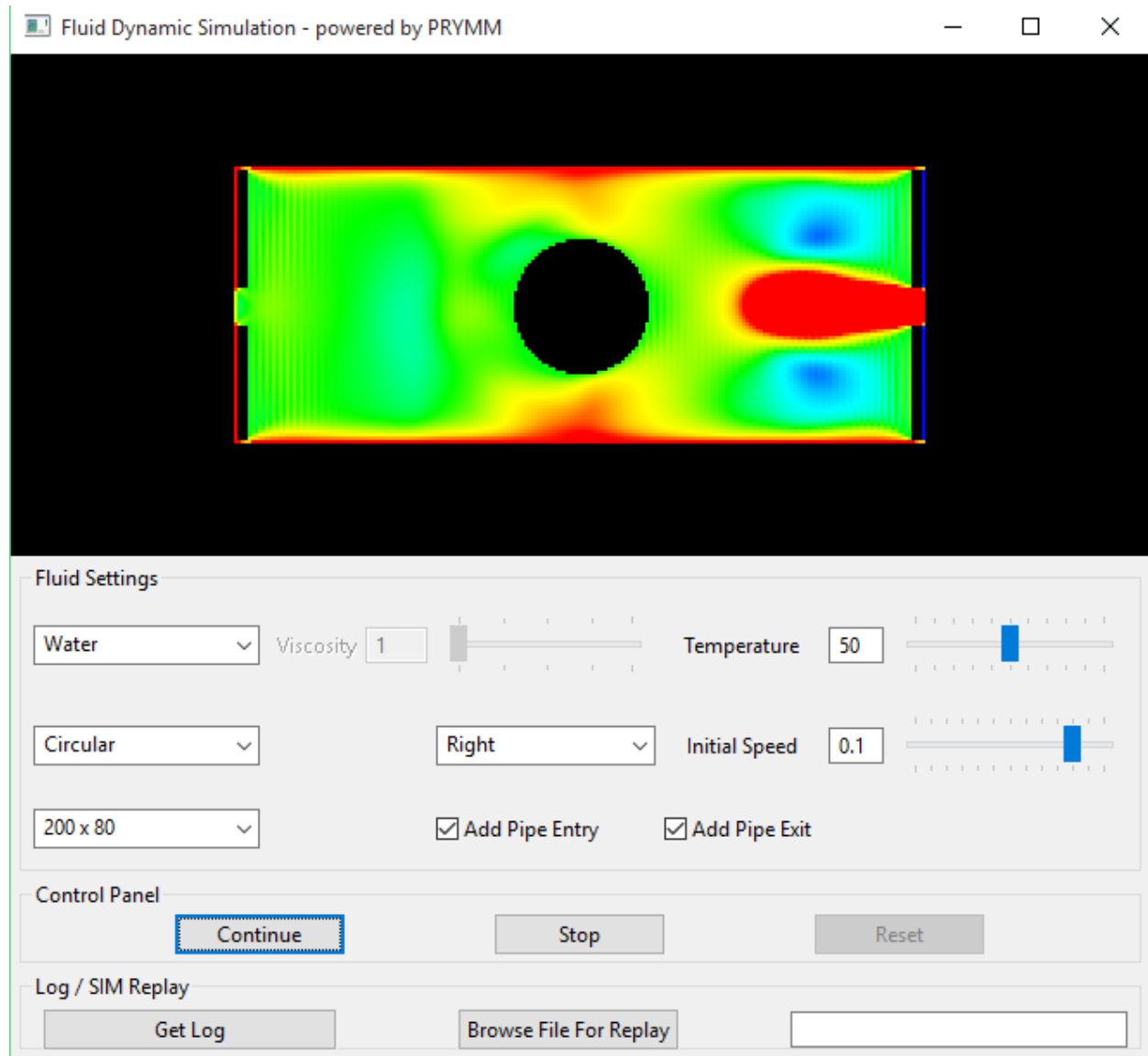


Figure - 10 Adding Entry and Exit point using pipe

2.2 Log/SIM replay

This is the sub-section at the bottom part of the GUI and provides functionality related to logging and replay of log.

- I. Get Log : This button provides user an option to save the last run simulation log in system file system.

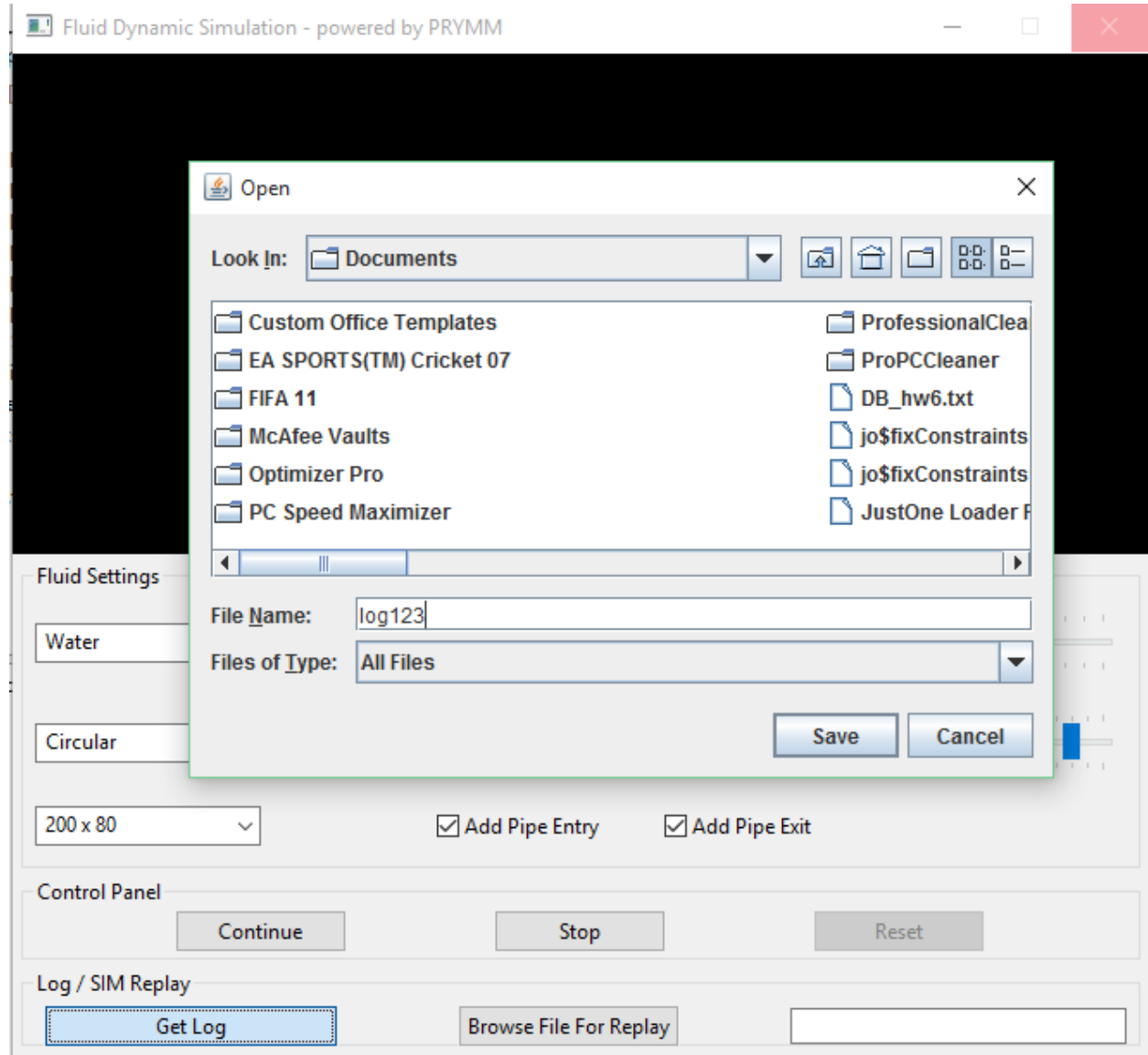


Figure - 11 get log file to save current simulation value

- II. Browse File For Replay : provides interface to the user to load a log file from the file system and replay it.

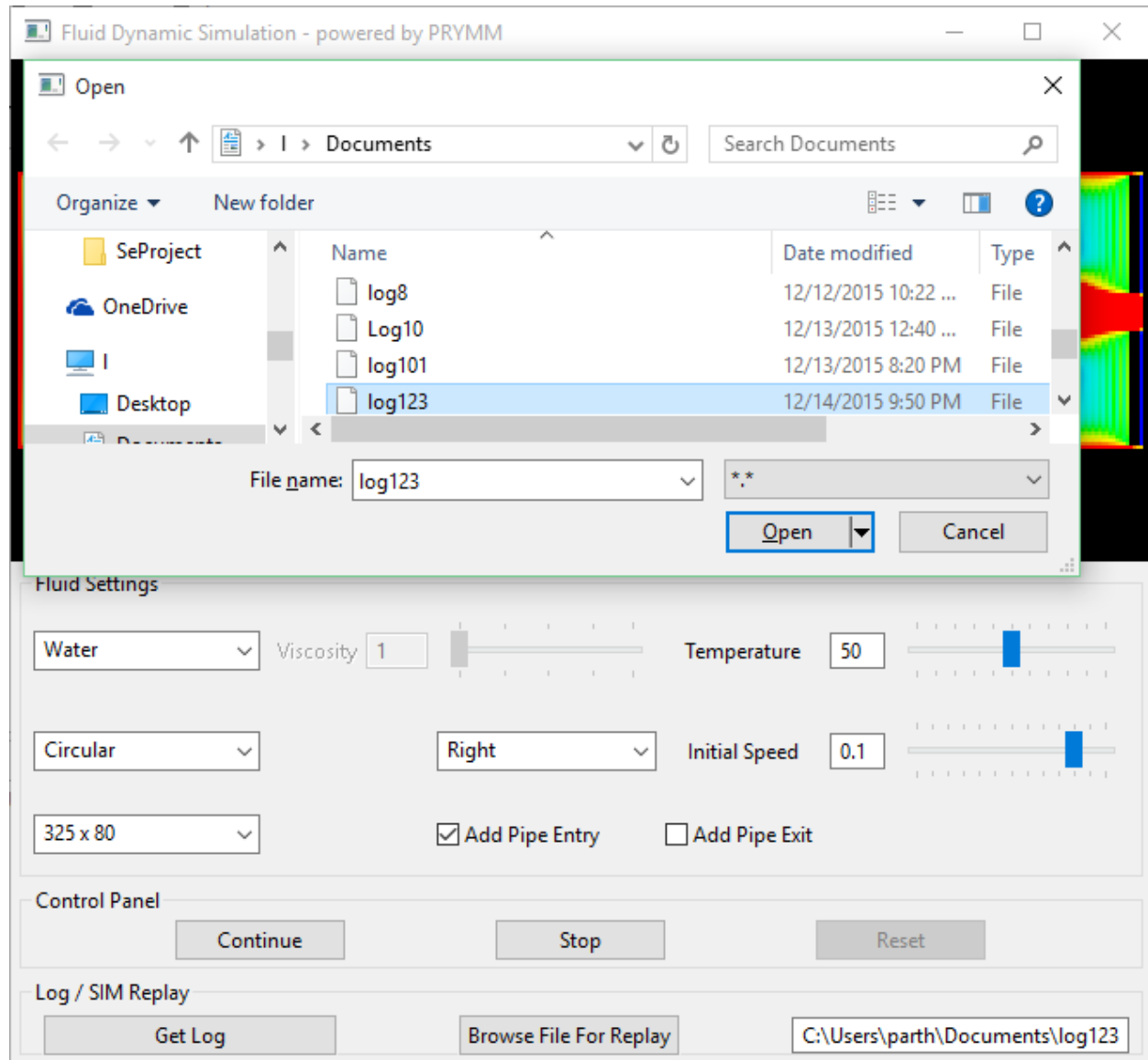


Figure - 12 Browse log file for replay

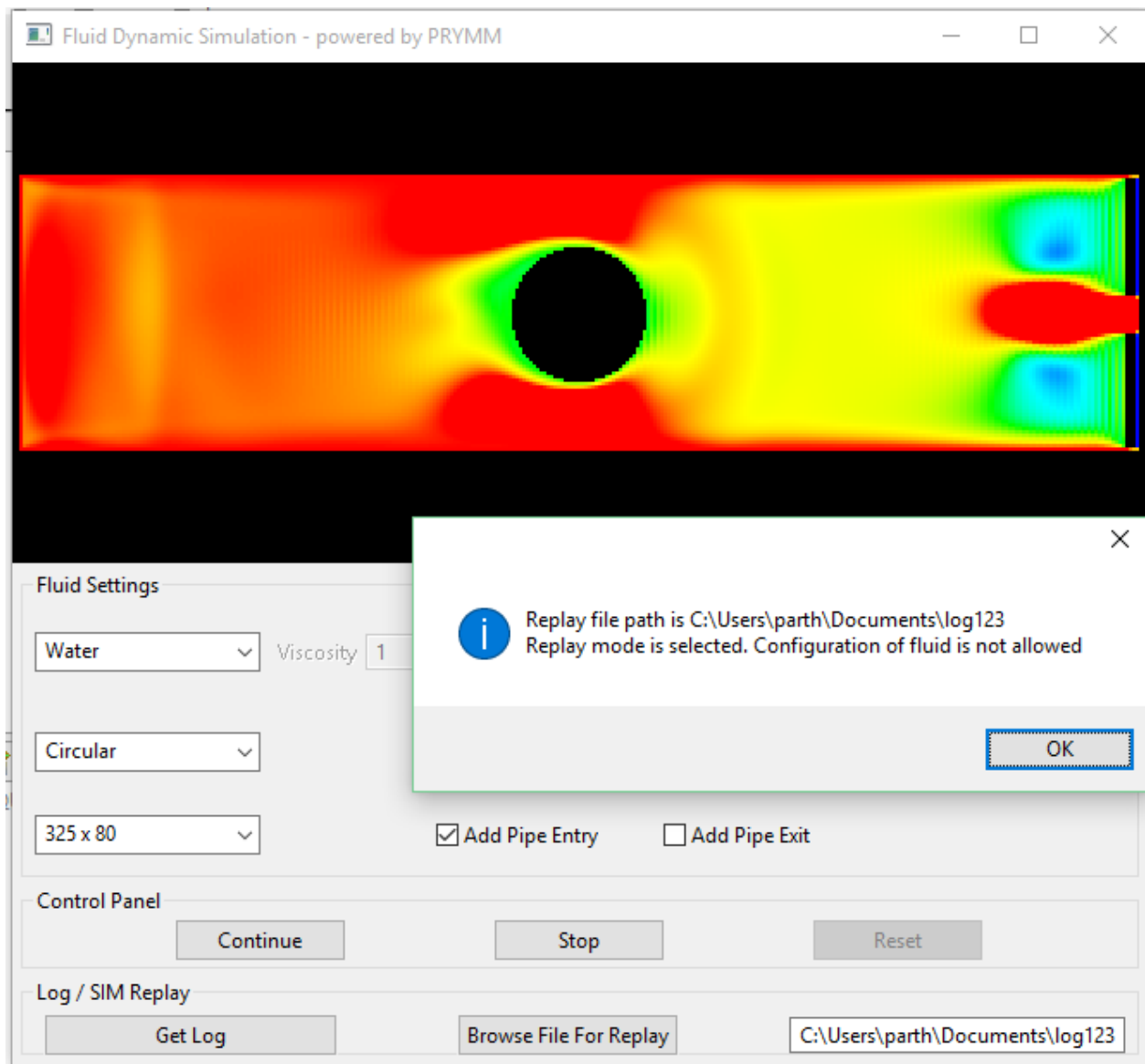


Figure - 13 notification for replay and that will disable the fluid settings

2.3 Control Panel

This sub-section provides user options to control the state of the application by providing buttons for Run/Pause, Stop and Reset. Run button is used to start the simulation and the same button toggles to Pause during the simulation is in progress providing option of pausing simulation to the user. Stop button in this section provides user an option to end or stop a simulation and the Reset button is used to clear all the user configuration settings in Fluid Setting sub-section of the GUI to their respective default values.

GUI behaviors should follow the original design , which is shown below:

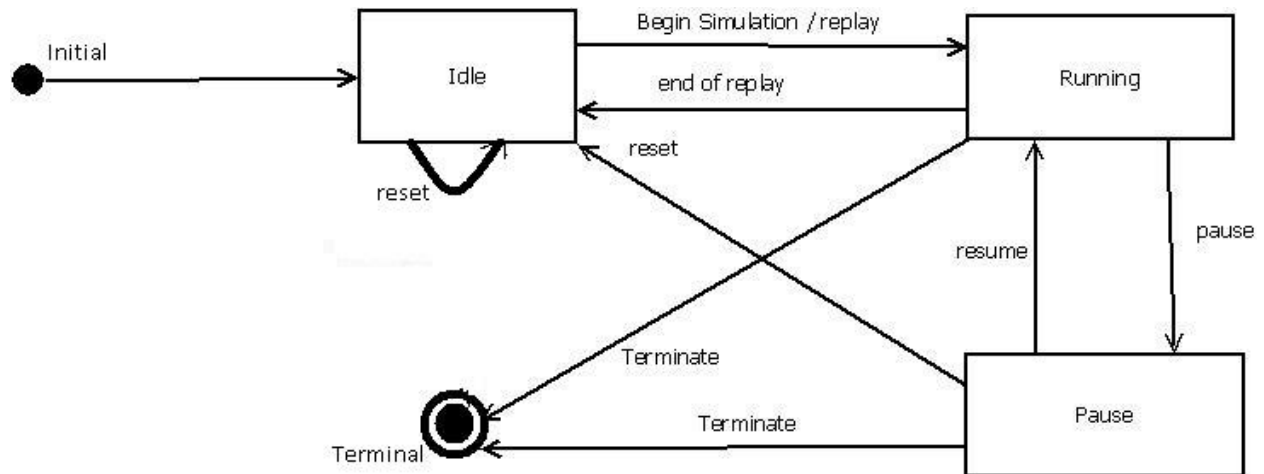


Figure - 14 State During the Simulation

2.3.1 Initial state / Idle State

Figure – 12 shows the initial or default state of the project Liquid: 2D-Fluid Dynamic Simulator. The buttons or input options which will be disabled are highlighted in grey color like Stop, Reset, Get Log, Browse and box to insert path of log file.

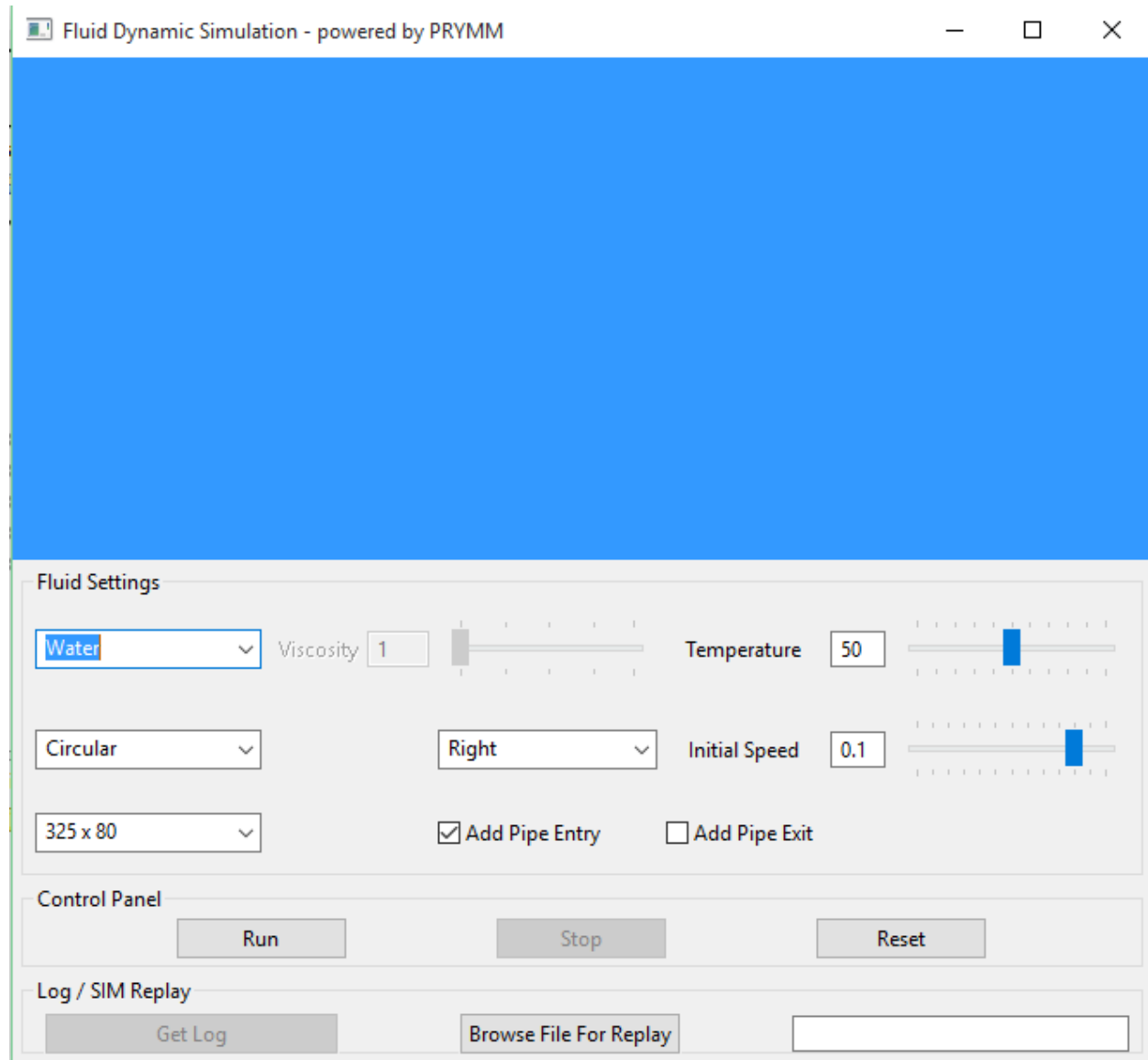


Figure - 15 It shows the initial state of the simulation

2.3.2 Running State

In this part of the document snapshots of the mock-GUI is provided for the scenarios when the system is in running state and simulation in progress. Press of Run button from Control Panel sub-section while the system is in its default state results in transition to running state from idle. This has been shown in Figure – 6 below with highlighting the addition of Fluid Setting sub-section to the disabled functionality along with log and replay which were already disabled as default. Run button changes to Pause during simulation is in progress.

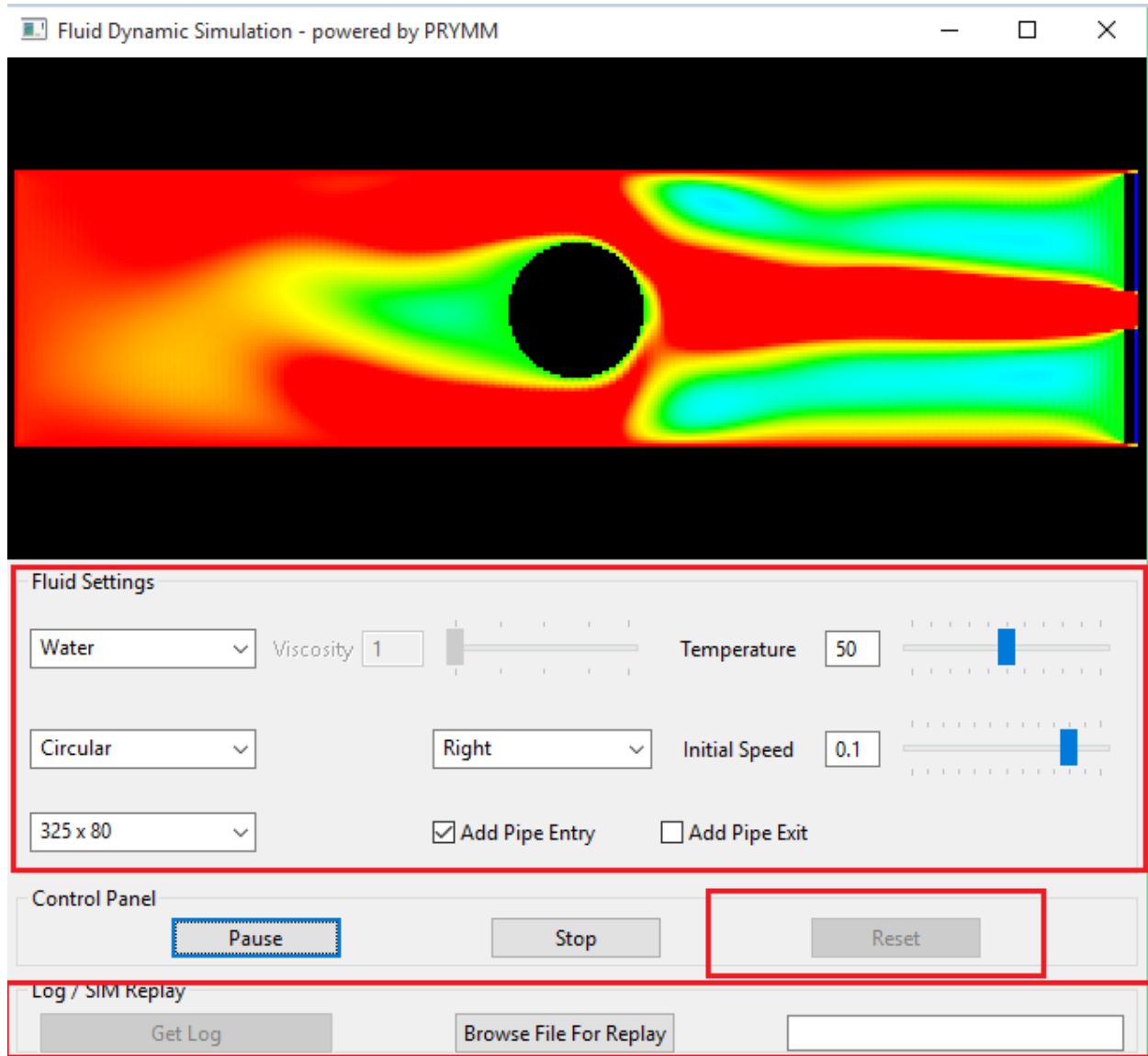


Figure - 16 Application in Run state after press of Run button. Run button changes to Pause during simulation is in progress and Fluid Setting sub-section gets disabled for the user.

2.3.3 Pause State

In this part of the document, snapshots of the mock-GUI is provided for the scenarios when the system is in pause state and simulation is paused. System can switch from running state to pause state when the Pause button is pressed while the system is running simulation or replaying the log file. These two scenarios have been highlighted in Figure – 9 and Figure – 10 below. During pause state the Fluid Setting sub-section remains disabled same as running state restricting any user configuration in this state.

3 Conclusion

This User Manual will guide the user for LIQUID: 2-D FLUID DYNAMIC SIMULATOR.

4 References

[1] “User manual template “, website: <http://techwhirl.com/user-guide-template/>