Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lab table # \_\_\_\_\_ at: 12:00 / 3:00 / 6:00

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Raw Data

In the tables below, record your raw data as well as your calculations of speeds (in real SI units). NB: this is really overkill and we won’t ask for anything this granular again. We just trying to make sure that there are no critical misconceptions flying under the radar at this early stage.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Series geometry / Narrow channel** | | | | | | |
| Bead | Initial pos.  (pix) | Final pos.  (pix) | Initial frame | Final frame | Speed  (pix/frame) | Speed (m/s) |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| average | N/A | N/A | N/A | N/A | N/A |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Series geometry / Wide channel** | | | | | | |
| Bead | Initial pos.  (pix) | Final pos.  (pix) | Initial frame | Final frame | Speed  (pix/frame) | Speed (m/s) |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| average | N/A | N/A | N/A | N/A | N/A |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parallel geometry / Narrow channel** | | | | | | |
| Bead | Initial pos.  (pix) | Final pos.  (pix) | Initial frame | Final frame | Speed  (pix/frame) | Speed (m/s) |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| average | N/A | N/A | N/A | N/A | N/A |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parallel geometry / Wide channel** | | | | | | |
| Bead | Initial pos.  (pix) | Final pos.  (pix) | Initial frame | Final frame | Speed  (pix/frame) | Speed (m/s) |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| average | N/A | N/A | N/A | N/A | N/A |  |

# Flow rate and pressure drop

Using your average speeds, calculate the total volumetric flow rate and pressure drop for each geometry. Make sure you convert all quantities to SI units (meters, seconds, kilograms)!

|  |  |  |  |
| --- | --- | --- | --- |
| Geometry | Channel | *Q* (m3/s) | Δ*P* (Pa) |
| Series | Wide |  |  |
| Narrow |  |  |
| Parallel | Wide |  |  |
| Narrow |  |  |

# Conclusion

When channels are connected in series, do they have the same flow or pressure drop?

What about when they are connected in parallel?

Why?

# Questions

Answer the remaining questions posed on the lab website in this space, if they haven’t been answered already.