

Experiment No. 5

PRESSURE DISTRIBUTION FOR FLOW AROUND A CIRCULAR CYLINDER

Instructions:

For submission of this experiment, you have to submit **one excel file** and **one PDF** file. Use the naming format: *rollno_exp1.pdf or.xlsx* (*Ex.183109002_exp1.pdf or.xlsx*). The detailed instructions are given below.

Excel sheet:

- Fill the columns in the excel sheet provided to you. There are two sets of readings, one for *smooth cylinder* and another for *rough cylinder*.
- In the excel sheet you have to plot the graph of C_p *experimental* vs θ for both *smooth cylinder* and *rough cylinder* as well as C_p *theoretical* vs θ .
- All the three curves (C_p *theoretical*, C_p *expt smooth*, C_p *expt rough*) have to be on the same graph. Make sure you label the plots (Add Legend) to identify them as well as provide proper axes label and Title.
- Try to identify the point of separation and mention it on the graph (Add a text box)
- The calculations are explained in the video as well as the lab manual.

PDF:

- In the PDF you have to scan and **submit hand written document** containing one calculation from each of the table(smooth and rough).Instruction for calculation is given in “**note**” This representative calculation is a means to check if the calculations done by you in the excel sheet is correct and without errors. Make sure that the calculations that you write down are step by step **detailed** calculations using all the formulas provided to you.
- Attach also the screenshot of graphs and calculated table in the pdf which you have drawn in the excel sheet. (copy pasting will be okay)
- After the calculations and graph will come the handwritten sources of error (at least two).
- Next will come the handwritten answers to the following questions:
 - 1) How the Point of separation affects the drag on the object?
 - 2) How the Point of Separation changes with Re and roughness?
 - 3) How does roughness help in reducing the drag on the body?
 - 4) Give practical examples other than that explained in the video where roughness helps in reducing the drag.
 - 5) If you could change the current experimental setup, what is the one change you would make to improve the results and why?
- Finally add conclusions that you draw from this experiment. (Give a careful thought after going through the theory and then write the conclusions)

Thank You.

Note:-

Roll No. last two digit	Choosing of Sr no. from each table to do calculation
$0 \leq x1_x2 \leq 37$	take Sr no. as it is
$38 \leq x1_x2 \leq 75$	subtract 38 from your last two digit
$76 \leq x1_x2 \leq 99$	subtract 76 from your last two digit

Example:

183109002: smooth cylinder and rough cylinder take Sr no. 02

183109088: subtract 76 from 88 ($88 - 76 = 12$), take Sr no. 12