

**An Experimental Investigation of Inner Surface Roughness
on Friction Factor for Horizontal Micro-tubes**

by

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Abstract

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This study aims to designing and developing an experimental setup which used to investigate the flow characteristics, mainly the pressure drop of common fluid in the micro-tube. The Reynolds number of this setup can cover diverse for different micro-tubes, but for most tubes, can ranges from 700 to 7,000, which has included the laminar, transitional and turbulent flow region. Twelve stainless steel micro-tubes with four different inner diameters from 2000 μm to 500 μm were tested. In order to find out the effect of inner surface roughness on friction factor of micro-tubes, different etching methods were used to obtain different inner surface roughness. The experiment results showed that the effect of inner surface roughness will be more significantly with the decrease of inner diameter of micro-tube. Increase of inner surface roughness will generate a high friction factor in turbulent flow and a narrower transition region.

Keywords: Micro-tube, Friction Factor; Inner Surface Roughness; Reynolds Number;

TABLE OF CONTENTS

LIST OF FIGURES.....	6
LIST OF TABLES	7
NOMENCALATURE.....	8
ACKNOWLEDGMENTS.....	9
CHAPTER 1: INTRODUCTION	10
1.1: Introduction	10
1.2: Literature Review	11
1.3: Research Objective.....	24
CHAPTER 2: EXPERIMENT SETUP	25
2.1: Experiment apparatus.....	25
2.2: Calibration of Instruments	31
2.3: Experiment Uncertainty.....	33
2.4: Surface Roughness Treatment and Measurement.....	35
2.5: Inner Diameter Verification.....	37
CHAPTER 3 EXPERIMENT RESULT AND ANALYSIS	38
3.1: Demonstration of the influence of diaphragms	38
3.2: Experimental Results under Isothermal Condition.....	40
CHAPTER 4: CONCLUSIONS AND FUTURE WORKS	51
REFERENCE	53

LIST OF FIGURES

<i>Number</i>	<i>Page</i>
Figure 1: Schematic Diagram of pressure drop measurement system	25
Figure2: Photo of pressure drop measurement system.....	26
Figure3: Nitrogen Tank	26
Figure4: Pressure Vessel	26
Figure5: Metering Valve	28
Figure6: Low Range Flow Meter	28
Figure7: High Range Flow Meter	28
Figure 8: Test Section.....	29
Figure9: Pressure Transducer and different range Diaphragms	30
Figure 10: Interface of the LabView program.....	31
Figure11: Calibration system	32
Figure 12: The roughness measured by the surface profiler	36
Figure13: SEM Measurements.....	37
Figure14: Comparison between different diaphragms on 1000 μ m SS tube.....	39
Figure15: Comparison of data with Ghajar et al. (2010) on 2000 μ m tube	40
Figure16: Friction factor of 1002 μ m glass tube and 2000 μ m stainless steel tube	42
Figure17: Friction Factor Differences between glass and 1mm stainless steel tubes...43	
Figure18: Friction Factor of 750 μ m tube with inner surface roughness of 4.2.....	44
Figure19: Friction Factor of 750 μ m tube with inner surface roughness of 4.7.....	44
Figure20: Friction Factor of 750 μ m tube with inner surface roughness of 4.8	45
Figure21: Friction Factor of 750 μ m tube with inner surface roughness of 5.2.....	45
Figure22: Friction factor differences between the largest and smallest roughness.....	46
Figure23: Effect of inner surface roughness on 750 μ m micro-tube.....	46
Figure24: Friction Factor of 500 μ m tube with inner surface roughness of 3.8.....	47
Figure25: Friction Factor of 500 μ m tube with inner surface roughness of 4.2.....	48
Figure26: Friction Factor of 500 μ m tube with inner surface roughness of 4.3.....	48
Figure27: Friction Factor of 500 μ m with inner surface roughness of 5.3.....	49
Figure28: Effect of inner surface roughness on 500 μ m micro-tube.....	49

LIST OF TABLES

<i>Number</i>	<i>Page</i>
Table 1: Roughness results by Kandlikar et al. (2003).....	15
Table 2: Summary of test condition.....	18
Table 3: Summary of critical Reynolds number and related results.....	20
Table 4: Summary of uncertainty	21
Table 5: Summary of instruments.....	22
Table 6: Surface Roughness Treatment Methods.....	35
Table 7: Surface Roughness Results.....	36
Table 8: Summary of Transition Reynolds Number Range for Various Stainless Steel Tubes Sizes and Inner Surface Roughness	50

