

EXPERIMENTAL STUDY OF HEAT TRANSFER COEFFICIENT OF
NANOFLUID FLOW THROUGH A PLAIN TUBE

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JUDUL: **EXPERIMENTAL STUDY OF HEAT TRANSFER
COEFFICIENT OF NANOFLUID FLOW
THROUGH A PLAIN TUBE**

SESI PENGAJIAN: 2010/2011

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EXPERIMENTAL STUDY OF HEAT TRANSFER COEFFICIENT OF
NANOFLUIDS FLOW THROUGH A PLAIN TUBE

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Report submitted in partial fulfillment of the requirements
for the award of the degree of
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SUPERVISOR'S DECLARATION

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TABLE OF CONTENTS

	Page
SUPERVISOR’S DECLARATION	ii
STUDENT’S DECLARATION	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	vi
ABSTRAK	vii
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xiv
LIST OF SYMBOLS	xviii
LIST OF ABBREVIATIONS	xx
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Problem Statement	2
1.3 Objectives of Study	2
1.4 Scopes of the Study	3
1.5 Significant of Study	3
1.6 Project Flow Chart	3
1.7 Conclusion	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Introduction	6
2.2 History of Nanofluid	7
2.3 Nanofluid Preparation	8
2.3.1 Materials for Nanofluids and Fluids	8
2.3.2 Methods of Nanoparticles Manufacture	8
2.3.3 Dispersion Nanoparticles in Fluids	9
2.4 Applications of Nanofluid	9

2.4.1	Nanofluid for Cooling Applications	9
2.4.2	Nanofluid for Lubrication Applications	10
2.4.3	Biomedicine Applications	11
2.4.4	Others Application	11
2.5	Theory of Heat Transfer	12
2.5.1	Convection	12
2.5.2	Forced Convection	13
2.5.3	Internal Forced Convection	14
2.5.4	Average Velocity and Temperature	14
2.5.5	The Entrance Region	15
2.5.6	Laminar and Turbulent Flow in Tubes	16
2.5.7	Constant Heat Flux	17
2.5.8	Constant Surface Temperature	18
2.5.9	Pressure Drop	20
2.6	Engineering Parameter	21
2.6.1	Heat Transfer Coefficient	21
2.6.2	Nusselt Number	22
2.6.3	Reynolds Number	23
2.6.4	Prandtl Number	24
2.7	Previous Experimental Investigation	24
2.7.1	Experiment with Metal Oxide Nanoparticles	25
2.7.2	Experiment with Pure Metal Nanoparticles	26
2.7.3	Experiment Study on Convective Heat Transfer	26
2.7.4	Conclusion on Previous Experimental Studies Results	28
2.8	Previous Mathematical Investigations	29
2.8.1	Theoretical Investigations	30
2.8.2	Conclusions from theoretical Studies with Nanofluids	31
2.9	Thermophysical Properties	32
2.9.1	Thermal Conductivity	32
2.9.2	Density	33
2.9.3	Specific Heat	34
2.9.4	Viscosity	34
2.9.5	Thermophysical Properties Correlations	35
2.10	Advantages and Disadvantages of Nanofluid	36
2.10.1	Advantages	36
2.10.2	Disadvantages	37
2.11	Conclusion	37

CHAPTER 3 METHODOLOGY

3.1	Introduction	38
3.2	Research Flow Chart	38
3.3	Experiment Setup	40
3.4	Calibration Apparatus	40
3.5	Sample Preparation	41
3.6	Running Experiment	43
3.7	Analysis	43
	3.7.1 Desired Reynolds Number	44
	3.7.2 Experimental Heat Transfer Coefficient	44
	3.7.3 Experimental Nusselt Number	45
3.8	Experiment Verification	45
3.9	Experiment Apparatus	45
	3.9.1 Circulating Pump	45
	3.9.2 Totalizer	46
	3.9.3 Heater	47
	3.9.4 Control Panel	47
	3.9.5 Insulating Material	47
	3.9.6 Thermocouples	48
	3.9.7 Chiller and Receiving Tank	48
	3.9.8 Collecting Tank	49
	3.9.9 U-Tube Manometer	50
3.10	Experiment Parameter	53

CHAPTER 4 RESULTS AND DISCUSSION

4.1	Introduction	55
4.2	Thermophysical Properties Study	56
	4.2.1 Determination of Water Properties	56
	4.2.2 Determination of Nanofluid Properties	59
4.3	Calibration Test	62
4.4	Nanofluid Test	65
	4.4.1 Experiment of Alumina (Al_2O_3 /Water) with Different Volume Concentrations	65
	4.4.2 Result Comparison for Different Volume Concentrations	70
	4.4.3 Wall Temperature Effect	72

4.5	Result Validation	73
4.5.1	Previous Research Result	73
4.5.2	Numerical Study Result	74

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1	Conclusions	76
5.2	Recommendations	77

REFERENCES

APPENDICES

A	Standard Properties of Water	83
B	Data From Experiment	84
C	Sample Calculation	92
D	Data from Numerical Study Result	97
E	Gantt Chart	99
F	Nanofluid Preparation	101

LIST OF TABLES

Table No.	Title	Page
2.1	Timeline of emergence of nanofluids	7
2.2	Thermal Conductivity of Various Materials at Room Temperature	10
2.3	Typical Value of Convection Heat Transfer Coefficient	13
2.4	Summary of Experimental Investigations in Convective Heat Transfer of Nanofluids with Water Based Fluid	28
2.5	Summary of Theoretical Investigations in Convective Heat Transfer of Nanofluid	31
3.1	Insulator and Maximum Temperature Withstand	48
3.2	Summarize Function for Each Apparatus	52
3.3	Important Parameter Investigations	53
4.1	Thermophysical properties of water estimation by regression equations	56
4.2	Data Contribution by Using Gnielinski Equation	62
4.3	Data Contribution by using Dittus-Boelter Equation	63
4.4	Experiment Data Distribution for Water	64
4.5	Experiment Data Distribution for (Al ₂ O ₃ /Water) with $\phi = 0.02\%$	66
4.6	Experiment Data Distribution for (Al ₂ O ₃ /Water) with $\phi = 0.10\%$	67
4.7	Experiment Data Distribution for (Al ₂ O ₃ /Water) with $\phi = 0.50\%$	68
6.1	Data distributions for experiment by water	84
6.2	Properties of water determine by Azmi et al. (2010) equations	84
6.3	Data distributions for experiment by Al ₂ O ₃ /Water with 0.02% concentration	86
6.4	Properties of Al ₂ O ₃ /Water with 0.02% concentration determine by Azmi et al. (2010) and Taufiq equations	86
6.5	Data distributions for experiment by Al ₂ O ₃ /Water with 0.10%	88

	concentration	
6.6	Properties of Al ₂ O ₃ /Water with 0.10% concentration determine by Azmi et al. (2010) and Taufiq, (2010) equations	88
6.7	Data distributions for experiment by Al ₂ O ₃ /Water with 0.50% concentration	90
6.8	Properties of Al ₂ O ₃ /Water with 0.50% concentration determine by Azmi et al. (2010) and Taufiq, (2010) equations	90
6.9	Data distribution from numerical study of water	97
6.10	Data contribution from numerical study of Alumina with $\phi = 0.02\%$	97
6.11	Data contribution from numerical study of Alumina with $\phi = 0.10\%$	98
6.12	Data contribution from numerical study of Alumina with $\phi = 0.50\%$	98

LIST OF FIGURES

Figure No.	Title	Page
1.1	Project Flow Chart	4
2.1	Average Velocity for Fully Develop Flow	14
2.2	Boundary Layer for Entrance Region	15
2.3	Developing Thermal Boundary Layer in Tube	16
2.4	Variation of the tube surface and the mean fluid temperature under constant heat flux conditions	18
2.5	Variation of the mean fluid temperature along the tube for the case of constant temperature	19
2.6	Nusselt number Versus Reynolds number	27
2.7	Heat Transfer Coefficient versus Flow rate	27
2.8	Hot-Wire Apparatus	33
2.9	The Lynn worth densitomer with its associated lattice diagram and received signal	33
2.10	Flow Calorimeter	34
2.11	Rotational Viscometer (Brookfield type)	35
3.1	Research Flowchart	39
3.2	Experiment Schematic Diagram	42
3.3	Circulating Pump with Electric Motor	46
3.4	Totalizer	46
3.5	Control Panel	47
3.6	Thermocouple	48
3.7	Chiller	49
3.8	Collecting Tank	49
3.9	U-Tube Manometer	50

3.10	Apparatus Arrangement	51
4.1	Comparison of density between standard properties of saturated water and regression equation by Azmi et al. (2010)	57
4.2	Comparison of specific heat between standard properties of saturated water and regression equation by Azmi et al. (2010)	57
4.3	Comparison of thermal conductivity between standard properties of saturated water and regression equation by Azmi et al. (2010)	58
4.4	Comparison of dynamic viscosity between standard properties of saturated water and regression equation by Azmi et al. (2010)	58
4.5	Comparison between regression equation and experiment data for dynamic viscosity	60
4.6	Comparison between regression equation and experiment data for thermal conductivity	60
4.7	Comparison between regression equation and experiment data for density	61
4.8	Comparison between regression equation and experiment data for specific heat	61
4.9	Comparison between experimental Nusselt number and that Theoretical calculated	64
4.10	Nusselt number comparison for water	65
4.11	Comparison of Nusselt number Alumina 0.02% volume concentration with water	66
4.12	Comparison of Nusselt number Alumina 0.10% volume concentration with water	68
4.13	Comparison of Nusselt number Alumina 0.50% volume concentration with water	69
4.14	Comparison Nusselt number of nanofluid with different concentrations	70
4.15	Comparison of Heat Transfer Coefficient of nanofluid at different volume concentration with water	71
4.16	Comparison of Nusselt number of nanofluid at different volume concentration with water	71

4.17	Effect of velocity to heat enhancement	72
4.18	Effect of wall temperature of nanofluid and pure water versus Reynolds number	73
4.19	Comparison of experiment Nusselt number with proposed correlations for nanofluids at different concentration	74
4.20	Comparison experiment data of Alumina and numerical study result by Taufid, (2010)	75
4.21	Nusselt number comparison for nanofluids with different concentration	75
6.1	Gantt chart for FYP 1	99
6.2	Gantt chart for FYP 2	100

LIST OF SYMBOLS

D_i	Inner diameter of the tube, (m)
h	Convective heat transfer coefficient, ($W/m^2.K$)
k	Thermal conductivity, ($W/m.K$)
μ	Dynamic viscosity of the fluid, ($kg/m.s$)
ρ	Density of the fluid, (kg/m^3)
C_p	Specific heat, ($J/kg.K$)
L	Length of the tube, (m)
\dot{m}	Mass flow rate, (kg/s)
\dot{Q}_{conv}	Heat convection rate, ($Watt$)
\dot{q}_s	Heat Flux, (W/m^2)
f	Friction factor
Nu	Nusselt number
Re	Reynolds number
Pr	Prandtl number
ΔP	Pressure difference
T_b	Bulk fluid temperature, ($^{\circ}C$)
T_s	Surface temperature, ($^{\circ}C$)
T_w	Wall temperature, ($^{\circ}C$)
ΔT	Temperature difference
ε	Roughness size, (m)
g	Gravitational acceleration, (m/s^2)
\emptyset	Volume concentration of nanofluid
A_s	Surface area, (m^2)

A_c	Cross sectional area, (m^2)
V_{avg}	Average velocity, (m/s)
V	Voltage, (Volt)
I	Current, (Ampere)
nf	Nanofluid
exp	Experiment
W	Water
Reg	Regression

LIST OF ABBREVIATIONS

FIST	Fakulti Sains & Teknologi Industri
FKM	Fakulti Kejuruteraan Mekanikal
FYP	Final year project
HTC	Heat Transfer Coefficient
STD	Standard deviation
Al	Aluminum
Cu	Copper
Ag	Silver
Au	Gold
Al ₂ O ₃	Aluminum Oxide/Alumina
CuO	Copper Oxide
TiO	Titanium Oxide
SiC	Silicon Carbide
SiN	Silicon Nitride
ZrO ₂	Zirconia Oxide