

UNIVERSITI TEKNOLOGI MARA

**AIR CORE DIAMETER, SPRAY
CONE ANGLE AND SPRAY
BREAKUP LENGTH OF SIMPLEX
ATOMIZER WITH VARIOUS EXIT
ORIFICE DIAMETERS AND
REYNOLDS NUMBERS**

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ABSTRACT

Simplex atomizer is the simplest form of swirl atomizer. The principal function of the atomizer is to break the liquid into very small droplets. It became challenging to designing the atomizer due to vary application and performance characteristics in wide range of industries. It require an understanding hydrodynamics process inside the nozzle to predict the different hydrodynamics parameter involved and then evaluate the different spray characteristics in terms of nozzle geometry, injection condition and liquid properties. Due to its important in various applications, many studies have been conducted to understand the characteristics of the resulting sprays. The present study investigates the spray characteristics of swirl atomizer with various exit orifice diameter using water at room temperature as the working fluid will undergo experiment test rig with certain range of volume flow rate. The investigation revealed the effect exit orifice diameter on the atomizer spray characteristics including spray cone angle, breakup length and air core diameter. Experiments revealed that the spray cone angle, air core diameter and break up length increased with the increase of exit orifice diameter. Furthermore, it was found that the spray angle and air core diameter increased with increasing injection pressure, while the break up length shows the opposite trend.

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TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF SYMBOLS	x
LIST OF ABBREVIATIONS	xi
LIST OF NOMENCLATURES	xii
CHAPTER ONE: INTRODUCTION	1
1.1 Research Background	1
1.2 Motivation	4
1.3 Problem Statement	5
1.4 Objectives	6
1.5 Significance of Study	6
1.6 Scope	6
CHAPTER TWO: LITERATURE REVIEW	7
2.1 Introduction	7
2.2 Atomizer parameter and Characteristics	10
2.3 Air Core Diameter	12
2.4 Summary	14
CHAPTER THREE: RESEARCH METHODOLOGY	16
3.1 Introduction	16
3.2 Flow Chart	17
3.3 Sample of Atomizer	19

3.4	Experiment	20
3.5	Post Processing Data	23
CHAPTER FOUR: RESULTS AND DISCUSSION		24
4.1	Introduction	24
4.2	Spray Angle	24
4.3	Breakup Length	28
4.4	Air Core Diameter	32
CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS		36
REFERENCES		38
APPENDICES		41
AUTHOR'S PROFILE		52