

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

COMPARATIVE STUDY INTO THE
VARIOUS DESIGNS OF DOMESTIC
AND COMMERCIAL OIL BURNERS

M / 397

HADJIGEORGIU ANDREAS

JUNE 2000

**A COMPARATIVE STUDY INTO THE VARIOUS DESIGNS OF
DOMESTIC AND COMMERCIAL OIL BURNERS**

by

Andreas Hadjigeorgiou

Project Report

Submitted to the

Department of Mechanical Engineering

of the Higher Technical Institute

Nicosia, Cyprus

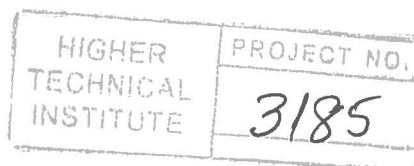
in partial fulfillment of the requirements for the diploma of

TECHNICIAN ENGINEER

in

MECHANICAL ENGINEERING

June 2000



CONTENTS

• Acknowledgements	3
• Summary	4
• Introduction	5
• Combustion Theory	6
• Heat Loss Calculations	8
• Domestic Oil Burners	
♦ Gun-Type Burners	10
♦ Rotary Burners	
➤ Horizontal Rotary Burners	15
➤ Vertical Rotary (Wall Flame) Burners	16
• Commercial Oil Burners	17
• Automatic Oil Burner Controls	20
• Control Systems	23
• Control Installation	25
• Combustion Chambers	27
• Piping Systems	28
• Service & Maintenance	29
• Conclusions	35
• References	36
• Appendices	

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation for the substantial assistance and guidance given to me by my diploma project supervisor Mr. Panayiotis Tramountanellis.

I would also like to thank my family and all my friends for being there when I needed them.

SUMMARY

Author's Name: Hadjigeorgiou Andreas

Title: “A Comparative Study into the Various Designs of Domestic and Commercial Oil Burners”

The purpose of this project is to present the various types of domestic and commercial oil burners and their components. Also, to present design features concerning heat loss calculations, burner and unit sizing, control and controls installation and finally to present some service and maintenance features. Besides all these, some features of combustion theory along with a report on combustion chambers and piping systems are also presented.

For the project, information from books and the Internet was collected. Also a great aid was supplied by the oil burner manufacturing companies' manuals.

INTRODUCTION

Fire was one of the biggest inventions man ever made. It was his best friend at his continuous struggle for survival, as it kept him not only safe, but above all warm. The importance of fire was so great that it was even worshipped like a god from all ancient cultures.

As years and decades passed, man improved, among other things, the ways of keeping warm. He moved from the open fire to the coal stove and finally to the nowadays'fully automated central heating units, which are employed at almost every house, providing heat and running hot water any time around the clock.

The most sophisticated part of the central heating system is without doubt, the burner. Burners at a majority, use fuel oil for achieving combustion, even though other types of burners employ gas or even both gas and oil. The flame produced is used at the boiler to heat the heating medium, either air or water.

But the use of burners is not limited in domestic uses only. Burners, at large scale, are used in hospitals, garages, laundries, power plants and many other workplaces.

Oil burners are classified according to the type of design. There are two types of oil burners: gun type and rotary type. Each design is to be presented separately.