HIGHER TECHNICAL INSTITUTE
MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

COMPUTER CONTROLLED TEMPERATURE OF A FURNACE

by
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Project Report

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ABSTRACT

The objectives of this project are to, investigate and report on the methods of computer controlled temperature, propose a method for the control of temperature using a PC and a suitable data acquisition card, present all necessary detailed calculations for the design and the required program for the control of the furnace, present selection procedures and detailed specifications for all items that are not to be designed, and present detailed layout drawings and a cost image.

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INTRODUCTION

All studies were conducted in conjunction with an OMEGA split furnace. A schematic of the apparatus is shown in the figure below.

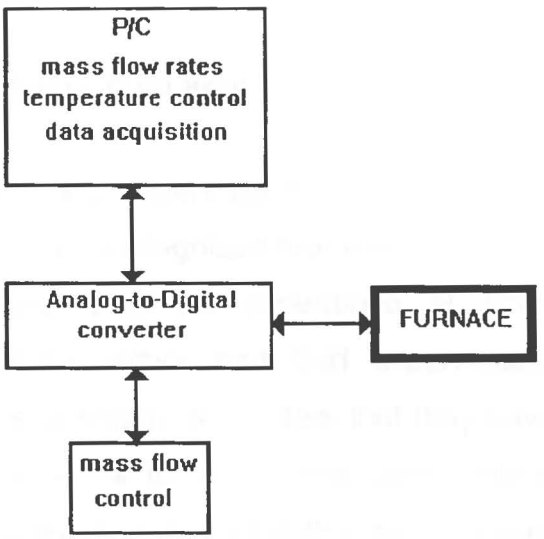

Figure 1 Schematic of the apparatus of an OMEGA split furnace.

Real-time control was implemented for the heating elements, mass flow controllers and TGA. The principal parameters controlling thermochemical processing of the precursor powders were heating rate, temperature, time and gas flow rate. The data acquisition and parameter control was enabled by an IBM-PC and a software package in communication with an Analog-to-Digital (A/D) converter. Both the A/D converter and data acquisition software package were purchased from OMEGA ENGINEERING. The input data (PID parameters for temperature and flow control) was integrated in a closed-loop control cycle and the sample weight was collected at a minimum two second interval, stored in a data file and tabulated or displayed as a function of temperature and time.