

# ENERGY UTILIZATION IN INJECTION MOLDING

TR-112781

## ABSTRACT

This report contains, in one source, all of the available information on optimizing energy use in plastic injection molding. The reader can compare a unique facility or process to similar operations and learn of techniques to improve energy efficiency. The report can be used both as a reference document, evaluation guide, and implementation aid.

## Background

The injection molding sector in the United States uses an estimated 23% of the industry's thermoplastics, in operations involving over 7,000 manufacturing plants and 86,000 injection molding machines (1).

It is estimated that these injection molding plants in the United States use around 30 billion kWh of electricity annually. This manual has been prepared to convey to the electric utility companies and the thermoplastic injection molding industry, information about this energy use.

## Objectives

The Manual has been planned and prepared with the following two objectives in mind:

1. To provide a tool for the electric utility company to assist their injection molding company customers to be more competitive.
2. To enable the molding company management to assess how well their company uses energy and to help them to use it more efficiently.

The goal of the manual is to provide an inclusive picture of energy use in the injection molding process. It contains information on the current injection molding operation, providing a picture of energy usage (average consumption, load factor, and power factor) which should allow the electric utility and the processor to ascertain how individual plants compare to the norm. It lists cost-effective measures that will enable companies to reduce their energy usage without reducing the quality or the production rates of the products. It shows opportunities for greater profitability through energy management using established techniques. It describes options that are currently in use and contributing to reduced energy bills; some require investment; others relate to choice of major equipment. It also explores power quality, as defined for this report as power interruptions and the measures that can be taken to minimize the effect on the plant operation.

This manual is divided into the following chapters:

Chapter 1 discusses the injection molding industry and the equipment and processes generally used. Chapter 2 gives an overview of energy management relevant to injection molding.

Chapter 3 provides information so that an individual plant or operation can compare its energy consumption to other plants.

Chapter 4 covers energy saving strategies, which can be implemented in day to day operation and in purchasing new equipment.

Chapter 5 covers energy conservation measures and best practices that will require some investment.

Chapter 6 discusses power reliability, the plant options for improving reliability, and provides methods to determine the most economic approach.