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# MANUFACTURING MANAGEMENT

## From basic machining to quality product

IIUM Press

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Chapter 22

# High Density Polyethylene (HDPE) as an Alternative Material in Fuel Tank Production

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## 1. Introduction

Towards development of automotive industrial, the weight and cost are the criteria performance for automotive material. Some automotive parts are made by material that has properties such as lighter weight as it reduces the cost of automotive manufacturing. When the part of vehicle is made with lighter material, this will improve the vehicle itself. According to Alvarado, conventionally, metallic fuel tanks were used as fuel tanks for motor vehicles [1]. In recent years, however, fuel tanks made from thermoplastic synthetic resins have been in use due to thermoplastic resin materials being light in weight to satisfy increasing demands for vehicles that are light in weight, being free from rust, being easy to be molded into desired shapes.

In general, fuel tank is safe container for flammable. Fuel tanks are the ones who hold and transfers fuel from which the whole machine generates its energy. It acts as an integral part of the vehicle's fuel system [2]. Since the fuel cost increases the automakers are taking a harder look to replace new material in part of automotive car. According to Alvarado, the usage of plastic fuel tank in automotive industry has been increased from year by year. In 1993, the market represents 70-90 % in Europe and 5 % in Japan compared to in 1990 which only 22.25% in market [1]. The replacement of steel tank with plastic tank is still keeps on increasing due to its durability toward vehicle efficiency this is because The European Plastic Fuel Tanks and Systems Manufacturers Association has claimed that "More than 95% of fuel tanks produced in Europe are made of plastics! .This high penetration rate is explained by the strong benefits brought by plastic solutions in this application" [3]. Seeing, as the material for fuel tank is needs to be replaced with lighter material, High Density Polyethylene (HDPE) has been the resin of choice for plastic gas tanks because of its physical and chemical properties such as withstand aggressive fuel, impact resistance, reduce vehicle weight and high temperature as well.