

# EXECUTIVE SUMMARY



## Polymer Composite Gasoline Tanks

**Submitted by: Group 11**

Lucio Boccacci  
Jaime Erazo  
Nick Harm  
Zack McGill  
Ryan Posey

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University of Oklahoma

## Executive Summary

The purpose of this project was to design a gas tank to compete in today's market and to meet future emission regulations. A profitable alternative design to current steel and polymer tanks was obtained. The tank is constructed of a 1.4 mm Curv® (polypropylene product) structure grafted with a maleic anhydride adhesive film, a 0.14 mm barrier layer of ethylene vinyl alcohol, and a 0.3 mm layer of maleic anhydride grafted Curv®. The additional 0.3 mm layer of Curv® is used to protect the EVOH layer from the environment. The tanks are manufactured from preformed sheets of Curv® pressed into the desired shape by thermoform stamping. The EVOH is sprayed onto one sheet of maleic anhydride grafted Curv®, the Curv® layers are combined and stamped. The stamping process produces the tank in two halves which are connected to form one tank. Each tank half has a flange which is used to join the halves. The flanges are riveted and the seam is sealed with EVOH. The tank has an impact strength equal to that of current steel tanks, is fully recyclable, and meets near zero emission standards. This design is lighter and cheaper than current plastic tanks. The tanks will be sold directly to automobile manufacturers at a cost of \$47.00 per tank. This is \$6.00 less than the estimated \$53.00 per tank charged by another leading polymer gas tank producer. The equipment required to carry out this venture is \$605,000. A total capital investment of \$3.65 million is needed. The process results in a return on investment of 15.8 % and a net present value of \$3.53 million over a 10 year project lifetime. These estimates are based on an operating capacity of 500,000 tanks per year. Risk analysis was performed on this process by considering 8 car models. Levels of interest were deduced for each model considered. Outcomes were generated by varying the level of interest for each model. For each outcome the expected plant capacity was calculated based on the probability of gaining a contract. The probability of gaining a contract was based on the level of interest for each outcome. The risk analysis showed that the expected net present value was \$25.2 million with a 9% risk of losing money.