



Advantages of Steel Tanks - Comparative Design Study

Process

The math data of a plastic tank and associated engineering space was supplied by a North American OEM and used to design a steel tank version to meet the OEM's engineering requirements.

- Internal vapor management
- Mounting of fuel delivery modules was the same as the plastic tank
- Common design for LEV II, PZEV and Euro-V emissions
- Heat shield (used in plastic version) not required for steel tank
- Pressure/Vacuum fatigue resistance

Steels

Type: Highly formable low carbon steel pre-painted with Magni A36 epoxy coating.

- Thickness (mm)

	Top	Bottom
Option A	0.8	0.8
Option B	0.7	0.8

- Manufacturing
 - Conventional stamping
 - Seam welding by Soutec Contour 1 or 2

Results/Advantages of Steel

- Reduced mass (pounds)

	Steel	Plastic	Savings/Vehicle
Option A	25	26.1	1.1
Option B	23.5	26.1	2.6

- Increased fuel capacity (gallons)

Steel	Plastic	Increase in Capacity
22	21.0	1.5

- CAE Forming Analysis indicated satisfactory forming strains
- CAE pressure-vacuum simulation demonstrated adequate fatigue performance
- PZEV/Euro-V emission compatibility

Additional Expectations of the Steel Design

- No emission variation with alcohol fuels (as is the case for plastic tanks)
- Compatible with conventional Diesel fuel and Bio-diesel fuel
- Sufficient durability to meet CARB life requirements (15 years or 150,000 miles)
- Global availability of steel tank manufacturing and services
- Likely lower cost
- More stable steel pricing and availability compared with HDPE, which is highly dependent on oil prices and geo-political uncertainty.