

Composite Cylinders for Propane Storage and Transportation

Translucent cylinder material allows clear view of fuel level

utdoor chefs are demanding ever greater convenience and performance from their barbecue grills. While this trend has already made propane the fuel of choice among home grillers¹, the technology of composites is poised to further boost the popularity of clean-burning propane grills in this competitive and fast growing market. Composite cylinders will enable homeowners to see at a glance how much propane is left and will lighten the task of toting containers for refills.

Composite cylinders are high strength, translucent, fiberglass vessels protected by thermoplastic outer shells. The translucent fiberglass body lets consumers readily see how much propane is left in the cylinder and avoid unexpected fuel run outs. Composite cylinders are 30 to 50 percent lighter than steel, rust proof, and can be manufactured in a variety of colors and convenient designs. The material heralds big changes for a product that has remained essentially the same for the last 60 years.

Although composite cylinders offer highly desirable features, consumers are traditionally wary of higher price tags. For example, aluminum cylinders are lightweight and non-corrosive, yet hold a limited share of the market due to their substantially higher cost. Other initial hurdles to widespread use of composite cylinders include exclusion from industry standards and regulatory requirements.

To accelerate acceptance of composite cylinders for propane storage and transportation, the Propane Education & Research Council (PERC) funded a research effort (**Docket 10662**) led by the Battelle Memorial Institute. The research pursued the following objectives:

- Identify the federal regulatory obstacles to successful introduction of composite cylinders and initiate a program to overcome them.
- Evaluate the potential for composite cylinders to enhance the attractiveness, image and sale of propane in the United States.

Global Applicability

Consumers in Europe and Australia have purchased approximately 350,000 composite cylinders for propane applications, including the following:

- Outdoor grills
- · Indoor cabinet heaters
- Boats
- Caravans
- Patio heaters
- Forklifts





Hearth, Patio & Barbecue Association, based on data submitted by reporting companies and HPBA estimates, 2001.





Regulatory Approval

Project Description

To promote acceptance and use of composite cylinders for propane in North America, Battelle formed the Composite Propane Cylinder Working Group, which included cylinder and appliance manufacturers as well as retail propane marketers and distributors. Battelle and the Working Group used technical data from existing national and international standards to support regulatory approval efforts for composite storage cylinders.



Project Results

Standard Recommendation:

- The Working Group supported the use of the International Standards Organization (ISO) standard ISO11119-3 as the model standard for composite cylinders in North America.
- ISO11119-3 has design and performance requirements comparable to those employed for the production of several hundred thousand propane cylinders in Europe. Similar composite cylinders have been used reliably for nearly ten years in Sweden, Norway, and Denmark.

Regulatory issues under U.S. Department of Transportation (DOT) authority:

- The Working Group learned that DOT acceptance would occur more rapidly through the exemption process rather than a rulemaking effort.
- An exemption template was developed for individual manufacturer requests to best facilitate DOT review and approval.

Issues outside the scope of DOT regulations:

- A summary of other issues was forwarded to the Composite Cylinder Task Force of National Propane Gas Association's Technology and Standards Committee for further review and evaluation.
- Recommendations will continue to be submitted to appropriate standards organizations for consideration within their respective standards.

Market Potential

Project Description

Good Company Associates conducted a market survey to assist Battelle and PERC in developing new product introduction strategies for manufacturers and marketers. The survey identified the limitations of existing steel cylinders, elucidated the compelling benefits of new composite cylinders, and provided fundamental data for initial marketing of composites.

Project Results

Consumers were overwhelmingly positive about the convenience features of composite cylinders. The most notable findings include:

- Nine out of ten current users said they would consider purchasing a composite cylinder.
- A fifth of current users said the improved features could motivate them to increase their propane use.
- A majority of current users indicated a willingness to pay a higher price for the improved features.
- To achieve significant market penetration the retail cost should not exceed \$50.
- Initial focus should be to persuade grill manufacturing companies to include composite cylinders with the purchase of a new grill.
- The most important feature to emphasize is fuel level visibility, followed by shape and stackability.
- A separate, simultaneous marketing campaign should be launched to build public awareness of the new products.

More details on regulatory approvals and market potential can be found in the document, *The Final Report on Composite Propane Cylinder Regulatory Approval Request, Battelle* (January, 2004).

Next Steps

- Develop and refine the marketing strategy; coordinate with efforts to obtain regulatory approval for composite cylinders.
- 2) Choose a small number of products for initial introduction.
- Create a separate Marketing Committee of the Composite Propane Tank Working Group.

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