

## CASE STUDY

# Hose Solution Reduces OEM Costs

### Customer:

Thermopol, Inc., is a New Hampshire-based producer of performance turbocharger, water coolant and specialty application hoses

### Project:

A North American OEM eliminated an engine component in its light duty truck engine design to save money and meet more stringent emissions standards.

Working with Dow Corning, Thermopol enabled this solution by developing and commercializing a new hose liner solution that met increased temperature and oil resistance specifications, while reducing the standard product development and commercialization process time and costs

### Solution:

Multi-layered fluorosilicone and high-consistency rubber hose liner that meets the increased temperature and oil resistance requirements set by the OEM

## Thermopol and Dow Corning Innovations Lower OEM Costs, Increase Temperature Performance to Reduce Emissions

### The Environment

In today's automotive market, constant innovation is required to keep pace with competition and maintain an edge in the market. The combined forces of increased engine temperature demands, more stringent emissions standards and low-cost competitors force original equipment manufacturers (OEMs) to work closely with suppliers to reduce costs and increase performance.

### The Challenge

A North American automotive OEM sought to reduce costs and meet more stringent emissions standards in a light duty truck engine. Working with specialty hose manufacturer, Thermopol Inc., the OEM found an innovative solution that allowed them to meet their goals by eliminating an engine component.

The revised engine design presented a new set of problems. Although the solution cut costs and reduced emissions it also increased engine operating temperature. Thermopol Inc. turned to long-time silicone solutions partner, Dow Corning, to jointly develop a new material that could withstand the increased temperature specifications, oil and fuel contact as well as other aggressive engine conditions.

*"The challenge was unique not only in its requirements, but also in its immediacy,"* said Mike DiPino, Dow Corning automotive lead application engineer. *"The customer needed a solution that could withstand high temperatures, and they needed it in half the time usually allowed for product development."*

Turbocharger hoses present a unique combination of requirements: they must be flexible to accommodate varying turbocharger placements in different models, reduce noise and vibration, and withstand high temperatures and corrosive effects of automotive gases, fuels and oils. The enhanced performance requirement specified an entire hose assembly that could withstand continuous operating temperatures 20°C to 30°C higher than before.



Thermopol Inc

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## The Solution

Thermopol invited Dow Corning to join in the OEM meeting to identify the most appropriate silicone for a fluoro elastomer hose liner that could withstand a continuous operating temperature of 235°C. The entire hose assembly needed to withstand high temperatures, requiring significant engineering on Thermopol's part, in addition to a high-performance material from Dow Corning.

*“We have years of experience working with Dow Corning,”* said Joseph P. Schultz, Technical Director, Thermopol Inc. *“Based on our history, we were confident that working together with Dow Corning, a solution would be identified that would meet our customer's needs in the given timeframe”.*

Together, they analyzed existing fluorosilicones products available within Dow Corning technology platform – which have low permeation, good fuel resistance and excellent oil resistance over a wide temperature range – and identified two multi-layered fluorosilicone (FSR) and high-consistency rubber (HCR) hose liner options. Thermopol and Dow Corning tested the materials and determined that the *Silastic* brand FSR formulation could be customized for the OEMs hose liners to deliver excellent performance at high temperatures.

Because of their long-standing relationship, Dow Corning was very familiar with Thermopol's processing needs and was able to quickly produce the custom FSR solution, which streamlined Thermopol's manufacturing process and allowed them to lower their costs and increase value to the OEM.



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*Picture with permission of Thermopol Inc.*

Hose developed by Thermopol with ***Silastic*** brand silicone rubber from Dow Corning.

## The Result

Thermopol and Dow Corning delivered to the OEM a high-performance, cost-saving solution on an extremely tight deadline. Development of a new silicone product would usually require six to nine months to fully complete product development, application testing and compatibility testing. By leveraging their excellent understanding of each other's capabilities, Dow Corning and Thermopol were able to significantly shorten the material development and qualification cycle.

The delivered solution made the OEM innovation possible, eliminating the targeted engine component to reduce emissions and save millions of dollars each year.

## The Product

Integrating hose construction design and material performance design, Thermopol and Dow Corning proactively responded to the OEM needs and Thermopol was able to produce an oil resistant turbocharger hose liner capable of continuous operation at 235- 240°C.

Dow Corning worked with Thermopol by testing a series of commercially available *Silastic*-brand FSR products. When none of these products met the specific requirements for the hose liner performance and Thermopol's manufacturing requirements, a customized *Silastic* brand Fluorosilicone Rubber (FSR) formulation based on Dow Corning's FSR technology was developed. *Silastic* brand FSRs can be molded or calendared for applications wherever high temperature and low temperature resistance and fuel and oil resistance are needed. They are an ideal solution for many automotive and aerospace applications, where harsh environments require reliable high performance elastomers: fuel line quick-connect seals, electrical connector inserts, air pump valves, exhaust gas recirculating diaphragms, fuel-resistant hydraulic and electrical clamp blocks, vapor recovery management system seals, natural vacuum leak protection control diaphragms, engine gaskets and fuel line pulsator seals.

Demands for high performances in harsh environments are poised to continue to increase in automotive designs. By working closely with customers to meet their needs exactly, Dow Corning can help the automotive industry increase fuel efficiency while reducing weight, costs and emissions.



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