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Can your elastomer handle changing regulations?

The EPA in 2000 assigned emission standards for heavy-duty highway engines built in 2007 and later. Part of the new regulations will lower the sulfur content in diesel fuel from 500 to 15 ppm.

Our company has closely followed this legislation because it could hurt the performance of elastomer seals in a variety of truck systems, including air brakes. The new EPA regulations will make truck engines run nearly 50°F hotter. The elevated temperatures accelerate rubber deterioration and cause many elastomers to take a higher compression set and eventually leak in some cases. It is generally agreed that the proposed low-sulphur fuel will change the chemical makeup of the operating environment as well.

One component we supply to this market consists of a rubber compound chemically bonded to an aluminum insert. It turns out that the current rubber compound may deteriorate more quickly when exposed to the low-sulphur diesel fuel, which prompted us to explore different formulas. In addition, new diesel-fuel by-products could weaken the metal-to-rubber chemical bond and ultimately lead to product failure.

In another application, a rubber spring that was working properly would now be exposed to higher temperatures. The

customer asked that we change the elastomer compound so the spring can maintain its mechanical properties at temperatures to 250°F, and last 500,000 miles. By working closely with our client's design engineers — and armed with the details of the new operating environment — we were able to quickly supply prototypes of three alternative materials.

Such regulation changes as these aren't unusual. Standards change frequently for engine-powered equipment and component markets. Though not all regulation changes will affect rubber seals or other elastomer components, it is important to know when they do. Here are a few questions engineers should consider:

- What materials are in contact with the elastomer seal and have these materials changed in chemical composition?
- Has the temperature of the operating environment changed?
- Is the performance requirement of the rubber component expected to change?

If the answer is yes to any of these questions, we recommend companies review their designs that incorporate elastomers. **MD**

Ashtabula Rubber
(www.ashtabularubber.com) is a designer and manufacturer of rubber components.

Edited by Lawrence Kren