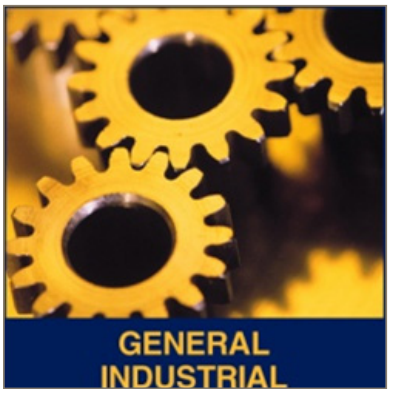
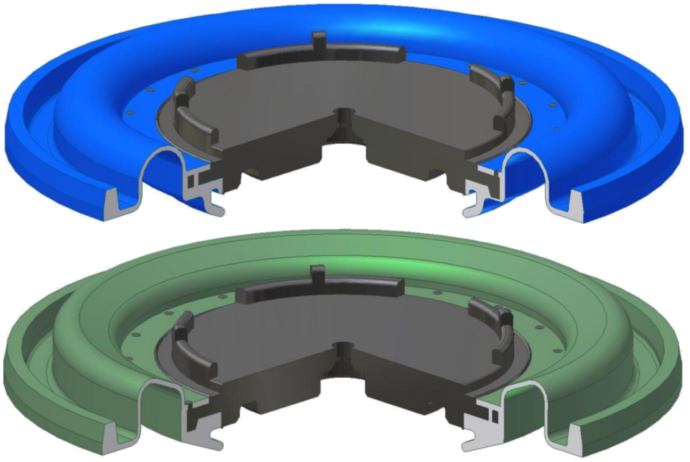
Material Optimization by Design

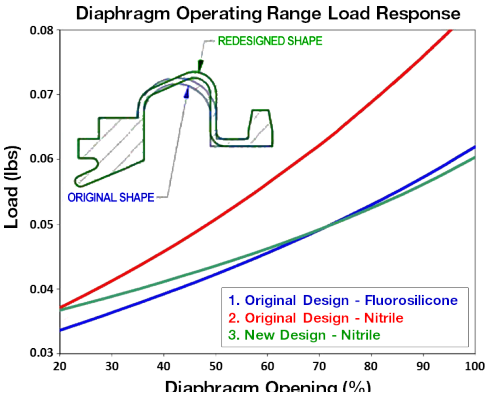
Engineered Solutions
Issue 3



Problem:

The customer came to Parker O-Ring & Engineered Seals Division with a desire to reduce the cost of a low-durometer, overmolded, flourosilicone diaphragm. The customer required the diaphragm to maintain the same opening pressure and flow rate requirements as the original.





Solution:

Utilizing Parker Hannifin's extensive material library, state of the art design software, and Finite Element Analysis (FEA) the O-Ring & Engineered Seals Division team was able to create a low-cost alternative for the customer while meeting all the performance requirements. The OES team identified a nitrile material which would meet the environmental requirements of the application with a lower cost. The OES team then characterized the material properties of the nitrile. The material characterization is utilized by the FEA software to accurately model the performance of the diaphragm. The FEA software enabled the OES team to maximize the diaphragm design to meet the performance requirements, while staying within the existing design envelope.

Benefits:

- Optimized seal loads to avoid undesirable distortion or failure of mating components
- Optimized elastomer usage to reduce waste and part cost
- Visualization of deformed shapes to confirm component stability and intended deflections
- Evaluation of maximum and least material conditions to confirm function at tolerance extremes
- Effects of pressure, load, deflection, and other conditions can be predicted and accommodated
- Failure analysis identifies weaknesses in designs and greatly improves new design success rate
- Virtual prototype evaluation reduces the number of physical prototypes needed
- FEA animations can be used as powerful communication and marketing tools

Contact Parker O-Ring & Engineered Seals Division and ask for a product engineer to review your application and see what opportunities are waiting to be discovered!

Parker Hannifin Corporation
O-Ring & Engineered Seals
501 South Sycamore Street
Syracuse, IN 46567

phone 574 528 9400
fax 574 528 9640

www.parker.com/oes

ENGINEERING YOUR SUCCESS.