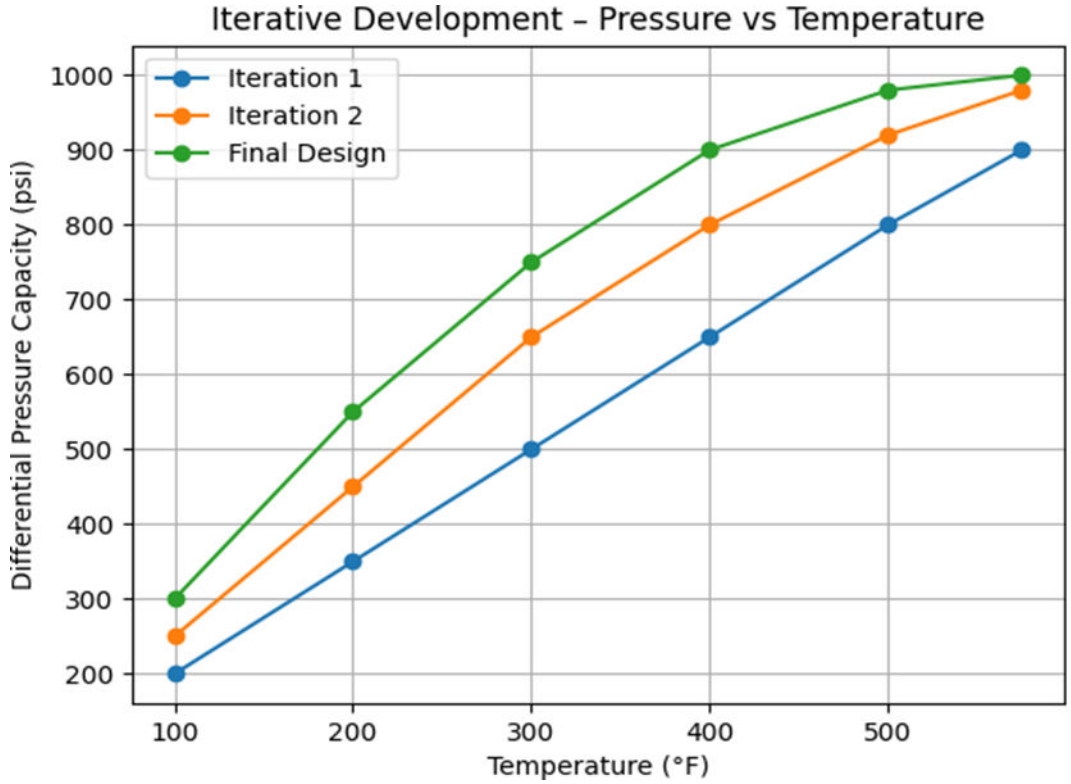
ITERATIVE DEVELOPMENT SUMMARY – 1000 PSI CLASS

This document summarizes the iterative development process undertaken to achieve the final qualified operating rating of 1000 psi differential pressure at 575°F for the Hybrid Swellable Packer and Thermal Expansion Sub system. The graph below illustrates progressive design improvements across multiple development iterations.



Each iteration reflects controlled optimization of elastomer formulation, metal geometry, and load transfer mechanisms, resulting in stable and repeatable performance at elevated temperature and pressure conditions.

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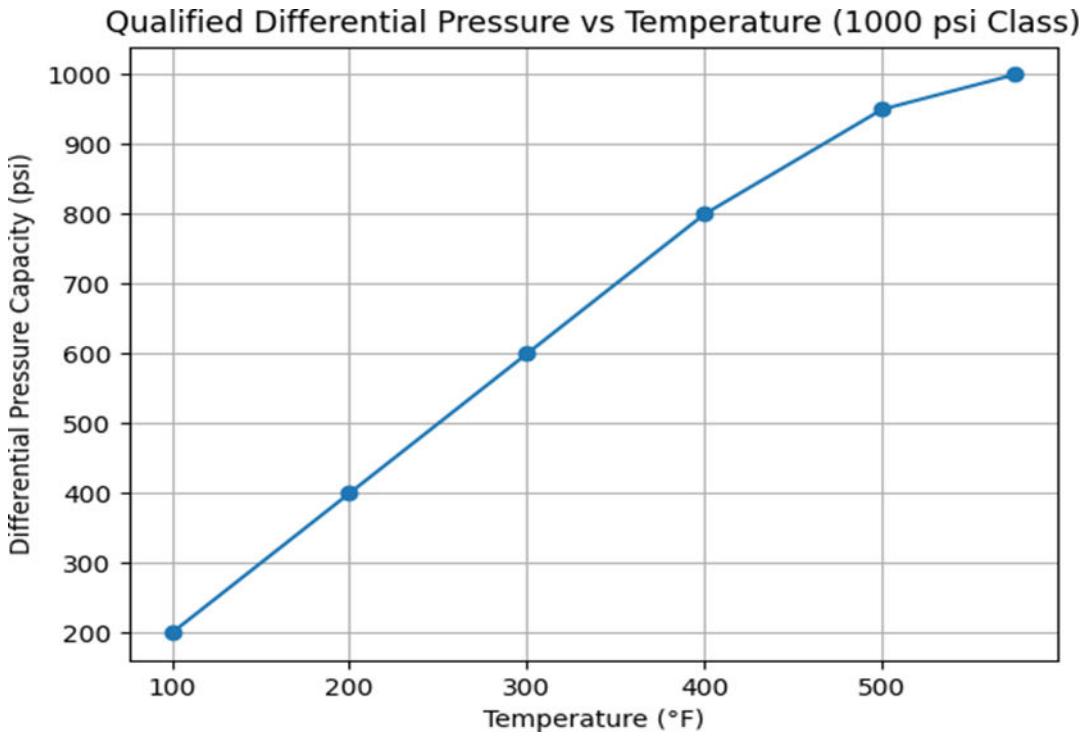
PERFORMANCE ENVELOPE – 1000 PSI CLASS

1. Differential Pressure vs Temperature



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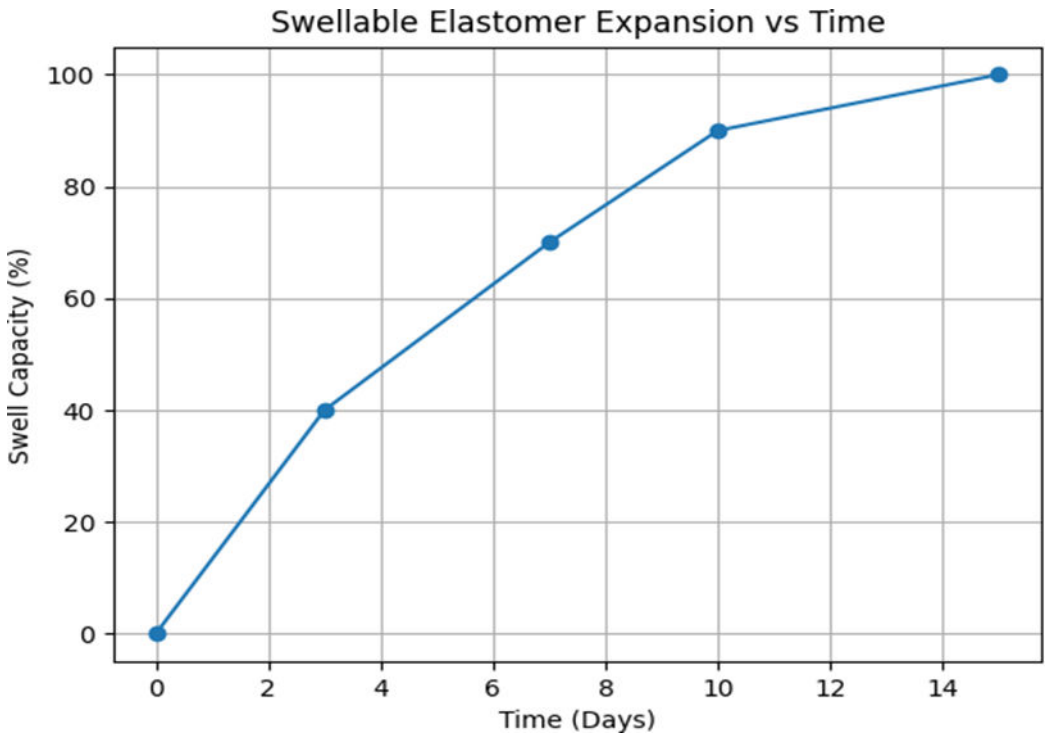
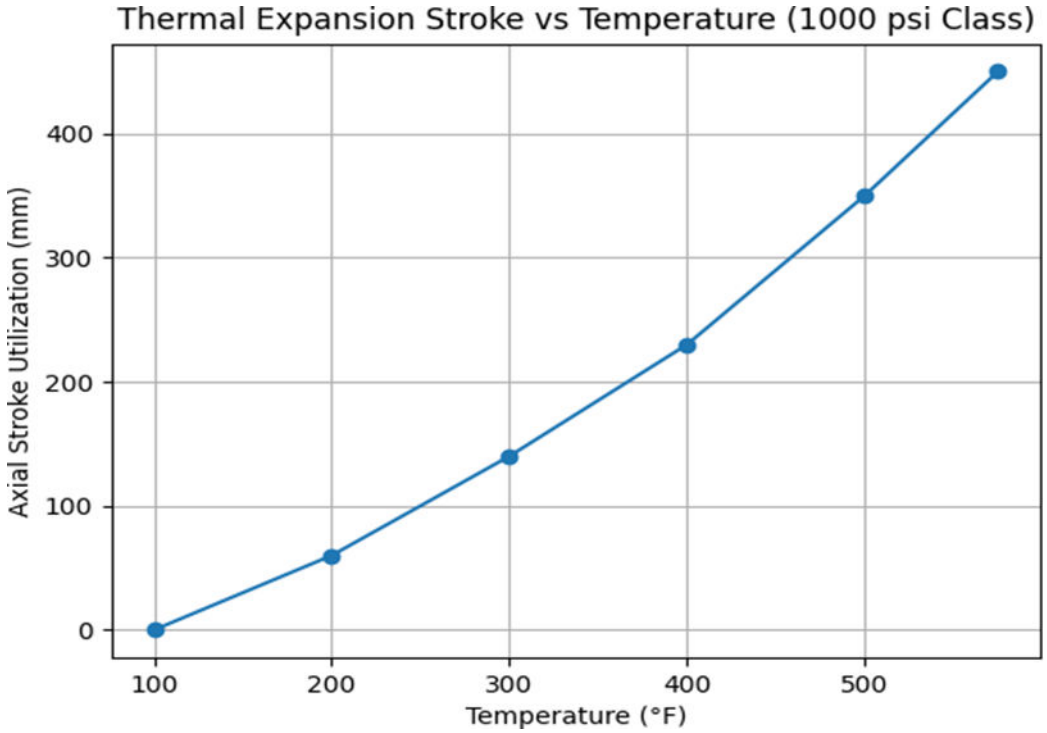
2. Swell Capacity vs Time



3. Thermal Expansion Stroke vs Temperature



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