



# Medical - Pharmaceutical Packaging & Drug Delivery Systems

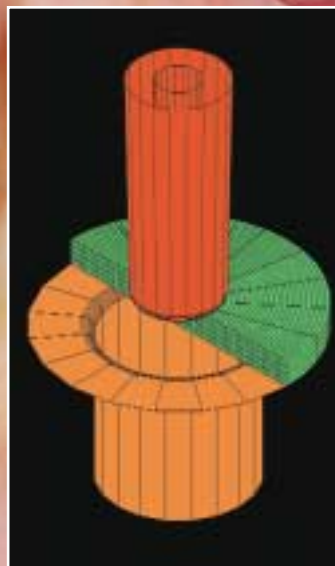
**SES has the skill and experience to help you save time, lower costs and reduce liability risks**

The design and development of functional and safe medical/pharmaceutical packaging and drug delivery systems for the health care industry offers significant challenges. Fueled by new and rapidly evolving medical and pharmaceutical applications, packaging design engineers working in this highly specialized area typically grapple with several difficult technical issues. These include:

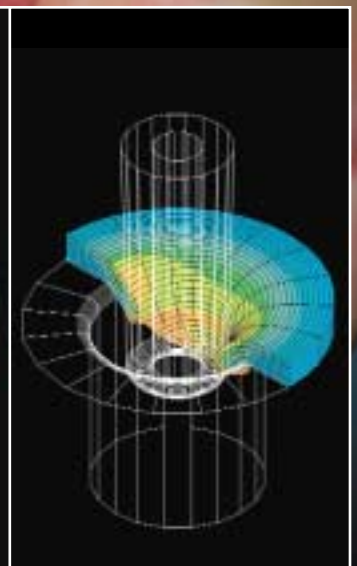
- Microbial sealing
- Peel-able opening features
- Gas and vapor permeability
- Sterilization effects
- Material performance in service
- Child resistance and tamper evidence



Drug transfer system with elastomeric access port for luer insertion.



Hyperelastic finite element model of luer insertion into elastomer membrane.



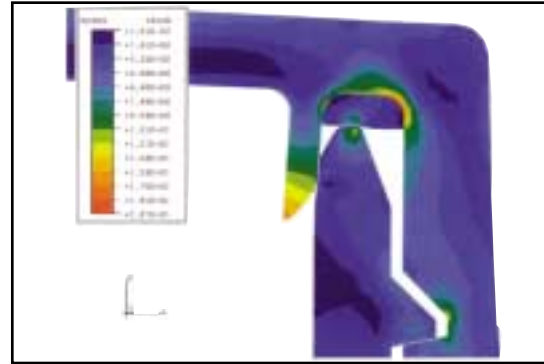
Stresses in membrane during luer insertion

# Predictive Engineering and Virtual Prototyping

SES offers a unique suite of tools to address the needs of these complex problems. We have developed effective design, predictive analytical and computational methods, along with highly customized material and product testing capabilities to support and accelerate the development of packaging and drug delivery systems.



Example of cross section of microbial sealing system



Stress relaxation, seal contact pressure and leakage analysis in a plastic closure during autoclave sterilization.

Whether it is structural, thermal or fluid system performance, SES' virtual prototyping technology and predictive engineering methods can help you optimize your package or drug delivery system before it is manufactured.



FEA model of push-and-turn CRC showing liner deformations following assembly.

Prediction of seal relaxation

Push-and-turn CRC (Child Resistant Closure)

**SES can help you save time, lower costs and reduce risk in medical/pharmaceutical packaging and drug delivery systems. Call us today.**

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