



STRESS?

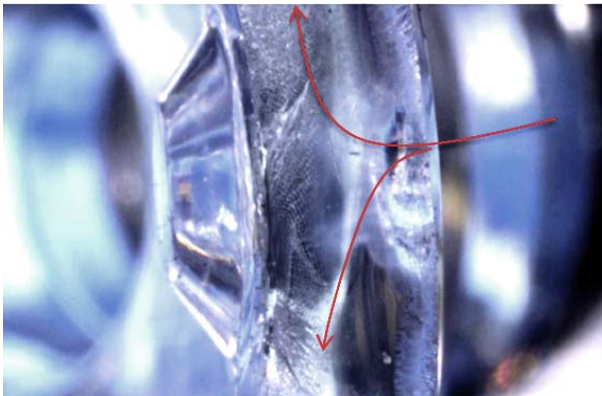
WE CAN HELP.

November 2019

SES's Materials Expertise and Capabilities for Enhanced Failure Analysis

The technique of failure analysis involves carefully reviewing the background information (part drawings and specifications, frequency of the failure, timing of the failure, conditions preceding the failure, etc.), inspecting the specimen for the mode of failure (preferably relative to an undamaged specimen), performing testing to characterize the material (preferably relative to an undamaged material), and then, if possible, attempting to replicate the failure. From this information, hypotheses about the likely root causes can be developed and proven or disproven. For those rare situations when it is not possible to identify the root causes with 100% certainty, by narrowing down the possibilities, the end-user can be guided towards product improvements.

SES has extensive material experience and capabilities, and we incorporate material review and testing into nearly all failure analyses that we perform. By capturing Material issues as well as Mechanical and Manufacturing issues, we can understand the full situation and provide our clients with the insights necessary to take remedial action.



Crack surface showing propagation pattern near gate.

As one example of a failure analysis that relied heavily on materials expertise, the image on the left shows the crack surface of a rigid plastic medical component that failed while in service. SES performed a detailed failure analysis that included inspection, material testing, and review of the mechanical and environmental factors which influenced the formation and propagation of the crack. SES was able to determine that the process of component failure included three root causes leading to failure: (1) residual stresses near the

gate during molding; (2) poor design where a thick region of the part was adjacent to a thin region, leading to additional mechanical and molding residual stresses; and (3) exposure of the exterior to hospital cleaning chemicals that led to an Environmental Stress Cracking (ESC) initiation site.

ISTA Certified Lab

Stress Engineering Services is now certified by the International Safe Transit Association (ISTA)!

ISTA's vision to "provide the global supply chain with the confidence that they have the best package possible for their supply chain" is also a driving force for SES. Acquiring ISTA certification was a natural next step in our evolution to become a one stop shop for all of our clients packaging needs.



Lansmont Vibe Table



Inclined Impact Tester

How can SES add value to your packaging needs? Broad experience through a diverse history!

Whether its paperboard packaging, flexible containers, rigid plastic bottles and closures, or heavy duty steel shipping crates, we have the equipment and the expertise to help keep whatever you ship safe.

Contact Matt Berrey @ 513-336-6701 to find out how SES can help.
matt.berrey@stress.com

Missed our previous newsletter?

[Click here to read about Industrial Packaging Solutions to improve packaging weight, performance, and cost.](#)

Stress Engineering Services, Inc. (SES) offers an integrated team of experts in creative design, functional engineering, design for manufacturing, materials, cost analysis, and reliability to deliver the highest level of innovation and technical success in developing products and packaging. SES provides expert engineering consulting services for:

- New Product Development
- Material Science
- Risk Assessment
- Human Factors
- Failure Analysis
- Package Development
- Testing
- Industrial Design

SES has extensive laboratory testing capabilities for evaluating materials, product performance, life assessment, and failure analysis. We have extensive simulation capabilities to predict mechanical, thermal, and fluid flow characteristics of complex problems.

Take your engineering to the next level. Find out more at innovation.stress.com.

To learn more about Stress Engineering Services, Inc., visit our website
or contact us at 513-336-6701.

ISO 9001:2015 & ISO 13485:2016 Certified
ISO 17025:2005 Accredited for Several Test Methods
ISTA Certified Testing Laboratory Member

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