

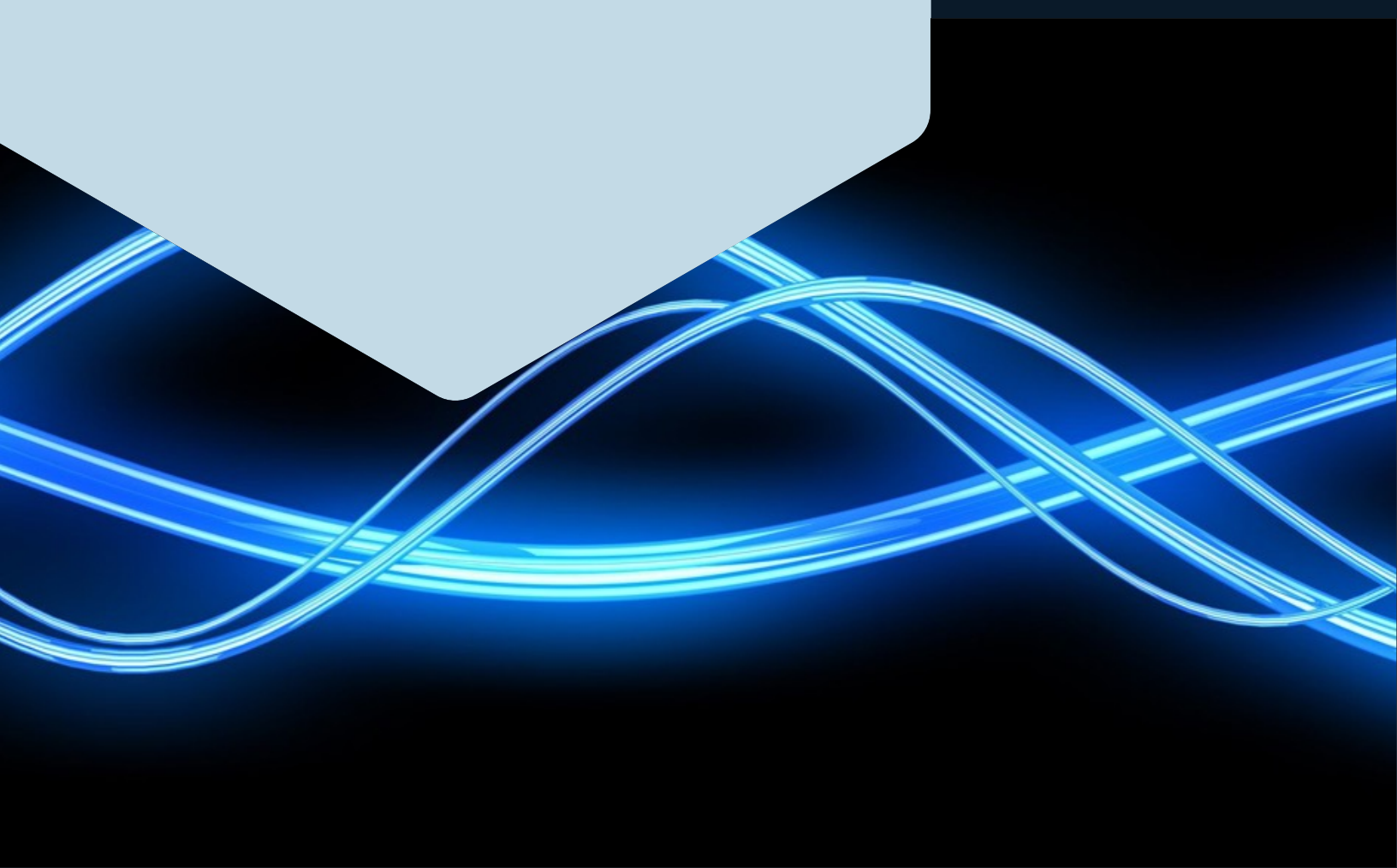
ROUSH®

ACOUSTIC MATERIALS DEVELOPMENT

Roush Noise and Vibration Engineering is a leader in developing innovative solutions for our customer's noise issues. Once the root cause of a noise issue is defined, Roush has an extensive toolbox of optional treatments to draw from to propose solutions. Often a treatment with special acoustic properties is needed to improve product performance. The Roush Acoustic Materials Lab has a wide range of analytical and experimental tools, and the expertise to design the treatment that is right for your product.

www.roush.com

We're focused, we're efficient, and we're at our best when we're challenged to think outside the box — critical traits when our customers' success depends on how quickly we can take their visions from the sketchpad to the marketplace.



ACOUSTIC MATERIALS MAY BE DESIGNED FOR:

- Maximum noise absorption
- Maximum noise blockage
- Minimum sound radiation from structural components

Whether the optimum solution is a barrier that blocks sound, or a treatment designed to absorb sound energy, or an optimized combination, Roush can help you find the best noise treatment for your product.

TEST TOOLS:

- Autoneum Alpha Cabin — (measures random incidence sound absorption)
- B&K Impedance Tube — (measures normal incidence sound absorption)
- Autoneum Apamat II — (measures acoustic barriers — Insertion Loss [IL])
- Air flow resistance measurement

DESIGN PROCESS:

- Roush uses laboratory measurements to characterize acoustic material properties
- Roush uses a variety of software modules to translate measurements into acoustical performance measures
- Roush can develop analytical models (SEA/FEA/BEA) to predict the impact of resulting treatment enhancements on the acoustical performance of a vehicle or system
- Roush can build prototype hardware to demonstrate improved performance

Roush engineers are experts at interpreting acoustic test results. Examination of the acoustic impedance (real and imaginary parts) provides tremendous insight into potential sound absorption improvements. There is no single acoustical material that is optimized for every application. For example, material flow resistance can be very influential in determining the sound absorption of a material, but, contrary to popular belief, there is no ideal flow resistance that is optimal for all applications. Roush works with their customers to optimize treatment acoustical performance by making recommendations regarding physical properties, surface treatments, and process variables. Using modeling technology (porous material and Statistical Energy Analysis models), Roush engineers can predict the installed acoustical performance of the end product. The acoustical material can then be optimized for the particular cost, weight, and space requirements of each end product application.

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