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# Authors' reply ☆

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The accurate comments are acknowledged. The strain dependence of the elastomer elastic moduli was not rigorously accounted for two reasons.

The first reason is related to practical aspects of sound transmission through bulb seals. Door seals are often cylindrical to minimize door closure effort, weight, and quantity of material. The strain in the compressed seal is very small in most locations, except in a limited number of areas where stress concentration occurs. Such small strain is consistent with the requirement for minimal door closure effort. Due to the small strain values in the compressed state, the dynamic behavior of the material is mostly determined by its frequency-dependent dynamic moduli, measured assuming linear viscoelastic behavior. Simulation results, not included in the paper, showed that accounting for the strain-dependent elastic moduli had in fact very little influence on the predicted sound transmission loss. As a result, the strain-dependent behavior of the dynamic moduli was altogether neglected when performing the optimization studies. Recent efforts have been focused instead on the accurate characterization of the frequency-dependent dynamic moduli of the elastomer. This could have been better explained in the paper, and it is clarified in a paper we recently wrote on this subject [1].

The second reason was a shortage of experimental data on the strain-dependent moduli, especially for EPDM samples. The available strain–stress data was thus simply tabulated following the format required by the HYPERFOAM command in ABAQUS.

Although the strain-dependent behavior can be safely neglected in vibration and noise studies, it would be very important to consider in the study of door closure efforts and non-linear relaxation phenomena.

## References

[1] J. Park, T. Siegmund, L. Mongeau, Viscoelastic properties of foamed thermoplastic vulcanizates and their dependence on void fraction, *Cellular Polymers* 22 (3) (2003) 137–156.

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