Vacuuming Textiles: A New Kind of Cost Benefit Analysis

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Introduction

With inexpensive instruments, we can measure the forces acting on textiles during vacuuming and ultimately use this data to establish more standardized methods of gentle and effective vacuuming.

A Continuum of NORMAL and SHEAR Forces

When the nozzle is ON the textile, normal forces are maximized and shear forces are minimized as the textile is drawn up into the nozzle.

When the distance between the nozzle and the textile is very small, normal forces are very small, normal forces are substantially reduced and shear forces are maximized.

As this distance is increased, normal and shear forces are reduced further (eventually cleaning potential is also reduced).

Conclusions

The more efficient you are while vacuuming, the less gentle you will be and vice versa. The standard practice of noting the vacuum setting is grossly insufficient to gauge either.

The technique of the individual operating the vacuum will play the crucial role in determining how gentle and efficient a vacuuming campaign will be, and we CAN measure this.

With continued testing, it may be possible to extrapolate aggregate data to establish general and/or treatment specific protocols for more efficient and more gentle vacuuming techniques.

Vacuuming is a method of mechanical cleaning, not unlike using a squeegee or vacuum to remove dirt from an object. When we vacuum a textile, we are employing a current of air rather than a squeegee to apply enough force to overcome the physical and chemical forces acting between the dirt and the textile.

In this context, the tree represents a textile and the kite represents dirt. The string of the kite represents the forces acting to keep them together, and the wind is acting to separate them and carry the kite (dirt) away.

When the nozzle is OFF the textile, the forces acting are minimal.

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