



Ontera Cushion Backings Acoustic Advantages

June 2016

Ontera[™]
A MILLIKEN COMPANY

Ontera offer 2 x Cushion backing options:

1. Underscore
2. ComfortPlus

Both Ontera cushion options are:

- PVC free - Made from Polyurethane
- Chemically Non-reactive ie no need for sealers or cleaning up old adhesive

Common misconception about carpet is that fibre type is the most significant factor affecting durability. Reality is backing is the major factor.

- **Most of the force of impact is transferred through the fibre to the backing.**
- **Shock absorption quality of cushion delivers significant appearance retention benefits.**
- **Ontera cushion backed carpet will on average last 40% to 50% longer than hard backed product.**

Comfort Plus[®] & Underscore[™]

Tufted Face Fiber (Yarn) ————— ●

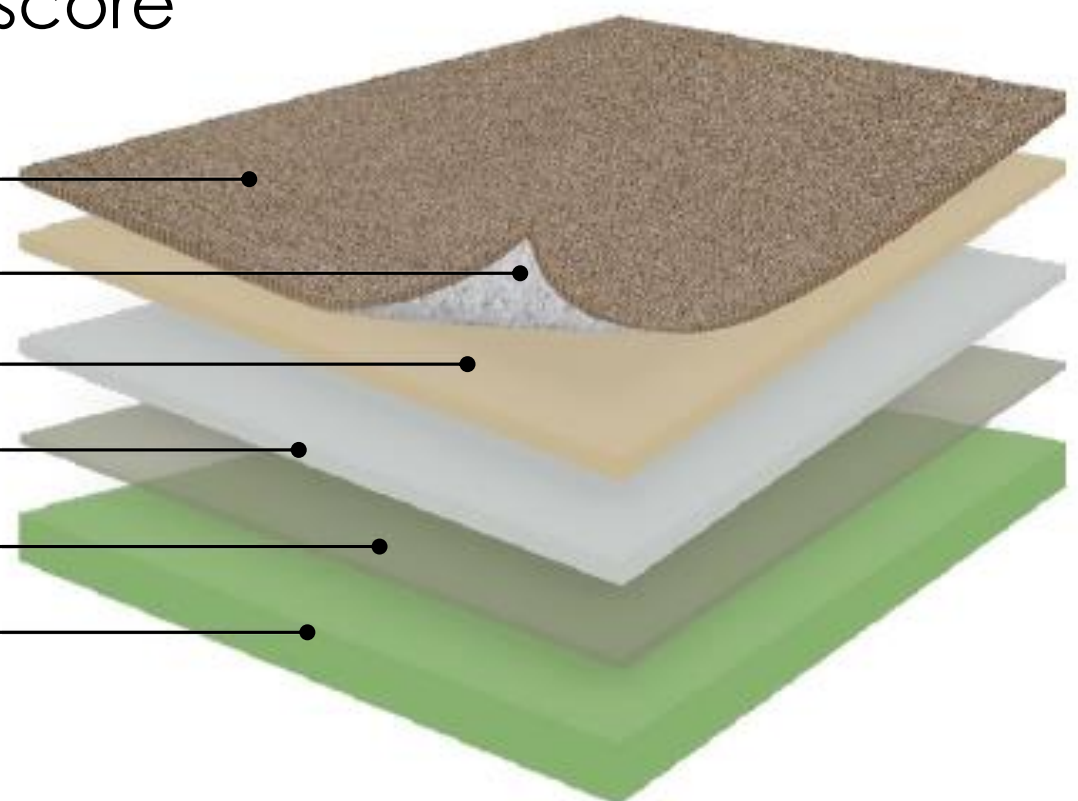
Primary Backing (Non-Woven Layer) ————— ●

Primary Coating (Latex) ————— ●

Secondary Backing (Adhesive) ————— ●

Fiberglass Layer (For stabilization) ————— ●

Cushion Layer
(Open cell foam) ————— ●



Ontera cushion backed products have superior dimensional stability to most competitors cushion backings as the Ontera cushion is integral within the product construction.

By comparison, most competitors simply add on the cushion layer to the existing tile - which introduces a level of stress on the tile - leading to dimensional stability problems and even adhesion problems.

Open-celled foam vs. Closed-cell foam

Milliken uses a open-cell urethane foam technology versus the closed-cell approach of our competitors. There is a lot of deep science to support this choice but the bottom line is our open-cell urethane offers the greatest durability and cushioning and is the same cushioning technology that Nike and other performance shoe companies use.

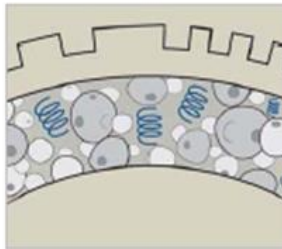
Open Cell

- Best cushioning
- Most durable
- Chemically inert & bonds to any surface
- Wicks away moisture

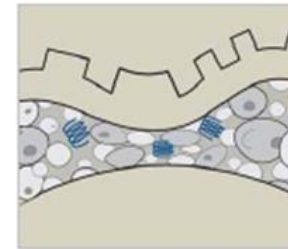
Closed Cell

- Loss of performance over time
- Contains phthalates harmful to the environment
- Incompatible with some adhesives
- Traps moisture which can lead to mold/mildew issues

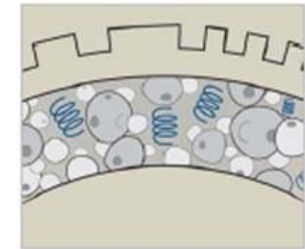
Open Cell



Micro-cellular open-cell urethane foam

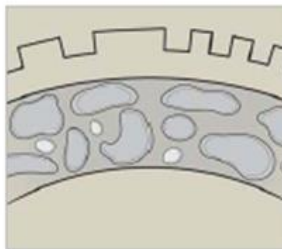


Open-cells or "Springs" recover after compression

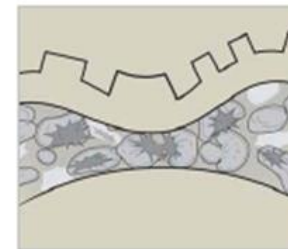


Cells return to original shape after compression

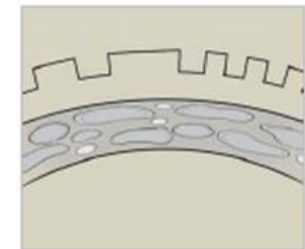
Closed Cell



Closed-cell foams



Closed-cells or "Balloons" rupture under compression



Loss of cushioning and reduced resiliency due to escaped air

Gmax simulates a foot-fall onto a surface. The measure is reported as multiples of "g" (gravities), or Gmax. The lower the value, the lower the force upon impact, and the more comfortable underfoot the product feels. The higher the value, the higher the force upon impact, and the less comfortable the carpet feels.

Resiliency measures the rebound percent of a metal ball when dropped from a standard height. It shows the shock absorbing character of the cushion, which helps reduce visible wear of the carpet face. It also indicates the anti-fatigue value of the carpet.

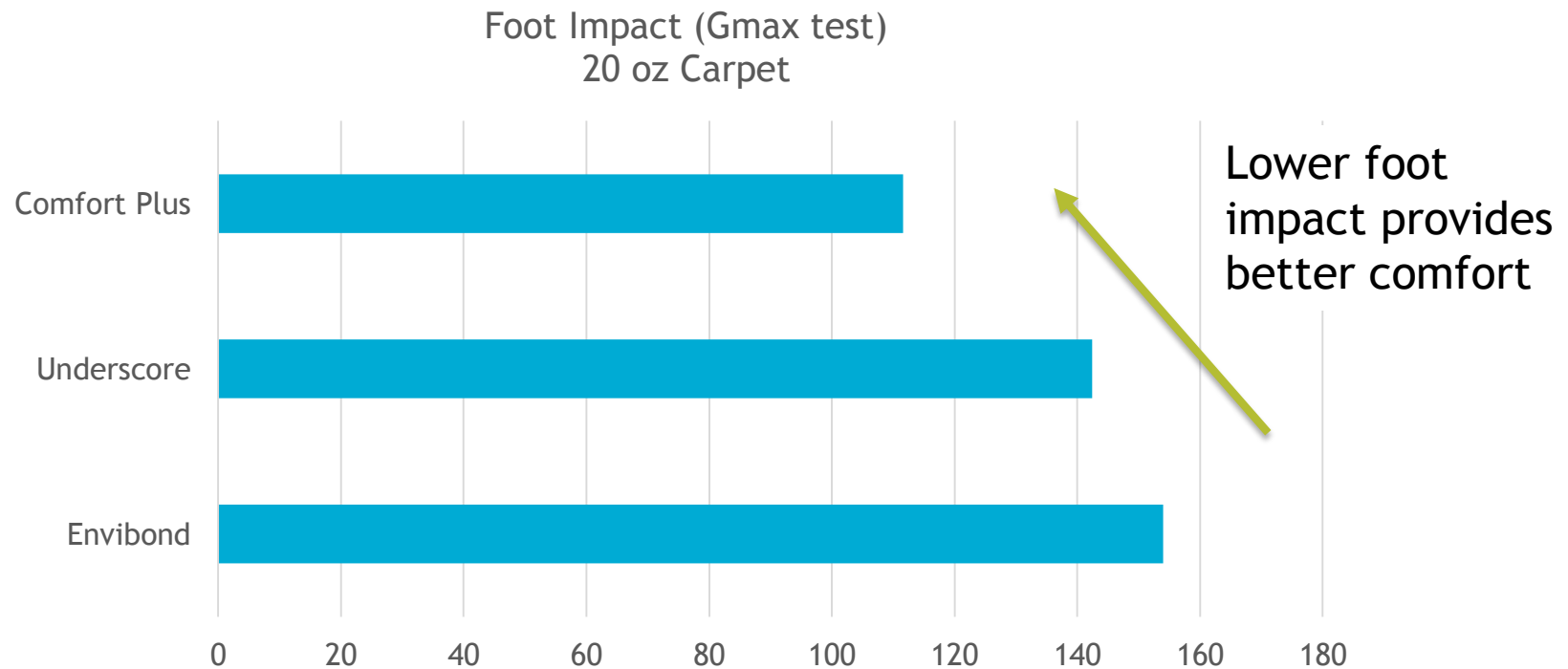
Sound Absorption measures the average sound absorption across many typical frequencies. Measurement is sound absorption coefficient α_w

Acoustic absorption coefficient is the proportion of incident sound energy absorbed by the sample. Thus a coefficient of 10% indicates that 10% of the incident sound energy is absorbed (i.e. not reflected).

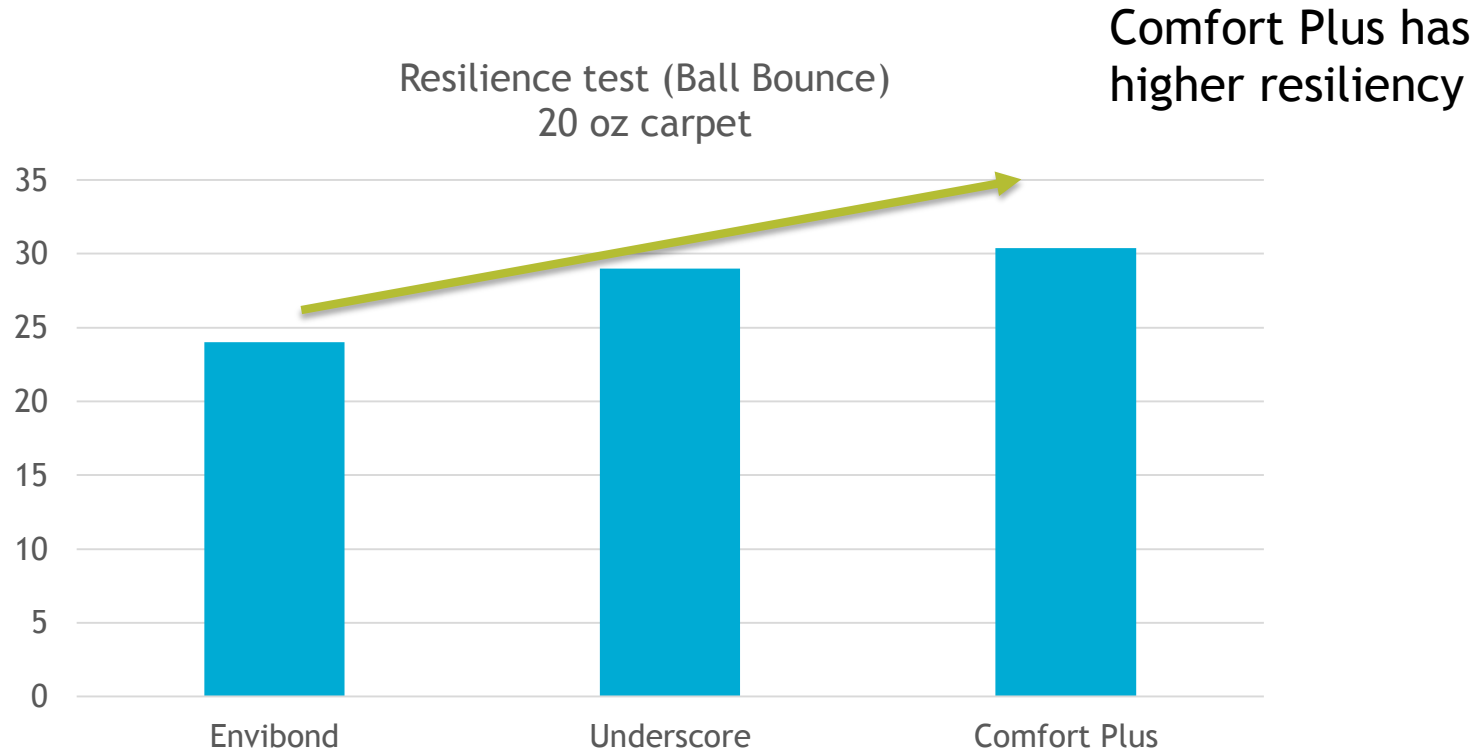
Noise Reduction Coefficient, NRC, is the arithmetic average of the absorption coefficients at 250, 500, 1000 and 2000Hz. (normally rounded to the nearest 0.05)

How do different cushion backings compare?

Lower foot impact numbers indicate better comfort performance.



How do different cushion backings compare?

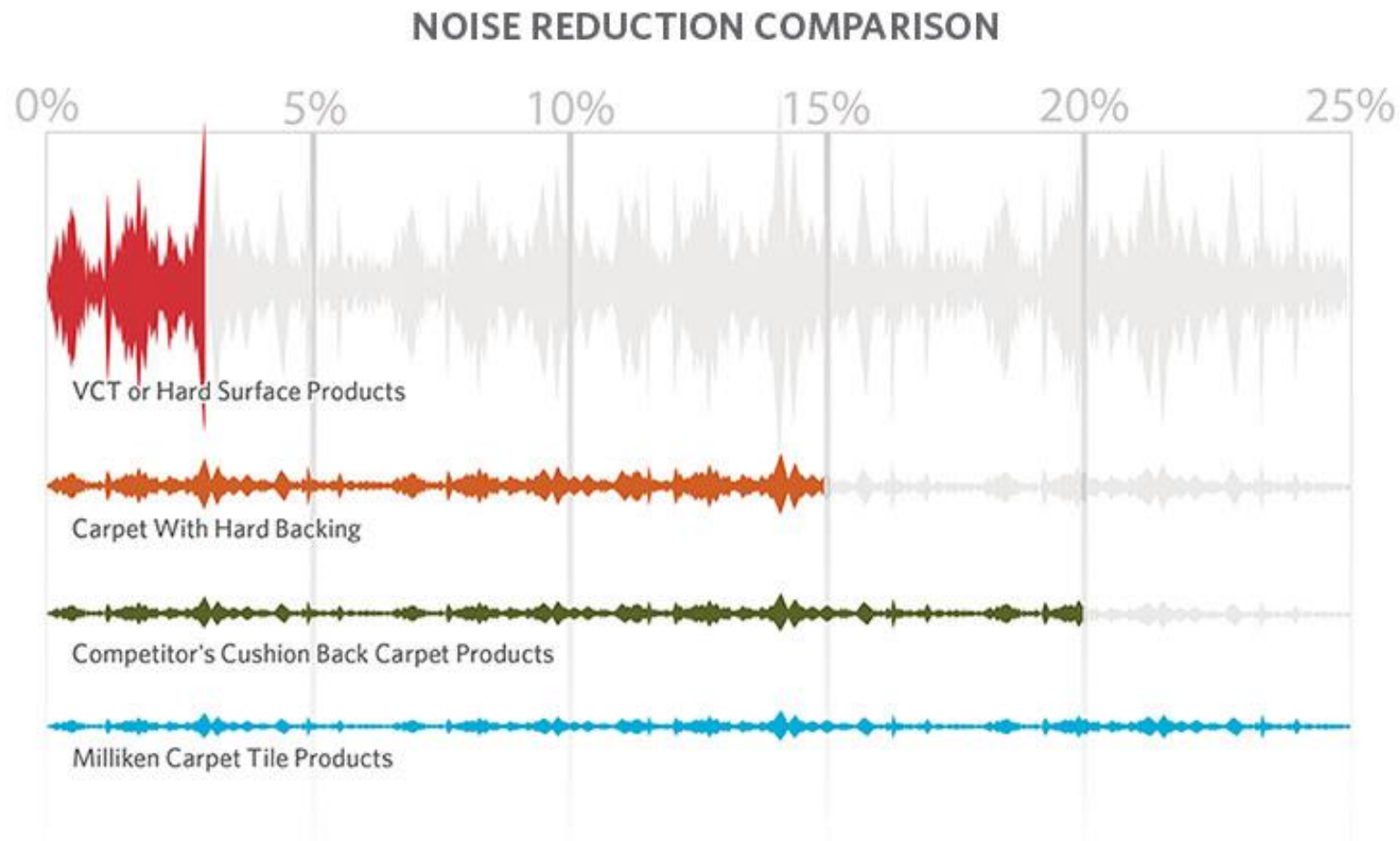


Ontera's products with underscore cushion backings have similar weighted sound absorption coefficients, α_w , typically measuring in the $\alpha_w = 0.20$ to 0.25 range.

NB Ontera's previous cushion backing - Envibond - had a similar rating to above.

Ontera's cushioned carpet tiles absorb up to 50% more noise than hard-backed carpets and up to 12 times more than hard surface and rubber flooring.

- Improved concentration, productivity and calmer environments
- important for offices, health care, education



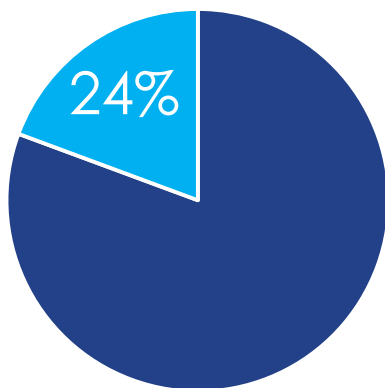
Other benefits of Ontera cushion backing

In a study by Beth Shapiro & Associates, more than 70% of teachers preferred carpet in their classrooms.

The best-in-class acoustics provided by Milliken carpets make it easier for students and teachers to hear, concentrate, and ultimately improve test scores. Numerous studies show that reduced noise levels improve knowledge retention and error rates among students while minimizing vocal chord strain among teachers.

Clearly acoustics matter.

Ergonomics is more than your desk and chair. ComfortPlus backing dramatically increases under foot comfort and [decreases muscle strain by 24%*](#).



***University of Pittsburgh Studies (Redfern)**



70%

PREFER TO
SIT/STAND



20%

PREFER
TO SIT

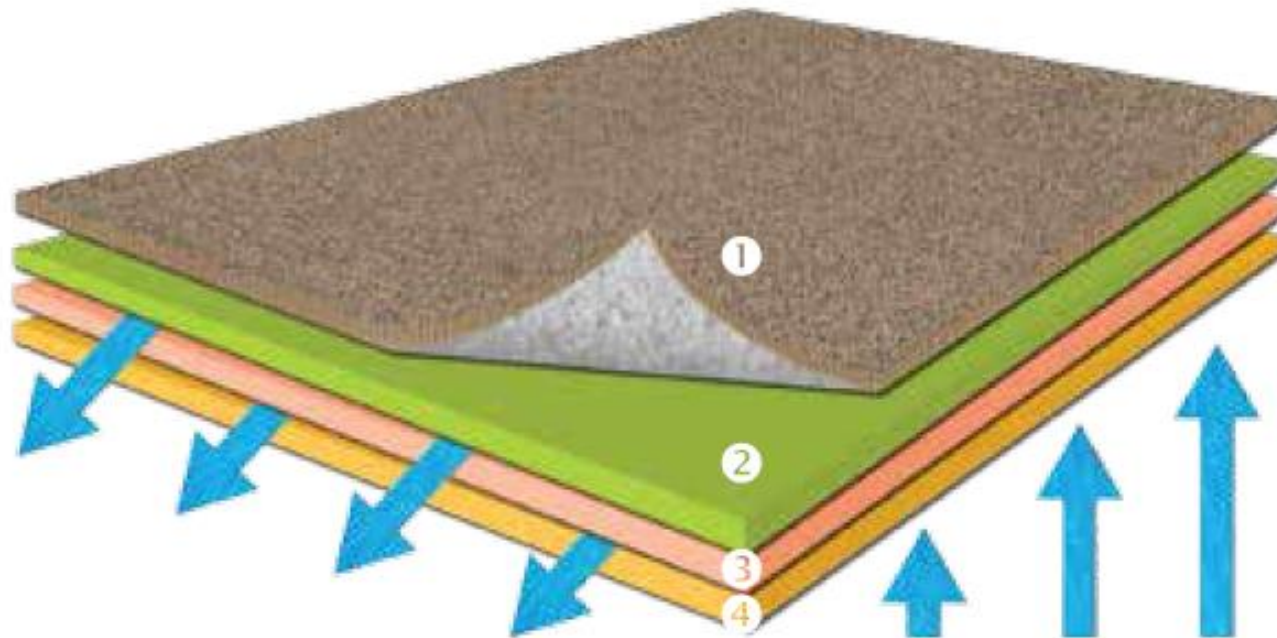


10%

PREFER
TO STAND

A case study of musculoskeletal discomfort experienced by bank tellers conducted by A. Roelofs and L. Straker.

Moisture Control



Moisture is absorbed, wicked across the tile and released through seams

1. StainSmart technology repels and beads surface moisture
2. Alpha San antimicrobial inhibits mold, mildew and odor
3. Primary coating prevents liquids from penetrating past the surface
4. Cushion layer is an open-celled foam that absorbs moisture from the sub-floor and wicks it away

Test results and certifications - see sales resource site