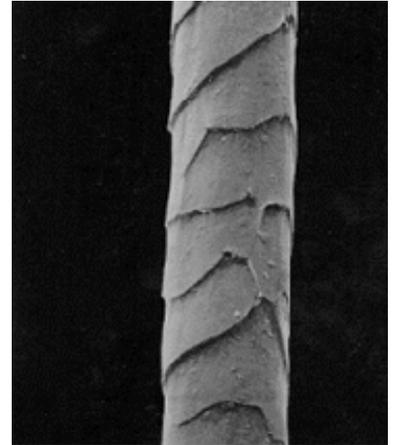


## Why wool carpets and fabrics in a theatre?

*Wool yarns are historically accurate for any theatre built prior to the end of World War II in 1945. Synthetic carpet yarn systems were not introduced until the late 1950s. In addition to wool's historic significance, wool has several important long-term performance attributes.*

Under a microscope, a single wool fiber appears to be covered by a thin sheath of overlapping scales. Statistically, there can be as many as 2,000 scales in a linear inch. Similar to the principle of overlapping roof tiles, the scaling effect forces liquids to form beads and roll off the fiber. While wool fibers have a natural repellency to liquids, they will absorb moisture in the microscopic gaseous form called moisture vapor.



*Magnified wool fiber*

### *Environment - humidity*

Wool is a hygroscopic fiber so it will absorb moisture vapor. Tiny pores in the fiber allows the fiber to absorb up to 30% of its weight in moisture vapor. The capillarity capacity to absorb moisture in high humidity environments also allows the fiber to release the moisture vapor in periods of low humidity. In its own way, wool helps to balance the moisture conditions throughout the space.

An added benefit to wool's ability to hold and release moisture is its natural ability to eliminate static electricity build up and discharge.

### *Safety – fire and smoke*

Because wool contains moisture in each fiber, it has a natural resistance to flames. Wool's natural resistance to flames is accomplished without the application of additional chemicals typically needed in synthetic fibers.

When exposed to a flame, wool chars and stops burning when the source of the fire is removed. In areas where smoking is permitted, the hot ash of a cigarette will not damage a wool carpet. Any char marks can be easily removed, leaving the remaining yarn, pattern and color intact. On the other hand, that same cigarette hot ash will melt nylon fibers leaving a permanent scar on the carpet.

Wool is naturally self-extinguishing and will not support combustion. Because of these fire safety properties, wool blankets are often used by fire departments to extinguish small fires.

### *Acoustics – sound absorption*

Sound is an interesting challenge for any venue. Sound is transmitted by the vibrations of air molecules. Technically, it is the porosity of a material that ultimately determines its noise reduction coefficient (NRC).

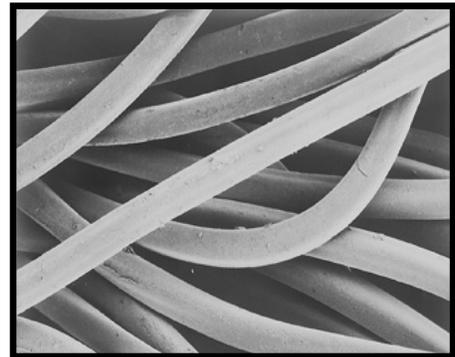
While carpet will absorb sound waves much better than hard surface materials, there are significant differences in the NRC rating of various carpet constructions, yarn systems, and backing structures.

For example, a cut pile will absorb more sound waves than a loop pile. A broadloom carpet will absorb more sound waves than the same carpet with a pre-applied performance backing. Woven carpets have better acoustical properties than tufted carpets.

Hard back carpet tiles and six-foot vinyl have probably the worst performing acoustical properties of any carpet.

Compound the backing structures with the lower face weights and pile heights, these particular carpets have acoustical properties closer to hard surface products than broadloom carpets.

Wool fibers absorb more sound waves than any synthetic fiber.

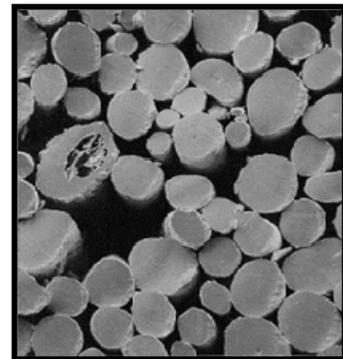
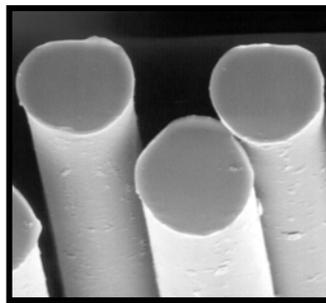


*Magnified nylon fiber*

Nylon is the preferred synthetic fiber used in commercial carpet applications. Unlike natural fibers (wool or cotton) the extrusion of nylon forms a slick, non-porous surface. Comparing magnified pictures of nylon types, the slick surface of the nylon fiber is evident. It is the non-porous uniformity of the synthetic yarn bundle that reverberates sound waves instead of absorbing them. On the other hand, the natural randomness of wool fibers in length, shape, and thickness creates an environment that absorbs sound waves.



*Nylon Type 6.6 hollow core and round cross-sections*



*Wool yarn cross-section*

Using government and industry accepted acoustical testing procedures; nylon carpet will absorb 35% (NRC 0.35) of airborne noise while the same carpet construction in a wool fiber will absorb 55% (NRC 0.55) of airborne noise. Overall, by reducing the noise levels and reverberation times, wool carpet significantly improves venue's acoustical properties.

It's no wonder that performing artists prefer wool carpets and fabrics in the venues they perform in.

Additional sound absorption can be increased by increasing the pile height, yarn weight and overall density of the construction. Ultimately, a woven carpet with a wool or wool blend yarn construction will acoustically out perform any tufted carpet using the same yarn systems.

### *Aesthetics – long-term appearance*

Another advantage of wool yarn is its ability to absorb and retain color. Because wool is an amphoteric fiber, wool absorbs numerous dye chemistry without additional chemicals typically used in the dyeing of nylon. The dyes penetrate into the inner medulla core of the fiber where a chemical reaction occurs making the color change permanent throughout the yarn bundle.

### *Sustainable Attributes*

Unlike synthetic fiber, wool is 100% rapidly renewable, as well as 100% recyclable at the end of its useful life. But perhaps woven wool carpets' greatest environmental attribute is the result of a combination of manufacturing types as well as the components used to make the carpets. The Carpet and Rugs Institute claims that studies confirm that the average life of tufted carpet is 7.5 years. At the same time, woven carpets have been documented to have a useful life in excess of 21 years. In many venues, woven wool carpets are still in service after 25 to 40 years.