Fabric Color Shift & Moiré Effect

The Science Behind Fabric Color Shift in Sunlight

What your customer is observing is a **visual phenomenon caused by a combination of factors**, including **light transmission**, **fabric weave density**, **optical contrast**, and **background reflectance**.

1. Light Transmission & Backlighting

- **White fabrics** are highly **reflective and translucent**, meaning they allow a significant amount of ambient and direct sunlight to pass through.
- When **sunlight hits the white OmegaTex fabric from outside**, it creates a **backlit condition** where the sun shines **through** the fabric rather than just bouncing off it.
- This backlighting causes the **individual threads and weave pattern** to become more visible, often **casting a yellow, beige, or tan hue** especially when viewed from a darker interior space (like a shaded patio).

2. Optical Contrast & Human Perception

- The human eye perceives color **in context**. When you're **inside a shaded area**, your eyes adjust to the lower light level. As you look out through a **white screen that is lit from behind**, the **contrast** between the **bright backlit fabric** and the **darker shaded interior** makes the screen appear **warmer or more tinted** than it actually is.
- The perceived **“tan” or “golden” tone** isn’t a pigment in the fabric—it's a result of **how light diffuses through the white yarns** combined with the outdoor environment's color spectrum (e.g., sunlight, greenery, ground color).

3. Fabric Weave and Yarn Composition

- OmegaTex fabrics are made of **specialized PVC-coated polyester yarns**, which reflect some wavelengths and allow others to pass through.
- The **openness factor** (how tight or loose the weave is) impacts how light interacts. The looser the weave, the more sunlight passes through and creates a visual color shift when viewed from inside.
- **Even pure white yarns** may give off **a yellowish tone** when layered and seen through light and shadows—similar to how stacked white plastic sheets can look beige from the side.

4. Reflection from Surrounding Surfaces

- Surfaces outside the screen (such as **brick, stucco, concrete, or even landscaping**) can **reflect warm-toned light** upward and through the fabric. That reflected light can **tint the screen’s appearance** as it passes through from behind.
- This is especially common in **sunny environments** like Florida, where the intensity of solar radiation is high and the light is more **"yellow"** during morning and late afternoon.

Summary

- "What you're seeing is totally normal and actually a well-known optical effect. When the sun shines through the white OmegaTex fabric from outside, the fabric becomes slightly translucent and catches the warm light from the sun and surroundings. This backlighting makes the screen appear tan from the inside, even though the fabric itself is pure white. It's similar to how curtains or blinds can look a different color when sunlight comes through them."

Understanding the Moiré Effect

Definition:
The **moiré effect** is a visual interference pattern that appears when two grids, patterns, or meshes with similar but slightly different spacing or angles are overlaid. It creates a **wavy, rippled, or distorted pattern** that can appear to move or shimmer as you change your viewing angle or distance.

How It Applies to OmegaTex Screens

1. Fabric Mesh vs. Human Vision (or Digital Devices)

- OmegaTex hurricane fabric is made from a **tight, repetitive woven mesh pattern**.
- When a person views the screen from inside the patio and looks **through it toward another repetitive pattern** — such as window screens, siding, brick walls, fencing, railing, or even the mesh of another screen — the eye can't cleanly resolve both patterns.
- The overlapping patterns **interfere with each other**, causing the appearance of moiré patterns.

2. Lighting and Angle Play a Role

- The moiré effect is more noticeable when there's **strong directional light** (like sunlight) and when the **viewing angle is indirect**.
- This is because light reflects and refracts off the screen mesh differently at each angle, enhancing the interference patterns.

3. Camera Screens Intensify the Moiré

- If your customer is **viewing the screen through a smartphone or security camera**, the moiré pattern can be **dramatically amplified**.
- That's because the camera sensor also has a **grid-like pixel array**, and it picks up the interference between the mesh and its own pixel grid — often creating patterns that don't exist to the naked eye.

Common Moiré Scenarios with White Fabric

- **White mesh is more reflective** than darker mesh, which makes **any moiré pattern more visible**, especially in bright daylight.
- With white OmegaTex, the reflective threads catch light and make the overlapping of patterns much more **apparent to the human eye**, enhancing the visual distortion.

Summary

"You're seeing what's called the moiré effect a completely natural optical illusion that happens when two fine mesh patterns overlap, like looking through your white screen toward a fence, another screen, or even a camera. The mesh patterns interfere with each other and can create a wavy or distorted look that shifts as you move. It's just the way light and patterns interact with our eyes or phone cameras not a defect in the fabric."