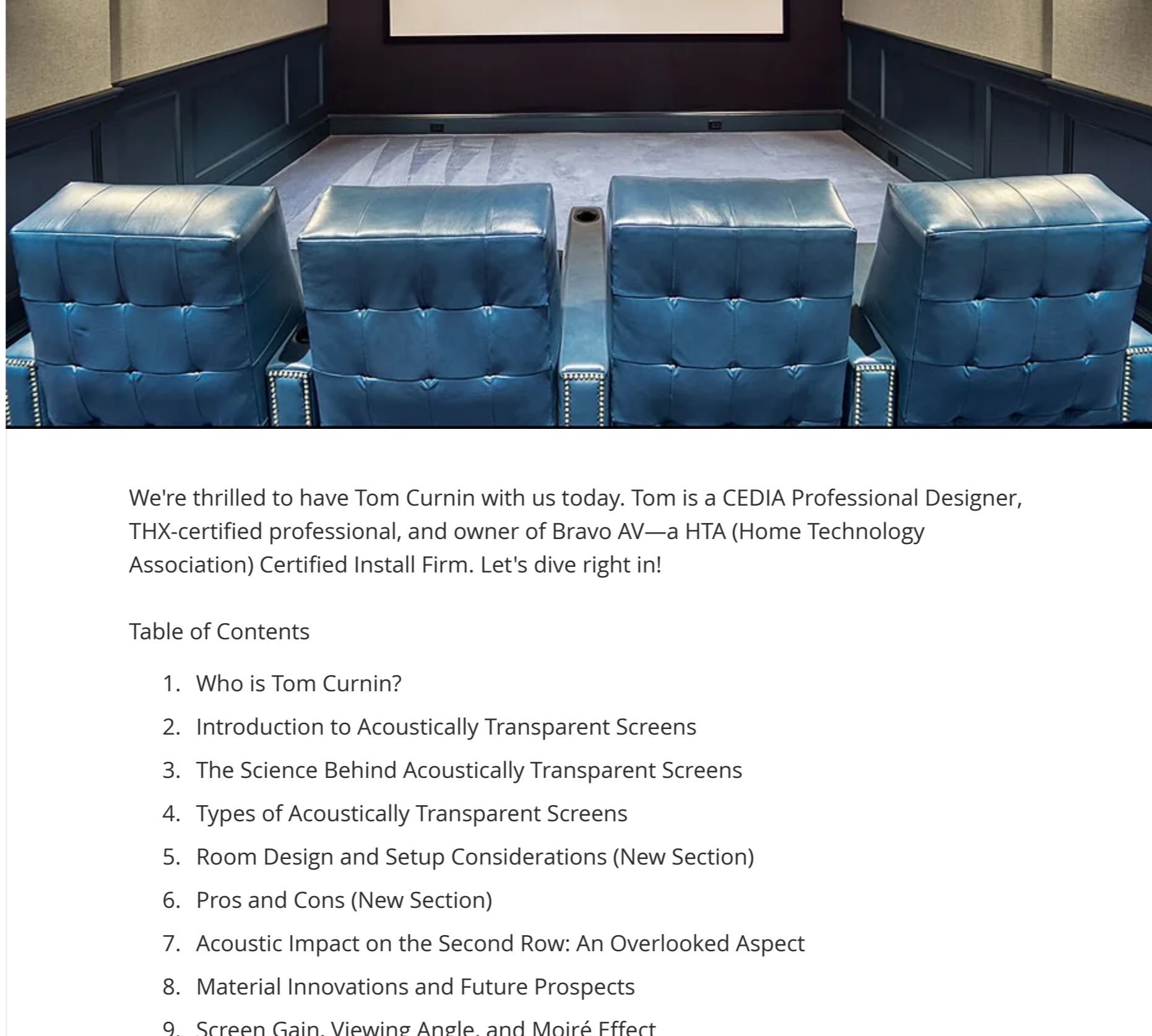


Tom Curmin 14 hours ago 8 min read

The Ultimate Guide to Acoustically Transparent Screens: An In-Depth Interview with Tom Curmin

Welcome to a comprehensive interview on acoustically transparent home theater screens.



We're thrilled to have Tom Curmin with us today. Tom is a CEDIA Professional Designer, THX-certified professional, and owner of Bravo AV—a HTA (Home Technology Association) Certified Install Firm. Let's dive right in!

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Who is Tom Curmin?

Q: Tom, before we dive into the nitty-gritty, could you tell our readers a bit about yourself and your journey in the home theater industry?

Tom: Absolutely. I've been passionate about audio-visual technology since my youth. I turned that passion into a career, and now I have the privilege of designing home theaters that bring the cinema experience into people's homes. I've undergone extensive training to ensure that I'm at the forefront of the latest technologies, including acoustically transparent screens.

Introduction to Acoustically Transparent Screens

Q: Fantastic! Let's start with the basics. What are acoustically transparent screens, and why do you consider them the secret weapon of home theater rooms?

Tom: Acoustically transparent screens are a revolutionary concept in home theater design. They allow sound to pass through the screen without distortion, while also blocking light to maintain image quality. This enables you to place speakers directly behind the screen, creating a more immersive audio-visual experience. It's as close as you can get to bringing the commercial cinema experience right into your home.

The Science Behind Acoustically Transparent Screens

Q: Tom, could you help us understand the science that makes acoustically transparent screens so unique?

Tom: Absolutely, the science behind these screens is a fascinating blend of acoustics and optics. The material used is either woven or perforated, designed with tiny fibers or holes that allow sound waves to pass through. These fibers or holes are small enough to prevent light from leaking, which helps maintain image quality. It's a delicate balance, and mastering it requires a deep understanding of both sound and light physics.

Q: That's intriguing. How do these screens manage to let sound through without distorting it?

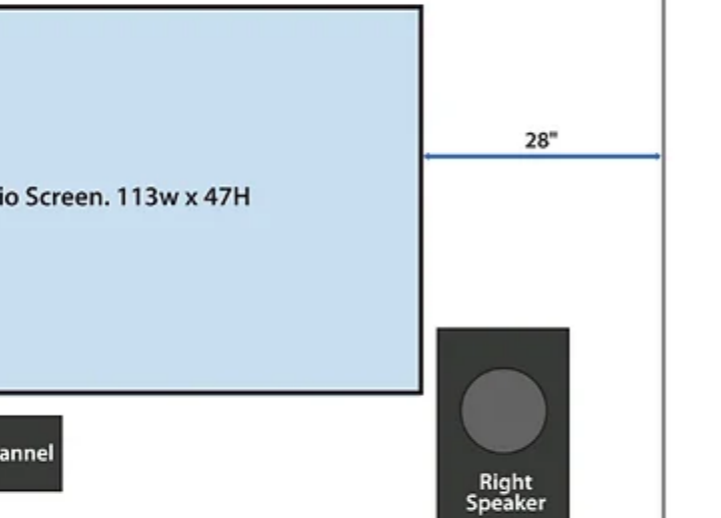
Tom: The key lies in the size and arrangement of the perforations or the weave patterns in the material. These are meticulously designed to minimize sound reflection while maximizing sound transmission. This ensures that the audio quality remains pristine, giving you an immersive experience.

Types of Acoustically Transparent Screens

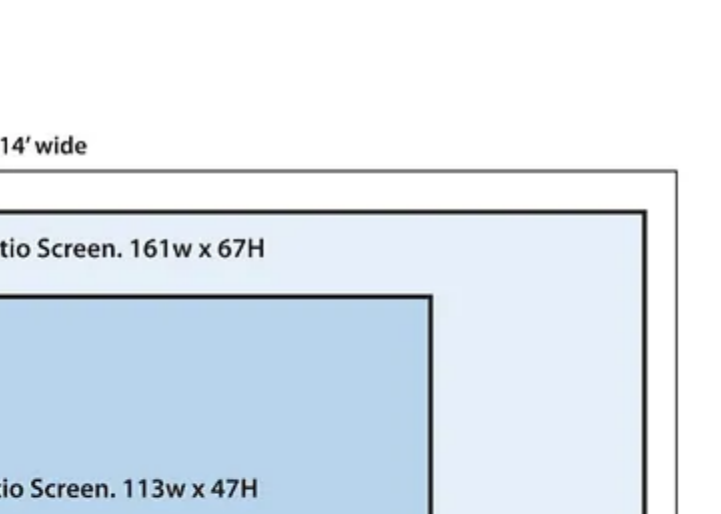
Q: Could you elaborate on the different types of acoustically transparent screens available?

Tom: Certainly. There are two main types:

1. Woven screens are crafted from a complex matrix of synthetic fibers like polyester or multi-component yarns. These fibers are woven in a specific pattern, often a twill weave, to create a uniform acoustic "window." This allows for a broader range of sound frequencies to pass through with minimal attenuation. The weave density and fiber thickness are calibrated to optimize the screen's Moiré pattern, thereby reducing any visual artifacts. Additionally, woven screens often have a special coating to enhance color reproduction and black levels. The result is a screen that excels in acoustic transparency while providing a satisfactory visual experience.



2. Perforated screens are typically made from a PVC based or vinyl material that undergoes a precision-engineered perforation process. The holes are laser-cut or mechanically punched and are usually around 0.5 to 0.9 mm in diameter. The spacing, size, and pattern of these perforations are meticulously designed to minimize the loss of light, thereby maintaining high image quality. These screens often feature a black backing layer to prevent light bleed from affecting the picture. Acoustically, the perforations are designed to allow a wide range of sound frequencies to pass through, although they may slightly attenuate higher frequencies. Advanced models may employ micro-perforations and specialized backings to further enhance both acoustic and visual performance.



Q: Are there any hybrid options that combine the best of both worlds?

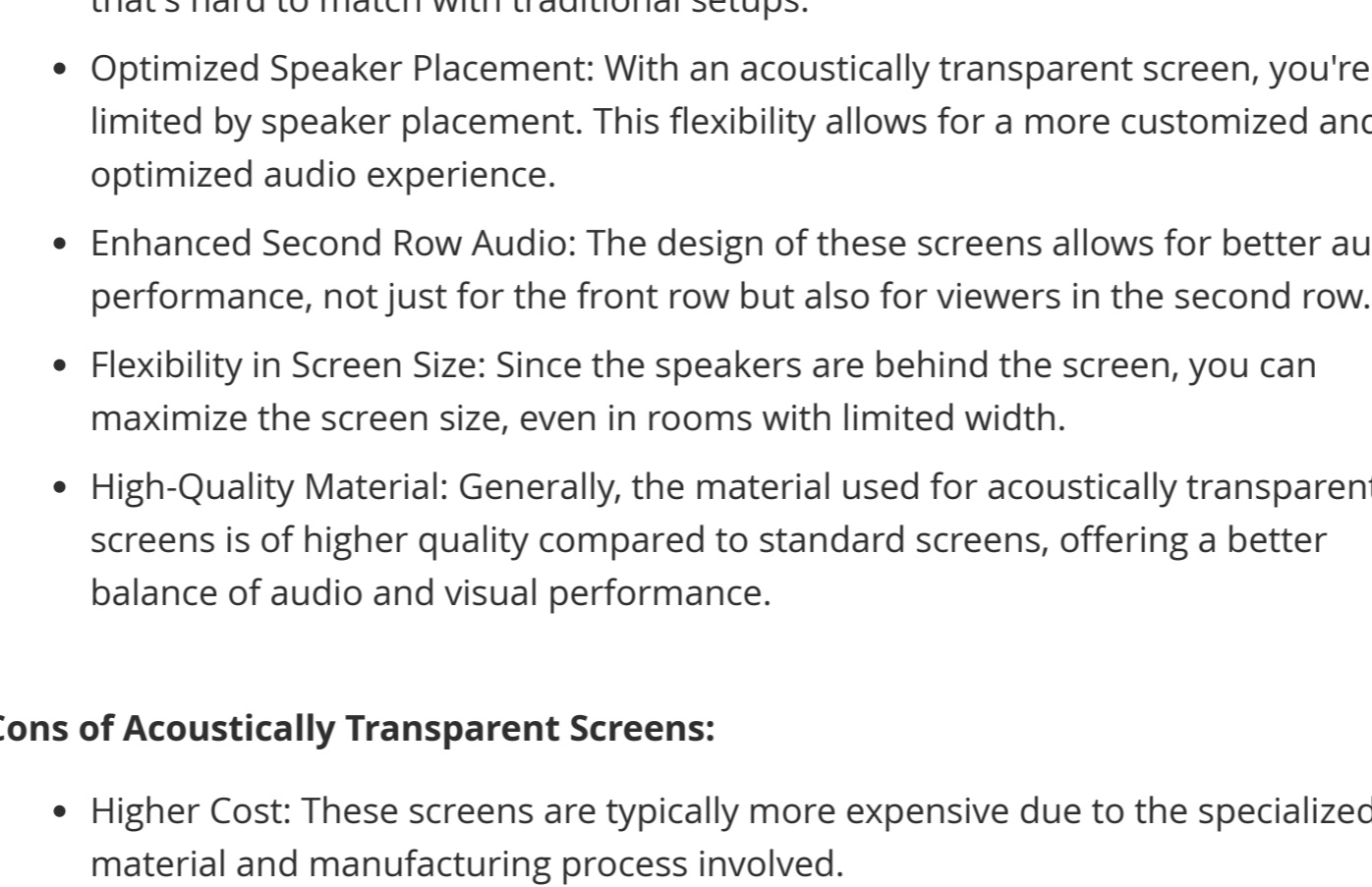
Tom: Some manufacturers are indeed experimenting with hybrid models. These aim to offer both excellent sound transmission and top-notch image quality. However, these are often at a premium price point due to the complexity involved in balancing both acoustic and optical properties.

Room Design and Setup Considerations

Q: Tom, you've given us a lot of valuable insights into acoustically transparent screens. Could you take us through a deeper dive into how screen size and speaker placement can vary in a typical room setup?

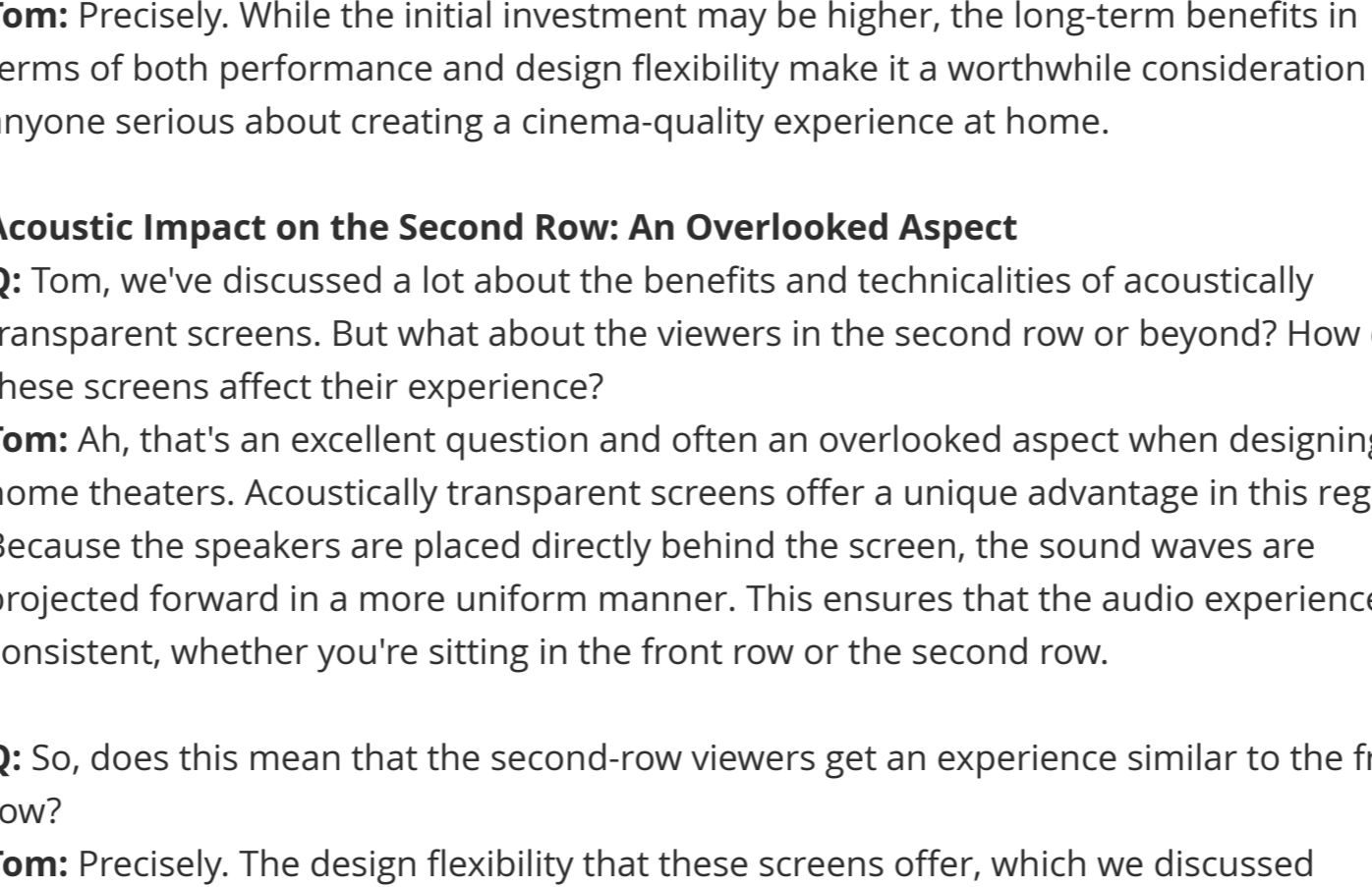
Tom: Absolutely. It's important to understand you have some diagrams to illustrate this. Let's consider an optimally sized room with two rows of three chairs each. Following THX recommendations, the chairs would be 36 inches off the side wall, making the room 14 feet wide. In such a setup, traditional left and right channel speakers would be 1 foot off the side wall and 14 inches wide. This reduces the potential screen size significantly. [See Appendix – Typical Screen Placement with Traditional LCR diagram]

Typical Screen Placement with Traditional LCR



However, with an acoustically transparent screen, you can utilize almost the entire width of the room for the screen. This can result in a viewing area that's nearly twice as large. [See Appendix – Comparison of Both Screens diagram]

Comparison of Both Screens



Pros and Cons

Q: Tom, we've covered a lot of ground on acoustically transparent screens. Could you summarize the pros and cons for our readers who might be considering this technology for their home theaters?

Tom: Absolutely, it's important to weigh the benefits and drawbacks before making an investment in an acoustically transparent screen.

Pros of Acoustically Transparent Screens:

- Clean Design:** One of the standout advantages is the clean, space-saving design you achieve by hiding the speakers behind the screen. It's a key design consideration that can't be overlooked.
- Improved Audio:** The ability to place the Left, Center, and Right speakers behind the screen allows for an audio-visual experience where both the image and sounds seem to emanate directly from the screen. This is a level of immersion that's hard to match with traditional setups.
- Optimized Speaker Placement:** With an acoustically transparent screen, you're not limited by speaker placement. This flexibility allows for a more customized and optimized audio experience.
- Enhanced Second Row Audio:** The design of these screens allows for better audio performance, not just for the front row but also for viewers in the second row.
- Flexibility in Screen Size:** Since the speakers are behind the screen, you can maximize the screen size, even in rooms with limited width.
- High-Quality Material:** Generally, the material used for acoustically transparent screens is of higher quality compared to standard screens, offering a better balance of audio and visual performance.

Cons of Acoustically Transparent Screens:

- Higher Cost:** These screens are typically more expensive due to the specialized material and manufacturing process involved.
- Slight Degradation in Image Brightness:** A small amount of light may pass through the screen, which could be a concern if you don't have a high-quality projector and a well-controlled lighting environment.

Q: So, it sounds like the pros outweigh the cons, especially for those serious about their home theater experience?

Tom: Precisely. While the initial investment may be higher, the long-term benefits in terms of both performance and design flexibility make it a worthwhile consideration for anyone serious about creating a cinema-quality experience at home.

Acoustic Impact on the Second Row: An Overlooked Aspect

Q: Tom, we've discussed a lot about the benefits and technicalities of acoustically transparent screens. But what about the viewers in the second row or beyond? How do these screens affect their experience?

Tom: Ah, that's an excellent question and often an overlooked aspect when designing home theaters. Acoustically transparent screens offer a unique advantage in this regard. Because the speakers are placed directly behind the screen, the sound waves are projected forward in a more uniform manner. This ensures that the audio experience is consistent, whether you're sitting in the front row or the second row.

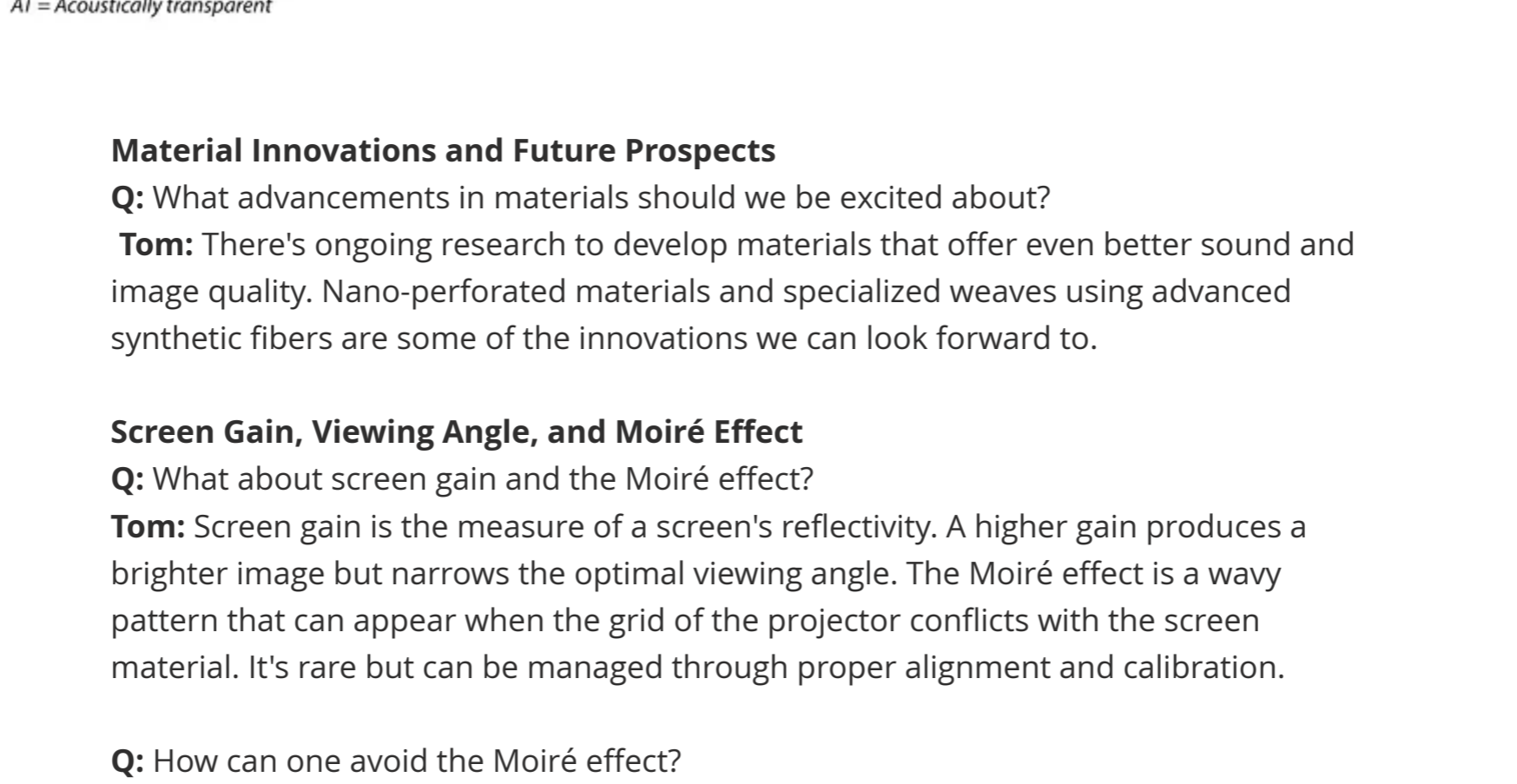
Q: So, does this mean that the second-row viewers get an experience similar to the front row?

Tom: Precisely. The design flexibility that these screens offer, which we discussed earlier, allows for more precise speaker placement. This results in a more evenly distributed sound field. So, whether you're in the front row or the second row, the audio-visual synchronization is nearly flawless. You get to enjoy a more immersive experience, irrespective of your seating position.

Q: Are there any specific calibration settings that can further enhance the second-row experience?

Tom: Great question. Calibration is key, as we've touched upon before. For multi-room setups, it's crucial to calibrate the system considering the acoustics of the entire room. Some advanced calibration systems even allow you to set different profiles for different seating areas, ensuring that every viewer gets the best experience possible.

AT Screen & Row 2 Audio Performance



Material Innovations and Future Prospects
Q: What advancements in materials should we be excited about?
Tom: There's ongoing research to develop materials that offer even better sound and image quality. Nano-perforated materials and specialized weaves using advanced synthetic fibers are some of the innovations we can look forward to.

Screen Gain, Viewing Angle, and Moiré Effect

Q: What about screen gain and the Moiré effect?
Tom: Screen gain is the measure of a screen's reflectivity. A higher gain produces a brighter image but narrows the optimal viewing angle. The Moiré effect is a wavy pattern that can appear when the grid of the projector conflicts with the screen material. It's rare but can be managed through proper alignment and calibration.

Q: How can one avoid the Moiré effect?
Tom: The key is in the alignment of the projector and the screen. Some advanced projectors come with anti-Moiré settings. Additionally, choosing a screen with a random weave pattern can also mitigate this effect.

Installation and Setup

Q: What should one consider during the installation process?
Tom: Installation is more complex due to the need to place speakers behind the screen. You'll need to account for the depth of the speakers and ensure there's enough space. Calibration is also crucial to synchronize the audio and video perfectly.

Q: Any tips for DIY enthusiasts who want to install these screens themselves?
Tom: While it's possible to DIY, I'd recommend professional installation due to the complexities involved. However, if you're keen, make sure to follow the manufacturer's guidelines to the letter and take your time with the calibration.

Calibration and Maintenance

Q: How important is calibration?
Tom: Tom, Calibration is vital for any home theater, but it's especially crucial for acoustically transparent screens. These screens blend audio and visuals, allowing sound to pass through without distortion while maintaining image quality. Proper calibration is key to unlocking their full potential. Calibration fine-tunes both the visual and auditory aspects of your setup. It ensures accurate colors and syncs the audio with the on-screen action. It goes beyond basic settings like brightness and contrast, diving into color accuracy, gamma correction, and sound equalization.

For these screens, calibration also includes aligning the speakers behind the screen for optimal sound. The goal is to create an immersive experience where the sound seems to come directly from the action on screen. I strongly recommend hiring a professional for this task. Kevin Miller of ISFTV is my go-to expert. He has a deep understanding of both visual and auditory calibration and can help you maximize your investment in an acoustically transparent screen and your entire home theater system.

Cost Considerations

Q: Let's talk about the elephant in the room—cost. How much of an investment are we talking about?
Tom: Ah, the all-important question of cost. Acoustically transparent screens are indeed a more significant investment, often ranging from \$1,000 to \$4,000, depending on the brand and features. But let's put this into perspective. The value you get is unparalleled.

Firstly, the audio-visual experience is elevated to a level that traditional screens simply can't match. The sound emanates directly from the screen, creating a more immersive and realistic experience.

Secondly, these screens offer a unique advantage in terms of design flexibility. Because you can place your Left, Center, and Right speakers behind the screen, you're not sacrificing valuable room space on either side. This allows you to install a larger screen, essentially turning your home theater into a mini-cinema.

So, while the initial cost may be higher, the long-term benefits in terms of both performance and design flexibility make it a worthwhile investment. You're not just buying a screen; you're transforming your entire cinematic experience.

Future Trends and Innovations

Q: What trends and innovations hold promise for acoustically transparent screens?
Tom: I see advancements in materials that offer even better sound and image quality. Smart screens that auto-calibrate based on the content are also on the horizon.

Final Thoughts and Recommendations

Q: Any last words?
Tom: If you're serious about home theaters, an acoustically transparent screen is a must. It's an investment that pays off by elevating your viewing and listening experience to professional cinema levels.

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For additional resources, please visit our [Home Theater](#) web page, Tom Curmin, the owner of Bravo AV, is a CEDIA Professional Designer, a certified THX Level 1 home theater professional and a member of the Home Acoustic Alliance-trained to Level II. You can contact Tom directly at (908) 953-0555 or through email at Tom@BravoAV.com.



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