



# Stewart Filmscreen StudioTek 130 G4 Projection Screen

## UltraPerf Acoustically Transparent Perforations And THX Ultra 2 Certification

### Doug Blackburn

Stewart Filmscreen is one of the oldest, best known, most respected, and diversified projection screen manufacturers in the world. They can produce projection screens from tiny to immense. Stewart engineers formulate and apply coatings in their factory. They can make screens as large as 90 feet wide by 40 feet high without seams. They have a rather remarkable range of projection screen materials, over 25 options as of 2023. Stewart also creates their own hole-punch machines while other screen manufacturers are limited to perforation machines that already exist for other purposes. Stewart's customers for large screen sizes often want screens that are much too large to be perforated with an existing machine. Stewart has the depth of engineering expertise to design and build their own perforation equipment that allows them to perforate screens much larger than other manufacturers as well as allowing Stewart to perform the perforation job as much as hours faster than other screen manufacturers.

Stewart provides the go-to reference projection screens for studios and studio service providers. The StudioTek line of screen materials is widely recognized as some of the best screens ever made for image fidelity. In addition, Stewart's reference screens have superb consistency. If a customer owns five projection screens used for screening and post-production, and they are all the same Stewart screen material, each one bought at different times will all produce "matching" images. Each StudioTek screen comes with a certificate of compliance indicating the screen

passed individual quality control testing. I use a solid (no punch holes) StudioTek 100 projection screen as my reference. In my setup, the screen material is bonded to a hard, stiff, backer-board so the screen material can't be moved by breezes from open windows or HVAC. It is a superb screen for making the screen itself seem to disappear leaving an image floating in space. One of the inescapable (so far) issues with the StudioTek 100 screen material is that it reflects light equally in all directions. So it's an impractical screen material unless you are willing to install black carpet and paint the walls and ceiling flat black. I have done that to support the StudioTek 100 screen, but my wife hates it. StudioTek 130 screens are better at directing most reflected light to the audience with much less light sent to the floor, walls, or ceiling. And they do that while providing more gain (1.3). Studios and studio service providers sometimes use SnoMatte 100 or UltraMatte 130 screens if their rooms work better with either of those screen materials. Studios that have made specific Stewart screens and screen materials their standard reference screens include Universal, Sony Pictures, Warner Bros., Paramount, Pixar, Technicolor, MGM, Lucasfilm, HBO, Amazon, 20th Century Fox and more. The list includes so many universities, car companies, cruise ship lines, museums, TV broadcast companies, and other venues that the list seems to go on and on.

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## Acoustically Transparent Projection Screen Types

There are two kinds of acoustically transparent (AT) projection screens on the market today. Perforated screens came first. Solid screen materials had holes punched right through the screen to allow high-frequency sound to have less of an “obstacle” between the sound and the audience. Lower frequencies, midrange and bass, are less affected by the projection screen material. So AT screens tend to focus on getting the high frequencies past the screen and to the audience. The second type of AT screen is woven. These materials are loosely woven, sometimes with a uniform loom pattern, sometimes with what is called “random” construction where fibers of the screen material are uniformly distributed over the screen, but there is no pattern to the fibers. The fibers have small gaps that allow sound through. But these orderly-woven and random-weave screens have gains below 1.0. The several woven AT screens I’ve reviewed have measured between 0.75 and 0.8 gain... so 20 percent to 25 percent less light gets through compared to a solid 1.0 gain projection screen without punched holes. UltraPerf holes remove 8.9 percent of the total screen area. So StudioTek 130 G4 screens’ 1.3 gain becomes effectively a 1.21 gain screen with those holes through the screen. That means the punched StudioTek 130 G4 material will be at least 40 percent brighter than a woven screen. Something vital for projected HDR images that look better than SDR images.

Because the size of the punched holes is a property that needs options, Stewart offers three types of punched holes for various screen materials. CinePerf produces the largest holes for large format screens in large spaces. These screens will be too large for most home theatre rooms. The next smaller size of perforation, MicroPerf X2, is recommended for medium-sized venues that would include larger home theatre installations, and medium sized spaces like museum presentation spaces and smaller screening/editing rooms. The newest perforation offering is UltraPerf™. These are the smallest holes Stewart offers. This is most suitable for smaller rooms that include many home theatre systems. UltraPerf is reserved for projection screens that are no more than 7 feet tall. The UltraPerf holes are 12 percent smaller than MicroPerf X2 holes. UltraPerf holes account for 8.9 percent of the screen area. MicroPerf X2 holes account for about 10.2 percent of the screen area. So UltraPerf will display images that are about 1 percent brighter than MicroPerf X2 assuming the same projector is used with the same settings. There is a trade-off. UltraPerf blocks a little more high frequency sound because of the smaller holes and slightly less screen area that is “open”. I found the UltraPerf very satisfying for images because the 1.3 gain of the StudioTek 130 G4 UltraPerf makes projected images about 21 percent brighter than a screen with true unity gain (1.0). UltraPerf has the advantage of the closest seats being able to be 1.5 to 2 feet closer to the projection screen than MicroPerf X2 before the holes become visible to those in the audience. Sitting closer to the projection screen increases viewing angle to produce a more immersive viewing experience.

The other type of acoustically transparent (AT) projection screens available today is woven screens. These have no holes. Instead, the fabric threads are the “screen coating”. Early versions of these screens had a tendency to bleed light into nearby threads in the fabric causing sharp lines and fine details like single hairs to look less sharp than they could without the bleeding of light. This has improved in the last five years or so, but fabric AT screens still

**Stewart Filmscreen StudioTec 130 G4 UltraPerf Projection Screen**

MSRP — \$3,364 as reviewed; 110 diagonal (101.5 x 43); 2.35:1 aspect ratio

Warranty — 1 year from purchase date or 18 months from manufacture date

Made In — USA

**Manufactured By:**

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have limitations that can be overcome with a perforated screen. 1.0 gain, aka unity gain, means that the screen is not brightening or darkening images. With StudioTek 130 screen material, you get about 30 percent more light than you would get from a 1.0 gain screen. The UltraPerf holes cause the loss of 8.9 percent of that light, but there’s still 21.1 percent more light reflected back towards the audience even with the perforations. A woven AT screen might work for you, but it will reduce the brightness of images by 40 to 45 percent compared to the UltraPerf ST130-4 screen material. That 40 percent more light from the UltraPerf ST130-4 is a substantial boost for the appearance of HDR content, something projectors have problems with when they don’t produce enough light to give HDR a fighting chance.

For rooms in home theatres that may not be dedicated blacked-out rooms, StudioTek 130 G4 is a more ideal/livable projection screen material. It allows some flexibility with using non-black colors for walls, ceiling, and carpet. Though bright, saturated colors would still not be ideal choices. I would suggest never trying to spec a projection screen from Stewart without discussing your requirements with Stewart’s Tech Support department. By asking you some questions about the size of your room, how close or far the nearest seats will be, the specific projector you will use and how/where the screen will be mounted, Stewart can help you determine the best screen material and the best punch-hole size for your specific system. Stewart may even change their recommendation based on the type of loudspeakers being used, seating distances, and even the type of imagers in the projector. Stewart says wide-dispersion horn tweeters are the best for getting high frequencies through a perforated screen. This type of loudspeaker can be placed 5 or 6 inches from the back of the ST130-4 screen material. If you are using loudspeakers with conventional dynamic tweeters, like dome tweeters, Stewart recommends placing those loudspeakers no less than 12-inches from the back of the ST130-4 screen material. Stewart says conventional tweeters work well when properly integrated with the screen, but this is something that Stewart should help you with. Of course if you are using an installer/integrator, they will handle those details for you.





## The Scrim And How To Use It

Both types of AT projection screens may benefit from a black scrim behind an AT screen. A scrim is a sort of visually semi-transparent open-weave fabric. For use with AT screens, the scrim is always black for maximum light blocking. If you simply mount the (optional) black scrim directly behind the screen, the loudspeaker sound then has to penetrate two impediments to sound waves... the AT screen and the scrim. When a scrim is needed, Stewart recommends using the scrim like the blackout cloth on an antique large-format camera. Attach the scrim only to the top of the frame, and drape it over the BACKS of the loudspeakers so the scrim can stop that little bit of light from reflecting back at the screen without putting a second layer of material in front of the loudspeakers. Because so many installs of AT screens can be accomplished without using the scrim, the scrim is not automatically shipped with every screen. But it is available for those times when it is needed.

## The Change From Gen 3 To Gen 4 StudioTek 130

StudioTek 130 G4 is the fourth generation of the StudioTek 130 screen material. Gen 4 was released in 2020 and is said to be quite an improvement over the Gen 3 material that had been installed in 1,000s of installations and was hailed pretty uniformly as representing the best image quality you could get for a home theatre room that wasn't going to be a blacked-out cave. Consequently, the public, pro users, and installers/integrators found StudioTek 130 the best option for not only home theatre but as the reference screen material for studios and service providers to studios. The studios and their service providers rely on consistency in performance of the screens they use while creating content.

The reputation StudioTek 130 G3 had as a quality screen material was very strong and deserved. But over time, new ideas or materials allow the performance envelope to be expanded. When I was actively calibrating home theatre video systems, I encountered StudioTek 130 Gen 3 screens more often than any other single "model" of screen. I found that the screen didn't mess with colors and that the gain was a big help when people perhaps went a little overboard on the large size of the screen to use with a projector that may not have enough light to illuminate the screen to 16 foot-Lamberts (fL) +/- 4 fL for SDR content. For HDR content, so far, it's pretty impossible to have too much light from a projection system unless the light overpowers the room and washes out the images. The gain in the ST130-4 material helps compensate for

that tendency to go bigger with the screen without considering getting a brighter projector. Fortunately, installers/integrators will keep that from happening—they know the light output for the projector needs to be close to 20 fL for SDR with a new light source and it should not fall below 12 fL as the light source ages.

## Lost Luminance With AT Screens

I find that having some screen gain above 1.0 is especially helpful with perforated screens. Since the UltraPerf holes cause a loss of about 8.9 percent of the light, the gain compensates for the loss of light through the perforations, and still gives a useful bump in luminance. Since retiring from doing calibrations in 2012, I haven't seen another StudioTek 130 screen of any generation. So it was interesting to have the Gen 4 screen material here with a fabric AT screen and the StudioTek 100 reference screen for comparisons. Comments about the Gen 4 improvements always mention that, good as the Gen 3 screens were, the Gen 4 material has a more grainless, more texture-free look to images, especially at 70 percent white and above (for SDR content). Because the screen is more grainless and texture-free, images appear sharper than they do on woven AT screens. The effect reminds me of the difference between stepping outside to enjoy the view and watching the view through a window from inside. It makes images have more of a you-are-there feeling. Having lost any memory of viewing content on those Gen 3 screens, I can't really do any sort of comparison of Gen 4 to Gen 3. But the comments online from people who had ST130-3 screens and changed to ST130-4 screens indicated 100 percent satisfaction with the new screen material. One of the frequent comments was that ST130-3 had some visible texture in bright areas of images, but they say that is 100 percent gone with ST130-4 screen material. Some measurements also indicate that the Gen 4 material has a little more gain than the Gen 3 material.

Uniformity measured perfectly, matching the projector's uniformity on the StudioTek 100 screen, though the Gen 4 screen produced more light due to its gain. I viewed probably 80 hours of content from DISH Network, Amazon Prime, and movies saved to my local network on hard disks. At least half of those hours were with 2160 HDR content. The 2160 content was primarily 4K/UHD Blu-ray discs at full quality with most of them on network servers. The rest of the viewing hours were with 1080 content. I was looking for issues with the screen material. Visible problems caused by the perfs like moiré or sparkles, and how easy or hard it was to forget about the screen and just watch the movie. I reviewed a 1.4 gain screen more than 10 years ago that had a hot spot in the center of your vision. So if you look around on the screen, the hot spot would follow. The hot spot looked like a ball of mosquitoes right where you were looking. If the image was fairly dark where you were looking, you saw nothing objectionable. But as you got to somewhere above 50 percent white, the ball of mosquitoes would show up. It would get worse if the image got brighter. There is none of that with the SF130-4 screen. I never saw a sparkle of any sort, nor any moiré. Even viewing test patterns in 1080 and 2160 didn't reveal anything produced by the screen or the perfs.

## Wallscreen Deluxe Frame

The frame Stewart Filmscreen provided for the ST130-4 is called the Wallscreen Deluxe. Capable of being wall-mounted, it

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can also be used with legs to allow the screen to be freestanding to make it easier to place loudspeakers behind the screen. If the screen leaks light onto objects or devices behind the screen, you might see bright spots through some perf holes. Stewart Filmscreen includes a black scrim with the AT screens. They recommend it be placed over the top and behind any loudspeakers placed behind the projection screen so there aren't 2 layers of material between the loudspeakers and screen. The black scrim will further alter the sound from the loudspeakers, so it's something that should only be used when necessary. Stewart recommends placing loudspeakers no closer than 12-inches from the back of the projection screen.

Assembly of the Wallscreen Deluxe frame and the screen material was a pleasure. The Wallscreen frame is exceptionally "solid" when assembled. The corner pieces are pre-installed in the top and bottom frame rails. The corner brackets are much beefier than flat "L" brackets that hold the corners together on many other frames. Short 1/2-inch hex bolts are used to lock the frame rails to the corner brackets. Those bolts are more secure than the setscrews commonly used in the corners of many other frames. These bolts help retain stiffness of the frame in the corners. The factory marks the ends of each piece of the frame with the ID for each of the four corners so you can be certain you are assembling the frame as the factory intended.

The Wallscreen Deluxe includes wall-mounting brackets that space the frame out from the wall. Stewart will even custom-fab the mounting brackets to get the ideal distance from the in-wall loudspeakers when the screen is mounted. With in-wall L-C-R loudspeakers behind the screen, the part of the wall behind the screen can be painted black to absorb light from the perfs that leaks through. When used as a wall-mount screen, there should be no need for a black scrim. If the wall-mount L-C-R loudspeakers have any bright trim or screws, black tape should be used to cover those areas to stop random reflections. Again, if you have an installer/integrator doing this install for you, they will take care of these details.

## Assembly

The screen material is shipped in a large-ish diameter tube so the screen doesn't have to be rolled up tight to fit in a much smaller tube as is often the case. The screen has snaps installed every few inches along all four edges. They mate with the other halves of the snaps that are mounted on the aluminum frame. The instructions identify which snaps to start with and how to proceed with the process of getting screen material installed properly by using

a very specific order for connecting the snaps. The screen material itself is stretchy. When removed from its shipping tube, and is laid out across the assembled frame, the screen material looks like it is a little too small for the frame. The stretchy character of the screen material is why you really need to follow the instructions for snapping all the snaps in the proper sequence. You want the "stretch" to be uniform as you install the screen material so the screen stretches uniformly to hold the screen material tight against the inside edge of the frame.

## Sound Quality

Is there a difference in sound quality between woven AT screens and Stewart's UltraPerf? Yes. They don't sound quite the same above 3,000 Hz or so. Below 3,000 Hz, there may be differences, but they were too small to be worried about. Above 3,000 Hz, the UltraPerf screen only needed a 1 dB boost. A little more boost above 7,000 Hz, +3 dB to get similar measurement levels of test tones using a hand-held analog SPL meter. With the woven screen and the Stewart screen after EQ and volume leveling, the sound is still a little different with the EQ applied. But it's the sort of difference that can't really be identified as one being a better presentation than the other. Moving the loudspeakers about 5 inches from the back of the StudioTek 130 screen was sonic poison in comparison. So it's no wonder Stewart recommends 12-inches of space or more. But both the woven screen and Stewart's UltraPerf did indeed sound better with the loudspeakers close to 12-inches from the back of the screen being evaluated. Using more than 12-inches separation from loudspeaker to screen did not seem to help or hurt sound quality, probably because so many more reflections and audio-bouncing-around-the-room cause the sound quality to go "off" a bit.

## Measured Performance

What about the color and luminance performance of the Stewart screen and a woven alternative? When I measured a 100 percent white test pattern at 20 fL on the woven screen, I got 28 fL on the StudioTek 130 G4 screen with several holes in the small measuring area my meter measures. 28 fL looks a lot brighter than 20 fL. The laser-phosphor UHD LCoS projector I used would produce about 40 fL on the woven screen in UHD/HDR mode while measuring 100 percent white. Keep in mind that UHD/HDR content never shows you a 100 percent white screen. It's too bright to be comfortable. The only time it ever happens is if you send a full-screen 100 percent white test pattern to the projector. In

UHD/HDR content, 50 percent white is about the brightest white you would ever see full-screen. The colors and shades of gray above 50 percent white are there to produce a larger color gamut and realistic spectral highlights. The measurement for 100 percent white in UHD/HDR mode with the ST130-4 screen was 56 fL. A full 16 fL brighter than the woven screen. This is quite significant. To the point that the woven screen was unable to make UHD/HDR content look significantly different than Standard Dynamic Range. While the UltraPerf ST130-4 material had enough extra light to work with that UHD/HDR content had at least some of the improvements you get with UHD/HDR.

## The Meaning Of Acoustically Transparent

Don't read too much into the term "acoustically transparent". No screen called AT, is really acoustically transparent. Different hole sizes and patterns do affect sound quality. And woven and punched screens don't sound the same, but I personally can't say woven is worse sounding or better sounding... it's just different. So think of "acoustically transparent" as meaning "less blockage of sound" rather than being truly transparent to sound.

## Constant Image Height Possibilities

I prefer a 2.35:1 aspect ratio for AT projection screens if the projector has memories for zoom, focus, and position. You can use those memories to create constant image height movie playback if you have a 2.35:1 aspect screen. Regardless of the image aspect ratio, you will be able to create a memory for zoom, focus, and position for each aspect ratio. Unused areas will no longer be black bars top and bottom... the black bars will be on the left and right sides if you use constant image height. Obviously, if you use an anamorphic lens to produce constant image height, that also works best with a 2.35:1 aspect ratio.

## The Big Payoff Of An AT Screen With Gain

I can't stress enough how much better projected UHD/HDR images look on a perforated screen with gain when compared directly to a woven AT screen. All the improvement comes from the roughly 40 percent increase in image brightness produced on the UltraPerf 1.3 gain screen versus the .75 or .8 gain for woven screens. Be aware that manufacturer gain specifications for woven AT screens are a bit misleading. Many of them, if not all of them, overstate gain specifications. It's common for woven screens to have an advertised gain spec of 1.0 or 1.1. But I've never measured a woven screen that had more than 0.8 real-world gain. I get why that is done. If you have a woven screen and say the gain is 0.8, nobody will want it if there are 10 other woven screens advertised with 1.0 or 1.1 gain. So if you are a manufacturer of AT screens, being truthful about AT screen gain specs puts you at a competitive disadvantage. So even manufacturers who would prefer to publish accurate gain specs for AT screens have to go along with the other manufacturers and keep AT screen gain specs artificially high. So be aware of misleading gain specs, especially for AT screens. I cannot recommend any screen with gain below 1.2 or so if you are going to be viewing UHD/HDR content. By going for any screen material with a gain less than 1.0, you will lessen the benefits of HDR. I should also point out that in the streaming world, quite a few shows and movies are being

released in 1080p with HDR. 1080p HDR benefits just as much as having a screen with gain as 2160 HDR benefits. For best HDR presentations, get the brightest projector your budget allows and also use a screen with some gain, whether it is AT or not. You can't have too much light for projection of HDR content. At least not with the projection tech we have available to us today.

## Conclusion

The StudioTek 130 Gen4 screen material provides good audio performance, requiring just a few dB of EQ. For image quality, the ST130-4 screen has enough gain to make UHD/HDR content show some of the characteristics of HDR content—wider color gamut, better contrast, better highlight detail, better shadow detail, and much more "snap" to the images than woven acoustically transparent projection screens. The woven screens are around 40 percent less bright than the StudioTek 130 Gen4 screen material. If you need an acoustically transparent screen for a system that will reproduce HDR content, I am now convinced that a solid, perforated screen material with a useful amount of gain would be my first choice. And the UltraPerf StudioTek 130 Gen4 screen material is roughly 40 percent brighter than woven AT alternatives. That's a big deal. I enjoyed the texture-free images and the complete lack of any visible hot spotting (that ball of mosquito's effect in the center of your vision). This is the best-performing AT screen I've reviewed in terms of video quality. For audio quality, it sounds a little different than the woven screens, but it's not something I can label as better or worse. **WSR**