Shooting in Low Light with ALEXA 35

QUICK GUIDE

January 28th, 2025

1 Version History

Version	Author	Change Note
2024-06-05	Jan Heugel	Initial Document
2024-07-15	Jan Heugel	Additions, changed the images
2024-12-13	Jeffrey Hagerman	Additions by IS
2025-01-10	Jan Heugel	Extended ES mode description by Marc Shipman-Mueller

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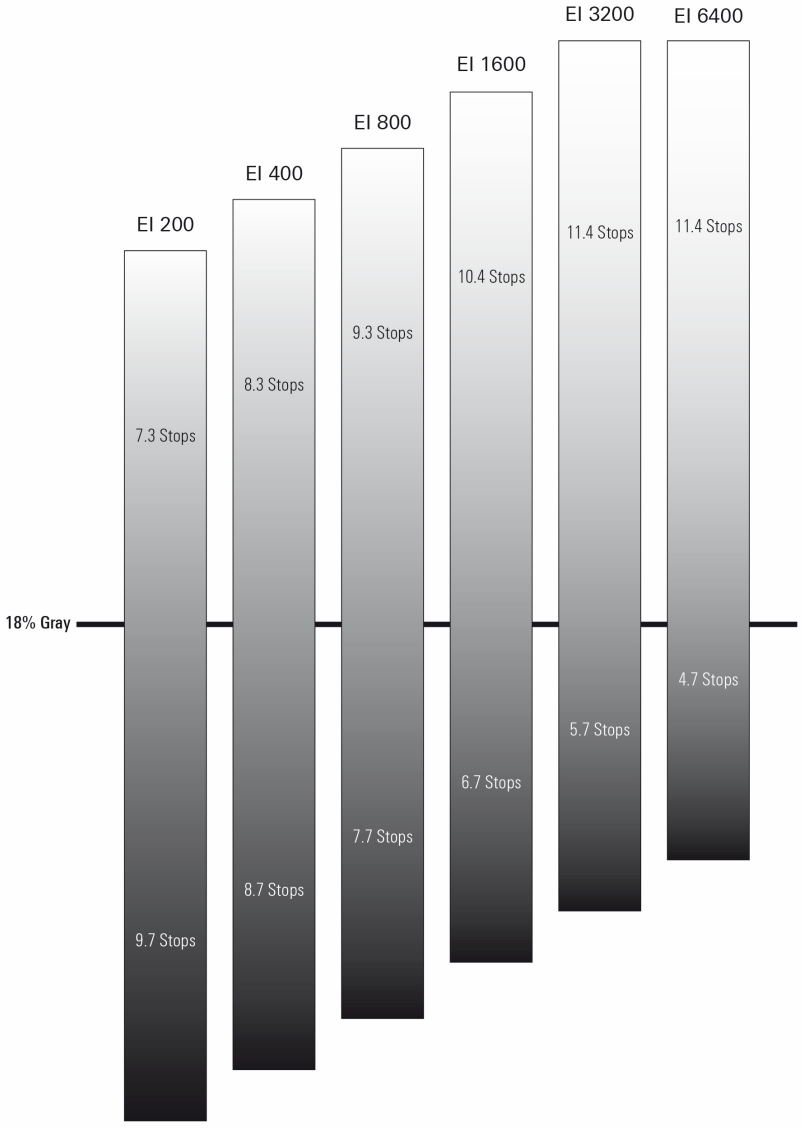
2 Introduction

This quick guide provides recommendations for achieving the best low light performance when shooting with the ARRI ALEXA 35 and discusses Enhanced Sensitivity and ARRI Textures in detail.

The inherent low noise and sensitivity settings ranging from EI 160 to EI 6400 make ALEXA 35 a *High ISO* camera with 17 stops of dynamic range. Additionally, there are two features which can be used to improve the ALEXA 35 low light performance even further: *Enhanced Sensitivity* and *ARRI Textures*. Together, all these features achieve the cleanest images in demanding lighting situations.



ALEXA 35's distribution of dynamic range at a given ISO rating.

3 ARRI Recommendations for best Low Light results

When shooting in challenging low light conditions with the ALEXA 35, it is ARRI's recommendation to use a high sensitivity rating in combination with Enhanced Sensitivity and one of the Shadow Textures. Choosing the right combination of Sensitivity, ES and Texture modes will ensure the best low light performance of the ALEXA 35.

ARRI's recommendations are as follows:

- When shooting moderately dark scenes, choose
  EI 2560 with Enhanced Sensitivity enabled and the L345 Shadow Texture
- When shooting dark scenes, choose
  EI 3200 with Enhanced Sensitivity enabled and the L345 Shadow Texture
- When shooting in extreme low light or no light conditions, choose
  EI 6400 with Enhanced Sensitivity enabled and the H457 Deep Shadow Texture

When shooting with the Nostalgic series of Textures in normal lighting circumstances we recommend to switch to the G422 Shadow Nostalgic Texture for best results in low light situations. Since the Clarity Textures enhance contrast, they are not recommended for low light shooting.

4 Enhanced Sensitivity

Enhanced Sensitivity is an optional in-camera noise reduction that offers cleaner images in low light situations. In addition to regular exposure indexes from EI 160 to EI 6400, you can choose EI 2560 to EI 6400 with Enhanced Sensitivity (ES) turned on. When recording ARRIRAW, Enhanced Sensitivity is baked into the image, but the exposure index is not. When recording Apple ProRes, both Enhanced Sensitivity and exposure index are baked into the image. ES computing takes place right after the sensor before the image is made into an MXF/ARRIRAW or debayered into Apple ProRes files.

4.1 How does Enhanced Sensitivity Mode work?

When the camera is switched to Enhanced Sensitivity Mode (ES), it will capture twice as many frames as in non-ES mode. The first one is the regular frame, and then, in the second half of the image cycle, a second frame is being captured. This is also why the shutter cannot be more than 180º and why the frame rates are always half the maximum frame rate.

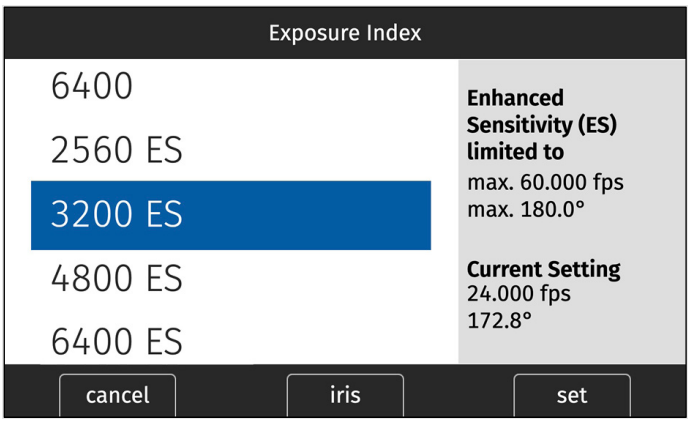
We do not actually use the image content of the second frame, but we use the noise from the first and the noise from the second frame to reduced the noise in the first frame. When reducing noise in just one frame, it becomes at some point difficult to distinguish between noise and fine image details. Once you have two frames, you can much better differentiate between random noise and fine image details, and a much more effective noise reduction is possible. We then discard the second frame.

And, yes, this is a temporal noise reduction, and in some instances a faint ghost of a fast movement can be seen trailing a moving object when the clip is paused. This is usually not visible in the moving image. Also, the noise in the first couple of frames after a big image change (like a flash, for instance) can be slightly different from the subsequent frames, which also is something usually not apparent in a moving image being played back. In our experience, Enhanced Sensitivity works great for all shooting situations.

Enhanced Sensitivity has some frame rate and shutter limitations (see table below). The shutter time can always be decreased in duration but is limited to a maximum value of 180 degrees. This means that it is possible to be in Enhanced Sensitivity mode while using a 144-degree shutter to mitigate flicker for instance. The ability to record with a 360-degree shutter while using Enhanced Sensitivity mode is not possible.

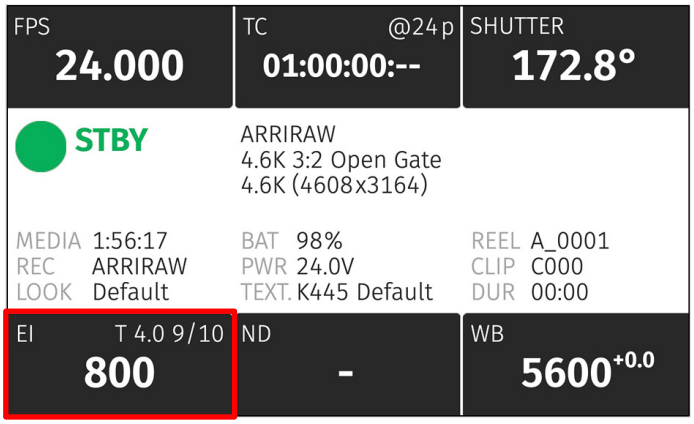
Codec	Sensor Mode	Max. fps	Max. Shutter
ARIRAW	All	60	180°
Apple ProRes	4.6K 3:2 Open Gate	30	180°
	4.6K 16:9	48	
	All others	60	

When choosing an exposure index in the camera menu, these limits are also indicated in the info pane on the right side of the exposure index list.

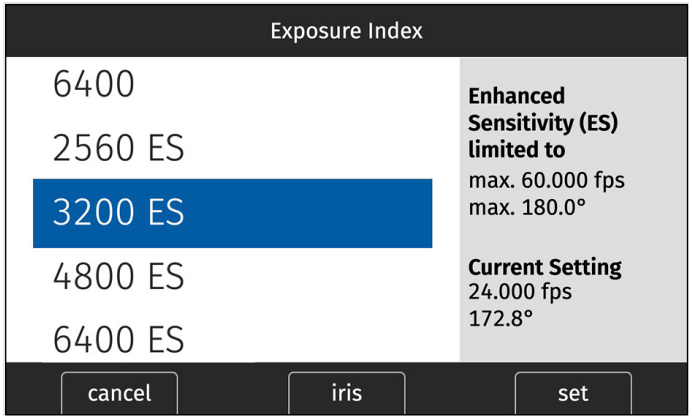


4.2 Camera Settings for Enhanced Sensitivity

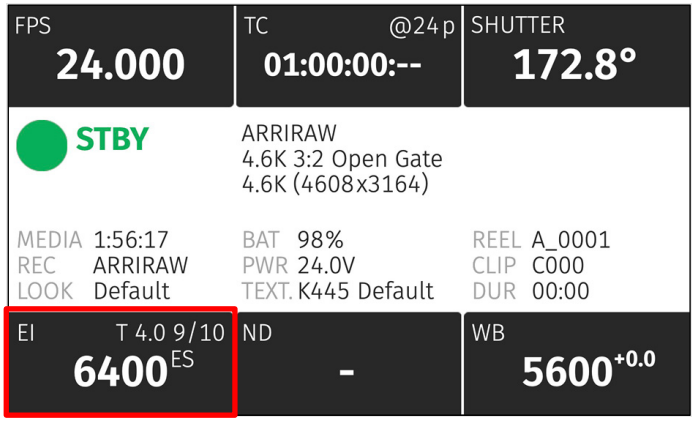
Starting at the camera's home screen, enter the EI menu and scroll down past regular 6400 to find the Enhanced Sensitivity modes 2560 ES up to 6400 ES:



Default home screen



EI menu



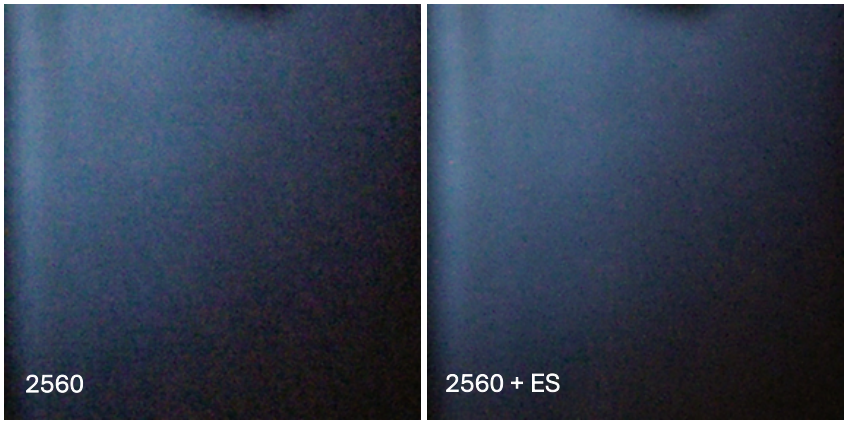
Home screen indicating EI setting with ES enabled

4.3 Comparison Images for Enhanced Sensitivity

The following examples have been shot using three (real) candles to light the actors and a SkyPanel S60 for the jacket in the back.

Faces

Detail



5 ARRI Textures

ARRI digital cameras have always had a ‘texture’ setting that is programmed into the way the camera processes images and that has always been baked into the subsequent ARRIRAW and Apple ProRes images. That texture setting, comprising many carefully balanced image processing parameters, determines the amount of grain in the image and the character of that grain. It also determines the amount of contrast at different levels of detail in the image, which defines the perceived sharpness (technically called the MTF curve).

Up until now, ARRI cameras have been pre-programmed with a single, unchangeable texture setting that is optimized for the widest possible range of shooting scenarios. The ALEXA 35 gives cinematographers the option to go beyond this default texture setting and choose from an evolving menu of ARRI Textures, each designed for specific applications. Textures are unique, in that they allow cinematographers to fundamentally alter the way in which the camera records images. It is a major step forward in giving filmmakers creative control over the parameters of digital cinematography.

Behind the three main texture characteristics of grain volume, grain character, and perceived sharpness, are around 30 image processing settings that occur early on in the imaging chain inside the camera, even before the ARRIRAW image is created. Since many of these steps interact with each other in complex ways, any user interface providing full access to all settings would be prohibitively complicated. Instead, we decided to collect sensible combinations of settings into individual ARRI Texture files.

The camera comes with several ARRI Textures preinstalled, which have been designed in close cooperation with cinematographers. These textures can be chosen in- camera in a similar way to choosing ARRI Look Files. Like with ARRI Look Files, additional ARRI Textures can be loaded into the camera. ARRI Textures are applied to the image before the EI sensitivity setting, which controls the camera's sensitivity, and before the ARRI Look File processing, which controls color. You can think of choosing an ARRI Texture like choosing a film stock's character; both determine the basic behavior of grain and contrast in your image.

5.1 Get a Grip

Judging a texture on set using a 7”/10” on-board monitor is not our recommended procedure, therefore we urge you to have a look at our documentation first: ARRI Textures Technical Note

To further ease into the topic, have a look at images with textures applied. Experience the nuances for yourself with our Image Comparison Tool for ARRI Textures.

Finally, shoot your own tests with different ARRI Textures applied and screen those on a large (at least 30-inch) high-quality UHD 4K monitor, ideally in HDR.

5.2 Recommended Low Light Textures

5.2.1 L345 Shadow

A texture based on the K445 Default texture, with lower noise and grain optimized for images with a lot of dark content. The visible grain emulates the look of grain in the toe of color negative film and is more pleasing in darker scenes, as the color of the grain has been desaturated. The Shadow textures are optimized for mid to high EI settings of the sensor and therefore work best in this exposure range.

5.2.2 H457 Deep Shadow

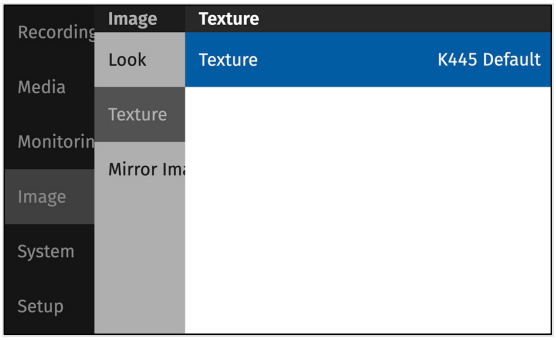
A texture designed for the darkest shots. This texture has low grain, and the color of the remaining grain is less saturated. It has higher clarity (more contrast) and even more shadow detail retention than the L345 Shadow texture. The Shadow textures are optimized for mid to high EI settings of the sensor and therefore work best in this exposure range.

5.2.3 G422 *(Custom)* Shadow Nostalgic

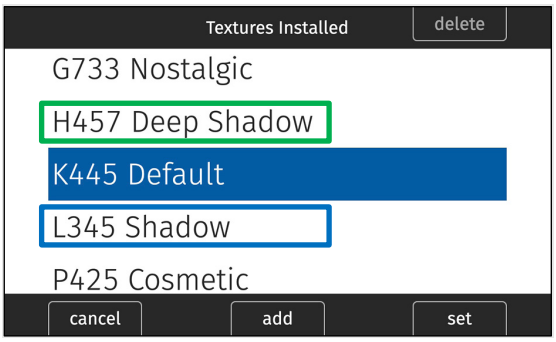
A grainy texture with a subtle vintage feel, designed to render some unsaturated grain and a soft character. This Texture has the exact same characteristics in Detail and Grain as the “G522 Soft Nostalgic” Texture but is optimized for low light conditions and dark content. As a Shadow texture it is optimized for mid to high EI settings of the sensor and therefore works best in this exposure range.

5.3 Camera Settings for ARRI Textures

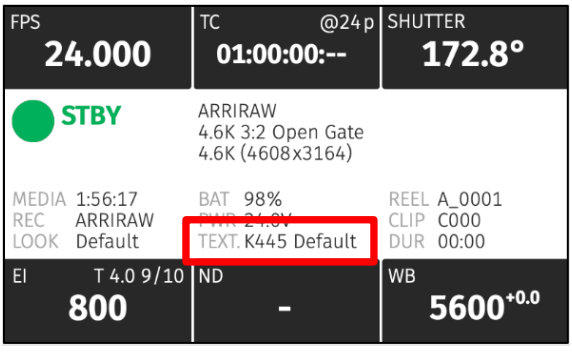
The standard Texture for ALEXA 35 is K445 Default. K445 will capture a cinematic image no matter what the situation, in the same way as every other ARRI digital camera from ALEXA Classic up to ALEXA Mini LF you have worked with before. Choosing another Texture is easy: navigate to MENU > IMAGE > TEXTURE.



Press the jog wheel or tap on the blue bar on screen to enter the sub-menu. Select the low light texture you favor the most.



The four-digit code for the currently selected ARRI Texture is shown on the HOME screen and on the status overlays in the CAM section.



6 Comparison Images for Enhanced Sensitivity and ARRI Textures

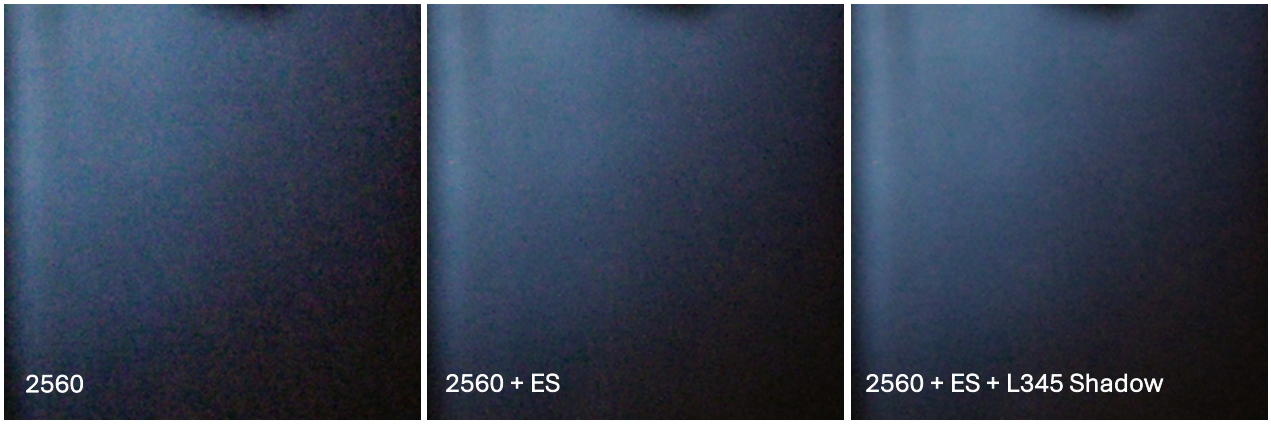
If you deviate from the standard texture K445 Default and decide in favor of L345 Shadow or H457 Deep Shadow texture you can gain an even better image in lowlight situations.

Here are more examples from our low-light-candles-shoot (three candles to light the actors and a SkyPanel S60 for the jacket in the back):

6.1.1 Non ES vs. ES vs. ES + L345 Shadow

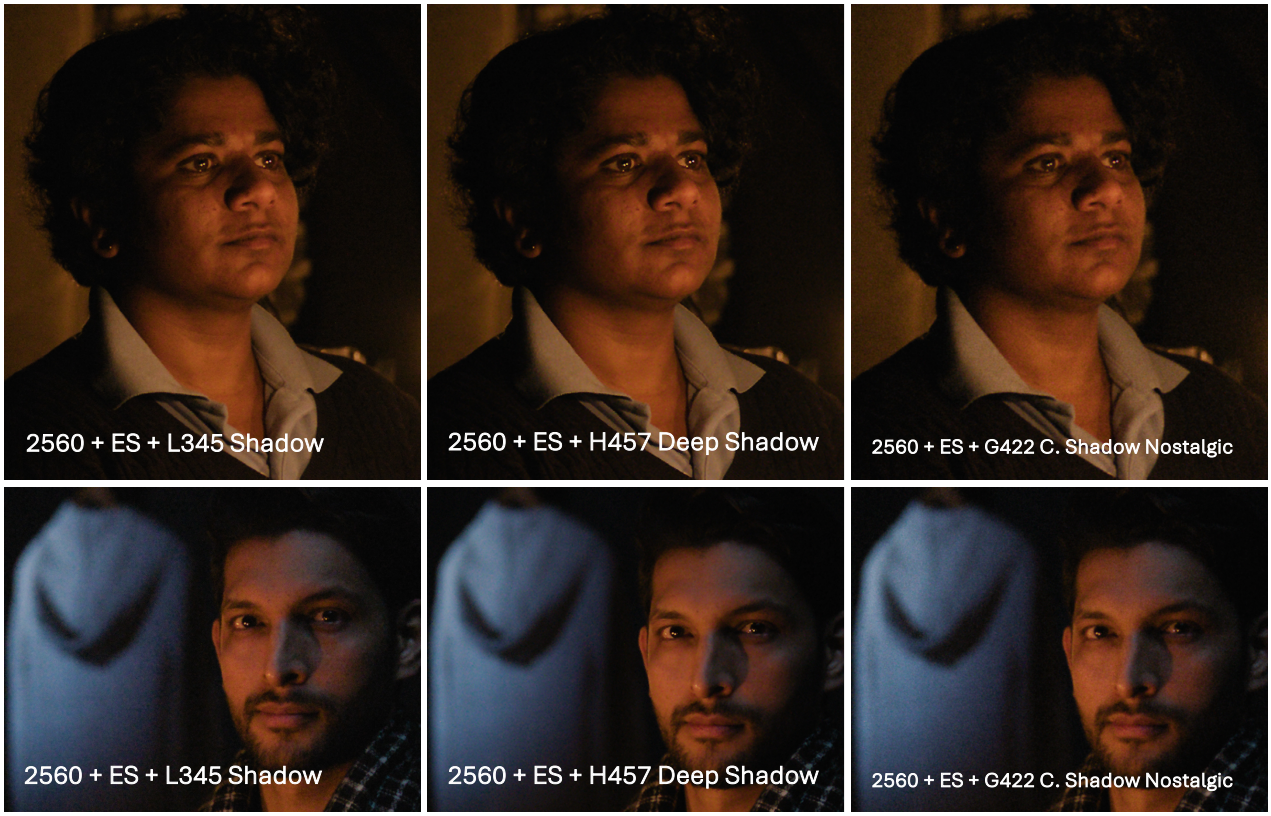
Faces

Detail

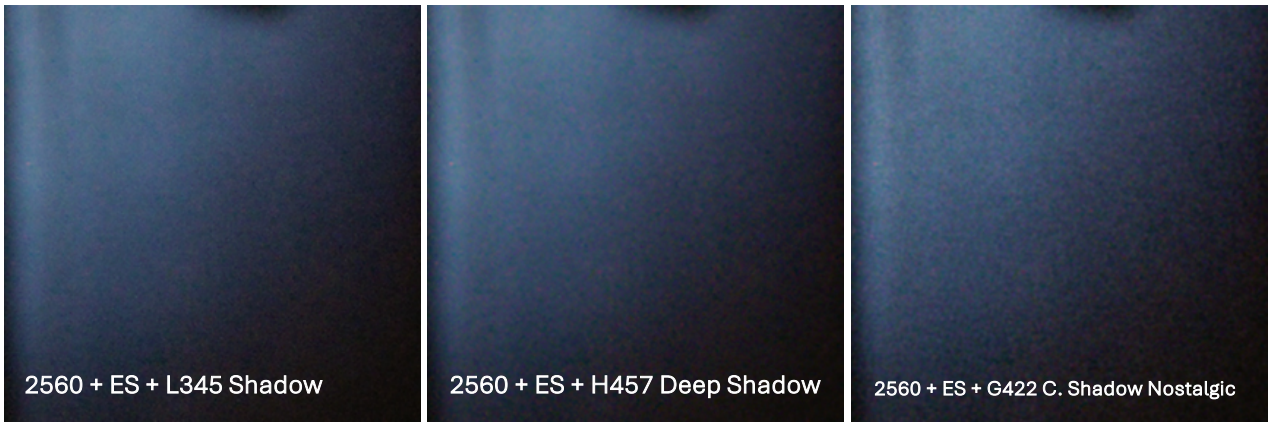


6.1.2 ES + L345 vs. ES + H457 vs. ES + G422

Faces



Detail



7 Contact

In case you have questions or recommendations, please contact the Digital Workflow Support within ARRI via email: digitalworkflow@arri.de