Aesthetic Tests

Each time a cinematographer embarks on a production, there are a multitude of tests that need to be conducted. Many are designed to address specific questions about achieving the aesthetic objectives of the project. Some are designed to help build a common vocabulary between the cinematographer and director.

The creative tests a cinematographer designs are specific to the requirements of the production at hand, and so are customized to address unique visual concepts.

These tests are normally conducted after the equipment has been thoroughly tested and is confirmed to be in proper working order.

Keep in mind that these tests are unique to each production and as such are subject to change and modification as specific needs arise. It is up to each individual cinematographer to conceive the tests that he/she thinks will best answer the questions at hand. Also remember that each cinematographer will find his/her own methodology and therefore the tests one cinematographer conducts may not be of significant use to another cinematographer, and so each cinematographer should conceive and execute his/her own tests to find the answers to the questions that need to be addressed for each production.

This range of tests is broad reaching and so it is impossible to address every issue here. A few of the more common aesthetic considerations for which cinematographers design tests are: (Many of these tests overlap each other)

1. Emulsion Comparisons
2. Negative Density (Exposure)
3. Lab Tests
4. Exposure latitude
5. Grain
6. Filters
7. Flashing
8. Color rendition
9. Make up tests
10. Special processing considerations (push, pull, bleach bypass)

1. When beginning a new production, it is often appropriate to compare the various **emulsions** available. One might want to compare film stocks from different manufacturers, or test different stocks from the same manufacturer. As with most tests, the cinematographer will likely have preconceived ideas about what the tests will reveal. Sometimes the tests merely confirm the cinematographers expectations, at other times the tests will reveal something unexpected.

   As with any test, it is best to design your methodology to specifically test for the differences brought about by calculated changes made one at a time. It is also a good idea to maintain a “control” to give basis for comparison.

When comparing emulsions, I would begin by listing the various conditions under which you expect to be shooting. (i.e. – day interiors, exteriors, night interiors, exteriors, on location, on a stage, etc.) Before you select the emulsions to test, you will also want to make note of the "look" or visual characteristics you want to exploit. Also, you will want to consider your equipment budget in relationship to your shooting situation. Under many circumstances, you probably wouldn't want to shoot a slow daylight balanced film stock, in a dark warehouse if your lighting equipment is limited to small tungsten units.

When comparing emulsions, try to create as closely as possible the same situation as you expect to shoot under when you embark on principle photography. If there are set design, make up or wardrobe considerations, be sure to include them in planning your emulsion test.

In the beginning stages of testing, I would shoot these initial tests using the manufacturers recommended exposure index. Carefully slate each take so you know what you are testing. Whenever possible, shoot each matching shot with the same lens and aperture. To do this, light to the slowest emulsion you will be testing, then use ND (neutral density) filters to adjust for differences in exposure rather than adjusting your aperture (which will affect contrast and depth of field, and therefore your perception of the test footage)

When you view these tests, it would be ideal to run the test side by side. If that is not possible, plan to watch them at least twice each so you can make the necessary observations. Also, be sure to shoot shots that last long enough for you to evaluate. Shots of a brief duration are often difficult to assess.

Once you determine the emulsions you plan to use for your shoot, you can proceed to test in more detail the various characteristics of each emulsion. Although one emulsion may most closely render the results you are looking for while treated as recommended by the manufacturer, it is possible, that another emulsion may more closely achieve your desired results when manipulated, either through lighting, exposure or lab processes. This said, it is still advisable to begin with the emulsions that most closely deliver what you are looking for from the outset.

2. **Negative Density** refers to the density (or opacity) of silver left on a black and white emulsion after exposure and processing, or the density (or opacity) of dyes left on a color emulsion after exposure and processing.

   The manufacturers recommended exposure index (ISO aka ASA) rating is established when their testing reveals the amount of exposure required to deliver their preferred LADs (Lab Aim Densities measured with a densitometer) after an emulsion is exposed and processed normally. These LADs are supposed to ensure the "best exposure" for a given emulsion. This is an exposure which will

maintain the greatest exposure latitude and most “true” color and/or gray scale rendering. This may or may not be the correct exposure index for your production.

Each time a cinematographer embarks on a new production, he/she must determine the best way to utilize, manipulate, and control the tools at his/her disposal in order to render the results that will best serve the material.

Negative Density Testing can be coupled with **Exposure Latitude** testing and even **Lab Testing** if executed carefully.

Exposure latitude refers to the range of exposure both above and below middle gray in which detail is still discernable. How white is an image before all detail is lost? How dark is an image before all detail is lost? This range in exposure, usually measured in stops, between which there are perceptible details from the dark shadows through the mid tones and into the hot highlights constitutes the exposure latitude for a given emulsion. As one modifies the photographic process, either through re-rating the exposure index or modifying lab processes, the exposure latitude shifts.

The testing one does for various emulsions and exposures will deliver varying results based on the lab chemistry. These differences are most pronounced when comparing the chemistry of one lab to another, but they can also produce differences based on variations within one lab. Labs frequently test and refresh the chemicals used in developing. But differences can occur depending on whether your film is the first through the soup after the chemicals have been refreshed, or the last through the soup before they are refreshed.

As part of your regular testing you might want to send similar footage through two labs to see the differences. On bigger productions where you can influence the lab you use, this is very helpful. On smaller productions, often the lab used is determined by economics and the best deal the producer can negotiate.

These tests essentially are your means to plotting the characteristic curve of each emulsion. You are establishing a series visual reference points along the film’s characteristic curve. This enables you to more accurately pre-visualize the results you will achieve when your footage has been exposed and processed according to your design and specifications.

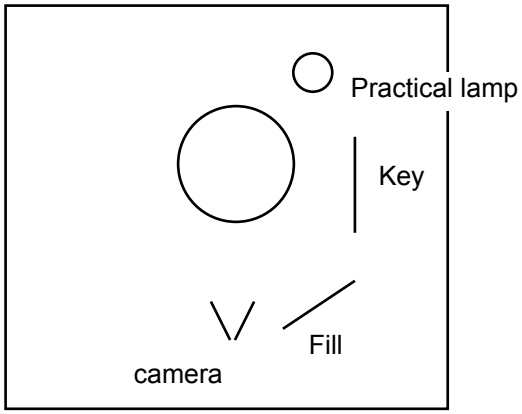
When setting up your negative density and exposure latitude tests, try to maintain as controlled an environment as possible. Consider the information that is important to learn from these tests. 1) what exposure index will render the characteristics (apparent grain, color saturation, richness of shadows, image softening, etc.) I am looking for? 2) how broad of a range can I utilize before my shadows are completely black and my highlights are completely white?

Set your test shot to includes a gray card in the foreground, your subject (a person) in the middle space and in the background set a white card, a black card and a grey card. Also there should be a practical lamp burning in the back ground (for a hot highlight). Consider the color of the shirt your subject is wearing – choose a color that you will want to test for your film. You might also what to include a bowl of fruit, maybe some red apples, lemons, oranges, and limes in the frame so you can see the effects of changing the exposure on color rendition.

(Include a slate in the corner of each frame indicating the (key + fill) and fill levels - this can be supported by a c-stand)

Negative Density: (How do variations in exposure/printing effect the resulting printed image? Be sure to slate every take accurately

Lighting Diagram #1



Set your lens to a T stop of 4. Expose a control for 10+ seconds (using the manufacturers recommended exposure index). Then increase exposure in half stop increments. Ideally this should be done by increasing the intensity of the light or by removing ND filters from the lens. It is best not to change the aperture, as that will alter contrast and depth of field. A full three stops change should be adequate, though I prefer five. Then shoot your control again at a T 4. Now, decrease the exposure in half stop increments by reducing the light or adding ND filters to the camera. Do not use a dimmer as this will alter the color temperature. Once you have gone three full stops (Again, I prefer five stops), you should reset and shoot the control one final time.

When you send this film to the lab, give instructions to print two prints. One print is a one light, and the second print is to be timed for each change in exposure.

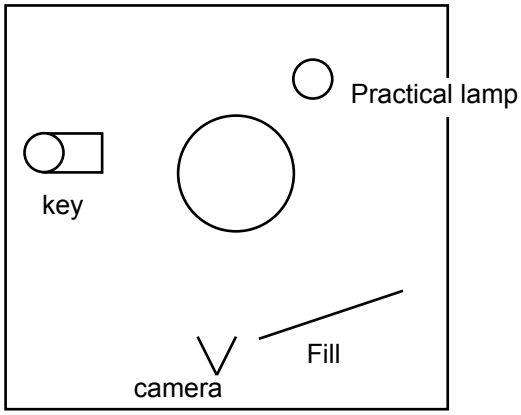
When you view these, you will see how the change in exposure affects the imaging characteristics, and when you view the timed print, you will see the effects of increasing or decreasing exposure and printing it back to a “normal print density”. This will help you to determine the exposure index you wish to assign the emulsion for your project.

If you have time, you will want to conduct the negative density test before the exposure latitude tests, so that you can then use your newly assigned exposure index as the base starting point when conducting your exposure latitude test.

If time does not allow this, you may need to combine these tests, and use all the information gathered to determine the exposure latitude for your emulsion at your assigned exposure index.

*Note: If your final film prints will be struck from an IN, then your tests should include the IP/IN steps in the process, as you will lose detail and increase contrast as you move the additional generations from the original.

Underexposure Latitude: (how far below key can a subject be exposed before it loses all detail in the shadows?)
Lighting Diagram #2



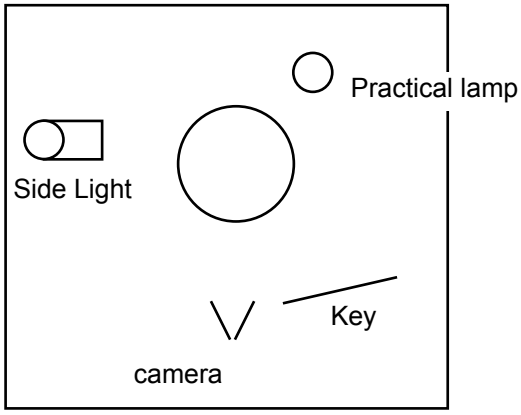
The key side of the face is the sum of the key light plus the fill light. The fill side of the face is the fill light alone.

Set your lens to a T stop of 5.6
Set the key plus fill to a stop of 5.6 and the fill to an T4, then in half stop increments reduce the fill light for each subsequent exposure Until your fill side is five stops under key.

Your second exposure would have a key + fill of 5.6 and a fill of 2.8/4 split
Your third would have a key + fill of 5.6 and a fill of 2.8…and so on until your key plus fill equals 5.6 and your fill light along equals an T1. If you are working in footcandles with 200asa film - your key + fill would be 200fc and your final fill level would be 6 fc.

As you reduce the fill, you may have to increase the key to maintain a consistent f 5.6 on the key side. (Note: Keep your camera's aperture and focal length constant)

Overexposure Latitude:
Lighting Diagram #3



Set your lens to a T stop of 2.8
Set the key light to a stop of 2.8 with **no side light**, then for your second exposure--start with a side light one stop hotter than key increase the side light for each subsequent exposure in half stop increments until your side light is five stops over key.

Your second exposure would have a key 2.8 and a side light of T4.
Your third would have a key 2.8 and a side light of T4/5.6 split, then T5.6…and so on until your key equals 2.8 and your side light equals an T16. If you are working in footcandles with 200asa film - your key would be 50fc and your final side light level would be 1600 fc.

*As you look at your tests, the Negative Density, Emulsion Latitude and Lab tests, be sure to take notice of the change in grain, black density, hue and chroma, contrast, acutance and any other characteristics that will affect your decision.

6. **Filter Tests** can take many forms, because there are so many kinds of filters available. Probably the most common tests involve contrast and diffusion. Before deciding which filters to test, first consider the effects you want to achieve.

   As a personal preference, I prefer to avoid filters whenever possible, as I find them to be and imposition on the image in most instances. However, there are frequently times when a filter is the right tool for the job and so must be employed.

   When shooting 16mm (and video) remember that the target area of the imaging medium is considerably smaller than in 35mm, and therefore the effects of each diffusion or contrast-altering filter will be magnified. Therefore it is often advisable to use very subtle filtration, as it will be more apparent than it would have been in 35mm.

   Since you have determined that using filters might help you achieve your objectives, you should set up tests that will simulate the real conditions you will

face in your production. This includes matching the lighting styles you plan to employ, using the real actors when possible (in make up) and using the same lenses.

As with any test, establishing the control is essential. In this case the control will be shooting without a filter. Before you begin, remember that adding a filter in front of your lens, is adding another optical element, it is susceptible to flares, reflections, etc. So keep your lens and filters clean, and flag unwanted light off the filter.

I like to test a complete set of filters and then run comparison tests to other filters I am considering. Suppose you want to compare black pro mists with white pro mists. First shoot your subject clean, without any filtration, then being sure to slate each shot, shoot from the lightest to the heaviest filtration of one type. I like to start each shot clean and introduce the filter as I am rolling film, so I can see the change more easily. Once I have shot with all of the black pro mists, I would shoot the same shots with white pro mists. I would then shoot a shot clean where I introduce one filter, remove it and replace it with its counterpart in the other set. After testing the filters I most think I will use this way, I might also try to shoot a split screen with one filter on half the frame and its counterpart on the other half.

The key to testing filters is to first understand what they do (or are reputed to do) then determine if there is a better way to achieve your results, or if using filters is the best solution, then test so that you understand the best way to use the filters that you select.

If you have already determined that you will be assigning your own exposure index or using any special lab processes, you should test your filters with these practices in mind so that you achieve the most accurate results and information.

7. **Flashing** film is a means by which cinematographers affect the contrast of an image. Each lab has its own methods and system, and so the lab you use needs to be tested regardless of your previous experience with flashing film.

   In essence, flashing is simply adding light evenly and overall in a controlled manner to undeveloped film to affect its contrast. The negative and the positive can both be flashed to achieve different results.

   Flashing the negative is like adding white light to the entire image, it raises the base fog level, decreases contrast and adds a bit of light to the shadows. Some say that “pre-flashing” film excites the emulsion and makes the film more photosensitive. Others prefer “post flashing” because they can assign the amount of flashing that they need based on the conditions under which the film was exposed.

The danger in post flashing is that the lab is taking film that has already been shot, and is exposing it to light. If there are any errors in the process, the footage may be destroyed. If there are any errors in the process of "pre-flashing" all that is lost is the unused negative.

Flashing the print is like adding a veil of black to the image. It can darken shadows, and even add some detail to very bright areas. It often results in increased contrast. Because flashing the print doesn't affect the negative, if the effect achieved is not appropriate, another print (without flashing) can be struck very easily.

Both processes can be combined in the appropriate circumstances and when the needs arises.

These, like any lab procedures have associated costs which should be considered before testing.

As with all tests, the more closely you are able to emulate your actual shooting conditions, the more accurately your tests will reflect what you are likely to achieve.

8. **Color Tests** are used to determine how a given film stock with specific lighting and lenses and lab procedures will render specific colors. Set up a situation close to what you will shoot for your film and test different lighting styles, with the colors that concern you. See the effects of hard light, soft light, frontal light, side light, back light. Use the same lighting units you will be using on your film.

   If you are unhappy with the way that certain colors are rendered, either change colors or alter your lighting style to accommodate. Once you decide on a change, you should test again to see if your plan will work.

9. **Make Up Tests** require you to test the actual make up design, with various lighting designs and situations that you expect to encounter in production. When the make up is particularly important, the outcome of these tests will often determine your lighting style for specific scenes.

10. **Special processing** considerations (push, pull, bleach bypass) must be tested before one can employ them with consistency and control. If you expect to use any special lab processes, these tests should include **negative density** and **exposure latitude** test s while testing the lab processes.

    The control should be one series of exposures processed and printed normally. Then subsequent exposures can be compared to "lab norms".

    Push processing and **Pull** processing refer to the duration of time exposed negative is in the developing chemicals (soup). Push processing extends

development time, which increases contrast, raises the base fog level, and increases the appearance of grain. Pull processing reduces the development time which typically results in reduced contrast and reduced appearance of grain. Colors often present with reduced saturation.

In the course of normal color negative development, the film is washed in a bleach process which removes the remaining silver halides. The **bleach bypass** process skips this and subsequently the silver is retained in the emulsion. The exposed silver has turned black through the photochemical process of exposure to light and developing. This adds density to the overall image, which results in increased contrast, dark blacks, and reduced color saturation.

Obviously, the process of making a film requires countless creative decisions. The more informed you are, the more you test, the more you explore the possibilities, the better suited you will be to control the images you are charged with creating.