



Performance Media Industries, Ltd.

Fiat Lux
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by A. Grimani

“That’s just the way we’ve always done it...” Those are words that make me cringe, scream, run for the hills, call the neighbors, and wake the kids! In our cutting edge world there’s no room for this type of excuse, which really says, “I don’t want to have to figure it out; I just want to go relax in my La-Z-Boy recliner.”

The fine folks at Runco must feel the same way I do, because they threw out the stone-age specification of ANSI Lumens when defining their projectors’ performance. Instead, they created a new standard called Cinema Standards Measurement System (CSMS). Based on the reflected-light measurement approach that the film industry uses, the new CSMS standard tells you more accurately how bright the picture will be. The ANSI Lumen standard was developed in the days of industrial CRT-type devices and just doesn’t mean much in today’s world of fixed-pixel residential applications. Differences in display technology persistence and On/Off duty cycles mean that the same amount of light output from different projectors can read Lumen values all over the chart. Also the ANSI Lumen measurement is done at maximum possible light output conditions, with no regard for accuracy in picture performance.

The light output in CSMS is actually measured using two devices. A high-precision optical analyzer, the Photo Research Spectroradiometer RP650, is used to set gray scale to the correct value of 6500K. The best film and video engineers tote around one of these multi-thousand-dollar devices, which gives you data on your picture that accurately represents what eyeballs perceive. Take a look at <http://www.photoresearch.com/> for more info on this great tool. Measurements of light off the screen are then made on the foot-Lamberts (fL) scale using the Minolta LS100 light meter. Without those two simultaneous pieces of data, you don’t really know how bright the picture is. The fL light value represents the amount of light at any single point of the screen, not the total light amount from the screen. The larger the screen is, the lower the light level you get off its surface since the light projected to it is spread through a larger area. The grey scale value is important, too, because ideally we want to be looking at white light that is really white, not red or blue. If you set up the projector bluer, the measured light

amplitude will go up, but the picture will be plainly wrong. What you would really like to see is the true peak white levels coming to your eyes at 16 fL. That's the film industry standard for white level in movie theaters, and that's what film directors use to compose their pictures. With fL, you can actually relate the picture brightness to what you are used to seeing in theaters!

As an analogy from the automotive field, let's say that the Lumen value is like an engine's horsepower. The fL value is like a car's top speed; you want to know how fast that muscle car will go, not just its horsepower! (Oh, by the way, I always drive the speed limit...)

Lumens and fL are actually related by a simple equation: $fL \times \text{screen ft}^2 = \text{Lumen value}$. In other words, the light coming off the screen times the total area of the screen will get you back to that old Lumen spec. So, for the purpose of double-checking the results, Runco also measures the Lumen values with the projector under Imaging Science Foundation (ISF) calibrated conditions and then divides that by the test screen area to verify that the numbers correspond to the fL measurement.

With CSMS, you can know that a certain model projector lighting up a 1.3 gain, 100" x 56" screen will give you 17 fL. Hey, that's one to spare, and you will need it when the bulb wears in! Now it's important to know that the rating is based on the amount of light reflected off a 72" x 40½" screen with 1.3 gain factor. So, to figure out the luminance for any other size screen, you will need to do a conversion based on area. Here's a simple conversion table if you need it:

Screen size	Conversion factor
60x34	1.4
70x39	1.1
80x45	0.81
90x51	0.63
100x56	0.52
110x62	0.43
120x67	0.36

Just take the stated CSMS specification and multiply by the conversion factor associated with your screen size to get the fL results. Also, you will need to take into account your screen gain. If you use a screen with a gain of 1, you will need to divide the value by 1.3.

Note that there is such a thing as *too much* light output. Since films are shot at 24 frames per second there is inevitably a sense of flicker between frames. This is particularly visible on panning shots under bright skies. Optical persistence in our eyes smoothes over flicker, but very bright light levels make it more visible. Flicker can be distracting

and can break the realism of the film experience, so watch out. Choose the right projector, and set it up for 16 fL of light output.

Now, with CSMS, you can actually buy the right projector and a screen of the right size and gain factor. Ain't progress great?!

By the way...no one at Runco paid me to write this puff piece; I just applaud their bold move!

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