How White Is Right?

Okay I'm not being a racist here, this is about pure white backgrounds and communica-tion, not skin colour. Some say that to get a perfect pure white, white-without-detail background (255 Levels brightness in all three channels in 8-bit colour), you need it to meter one stop brighter than the camera setting. Others say it should be three stops. Who's right? Well, both are and aren't depending on your 'relative to'. Communication in pho-tography and especially in lighting is ambiguous at best. So many arguments have participants foaming at the mouth needlessly because their argument rests on an assumption which neither has taken the time to voice. In the case of our pure white background our two argumentative phantoms could both be right at the same time depending on how you look at it:

If the background is a white wall or white seamless backdrop, then metering it with an in-cident meter (see Image 001) and making it read one stop brighter than the camera setting will make it record as, or close to, three stops brighter than middle-grey. This is true because the actual tone on the greyscale of a correctly exposed wall painted with regular white paint, or a white seamless backdrop, is approximately two stops brighter than middlegrey. If you give it one stop more light by increasing power on the background light(s) by let's say one stop, it will reproduce as three stops brighter than middle-grey. Get it? If it is two stops more reflective than a middle-grey tone, then if you add one more stop of light to it, well 2 + 1 = 3, it will be a +3. Meaning that the wall or paper will appear three stops brighter than middle-grey in your image. Now is that going to be a burned-out-no-detail-255-Levels-in-all-three-channels-white? Many think so, but your meter, your cam-era, your white background, and your Raw file processing algorithm are all factors. For instance; if you process with lower than normal contrast settings then your white back-ground will turn out darker than if you used more contrasty settings. White seamless pa-per or paint yellows/darkens with age. Light-meters tend to differ a bit from one to the next as do cameras from one brand to another and from one model to another. In my tests, I used the default Raw processing settings in Lightroom and Adobe Camera Raw, which are very conservative normal-type settings. The readings off the white background with the densitometer/eyedropper ranged from 245 to 253 in all three channels depend-ing on what white backdrop I used (seamless, white cloth, and white paint wall). Also, I insured that the capture was a correct exposure by including a grey-card and made it read 116 RGB Levels (8-bit) in Adobe Camera Raw with flat processing – 'Process' set to 2010 in the Camera Calibration panel, sliders set to zero from Exposure down to Saturation in the Basic panel, and Point Curve set to Linear in the Tone Curve panel. These process settings are not for general use but are handy to apply temporarily to a test image with a grey-card for the purpose of checking to see if your exposure system is bang on or not – the card should read 114 to 118 Levels in all three channels (in 8-bit Adobe RGB colour space). But for simplicity sake, let's continue to assume that a +3 background will give you 255 Levels – pure white. So if one of our combatants claims they turn up the light on the background until the meter reads one stop over (over the camera setting), then to be right we must assume that they are taking an incident meter reading with the back of the meter against the background and the white dome pointed at the background light-source(s), and, that the surface of the background is made of white paint, paper, or the like. If the actual background were black, or some shade of grey, then this would not ren-der a 255 RGB white, it would be darker – an incident meter only reads how much light is striking the area and not the amount of light coming off and/or out of the surface you are metering for. An incident meter knows nothing about the background in question, it has no idea whether that surface returns a lot of light as does white, or if it absorbs a lot of light and so returns very little as does black, or if it is somewhere in between like grey. So, it falls to the photographer to know where that tone sits on the grey-scale, then interpret the incident reading with this tone in mind.

1

2

If one of our argumentative photographers used a reflective meter (see Image 002) to meter the background (by pointing the reflective meter directly at it) instead of an inci-dent meter and if s/he made the background read one stop brighter than the camera setting, this background would reproduce as one stop brighter than middle-grey, a far cry from pure-white. So it would seem that the rather vague 'One stop over the camera setting' method when done with a reflective meter rather than an incident meter yields a both different and disappointing result. To get this background in this reflective-metering scenario to record as or near pure-white, the photographer would need to set the light on the background until it read three stops brighter than the camera exposure setting.

So why would it need to read three stops brighter with reflective and only one stop over with incident? It is really the same volume of light, just two different methods of measurement. When you adjust the amount of light on the background so that it reads three stops brighter (with a reflective reading) than the camera setting, then theoretically an in-cident meter reading of the same light hitting the backdrop should read as one stop over the camera setting. And conversely, if you adjust the amount of light on the background so that it reads one stop brighter (using an incident meter) than the camera setting, then theoretically a reflective meter reading of the same light coming off and out of the back-drop would read as three stops over the camera setting. So, the same lighting reads dif-ferently depending on metering method but the end result is the same.

As you may have noticed, metering with a reflective meter is less mentally taxing because what it reads represents what that surface is, whereas an incident meter reading represents how much light is striking that surface rather than how much light is coming off/out of that surface. With a reflective meter reading you don't have to factor in what the actual tone of the background is because the meter is reading directly off the tone and so has already taken it into consideration for you. Now that seems way easier, so why would one use an incident meter? Laziness, if you are already using an incident meter to measure the main, fill, and separation light brightnesses, then it is faster to meter your white background with that meter – changing the meter from incident to reflective takes a few sec-onds. Keep in mind, if you are going to do it with your incident meter then you have to know and remember to make it read one stop (incident reading) over the camera setting if you want that white backdrop to go pure white or near pure white.

Well, that all seems pretty confusing! Just remember, if you want a white wall or seamless backdrop to record close to pure white, and if you are using an incident meter, then set the lighting on the wall to read one stop over the camera setting. If instead you are using a reflective meter, then adjust the lighting until it reads three stops brighter than the camera setting – by the way, the camera exposure setting equals middle-grey.

So next time some argumentative pig-headed photo-lout is spewing in your face about 'how white is right,' shed a little light on this ambiguous brute, ask them, 'Are you using incident or reflective readings?' … And, 'Is it a white backdrop or what?'