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GLP Highlander Wash

By: Mike Wood

Figure 1: Fixture as tested.

It's been a while since I reviewed something that wasn't LED-based, particularly a wash light. However, it's hard to beat those short-arc HID lamps for optical efficiency, particularly when using a zoom optical system. This month, we look at the GLP Highlander Wash, from the well-respected German manufacturer, taking us back to our roots.

The mid-range wash market is completely dominated by LED-based units; however, the GLP Highlander Wash is at the top end of that scale and has a full-field soft-edged framing system. It's primarily the optical needs of the framing, in my opinion, that drives the use of an HID lamp in this product. How does it perform and how does it compare with its LED-based competitors? As ever, I'll do my best to measure and report what I can to help you decide.

The results presented here are based on the testing, with the fixture operating on both a 110V 60Hz, and a 230V 60Hz supply, of a single GLP Highlander Wash supplied to me by GLP (Figure 1).

Lamp and lamp access

The Highlander Wash uses the OSRAM Lok-It! 1400/PS Brilliant lamp, which has a rated output of 120,000 lumens with an arc gap of 5.3mm and a rated life of 750 hours. It's mounted on a plug-and-play twist-lock base, so replacement is very simple. A single screw retains a die cast door at the back of the unit which opens to reveal the lamp base. Figure 2 shows the lamp and access. The power supplied to the lamp depends on the voltage on which you run the fixture. At 220V – 240V, the lamp is run at its full 1,400W. At 120V, it runs at a lower level of 1,000W. (This fooled me for a while when I powered the unit up using the supplied 120V cable. GLP might want to make it clearer that you won't get full output at 120V.) The temperature-controlled lamphouse containing the lamp and ellipsoidal reflector is capped with the usual hot mirror leading the light into the main optical train.

Figure 2: Lamp change.

Dimmer and strobe shutters

The Highlander Wash has two large dimmer/strobe flags using a sawtooth cut pattern mounted immediately after the lamp house. These are shown in Figure 3. The dimming from the flags is smooth and even across the beam. There are very few or no beam artifacts, with vignetting only at the very bottom end of dimming. Figure 4 shows the dimmer curve. It's an S-law curve, with most of the dimming happening between 90% and 30%. I measured the strobe function from these flags acting as a mechanical shutter as providing strobe rates up to 15Hz.

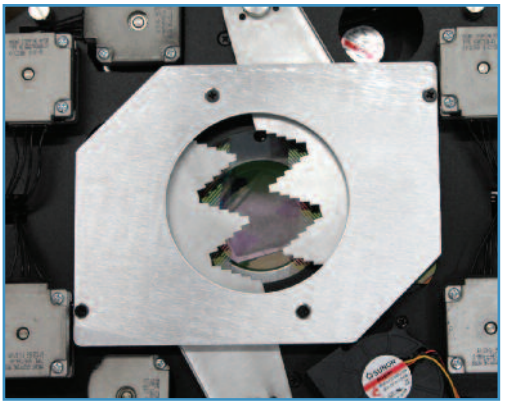

Figure 3: Dimming shutters.

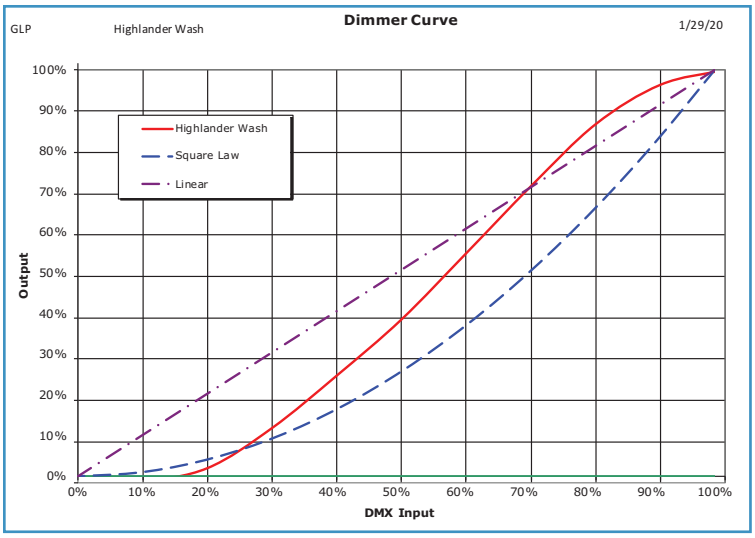

Figure 4: Dimmer curve.

Color systems

The Highlander Wash has four color CMY/CTO color mixing plus two static color wheels. First in the optical train, immediately after the dimmer, are the color-mixing flags. These are four sets of linear curtain dichroic filter pairs, providing control of the usual cyan, magenta, yellow, and CTO. These

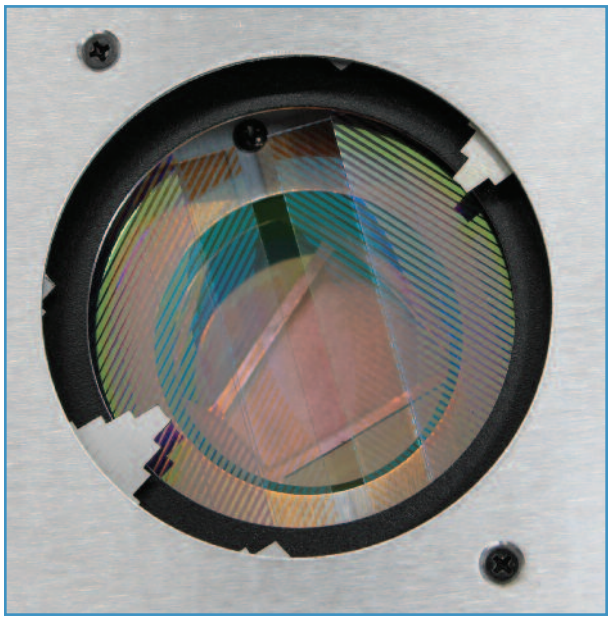

Figure 5: Color mixing.

are etched with a pattern of angled lines to provide variable saturation of each color. Color-mixing from this system was very smooth, with only a small amount of visible edge color fringing when trying to mix pale pastels. Figure 5 shows a view past the dimmer shutter and through the partially inserted color mixing flags.

COLOR MIXING

Color	Cyan	Magenta	Yellow	Red	Green	Blue	CTO
Transmission	15%	4.3%	79%	3.6%	4.8%	0.3%	58%
Color change speed – worst case				0.8 sec			

As you can see from the figures, the chosen dichroics are highly saturated, particularly the magenta, allowing the mixing of deep blues and, to a slightly lesser extent, reds. (I say lesser with the reds as the Osram lamp has relatively low red energy in the first place.)

The CTO flags smoothly adjusted the color temperature from the native lamp 6,413K down to 3,190K when fully inserted.

Following on from the color-mix system are two fixed color wheels, each with seven trapezoidal dichroic filters and an open position. The colors are not designed to be user-replaceable.

COLOR WHEEL 1

Color	Red	Blue	Green	Lt Green	Yellow	Orange	Congo
Transmission	3.7%	6.5%	19%	49%	89%	37%	0.4%

COLOR WHEEL 2

Color	Lavender	Magenta	Pink	Minus Green	CTB	CTO	Amber
Transmission	26%	5.9%	51%	87%	63%	55%	61%

COLOR WHEEL SPEED

Color change speed – adjacent	0.2 sec
Color change speed – worst case	0.5 sec
Maximum wheel spin speed	1.2 sec/rev = 50 rpm
Minimum wheel spin speed	26 sec/rev = 2.3 rpm

Color wheel movement was quick and smooth. The trapezoidal shape means that half-colors are available. Figure 6 shows an example. The Highlander Wash has both zoom and focus controls, which is perhaps a little unusual for a wash light, but that means you can adjust the focus on the color transition. It's always somewhat soft—it is a wash light, after all—but can be softened much more than my photograph shows.

Figure 6: Half-colors.

Framing

Last in the optical effect train are the framing shutters. This is a conventional four-blade system that you would normally see in a framing profile unit, but with the softer optics of a wash light. Figure 7 shows the layout. Each of the four blades can travel fully across the beam and is adjustable in angle by +/- 30°. The entire assembly can also rotate by +/- 45°. I measured the maximum time to insert or remove a blade at 0.5 second, and the system rotate took 1.5 seconds, end-to-end.

Figure 7: Framing shutters.

Figure 8: Soft-edge shutters.

Figure 8 shows the effect of the shutters in a photograph. As with the half-colors, the focus control can further soften the edge. The figure shows them at their sharpest when they act, as intended, like a barn door. The user can choose two options for DMX profiles to control the shutters. In both profiles, each blade has two channels. In one option, the two channels control blade insertion and blade angle; in the other profile, the two channels are left insertion and right insertion.

It is also possible to control the framing shutters through a dedicated iris channel; in this mode, all four shutters work together and open and close like a square iris. Using the iris channel constrains the shutters to work at right angles. The iris channel interacts with the shutter insertion channels on a smallest-takes-precedence basis—that is, whichever of the shutter or iris channel calls for the blade to be closed the most takes control.

Lenses and output

The Highlander Wash uses a familiar three-group-lens system to provide zoom and focus control. Two groups move,

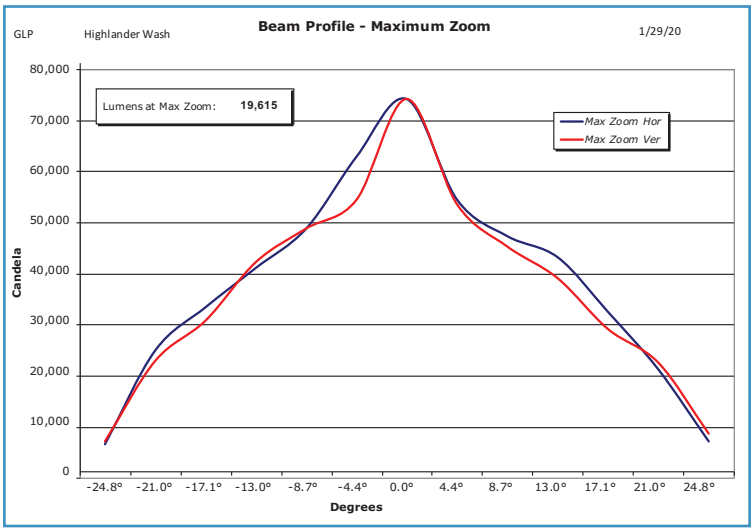

Figure 9: Output at maximum zoom.

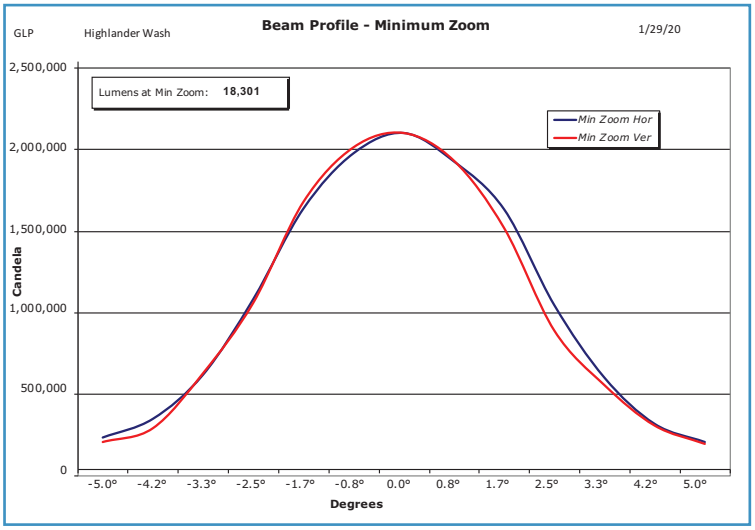

Figure 10: Output at minimum zoom.

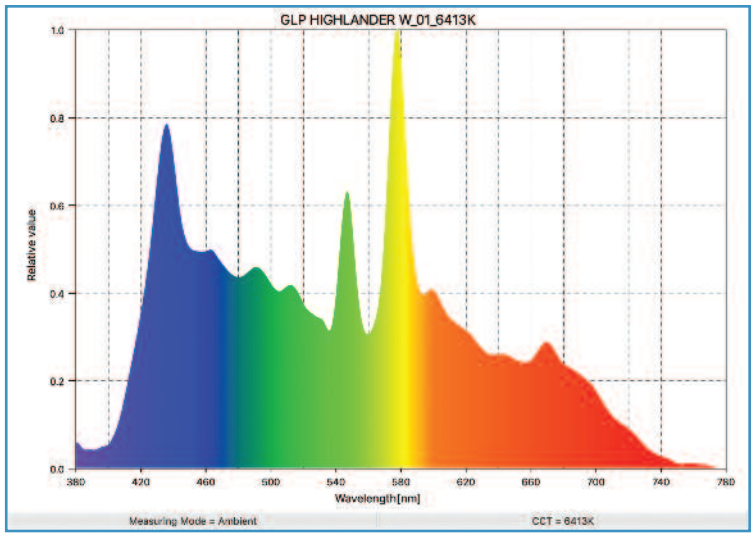

Figure 11: Spectral distribution - native 6,413K.

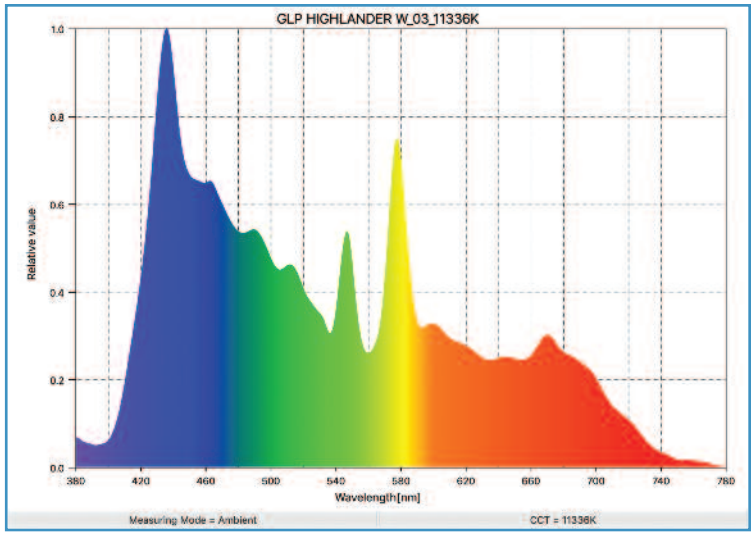

Figure 12 - Spectral distribution - CTB 1,1336K.

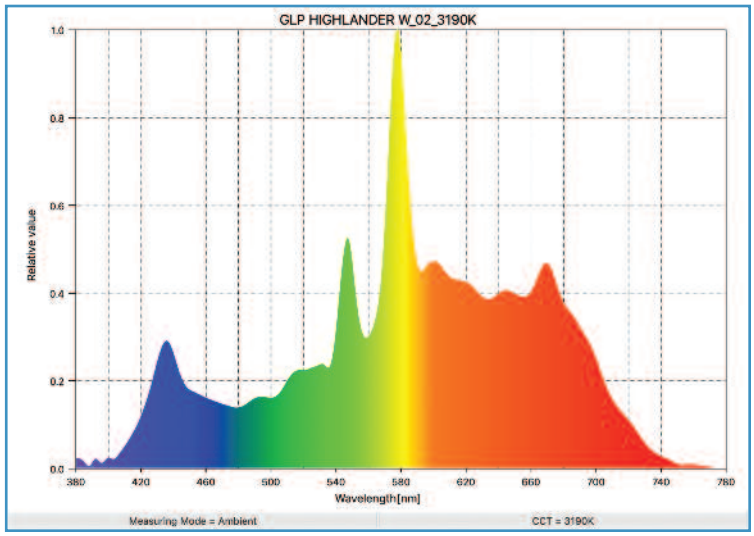

Figure 13 - Spectral distribution - CTO 3,190K.

and the final group, the output lens, is fixed. I measured zoom as taking 0.9 second to move end-to-end, while focus took 0.7 second. In its widest angle zoom when running at 230V, I measured just under 20,000 field lumens at a field angle of 50°. In narrow angle, again when running at 230V, the output was 18,300 field lumens with a field angle of 10°. If you run it at 120V, these figures drop by about 45% to around 11,000 – 12,000 lumens (Figures 9 and 10).

This is a wash light, not a profile, so the focus control doesn't work in exactly the same way as it would when focusing on a gobo. Instead, the primary visual effects of the focus control are that it affects the peakiness of the beam and adjusts the hot spot. This is something you would need to use yourself to see exactly how it works and the effect it gives to the output. Note that, as I always do, I report field lumens. That is the light output where the intensity is greater than 10% of the peak. With a wash unit, there is always a significant amount of light outside that area, but it isn't counted in the field lumen number.

I measured the spectrum and color rendering of the unit both in open white, and with the CTO and CTB filters in place. Figures 11, 12, and 13 show the results. In normal open white, the unit has a CCT of 6,413K with a color rendering TM-30 Rf of 82, and an Rg of 94. With the CTB filter in place, the CCT rises to 11,336K and the TM-30 Rf goes up to 91, and Rg to 100. Finally, with the CTO filter, CCT reduces to 3,190K while TM-30 Rf goes down to 73 and Rg to 71. If you look at the open lamp spectrum in Figure 11, this is what you would expect. The lamp has a lot of energy in the blue and green, but tails off in the red. This helps the color rendering at higher color temperatures when less red is needed.

If the Highlander Wash has the same kind of lamp, reflector, and three-group-lens system as a spot or profile light, what makes it a wash light? The answer is, primarily, the front output lens. Instead of a smooth convex lens, there is a large Fresnel lens with a stippling pattern on the back surface. A Fresnel lens has a soft focus and the stippling helps by acting as a diffuser. Figure 14 shows the lens.

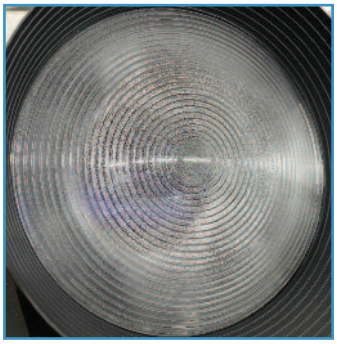

Figure 14: Front lens.

Pan and tilt

I measured the pan-and-tilt range at 660° and 260° respectively. A full range 660° pan move took 5.5 seconds to complete, while a more typical 180° move finished in 2.5 seconds. Tilt took 2.7 seconds for a full 270° move and 2.1 seconds for 180°. All movements were smooth, with little

bounce and no visible steppiness. Hysteresis on both pan and tilt was very small at 0.06°, equivalent to 0.2" at 20'.

Noise

The fans removing that 1,400W of heat are by far the major contributor to the noise floor from the GLP Highlander Wash. Of the motors, as is nearly always the case, full-range zoom and focus movements were the loudest and the only functions to get above the noise floor of the fans.

SOUND LEVELS

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	55.9 dBA at 1m
Homing/Initialization	59.2 dBA at 1m
Pan	56.5 dBA at 1m
Tilt	57.3 dBA at 1m
Color	56.0 dBA at 1m
Zoom	58.1 dBA at 1m
Focus	56.2 dBA at 1m
Strobe	56.1 dBA at 1m
Framing	56.1 dBA at 1m

Homing/initialization time

Full initialization took 35 seconds from either a cold start or a DMX512 reset command. Homing is very well-behaved. The fixture fades out smoothly, resets, and keeps its shutter closed before fading up again after all reset movement is finished. The lamp is cold-restrike and took about five minutes after dousing before it had cooled down sufficiently to be able to restrike.

Construction

As with other GLP automated fixtures, the Highlander Wash has no top box, which helps reduce the overall weight of the product. Instead, the power supplies and some of the electronics are in the yoke arms, with the remainder of the distributed electronics for motor control in the head. Figure 15 shows that the high-voltage ignitor (35kV needed to strike these lamps) is mounted in the head, just above the focus and zoom lenses. (The lamp power supply itself is mounted in one yoke arm, as seen in Figure 16, while the motor and electronics power supply along with pan-and-tilt motor control is mounted in the other, Figure 17.)

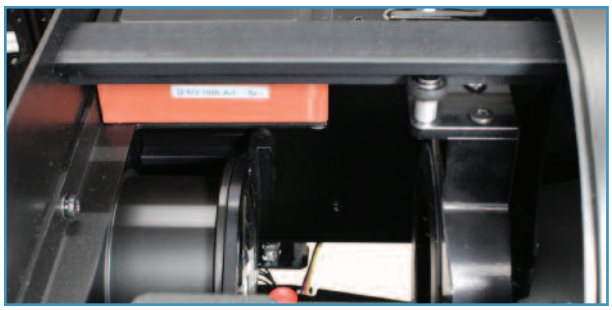

Figure 15: Ignitor and lenses.

Figure 16: Lamp power supply.

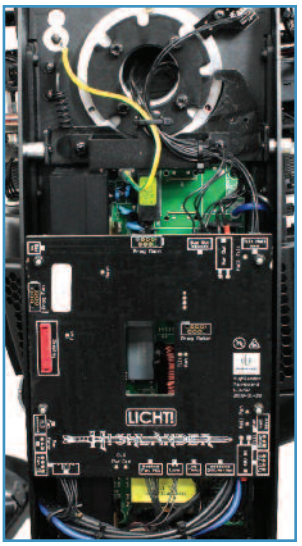

Figure 17: Main power supply.

The effects components of color mixing, color wheels, and framing are mounted in a single readily removable module, which is held in place with four thumbscrews and two electrical connections. This was very easy to remove and replace. Each motor system on this module has its own local motor control and sensors (Figure 18).

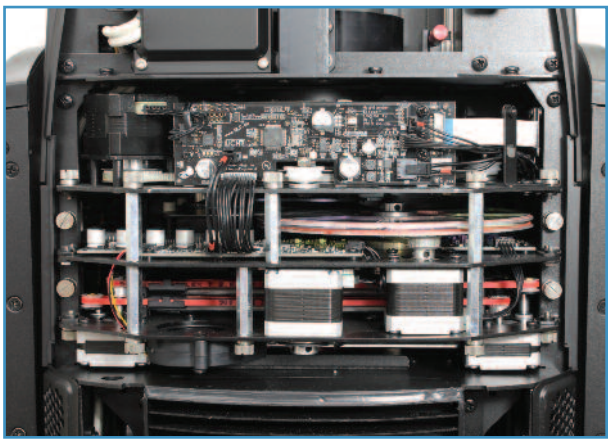

Figure 18: Main optical module.

Power and control

The Highlander Wash provides a menuing and control system through a monochrome display, rotary encoder, and control buttons (Figure 19). Power and data connections are either side of the minimal top box and include Neutrik TRUE1 power input and output, and standard five-pin DMX512 connections, as well as a Ethernet RJ45 (Figure

20). Also, the unit offers RDM functionality, which I tested with a City Theatrical DMXcat.

I've mentioned this before, but it perhaps bears repeating as I'm not sure it's widely understood: The TRUE1 connector, like the PowerCon before it and other connectors such as Socapex, are rated for both

Figure 19: Control panel.

Figure 20: Connectors.

110V and 230V use and can safely and legally be used for either. It's up to you to ensure that you don't supply an inappropriate voltage to the connector for the specific fixture it's used with. In the case of the Highlander Wash, the fixture behaves differently depending on which voltage is provided, but in neither case is any damage caused. Other fixtures may not be so accommodating and providing 230V to a unit rated for 110V might cause problems! Just because a unit has a TRUE1 power inlet it doesn't tell you what voltage it needs.

So, there it is, the GLP Highlander Wash. An interesting product at this time of LED domination. Does it fit the bill for your application? As always, I try and provide the raw data but it's you who gets to decide.

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