

FIGURE 1 — The PAR64 version of the CID lamp. Add-on lenses are used in order to modify the beam shape characteristics.

CID: The Latest Compact Source AC ARC Lamp for Film and Television

By Richard Glickman

The CID lamp is made by Thorn Lighting, Ltd., of the UK. It is a tin-halide type with other additives. *Lighting Dimensions* readers will recall that this lamp was first exhibited at Film '79 (London, July 2-6, 1979) and was reported in this magazine in the October 1979 issue in an article entitled "Film '79 Report".

The data available at that time was considered provisional, and there is now a much firmer set of offerings from the manufacturer with more detail about the operational characteristics of this source.

Physical Form

As can be seen from the Figures 1 & 2, the lamp is essentially identical in mechanical dimensions and in appearance to the CSI type which has been made by Thorn for some time. It is reported by the manufacturer that the ballast and igniter circuitry used for CSI is directly applicable to the

new CID type.

CID lamps are available in two forms. The bare bulb version will be directly applicable in certain types of Fresnel spotlights (with some minor adaptation) with its mogul bipost basing. The other version, in the PAR64 configuration, offers the potential ease and application usually associated with the PAR64.

At the recent NAB exhibit in Las Vegas, a 2.5kw CID was shown. This was in the form of a mogul bipost lamp with a 5 inch light center length. This will permit the application of this lamp as a direct replacement in the 10 inch and 12 inch Fresnel spotlights using lamps with this LCL. A further and more detailed report on the 2.5 kw will be offered in an upcoming issue.

The PAR64 version of the lamp comes with a clear lens and in its basic form has a beam diameter of approximately 8 degrees (to one half of center intensity). The initial beam candle power on the center line is 850,000 cd.

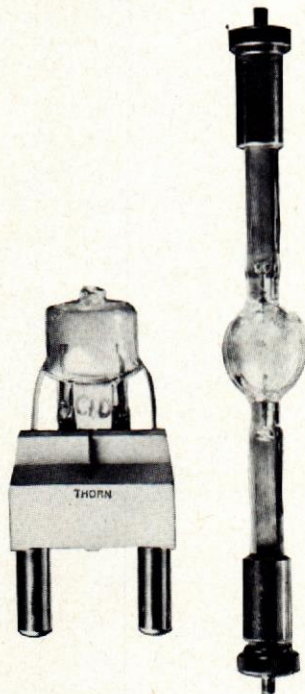


FIGURE 2 — Illustrates a comparison between the 1000 watt Thorn CID lamp in the hot restrike version with a 1200 watt HMI lamp.

CHARACTERISTICS OF 1KW HOT RESTRIKE CID LAMP

Electrical	Arc Voltage	— 70-85
	Nominal Arc Current	— 15 amp
	Run-up Time	— 1 minute
	Re-Start Time	— Instantaneous
Bare Lamp	Arc Length	— 14 ± 1.0
	Lumen Output	— 70,000
	Lumen Maintenance	— 90%
	Correlated Colour Temp.	— 5500 ± 400°K
	General Colour Rendering Index Ra	— 85
	Rated Life	— 500 hours
Sealed Beam Lamp	Peak Initial Beam Candlepower	— 850,000 cd
	Beam Width (1/2 peak)	— 8°
	Field Angle (1/10 peak)	— 20°
	Correlated Colour Temp.	— 5500 ± 400°K
	Colour Rendering Index Ra	— 85
	Rated Life	— 1000 hours

Four different "spread" lenses are available, which may be applied over the clear lens of the basic lamp, to change the beam characteristics. This is exactly the same situation as has prevailed in the PAR64 version of the CSI lamp.

Only the hot restrike versions of the CID lamp are considered in this article.

Color and Light Output

This lamp has an efficiency of 70 lumens per watt, for a total lumen output of 70,000 in the 1000 watt version. Lumen maintenance is claimed to be 90 percent throughout the entire rated life (500 hours for the bare lamp and 1000 hours for the PAR64 version).

The efficiency noted above is somewhat lower than HMI (85-102 lumens per watt, for 575 through 4000 watt lamps). The 70 LPW number, however, is still an impressive figure, and due consideration must be given to the physical forms in which the lamps are available and their potential for interchangeability in some existing systems.

The correlated color temperature ascribed to this lamp is $5500^{\circ} \pm 400^{\circ}\text{K}$, and a General Color Rendering Index of 85 has been assigned. This is slightly lower than the CRI of 90 associated with the HMI lamp. The CRI is a somewhat arbitrary reference, and the small differential should probably not be significant. The spectral energy distribution is shown in Figure 3, compared to the D55 reference (the international reference standard approximately 5500°K daylight).

An interesting characteristic of this lamp is its claimed insensitivity to significant color shifts with changes in lamp power dissipation. The claim is made that the color is constant in this range of power variation ("... within the limits of measurement"). The claimed variation range of lamp power dissipation is between 700 and 1150 watts for the 1000 watt nominal rated version. This is demonstrated in Figure 4. It is suggested by Thorn that some degree of dimming may be practical based on this characteristic.

Flicker

Perhaps the most exciting news about this lamp as an AC operated arc, is that the modulation of light output with time is substantially improved over either HMI or CSI.

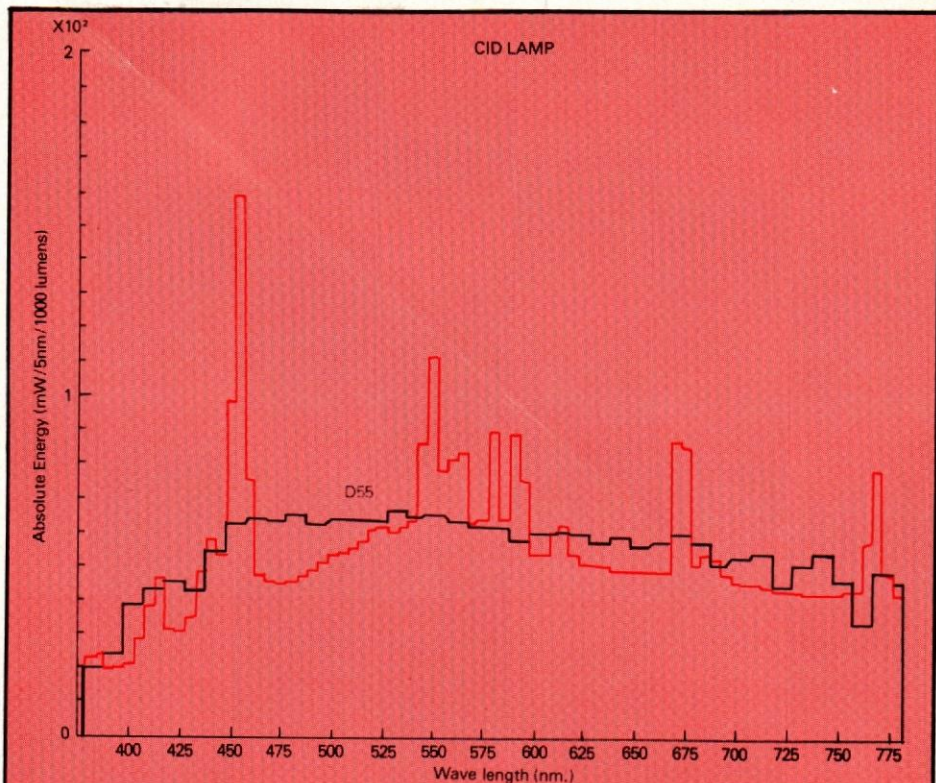


FIGURE 3 — Spectral energy distribution of the Thorn Cid lamp compared to the D55 reference.

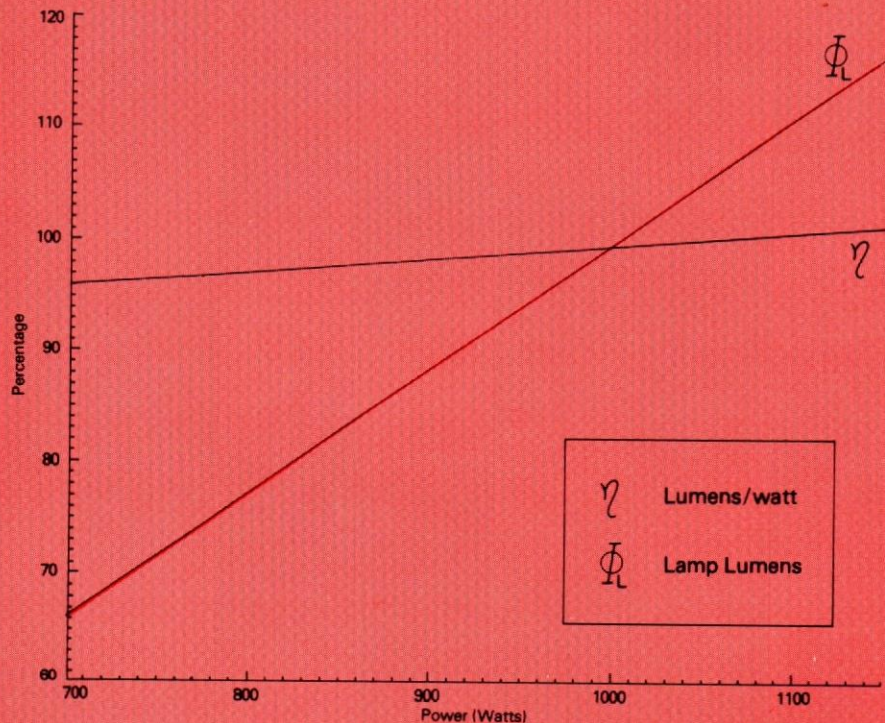


FIGURE 4 — Relationship between the efficiency and gross light output as a function of the total power dissipated at the lamp. Thorn states that the lamp color is constant within "measurement error" over the same wattage range.

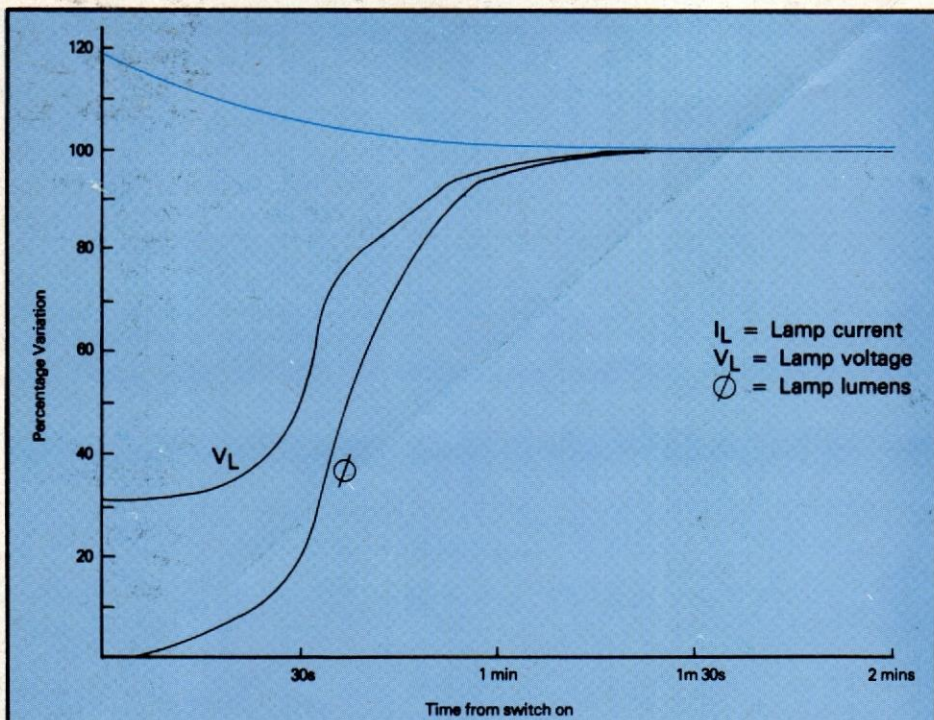


FIGURE 5 — The transient behavior of the 1000 watt CID lamp after it is switched on from the cold condition.

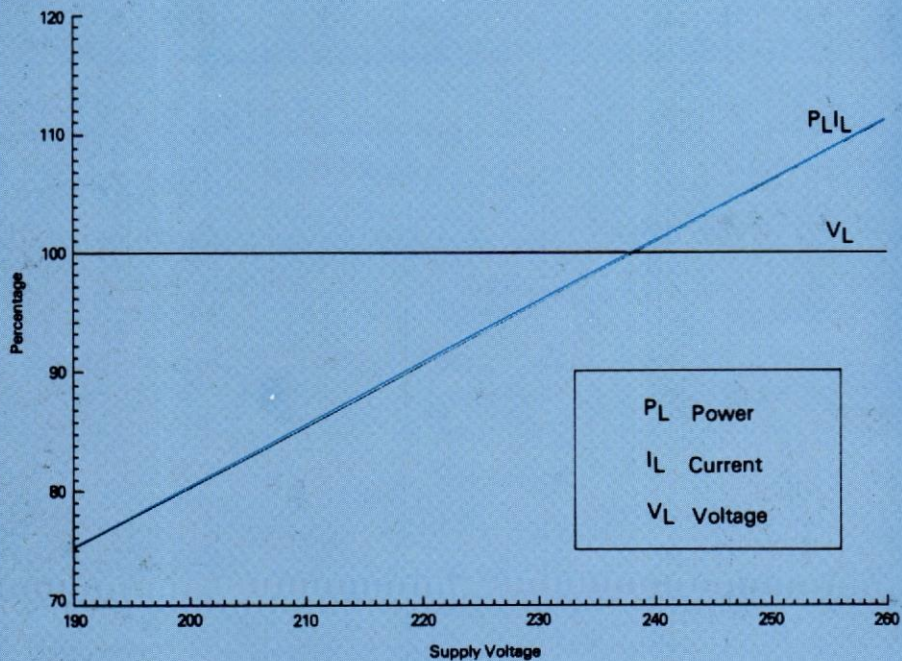


FIGURE 6 The relationship between the basic electrical characteristics of the lamp and variations in supply voltage.

Photos and charts courtesy of Thorne Lighting, Inc.

HMI fluctuates on each half cycle of the AC power, so that the light output varies between 100 percent (at peak current) and 18-20 percent (as the current is crossing through zero). This represents a modulation through 80 percent. The modulation figure for the CSI lamp was 62 percent. These are based on operation from a simple inductive type ballast.

In the case of the CID lamps, on the same ballast type, the modulation is only 45 percent. This a very large improvement, and should offer substantially improved tolerances relative to the parameters which are time related (variations in power frequency, camera shutter angle and framing rate). No data has been offered by the manufacturer relative to the exact amount of the tolerance improvement, or what the limits of the CID lighting system may be at various standard camera operating states.

Technical Data Summary

Following, is a technical data summary for those who are interested in the more precise characteristics of the lamp and its electrical and time related characteristics. Figure 5 shows the transient operation of the lamp after it is switched on from the cold state. Clearly, approximately one minute is required for stable operation from this condition. Hot restrike can be accomplished instantaneously and the time for stable operation when the lamp has only been shut off for a short time is somewhat shorter than one minute for the cold lamp. Figure 6 is self explanatory.

Table 1 offers a summary of the overall characteristics of the 1kw CID lamp (hot restrike version), for both the bare lamp and the PAR64 version.

Conclusions

The new Thorne CID lamp is one which should be welcomed as representing further expansion of the range of high efficiency daylight type enclosed-arc AC operated lamps. It will be interesting to see if the fixture manufacturers are responsive to the appearance of this source, and just what that response will be.

The pending 2.5kw CID lamp offers some exciting possibilities for conversion of existing fixtures. It is to be hoped that concern will be shown by those undertaking conversions for the safety problems relative to both electrical grounding and ultraviolet exposure. □