THE LUMEN GAME

For CRT Projectors

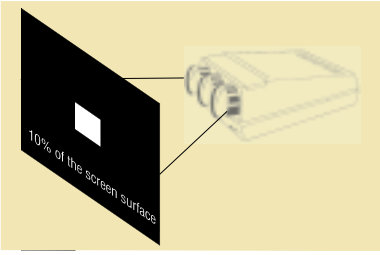
Playing "the lumen game" has become a favorite pastime for many manufacturers of large screen projectors, and indeed the game offers some very interesting challenges. The rules of the game are simple: 1. He who measures the highest light output of his large screen projector, wins. 2. You don't have to tell anyone how you measured the light output.

Although this ingeniously simple set of rules opens the gates for the most creative practices, it has led to the deplorable situation where the value of brightness specifications of the different manufacturers are reduced to a mere factor of publicity, without much relationship to reality and without any means of checking or reproducing the results.

With this note, we would like to remedy at least part of this, by stating clearly BARCO's procedure for measuring Light Output.

BARCO

Technical Specifications



10% Peak White:
As you may know, our brochures mention the light output on 10% peak white for CRT projectors.
The "Peak white" means that all power is concentrated on a part of the CRT where a pure white rectangle is projected.
The 10% indicates how large the part that is used is compared to the total screen area. These values are comparable with the screen content of an average video picture, that is never completely white or completely black.

How to measure ?
The measurement is done in the very center of the screen in a completely obscured room, using a pulse light meter, i.e. a light meter that is able to measure pulsating light like video is, as the picture is scanned 60 times per second (the light meter we use is a Minolta Chroma Meter).
This gives a result in Lux (=Lumens per square meter), a value that has to be multiplied by the surface of the total screen in order to get the total light output (see example).
Although the above measurement is very straightforward and simple, some parameters influence this measurement dramatically.

Parameters that influence this measurement:

1. Level of the video signal
It is obvious that a very small input signal will diminish the light output. Therefore, use a video signal of 1 Vpp.

2. Brightness and contrast settings
Full brightness and contrast settings will invoke the BCL circuit (Beam Current Limiter) to limit the light output in order to avoid damage to the tubes. Ideal settings are contrast at maximum, and brightness near the middle position.

3. Active phosphor area:
The larger the phosphor area used, the higher the light output becomes. Therefore, use maximum by yourself scanning in order to determine how large the 10% area should be.

4. Throwing distance:
Since the focal length of a lens becomes larger for larger pictures (larger throwing distance), the cone under which the light falls into the lens becomes sharper. This means the angle under which the light rays enter the lens, becomes smaller, which decreases the light loss in the lens.
Therefore a better result will be obtained on 10% of a large picture than on 10% of a small picture. Our measurements are done on an average screen size, with the standard lens.

An example:
The following example is a transcript of an actual test done with a BARCODATA 1209s.
- Total picture width : 2.36 x 1.78 which gives a screen surface of 4.2 square meter.
- White rectangle of 0.74 x 0.56 meter in the centre of the screen, which gives a surface of 0.4 meter (± 10%).
- Light value measurement with a pulse light meter: 299 lux or Lumens/square meter.
- Multiply by the surface: 299 Lumens per square meter x 4.2 square meter = 1256 Lumens, which is even slightly better than the spec in the catalogue: 1250 Lumens.
All specs given for BARCO projectors are results of actual measurements performed as described, on standard production models. All these results are therefore prone to repetition by yourself.

Peak White	**10%**	**ANSI**
BarcoVision 701s	1200	
BarcoVision 701 MM	1100	
BarcoVision 1609s	1600	270
BarcoData 708	1200	165
BarcoData 808s	1250	210
BarcoData 1209s	1250	240
RetroData 708 (Nit)	2000	234
RetroData 808s (Nit)	1250	195
BarcoGraphics 808s	1250	210
BarcoGraphics 1208s	1250	210
BarcoGraphics 1209s	1250	240
RetroGraphics 808s (Nit)	1250	195
Baron (Nit)	603	91

BARCO Projection Systems
Head Office
Noordlaan 5 8520 Kuurne - Belgium
Tel: +32 /56/ 368 211 Fax: 32 /56/351 651
E-mail: sales.bps@barco.com
Visit Barco at the web: www.barco.com

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