

Direct view LCD vs. plasma technology

Evaluating flat panel displays for real-world DVM conditions

Companies implementing Digital Visual Messaging (DVM) applications using large, thin displays now have two technology options: direct view LCD and plasma. Both offer the design flexibility and appeal desired in consumer environments such as retail stores, banks and airports.

When considering which technology to use, however, it is very important to evaluate the critical differences within the context of the real-world application. Your evaluation should consider total cost of ownership, ambient light and content, among other factors.

Total cost of ownership

Plasma display panels (PDPs) are available at a much lower price than direct view liquid crystal display (DV/LCD) products. However, initial price is only one element in the total cost of ownership picture over the life of a DVM project. That is why Clarity has developed a total cost of ownership model (see inside) that illustrates how various real-world factors affect PDP and DV/LCD displays differently.

Ambient light

DVM applications are typically deployed in high ambient light environments, which require display technology that will maintain its visual impact under demanding circumstances. Ambient light reduces brightness and contrast ratios on any display, but PDP units are particularly vulnerable even when running in full brightness mode.

For example, the ambient light in a typical retail environment (300 lux) reduces the darkroom contrast ratio specification of plasma by up to 90 percent and the brightness rating by as much as 50 percent. The impact on DV/LCD under the

same conditions is not nearly as significant. In addition, PDP displays generally need to run in full brightness mode in digital signage applications, reducing the average lifespan of the unit to 10,000 hours – or about 14 months running 24 hours a day.

Content

If the majority of content being used is video, PDP units may be an acceptable display option, notwithstanding the inherent brightness and panel longevity problems. However, DVM applications often combine static images, text and short video segments causing the plasma display to quickly exhibit image “ghosting” or burn-in.

PDP burn-in can be reversed, but this occurs at the expense of shortening the overall lifespan on the display panel. DV/LCD does not suffer from burn-in, making it a superior technology for DVM applications.



Clarity Bobcat uses its DV/LCD™ technology to deliver high brightness for the life of a DVM application.

Comparing DV/LCD and plasma technology

Display performance

When comparing DV/LCD and plasma technologies, it is important to evaluate brightness and contrast ratio in the context of the environment where the displays will be used. In both cases, Clarity testing has revealed that DV/LCD has significant advantages over PDP.

Brightness

Plasma display manufacturers maximize their “peak brightness” specification by illuminating and measuring only a small portion of the total screen area. Average brightness is a far more meaningful indicator of total performance because it is measured at multiple points across a fully lit display.

Contrast ratio

Published contrast ratio specifications can be equally misleading. The peak contrast ratio of plasma is measured in a totally dark room – not very representative of a well-lit retail environment. Again, the average contrast ratio is a better measure of real-world performance and where DV/LCD is far superior to PDP technology.

Display technology comparison*

	DV/LCD	Plasma
Panel size	40"	42"
Resolution	1280 x 768	852 x 480
Total pixels	983,040	408,960
Brightness**		
Peak	480 cd/m2	500 cd/m2
Average	480 cd/m2	230 cd/m2
Contrast ratio		
Dark room	600:1	500:1
Average retail environment	400:1	30:1
Backlight life rating (LCD)	60,000 hours	
Phosphor life rating (Plasma)		20,000 hours***
Image burn-in	No	Yes
Significant loss of brightness over time	No	Yes
Power consumption****	240 Watts	300 - 900 Watts
Weight	53 lbs.	80 lbs.
Viewing angle, horizontal & vertical	170°/170°	160°/160°
Extended warranty coverage (optional)	Non-restrictive, 5 year full replacement	Restrictive

* Compares the Clarity Bobcat DV/LCD display and the Clarity Lynx plasma display

** Brightness specifications are given in Candela's per meter squared (Candels/m2), or "nits." This is defined as: "A measure of the brightness or luminance of a surface. Measured in SI (International System) units as candela/m2 or nits, and English units as footlamberts (ftL)."

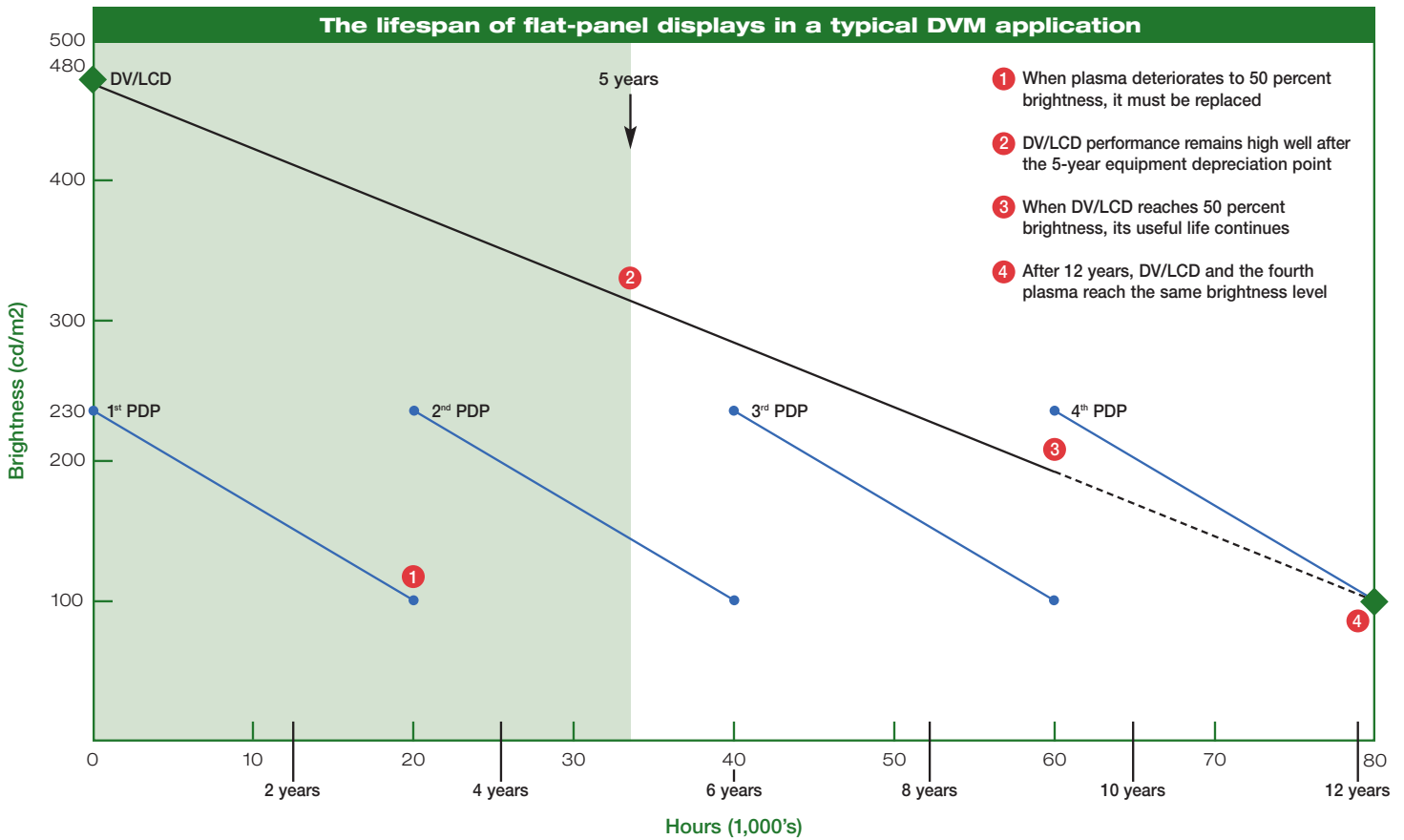
*** See 5 Yr. TCO Assumption table for explanation of PDP life rating measurement.

**** Power consumption specification on plasma varies based on content type. A full white screen draws the greatest amount and a full black screen the least.

Cost of ownership

The DV/LCD performance advantage translates directly to the bottom line. A DV/LCD display will deliver outstanding performance long after the equipment has been depreciated on the balance sheet. Meanwhile, the initial PDP unit deteriorates beyond its useful life as a digital sign and needs to be completely replaced – multiple times.

As a result, DV/LCD technology is more cost effective than plasma in a five-year cost-of-ownership model and through the entire lifecycle of an application, despite its higher initial purchase price.



Five-year cost-of-ownership			
	40" Bobcat	42" Plasma	50" Plasma
List price	\$8,595	\$4,500	\$6,995
Replacement parts	-	\$7,371	\$11,458
Consumables labor	-	\$213	\$213
General maintenance labor	\$325	\$325	\$325
Energy consumption	\$945	\$2,360	\$3,145
Total cost of ownership	\$9,865	\$14,769	\$22,136
Extended warranty (optional)			
DV/LCD ext. warranty covers full replacement of unit	\$3,201		
Plasma ext. warranty does NOT cover panel burn-in		\$2,000	\$3,600
Total cost of ownership with optional extended warranty	\$13,066	\$16,769	\$25,736

Hours of operation	
Hours per day	18
Days per week	7
Years of operation	5

Cost of ownership assumptions

The Clarity five-year total cost-of-ownership model is based on a typical DVM application running 18 hours a day and factors in the following costs:

Assumptions			
	Clarity Bobcat 40"	Plasma 42"	Plasma 50"
Consumables			
Illumination panel projected lifespan	60,000 hours	20,000 hours*	20,000 hours*
Failed illumination panel remedy cost	During first 5 years - \$0	Every 3 years - \$4,500	Every 3 years - \$6,995
Replacement labor hours	None	2	2
Total cost of labor	\$0	\$130	\$130
General maintenance			
Hours per year	1	1	1
Cost per year	\$65	\$65	\$65
Extended warranty cost per year			
Plasma (limited)		\$500	\$900
DV/LCD (full coverage)	\$800		
Energy consumption			
Rate per kilowatt-hr.	\$0.12	\$0.12	\$0.12
Power consumption (watts)	240	600**	800
Kilowatt-hours per year	1,572	3,931	5,242
Annual energy costs	\$189	\$472	\$629
Screen dimensions			
Aspect ratio	15:9	16:9	16:9
Diagonal (inches) viewable	40	42	50
Width (inches)	34	36.3	43.3
Height (inches) viewable	20.4	20.4	24.4
Screen area (square ft.)	4.8	5.1	7.3

* 20,000 hours is the average of the full brightness rating (10,000 hrs) and the half brightness rating (30,000 hrs) of PDP units

** 600 watts is the average of the 300 – 900 watt power consumption on a 42" PDP running in full brightness mode

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