

WHITE PAPER

Plasma Facts and Myths

Panasonic Presents Advice From the Video Purist Perspective

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Executive Summary

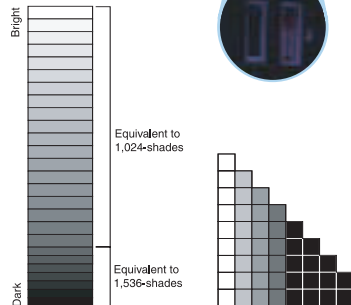
The 21st Century display technology called plasma TV looks, operates and performs unlike any previous device. No other television today offers the form factor, screen size and performance of plasma. The purpose of this report is to provide in-depth information about plasma technology. You will learn how plasma operates, the truth about plasma life span, the so-called uneven aging phenomenon, and maintenance. Performance criteria will also be examined so you can determine if a plasma panel is right for you.

How It Works

Plasma displays use three types of phosphors (red, green, and blue). Like a standard cathode ray tube (CRT) TV the phosphors glow to create an image. The difference lies in the way the phosphors glow. In a CRT, electrons strike the phosphors causing them to glow. A plasma display contains a combination of inert gases. Electrodes inside the glass panel charge the gas, resulting in the production of invisible ultra violet (UV) light. When the UV light strikes the phosphors, they glow, producing a brilliant picture.



Dark areas are not shown clearly.



Conventional



Dark scenes have finer detail.

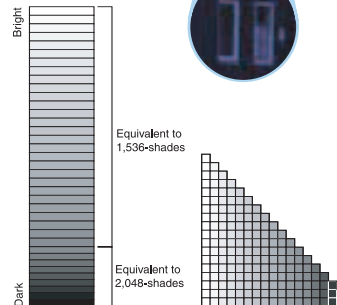


Image definition in low brightness areas is greatly improved.

XVS Series

Advantages of Plasma

Plasma TVs offer excellent color saturation, very wide viewing angles in both horizontal and vertical planes, and are equaled only by the bulky flat-faced direct-view sets based on traditional CRT technology. Their rapid response times assure crisp images even when fast motion is present, such as when viewing football or other fast-moving sporting events. Plasma televisions provide image brightness at a level far higher than large-screen projection displays, allowing for viewing in areas of high ambient light without washing out picture detail. (There are no direct-view CRT sets with comparable screen sizes to plasmas that are 42 inches or larger.) Panasonic black levels are close to direct view CRT levels, permitting superb deep blacks and outstanding viewing in dark environments. Panasonic contrast ratios are rated as high as 4000:1. Current LCD flat panels cannot achieve the dark black levels or contrast ratios of plasma in a home theater environment. Panasonic makes plasma panels in widescreen (16:9 aspect ratio) with enhanced-definition, commonly known as 480p, (37" & 42" have 852 pixels measured horizontally (H) by 480 pixels measured vertically (V) and high-definition resolutions (37"=1024H x 720V; 42"= 1024 H x 768 V; 50" and 65" 1366 H x 768 V).

Lifespan

There has been much misinformation about the longevity of today's plasma TVs. Like all other display devices, there are two parts to a television. The first is the internal electronics. Modern circuit designs are extremely reliable and all televisions, including plasma's circuits, are designed to provide extremely long life. The second part is the section of the television that produces light. In plasma, it is the phosphors within the glass panel. Phosphors are used to produce an image in standard picture tube (CRT) televisions as well, and in three-CRT rear projectors.

Television manufacturers base the projected life of all TVs on "half brightness," meaning the time it takes for the display to create an image that's only half as bright as when the TV was new. The three-CRT rear projector is generally rated at 15,000 hours until half-brightness. Direct-view CRTs are generally rated to 30,000 hours. Panasonic plasmas have a half brightness rating of 60,000 hours – four times the life of CRT rear projection. This equates to more than twenty-three years at seven hours a day viewing, around the average daily TV viewing time per U.S. household. With its inherent high brightness, a Panasonic plasma will likely retain its image quality for many years.

Myths Regarding Plasma Televisions

While a CRT direct-view television is an analog device that uses a picture tube and the plasma is a digital device, there are many similarities between the two technologies. As noted, each display uses phosphors to create light. While a direct-view picture tube operates in a vacuum, and the plasma screen uses inert gases, both are completely sealed. There is no possibility of the gas leaking out (barring physically breaking the panel), and there is never a need to "recharge" or "refill" the plasma panel. Conversely, there is no possibility of moisture leaking in, it can never "fog up" like a car windshield and, unlike an incandescent light bulb, a plasma panel doesn't suddenly "burn out."

Power Consumption

All Panasonic plasmas are Energy Star® compliant insuring low power consumption in standby mode (a mere 18 watts), when compared with non-Energy Star® models. The maximum power consumption during use depends on screen size; the 37-inch diagonal models, for example, are rated at 345 watts maximum. However, typical power consumption is much lower and varies depending on picture content and display settings such as brightness and contrast. With typical content and display settings, Panasonic plasmas have virtually the same power consumption as similar-sized LCD TVs.

Burn In

Much has been written about the possibility of permanently marking a plasma screen by viewing a static image on the screen for too long. This is often referred to as “static image burn in,” which is a misnomer. The phosphors are never “burnt,” rather they are unevenly aged. While the possibility of uneven aging exists, it can also occur with any other phosphor-based display such as a direct-view CRT television or CRT rear projection TV. Panasonic has developed new phosphors that are resistant to image burn-in and has added other features that minimize its occurrence. One such feature imperceptibly moves the image around the screen to eliminate sharp delineations between dark and light areas.

There are several simple steps to take to further prevent the possibility of image burn-in which should be performed during the break-in period.

Plasma Break-In

Like a fine new automobile, the performance of a plasma TV can be optimized by allowing a break-in period. By properly following these simple break-in instructions, you should be rewarded with long-term enjoyment of your plasma TV.

Plasma phosphors are most susceptible to image retention in the first hundred hours of use. The panel becomes considerably less sensitive to burn-in after this period.

Very often, televisions, including plasma, are shipped from the factory with the contrast control at a high setting to provide a bright picture under typical dealer showroom lighting conditions. In your home, the room light levels are usually one half or less than that in retail showrooms. The contrast control may need to be lowered in your home for comfortable contrast levels that do not induce eye strain.

When the plasma is initially installed, videophiles say it is best to do the following:

- ☒ Make sure the display is in a viewing mode (aspect ratio) that completely fills the screen (there are often three or more settings from which to choose). The panel is shipped in this condition, in what is called the “Just” mode.

- ☒ Turn down the picture control (contrast) to 50% or less.

- ☒ Briefly engage the 4:3 mode to confirm the side bars are set to mid-gray (there is usually an adjustment in the Set Up menu that takes the sidebars from black to gray) to minimize the chance of burn-in.
- ☒ Return the set to a “full screen” (Just, Zoom, Full) position during the first hundred hours of use.
- ☒ During the first hundred hours of use it is best not to view the same channel for extended periods. This should prevent channel logos and other fixed images found on some channels from being retained.
- ☒ Avoid any static images (video games, computer images, DVD title screens, etc.) during the hundred-hour break-in.

After the hundred-hour break-in period, during the next nine-hundred hours:

- ☒ Continue to retain the picture setting at 50% or less.
- ☒ Limit the use of 4:3 aspect ratio mode (traditional picture size that does not fill the entire screen) to 15% of viewing time.
- ☒ Limit the use of static images (computer, video games, etc.) to less than 10% of viewing time.

After one-thousand viewing hours, panels are much less likely to experience image burn-in.

What to do if you see a ghost image on the screen

In the rare event you begin to see a ghost image on the display, Panasonic has incorporated a built-in “white-bar scroll” feature to assist you. When enabled, the scroll will (in many cases) reduce or eliminate image retention. Consult Panasonic customer service for any technical support issues (800-211-7262 or <http://www.panasonic.com/support/>).

Panasonic Plasma Picture Quality

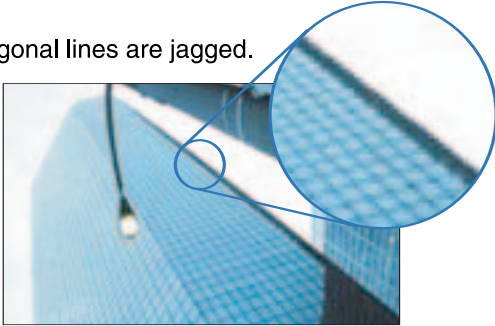
Panasonic has included several exclusive features to provide the best picture of any plasma television available. Here are the performance features that best separate Panasonic plasma from the competition, as well as other technologies.

Contrast Ratios and Digital Artifacts

Earlier generations of plasma displays lacked true blacks and dark area clarity, causing washed-out low-level detail and requiring viewing only in rooms with relatively high levels of ambient light. Panasonic has developed the exclusive Real Black Drive system that allows the shut off of individual picture elements (pixels) within the panel, to produce a true deep black. Panasonic’s Gamma Enhancement System allows near-black image information to be reproduced accurately. In addition, the Gamma Enhancement System increases the number of gradient steps, eliminating unnatural “dithering” artifacts that may degrade image quality. Dithering

artifacts are often noticed in programs with gradual brightness transitions, such as wide blue-sky scenes. A dithered sky breaks up into tile-like areas of varying brightness levels, instead of a smooth, uniform, natural expanse. The combination of these Panasonic breakthroughs increases rated contrast ratios, up to 4000:1, and allows Panasonic plasmas to reproduce 1536 different shades from black to white. Many competitors' designs are limited to only 256 steps, resulting in disturbing picture artifacts.

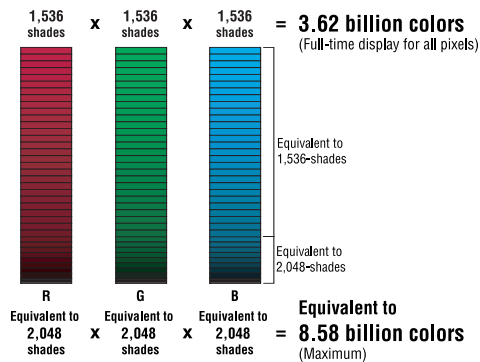
Diagonal lines are jagged.



Conventional

Color

Panasonic plasmas reproduce more than 1 billion colors, providing a rich natural palette for superb reproduction of movies, broadcasts and home videos. Many competing plasmas can only reproduce less than 17 million colors.



Angle of View

Plasma provides a bright, vivid high-contrast image with uniformity in both the horizontal and vertical viewing planes. Flat LCD panels lose contrast as viewing angle approaches the extreme. Only flat-faced direct-view CRT televisions have similar viewing angles, but without the slim form factor that plasma affords. Providing a remarkable picture at virtually any angle assures that everyone in the viewing room — regardless if they are sitting, standing or even lying on the floor — will see the same crisp clear images.

Rise/Decay Times

Plasma displays react very quickly to picture changes insuring exceptional viewing of fast motion found in sports programs. Flat LCD panels often have slower response times causing blurring with action and sports material.

Conclusions

As a relatively new technology, plasma faces challenges in the form of misinformation; possible misuse by the consumer; and myths previously assigned to preceding technologies that are carried over to the new. Hopefully this report has met these challenges by reviewing plasma not in terms of strengths or weaknesses, but in terms of actual capabilities and well-researched practices to achieve the best consumer experience possible.

Plasma is a superior technology in its obvious display capabilities but also in its longevity potential. With your attention to a few important settings and practices, plasma will provide you with an exciting and reliable viewing experience for years to come.

Panasonic ideas for life

••• Visit Panasonic Plasma on the web at www.panasonic.com/plasma