



White Paper

Glossy LCD vs. Non-Glare LCD - Merits and Demerits

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1 Preface

A non-glare LCD has long been a standard for the LCD monitor. However, glossy LCD monitors are recently increasing in popularity. “Non-glare LCD” and “Glossy LCD” refer to the types of surface treatment of a polarizer filter that is usually incorporated on an LCD panel. A polarizer filter with non-glare surface treatment is used for a non-glare LCD and that with glossy surface treatment is used for a glossy LCD.

Then, which type of LCD should you buy, a non-glare LCD or a glossy LCD? What else should you consider when buying an LCD? The points to be considered should include image quality, specifications, design and price. In addition to these product-related points, it is desirable to consider practical aspects as well. This white paper will compare a glossy LCD and a non-glare LCD in terms of merits and demerits, structure and impacts on color, and then explain which type of LCD will better suit for your needs.

2 Merits and Demerits of Glossy a LCD and a Non-Glare LCD

This section will explain the merits and demerits of a glossy LCD and a non-glare LCD, focusing on their screen performance.

A glossy LCD delivers vivid color, deep black tones and high contrast ratio, and thus reproduces rich and vibrant moving and still images. On the other hand, a glossy screen clearly reflects indoor fluorescent light and external lights, the user’s figure and so on. In addition, this type of monitor tends to cause eyestrain. Moreover, the screen surface is easily scratched, and thereby requires careful handling and cleaning. The screen may also be damaged by chemical cleaner.

A non-glare LCD offers less reflection of ambient light and is easier on the eye allowing for long hours of viewing the screen. These features are advantageous for use in general offices, government offices and schools. In addition, the non-glare surface is resistant to scratches and will not be damaged by moderately wiping the screen surface with a soft cloth (A microfiber cloth with LCD cleaner is advised.). On the other hand, the images on a non-glare LCD appear less vibrant, which results in lower contrast and tends to give an impression that the image quality of a non-glare LCD is inferior to that of a glossy one.



Fig.1: Image on Glossy LCD

Vivid colors / Deep black (Left)
Clear reflection of light from room lamp (Right)

An EIZO LCD monitor with an EIZO glossy panel protector is shown.



Fig.2: Image on Non-Glare LCD
(The photo was taken under the same condition as Fig.1.)

Less vibrant colors (Left)
Little reflection of light from room lamp (Right)

3 Structure of a Glossy LCD and a Non-Glare LCD

Sections 3 and 4 will explain some technical items focusing on the structures and the colors of a glossy LCD and a non-glare LCD. Knowing their structures and their colors will deepen understanding of the merits and demerits mentioned above.

A non-glare polarizer filter has microscopic unevenness on its surface. Understanding how this unevenness affects the way the screen is seen is part of the technical know-how of each manufacturer.

When light hits the uneven surface of a non-glare LCD, it scatters and diffuses to various angles. This reduces the intensity of light reflecting off the panel surface and moderates the light hitting your eyes. On the other hand, the diffused reflection of light from ambient light as well as a backlight lightens black tones and makes the screen surface look washed-out and hazy.

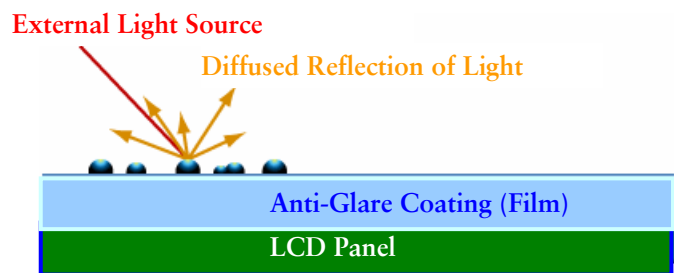


Fig.3: Surface Structure of Non-Glare Panel

Non-glare LCDs of late can show a deeper black and reduce blur on the screen surface by improving RGB filter performance and shutter aperture ratio.

The surface of a glossy panel is extremely smooth. The light from an LCD backlight reaches the user's eye without diffusion. This contributes to sharp contrast and vibrant pictures. On the other hand, the smooth surface of the panel reflects external light, which incurs surface reflection.

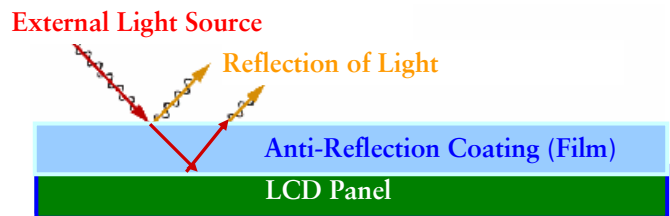


Fig.4: Surface Structure of Glossy Panel

A glossy LCD panel is usually treated with anti-reflective coating (AR Coat) to reduce light reflection. The AR coating absorbs a specific wavelength to alleviate light reflection. Absorbing extended range of wavelength by applying multi-layer AR coating can further reduce light reflection. However, this can lead to higher cost and lower brightness. The balance of these factors is part of the crucial technical know-how of each manufacturer.

4 Influence of Surface Treatment on “Color Space” and “Grayscale”

Our perception of color is greatly affected by ambient light. An image displayed on a monitor will look different when the room light is on and when it is off. Our color perception is also influenced by a visual trick in which a small digitally-taken picture displayed in the center of a monitor looks different on different backgrounds.

When comparing a glossy LCD and a non-glare LCD, it becomes clear that the diffused reflection of light

and the resulting washing out of the screen on a non-glare LCD greatly affect our perception of color. In low brightness or shadow areas, especially, the diffused reflection of light from external lights and backlight affect the grayscale tones. In the high brightness area, too, the washed out screen reduces color saturation.

As for the inherent color space and grayscale of LCD monitors, EIZO and other manufacturers usually measure them in a dark room. The measurement results show that a glossy LCD and a non-glare LCD have little differences in their performance in color space and grayscale rendering.

5 Surface Treatment of EIZO LCD Monitors

With the exception of some of its RadiForce series of monitors for medical imaging, all EIZO LCD monitors have a non-glare surface. However, EIZO offers protection panels with both glossy and non-glare sides for most of its monitors. The protection panels can be placed directly over the screen and have a light transmission rate of more than 90% so they leave minimal trace of implementation.

For more information please see: www.eizo.com/products/accessories/lcd/protectors/index.asp

6 Which should you choose, a glossy LCD or a non-glare LCD?

Choosing between a glossy LCD and a non-glare LCD depends on what you use your monitor for. A glossy panel may be suitable for mainly watching still images and movies. Using a glossy panel may cause eyestrain, but ambient light reflection should not bother you so much when viewing still and moving images.

On the other hand, a non-glare panel may be better suited for Internet browsing, business applications, and editing of still and moving images. Conducting these tasks on a glossy LCD may result in irritation from screen reflection and loss of concentration due to focusing on relatively small areas on the screen.

Special care should be taken when comparing a glossy or a non-glare LCD at outlet stores. The stores usually display a number of LCDs next to each other in a brightly lit space. This environment makes the images on a glossy LCD appear extremely vivid and attractive, giving the impression that the images on a non-glare LCD look somber and less vivid. How the images are displayed varies by the panel specifications such as brightness and contrast and especially by the ambient lights. The ambient lights at home are usually darker than those in the stores.

In conclusion, when comparing a glossy or a non-glare LCD, it is crucial to consider not only the specifications but also the practical factors such as the ambient lightning, the image types most frequently displayed and the images displayed for the longest hours.

Reference:

「IT media +D / EIZO channel 『Glossy LCD vs. Non-glare LCD – Let's understand their merits and demerits!』 Toshiaki Hayashi <<http://plusd.itmedia.co.jp/pcupdate/articles/0505/26/news001.html>> (2005/05/31)

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