

Haze Comparison

Among different generations of liquid crystal switchable films

Generations of smart glass are determined by manufacturing technologies of liquid crystal switchable film or LC film. In industries, independent patents or principle technologies are usually used to classify generations of a product. There are only three generations in the LC film or smart glass market. To control applications and understand the market situation, it is very important to understand differences among generations of LC films. Seeing is believing. Find facts and make the right choice by comparison. However, consumers often have difficulty directly seeing differences without professional instruments. This article introduces simple testing methods which allow consumers to compare haze level or clearness and other electro-optical properties among different generations of LC films in home or office conditions.

Samples and testing condition:

Prepare three sample films with different generations of LC film. Three samples have identical sizes and two busbars are on both short edges. These samples are hung on a window facing a street with a little overlap so that busbars can be connected each other. A dark gray car is used as a background. Using a variable voltage transformer to introduce different voltages from one side, haze level can be observed under the exact same condition. As clearly shown in pictures on right, the 3G Film in center position has the lowest haze level or the highest clearness at any driving voltages.

Haze is a core feature for LC film and a low haze in a clear state is very crucial for all its applications. Clearness is the soul of any optical device, like camera lenses or TV displays. If a core feature is poor, there is nothing else to talk about. Obviously, every manufacturer wishes to make LC film with a low haze. However, it was very difficult to achieve this goal in past. Older generations of LC film theoretically cannot produce a low haze, because high voltage can only turn the center portion of liquid crystals in micro droplets, but cannot turn liquid crystals near bipolar ends of micro droplets. Therefore, theoretically and practically, about 10% haze cannot be eliminated in older generations of LC films. 3G Film solved this long lasting problem by utilizing non-linear technology and nanotechnology and obtained US independent patent (most patents belong to dependent patents for improvement only.). New technologies can not only turn 100% of liquid crystals to clear in micro droplets, but can also turn them in very low voltage. Our results completely meet the expectation from these theories. 3G Film is the clearest film in the market and its haze level is at least 4% to 10% lower than any other product. Therefore, clearness, quality and lifetime of LC film are matched with its category standard of luxury merchandise. For more information, please visit Scienstry's website at www.scienstry.us

Since the comparison of haze levels at varying driving voltages is so simple to see, all of Scienstry's customers are encouraged to conduct such comparison themselves.



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What does low haze or high clearness bring to consumers? The advantage of low haze is not only beneficial for visual applications, but also offers a wider range of application temperature and a longer lifetime because a high clearness also results from high purity of materials. As we know, purification is quite costly. Prices of chemicals are almost double for upgrading purity from industrial grade (~90%) to reagent grade (~95%) or from reagent grade to analytical grade (99+%). With common sense, the purer a liquid, the higher clearness it has. Impurity is not only responsible for cloudiness/haze but also a shorter lifetime, as impurity promotes and accelerates decomposition, especially under high voltage, high temperature, or high sunlight/UV conditions. Without exception, for LC films, a wide range of application temperature must use high purity of liquid crystals and other chemicals. When impurity is included in liquid crystals, the impurity will narrow temperature range. Impurity often shortens lifetime by losing required scattering (hiding power) level or showing semi-transparency without power. 3G Film never has such problems and risks. Therefore, wider ranges of application temperature reflect a higher purity of materials, automatically offering a longer lifetime. This is why 3G Film's the lowest haze, the widest temperature range (from -30°C to 80°C) and the longest lifetime always come together. 3G Film can work in anyplace where people can live and work in indoor without lamination for over 10 years without notable change. The toughest tests including systemic automobile tests (9 tests), high temperature tests at 150°C for 10 days, underwater tests for 30 days, sunlight tests for 100 days, UV test, impact and switching tests have clearly shown that 3G Film is far superior to earlier generations in any optical feature. High quality is the best guarantee for your projects and business. For large projects, when quality and risks become the most important factors to be considered, 3G Film usually becomes only choice.

