

Light Management Films Selector Guide

Finding the right polymeric film to meet a specific light management need is often a difficult commercial challenge. The wide range of inherent characteristics of plastic films, varying test methods, and terminology differences can add to that material selection challenge. A good starting point is to understand that plastic films can be categorized into the 3 different types of light management products: Light Transmission (high, low, or spectrum specific), Light Diffusing, and Light Reflecting. The pages below provide an overview of each material type, common design challenges, commercial applications, and the products offered by Tekra and our supply partners in this space.

Light Transmission

As mentioned above, plastic films and laminated products have light transmission ranges from virtually zero to approximately 88%. With the addition of anti-reflective coatings, it is possible to add 1.5% - 3% to the total transmission values, possibly more. Anti-reflective materials have applications in personal protective equipment and electronic displays. On the opposite extreme, even thin films can be made completely light blocking by laminating metal foils into the structure of the film. Applications for blocking materials are two sided displays and packaging of photo-sensitive materials.

Other considerations for the high light transmission segment are:

- Does the film require secondary processing where micro-scratches can reduce transmission? If so, introduction of a removable mask is suggested.
- Does the intended application expose the film to higher temperatures? If so, all testing of published values should be verified within the process and post processing because some substrates can change under these conditions.
- If the application requires additional coatings, laminating, or the addition of any nano-structures, adhesion should be carefully evaluated.

With so many possible needs to be considered, there are a wide range of film possibilities. Here are just a few of the options that can be offered by Tekra with links to a product data sheet for each product:

[Melinex[®] 453 Polyester](#) - Is an excellent handling, high clarity film with one side pre-treated to promote adhesion to most printing inks and industrial coatings.

[Melinex[®] 454 Polyester](#) - Is an excellent handling, high clarity film with both sides pre-treated to promote adhesion to most printing inks and industrial coatings.

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Melinex® 455 Polyester - Is a high clarity polyester film pre-treated on one side for slip. It has excellent handling characteristics and low surface resistivity.

Melinex® 456 Polyester - Is a high clarity polyester film pre-treated on both sides for slip. The two smooth surfaces allow for easy top coating.

Melinex® 515 Polyester - Is a high clarity polyester film which is two side pre-treated for slip to combine good handling properties with high clarity and brilliance.

Melinex® 516 Polyester - Is a high clarity polyester film which is two side pre-treated for slip to combine good handling properties with high clarity and brilliance. This film has UL94 VTM-2 approval.

Melinex® 561 Polyester - Is a high clarity polyester film which is pre-treated on both sides to promote adhesion to many industrial coatings and inks. It is suitable for applications which require more die cuttable polyester film. This product has been registered with UL.

Custom Polyester films with Anti-Reflective Coatings - Tekra has the ability to take clear polyester films and add custom anti-reflective coatings to meet the specific specifications of your application.

Light Diffusion

The most common light diffusion application is backlits, including backlit signage. Backlits are typically lit with LED or fluorescent light sources. These light sources can cause hot spots of focused light if the proper film type is not used. These hot spots detract from the visual appeal and readability of the image for the backlit sign. Light diffusing films are engineered to diffuse LED and fluorescent hot spots without sacrificing light transmission to improve display quality and reducing energy consumption within the light source.

There are many films that have light diffusing characteristics, however there are more properties to consider when selecting a film for backlits.

- Is the material going to be printed?
- If it is going to be printed, what method of printing will be used?
- Does the film need to be durable and/or used in outdoor applications?
- Will it be encased in the middle of a construction or does it need to be able to stand alone?
- Does it need to be formable?
- Does it need to have an adhesive?

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The following is a wide selection of different products that qualify as Light Diffusion films:

Illuminex Standard Diffuser “DS” Series Polycarbonate - Is a standard diffuser film featuring random light diffusing texture providing high light transmission and good hiding power. This polycarbonate film is designed for use as a bottom or top diffuser sheet or micro-lens film in a wide variety of LCD back lighting applications using a single or crossed prism sheet(s). This product provides superior environmental performance at elevated temperatures & humidity which you can find in larger LCD displays.

Illuminex Basic Microlens Diffuser “MB” Series Polycarbonate - Is a basic microlens diffuser film featuring patented monolithic lens structure, providing best in class hiding power and good luminance. This polycarbonate film is designed for use as a bottom diffuser sheet or micro-lens film in a wide variety of LCD back lighting applications using a single prism or multiple bottom diffusers. This product provides superior environmental performance at elevated temperatures & humidity which you can find in larger LCD displays.



When light diffusion films are not used in backlit applications, hot spots of focused light can be seen through the film and detract from the visual appearance of the application.

LEXAN™ 8A23 Polycarbonate - This polycarbonate film is one side matte, one side polished custom colored film. It offers high temperature resistance, excellent dimensional stability, as well as, good printability. It can be used as a backlit film over light-emitting devices (LEDs). Its low gloss level reduces glares.

LEXAN™ HP12W Polycarbonate - Is a high performance coated film that offers very good chemical and abrasion resistance along with very good UV resistance. These performance characteristics make this film a good choice for outdoor applications.

3M™ Envision Diffuser Film 3735-60 - Is a 2 mil white vinyl film with pressure sensitive adhesive designed to adhere to rigid substrates. It was created for custom lighting effects for backlit applications. The film controls brightness and light distribution within light boxes without hotspots. It is available in different transmission levels: 30%, 50%, and 60%.

JetView™ Latex Inkjet White Translucent Backlit Polycarbonate - This polycarbonate film is a one side matte, one side polished custom colored film. It offers high temperature resistance and excellent dimensional stability. It is designed to be used as a backlit film over light-emitting devices (LEDs) that is printed via Latex Inkjet printers. Both the polish and matte side can be printed via Latex inkjet offering two different backlit looks of the film. Available in 53”, 57”, and 60” wide rolls.

JetView™ Latex Inkjet Backlit Polyester - This brighter white polyester film is the film of choice for latex inkjet printable backlit signage for the retail signage marketplace. The blueish white appearance gives a clean, crisp look to latex inkjet colors making them pop when backlit. With a light transmission value of 43.6/100, it is translucent enough to ensure your light source comes through with enough opacity to diffuse the light properly and eliminate hotspots. Available in 50”, 60”, and 87” wide rolls.

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JetView™ UV Inkjet Diffused Polyester - This diffused polyester is designed to be front printed by UV inkjet presses for backlit applications. It offers excellent ink adhesion and usability. The translucent white color diffuses the light evenly to eliminate hot spots.

JetView™ Solvent Inkjet White Translucent Matte/Gloss Polycarbonate - This white translucent matte/gloss polycarbonate film is print receptive coated to allow solvent inkjet inks to adhere to the film while protecting the film from breaking down from the solvents. Typical applications include backlit signage.

JetView™ Solvent Inkjet Backlit Polyester - This white translucent gloss/gloss polyester film is print receptive coated to allow solvent inkjet inks to adhere to the film while protecting the film from breaking down from the solvents. Typical applications include backlit signage.

Dura-Go® White Translucent Polystyrene - This white translucent polystyrene is coated on both sides to be print compatible with HP Indigo presses. This film is designed to be backlit in small light boxes. The translucent film, evenly diffuses the light eliminating hot spots.

Melinex® 377 Polyester - Is a translucent matte film having medium surface gloss with light diffusing properties.

Melinex® 378 Polyester - Is a translucent, matte, polyester which has a rougher surface (lower surface gloss) than Melinex® 377. This film also has some light diffusing properties.

Teijin® Tetoron® U4 - Is a filled, translucent white polyester film with rough surface and diffusing characteristics.

Light Reflection

Light reflection films are designed to do just what the name says: to reflect or redirect light. In many light management applications such as LCD backlight units and light ballasts, light will escape or be absorbed by other materials in the construction which will diminish the brightness of the light source. By adding reflective films to these applications, upwards of 98.5% reflectivity over the full visible spectrum and all incident angles can be achieved depending on the type of light reflection film that is used. The results can minimize the amount of light loss and increase the illumination. In addition, most reflective films also help spread the light instead of focusing it like a mirror. By adding these films to the construction, it can allow a lower capacity light source to produce a very bright display.

Typical applications for light reflection films can include:

- Signs and light boxes
- Channel letters
- Ballasts
- Reflectors in display boards
- T4 fluorescent lighting
- LCD backlight units
- Luminaries
- Insides of cabinetry

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Light reflection films can vary in thickness, reflectiveness, and color. Tekra can source a variety of these films with different properties to meet your needs including:

3M™ Specular Film Protected D50A - Is a high performance ultra-high reflectivity film, which is greater than 98.5% reflective over the full visible spectrum and all incident angles. It is also specially formulated to provide significantly increased lifetime when used in high intensity LED light engines over standard specular film protected product. The product is coated with a pressure sensitive adhesive, and has a release liner for easy attachment.

3M™ Specular Film Protected D50F - This is the same product as the D50A except that it is film only. There is no pressure sensitive adhesive.

3M™ Light Enhancement Film 3635-100 - Is a white, opaque, matte calendered vinyl with a solvent acrylic permanent pressure sensitive adhesive. The film offers a very low light absorption increasing sign luminance, even more than with the most reflective materials including mirrors. This feature can also help eliminate hot spots.

Melinex® RFL1 - Is a highly reflective, biaxially oriented, glossy white polyester film. The pearlescent finish delivers brilliant whiteness, while adding an average of 6 points in reflectance to standard white polyester film.

With access to the latest films from top manufacturers augmented with Tekra's coating capabilities, Tekra can help you with all of your light management application challenges. Our technical team will work with you to select the right film for your specific application. Contact Tekra today at 1-800-448-3572 for your light management needs.



Light Management Reflective films allow you to redirect light so as not to diminish the brightness of the light source.