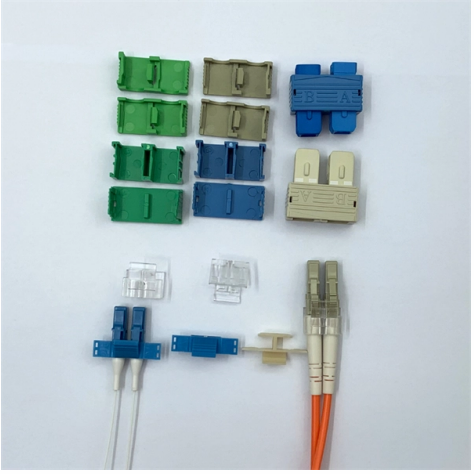
Illumination module for blister packaging box



Overview

illumination for pharmaceutical blister pack inspectionthe inspection of curved, reflective blister is a challenging task for image processing systems. app.

Key Takeaways

Diffuse, multi-axis LED illumination modules are essential for high-quality inspection of blister packaging, ensuring uniform lighting, reduced reflections, and accurate color capture.Key Considerations for Blister Packaging Illumination

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1. Diffuse Lighting for Reflective Surfaces Blister packs often have curved, reflective surfaces that can create glare and hotspots, making inspection challenging. Diffuse illumination, sometimes referred to as a "light tent," evenly spreads light across the blister surface, minimizing reflections and improving image quality for line-scan cameras . This is particularly important for transparent or colored capsules and tablets. 2. On-Axis and Off-Axis Illumination Modern inspection systems, such as the Smart Vision Lights TL305, combine on-axis lighting (directly aligned with the camera) with off-axis lighting (angled illumination) to provide multi-dimensional coverage . This approach ensures consistent brightness across the blister, enhances edge contrast, and improves color reproduction, even for multi-colored or opaque products. 3. LED Technology Advantages High-brightness LEDs are preferred over fluorescent lighting due to their long lifespan (50,000+ hours), energy efficiency, and stable intensity . LEDs also allow for strobe or continuous operation, adjustable intensity, and multiple wavelengths or colors, which can be tailored to the specific inspection task. 4. Integration with Vision Systems Illumination modules are often integrated with line-scan or area-scan cameras for automated inspection. Systems like Baumer's VeriSens or CX series cameras include integrated illumination controllers, allowing flexible adjustment of light intensity and synchronization with image acquisition . This ensures reliable detection of defects, completeness, and color consistency. 5. Customization and Flexibility Lighting modules can be customized in length, color, and mounting options to fit different packaging lines and blister formats, including flat foil, pocketed foil, lined foil, and cardboard packaging . Adjustable intensity and multi-axis control allow operators to compensate for variations in product shape, color, and reflectivity.

Practical Benefits

• Improved defect detection: Cracks, missing tablets, or misaligned capsules are more easily identified.

• Enhanced color accuracy: Critical for multi-colored or coated tablets.

• Reduced glare and hotspots: Ensures consistent image quality across reflective surfaces.

• Energy efficiency and durability: LED modules reduce maintenance and operational costs. In summary, a well-designed illumination module for blister packaging combines diffuse, multi-axis LED lighting with adjustable intensity and integration with vision systems. Solutions like the TL305 from Smart Vision Lights or Banner Engineering work lights provide reliable, uniform illumination that enhances inspection accuracy and efficiency across diverse pharmaceutical packaging formats .

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