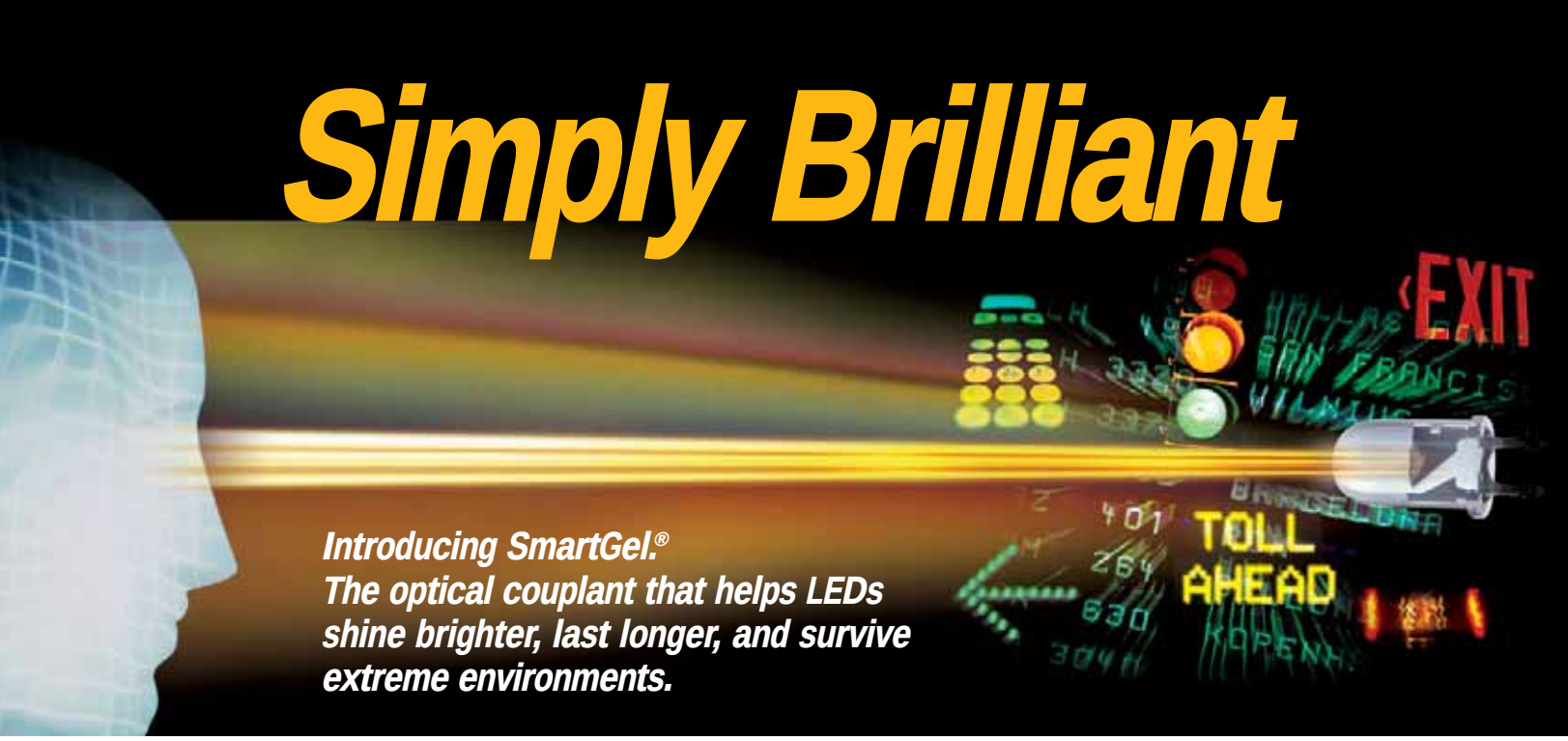
Simply Brilliant

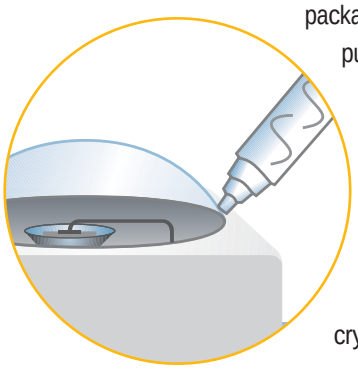


Introducing SmartGel.®
The optical couplant that helps LEDs shine brighter, last longer, and survive extreme environments.

SmartGel®

Index-matching gels for LEDs

SmartGel® — a breakthrough in LED encapsulants — is the new alternative to optical-grade epoxy resins. Custom-designed to match the requirements of your LED packaging system, SmartGel increases lumen output, extends lumen life, and survives demanding operating conditions better than epoxy.



SmartGel consists of a low viscosity optical fluid and chemically active thickening agents. The uncured components fill the gap between the light emitting diode and the lens, cure in place, and become a stable, crystal-clear, long-life viscoelastic gel.

Why SmartGel instead of epoxy? The benefits are perfectly clear.

■ ***Unlike off-the shelf epoxies, SmartGels are formulated to match precisely the refractive index of your lens***. They can even be optimized for specific wavelengths. They deliver maximum lumen efficiency from Day One.

■ ***Epoxies turn yellow or brown over time***, reducing an LED's useful life. SmartGel is non-yellowing under typical conditions and keeps LEDs bright for their functional life.

■ ***Epoxies are rigid.*** They can trap stress, fracture, and delaminate, which leads to decreased light output or even catastrophic failure. SmartGel is mechanically rugged *and* viscoelastic, so it relieves stress. Your LEDs last longer — so do the products where they're used.

■ ***Epoxies can crack when cold and soften when hot.*** SmartGel withstands temperatures from -65°C to 200°C without cracking or softening. They are designed for wide temperature excursions in the field and in production, including soldering temperatures during device assembly.

SmartGel is also production-friendly. You determine set time and cure rate. You specify its cured consistency, from toothpaste-soft to silicone-rubber-hard. And you can integrate SmartGel dispensing systems into your existing automated LED manufacturing system.

Try SmartGel® Today.

Nye's Optical Coupling Kit will introduce you to this unique optical couplant family, which includes optical fluids, non-curing gels, and curing gels, — which are designed specifically for LEDs, displays, and other applications where an optical couplant must wick into tight spaces. To order a kit or to consult with a Nye engineer, visit our web site or call us at 508-996-6721.

Why they're called SmartGels?

SmartGels® are "taught" how to work in your LED and adapt to your production environment. Here's how:

Refractive Index. SmartGels are used as a light bridge between the diode and the lens. We match the refractive index of the gel to the refractive index of your lens within very tight tolerances — to eliminate reflection and maximize lumen output.

Hardness. You specify the cured consistency of SmartGels, from gelatin-like with self-healing characteristics, to hard silicone rubber. Softer gels (10 to 40, Shore 00) provide more strain relief. Harder gels (10 to 50, Shore A) deliver more dimensional stability.

Clarity. SmartGels are highly transmissive throughout visible wavelengths. Typically, optical losses are 0.1 db/cm.

Cleanliness. SmartGels are super-clean gels. They're manufactured, filtered, and deaerated in a clean room environment to ensure optimal light transmission.

Set Time. You decide how long SmartGels take to reach final consistency — from a few minutes to many hours. They can also be designed to "snap cure" when exposed to a specific temperature.

SmartGels can also be formulated to resist water, ionizing radiation, reactive chemicals, yellowing at soldering temperatures…and more.

Nye® *Synthetic Lubricants* *The* SmartGrease *Company*®

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Nye optical products are developed and manufactured by Nye Lubricants, Inc.

ISO 9001:2000
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ISO 14001