

Optical Coupling Fluids & Gels serve as a “bridge” for light signals by carrying light between different media such as transparent plastic or glass light pipes or lenses. These materials, also known as *Index Matching Fluids and Gels*, are used to optimize light transmission (by matching the refractive index of the mating materials) while allowing pliable mechanical connections between rigid parts. Unlike a rigid optical epoxy, Nye’s pliable gels are viscoelastic and can take up the differential thermal expansion of precision optical parts without inducing excessive stresses or delamination. In many devices, these materials serve an additional function: they help seal out ambient dust or fluids from sensitive optical components. Nye’s optical fluids and gels are formulated to be ultraclean, non-yellowing, and unaffected by x-ray, ultraviolet or sunlight exposure. They have extremely low outgassing and volatility characteristics, and are free from light-absorbing microscopic particulates. Nye’s optical products are chemically stable, non-toxic, synthetic materials with wide temperature serviceability and are suitable for designs with high reliability and long service life.

Typical Properties of the Gel		Typical Value	Test Method
Color, Appearance		Milky, Translucent	
Refractive Index	402 nm	1.5456	ASTM D-1218
	589.3 nm	1.5095	
	980 nm	1.4922	
	1550 nm	1.4839	
Refractive Index Temp. Coefficient	25°C to 60°C	-3.4 X 10 ⁻⁴	
Refractive Index vs. Wavelength, Cauchy Fit		1.4831 + 10474 λ ⁻²	ASTM D-1218
Optical Absorption	650-900 nm	< 0.03 %/micron	Nye CTM-23
Penetration Unworked		301	ASTM D-1403
Apparent Viscosity	25°C	7,000 poise	Nye CTM-14
Oil Separation	24 hours 100°C	4 %	FTM 791, Method 321.2
Evaporation	24 hours 100°C	< 0.1 %	ASTM D-972
Specific Gravity	25°C	1.15	ASTM D-1217
Thermal Coefficient of Expansion	cc/cc/°C	4 X 10 ⁻⁴	ASTM D-1903
Microscopic Particulate Contamination	10-34 microns	< 500	MIL-G-81937
Number of Particles/cc	>=35 microns	0	

The typical properties shown on this product data sheet should not be used as a basis for preparing specifications. Refer to the Material Safety Data Sheet for detailed safety information.

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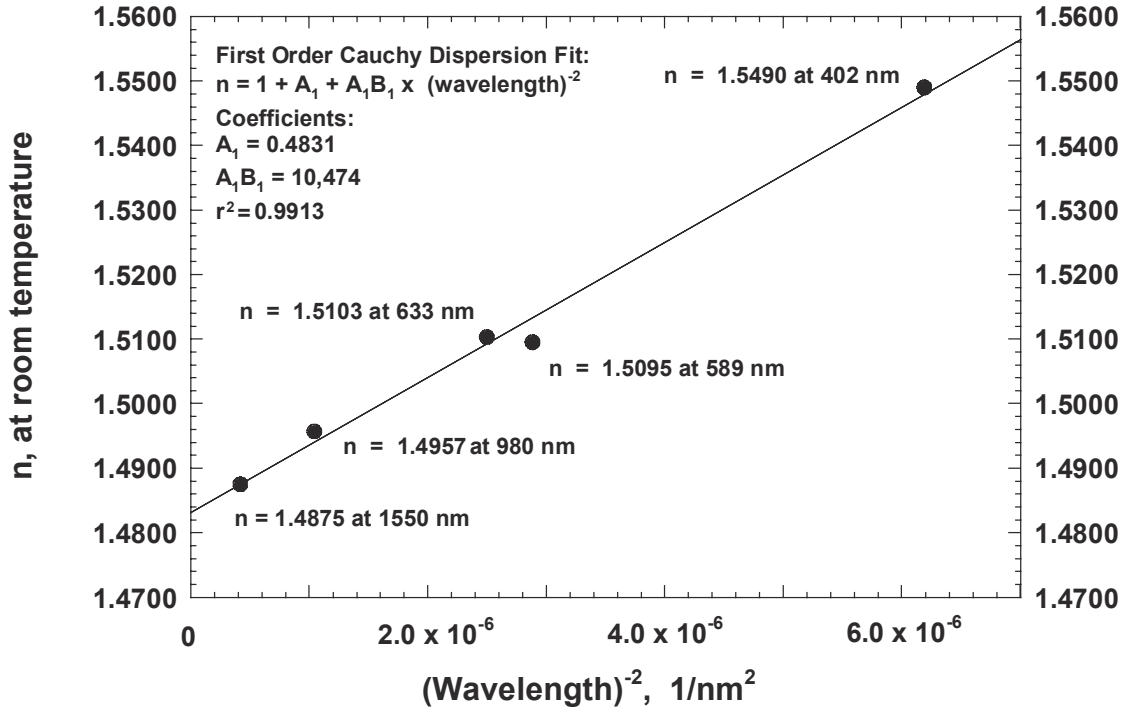
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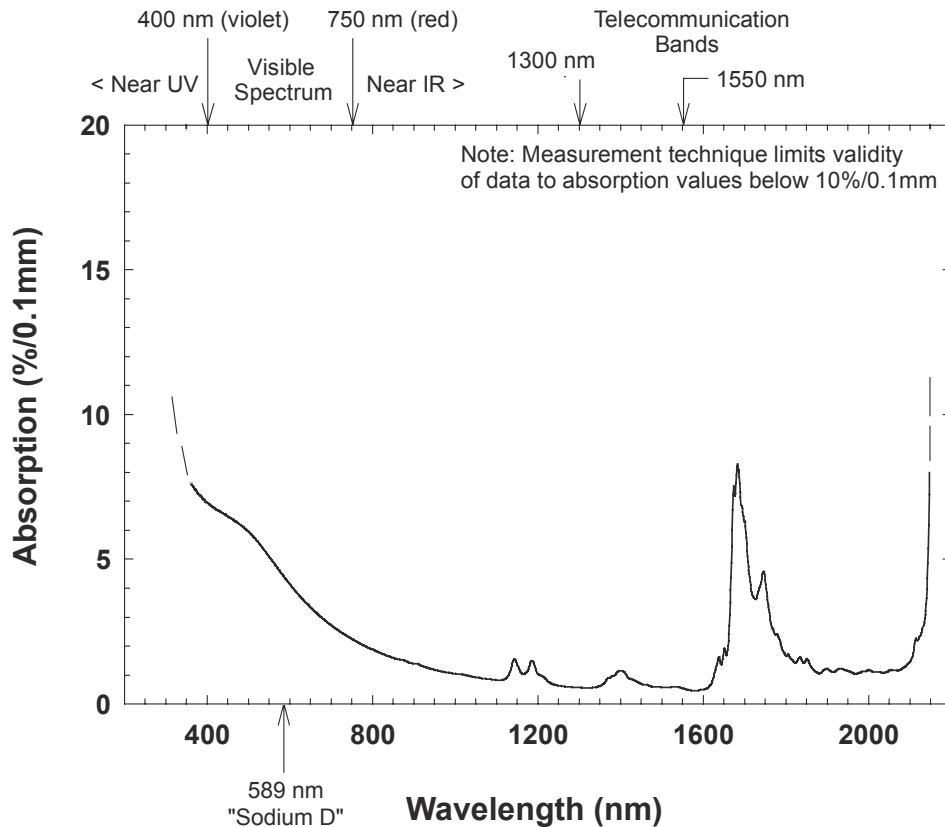
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Index of Refraction vs. Wavelength Thixotropic Gel OC-440



Optical Clarity vs. Wavelength Thixotropic Gel OC-440



Nye's Optical Products are organized into three families with different fluid/mechanical characteristics:

Optical Coupling Fluids are true fluid materials used in applications where free fluid flow is advantageous.

Thixotropic (non-curing) Optical Gels are ready-to-use materials with high apparent viscosity, and similar in feel to a soft putty.

Curing Optical Gels are available in two-part curing systems; the end user must mix the product components in the specified mix ratio and the product will then cure in place (with a cured consistency which can range from that of a stale gelatin to a medium hard rubber). Curing gels flow easily into tight spaces and are more elastic than non-curing gels.

Selecting the Best Optical Coupling Material for Your Application. Once you have determined which mechanical consistency is best for your application (fluid, non-curing gel, or curing gel), the next step is to determine the ideal index of refraction for optical coupling. Usually, the ideal index is equal to the value of the index of refraction of the two light transmitting plastics or glasses, which are to be "bridged" by the optical fluid or gel. If the mating materials have different indices of refraction, then the geometric mean of the two indices usually approximates the best choice for the optical fluid or gel.

