



Beyond Solvent:

How UV-Cured Adhesives Are
Redefining Sign & Display Graphics

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INTRODUCTION

Sign and display graphics providers are under growing pressure to balance performance, cost, and sustainability when selecting adhesive films. Traditional solvent-based products deliver proven durability and adhesion but rely on energy-intensive manufacturing processes and raise environmental concerns. Water-based adhesives address some of these issues, yet often fall short in demanding environments, such as high humidity, cold temperatures, or applications involving textured or low-energy substrates.

To address this performance gap, Nekoosa developed NextBond, a UV-cured adhesive film technology engineered to deliver solvent-level performance through a cleaner, more efficient manufacturing process. UV curing enables strong, consistent adhesion, broad substrate compatibility, and long-term outdoor durability while improving production efficiency and cost structure. These advantages are particularly relevant for wide-format graphics that must perform reliably in harsh, real-world conditions.

This report examines the development of NextBond, the underlying UV-curing technology, and its performance across challenging sign and display applications.

THE ORIGIN STORY

NextBond originated from Nekoosa's effort to expand beyond its established expertise in water-based adhesives. While sustainability was becoming a higher priority for customers, many continued to rely on solvent-based films to meet outdoor durability requirements and ensure reliable adhesion to textured or low-energy surfaces. This disconnect highlighted a clear market need: an adhesive technology capable of matching solvent performance without the environmental and operational drawbacks of solvent-based production.

Nekoosa Product Development Manager - Wide Format Bryan Baab proposed addressing this challenge through UV-curing chemistry. The development process began with a high-performance solvent adhesive; however, instead of applying it using conventional coating methods, the solvent was removed from the final formulation and photo-initiators were incorporated to enable UV curing. The resulting adhesive is a 100% solids system that cures instantly under UV lamps (eliminating ovens, combustion processes, VOC emissions, and the need for solvent incineration) while preserving the durability and reliability expected from solvent-based products.

Initial testing within Nekoosa validated the technology for wide-format sign and display applications. The UV-cured adhesive produced stronger, more uniform bond layers, eliminated oven-related defects such as liner curling, reduced energy consumption, and improved overall manufacturing safety and cleanliness. Based on these results, Nekoosa invested in UV-coating equipment, laying the groundwork for the NextBond product line and providing customers and distribution partners with a compelling alternative to traditional water-based and solvent adhesive films.

A CLOSER LOOK AT THE PRODUCT LINE

NextBond's UV-cured adhesive platform supports a flexible portfolio of printable vinyls, overlaminates, and mounting films designed for varied signage applications. The portfolio includes the following formats:

- **NextBond Premium Vinyl** — ideal for everyday graphics requiring durability and clean removal.
- **NextBond High-Bond Opaque** — engineered for difficult substrates such as brick, concrete, textured plastics, and wood; also acts as a true block out film and can be applied in temperatures as low as -10°F.

■ **Clear Overlaminates** — provide UV protection, abrasion resistance, and optical clarity.

■ **Mounting Films** — support smooth application to rigid substrates.

Together, these products combine durable adhesion, optical clarity, installation efficiency, and environmental responsibility.

Nekoosa positions these products around four key performance pillars — durable bond, visual clarity, installation ease, and environmental responsibility — summarized in **Table 1**.

Table 1: NextBond Performance Pillars

Durable Bond	Visual Clarity	Installation Ease	Environmentally Responsible
■ Durability comparable to or exceeding solvent-based adhesive systems ■ Maintains performance across a wide range of environmental conditions ■ Service temperature range of approximately –40°F to 180°F ■ Designed to bond reliably to challenging and textured substrates	■ Optically clear adhesive suitable for overlaminate applications ■ UV-cured process eliminates the need for drying ovens, reducing contamination risk ■ Formulation minimizes haze or clouding, including during wet application ■ Maintains clarity over the expected service life of the application	■ Available in permanent and high-peel removable adhesive options ■ Supports both wet and dry application methods ■ High-peel removable option allows clean removal within short-term applications (e.g., under six months)	■ UV-cured process reduces energy use and associated CO₂ emissions compared with solvent-based systems ■ Free of VOCs and solvent emissions; non-flammable and safer to handle ■ Compliant with OSHA, EPA, and CARB requirements ■ Suitable for use in sensitive indoor environments

Source: Nekoosa



Unlike traditional adhesive families built on multiple chemistries, the NextBond line is engineered on a unified adhesive platform. This approach enables consistent performance across premium vinyls, high-bond films, and overlaminates, supporting everything from routine retail graphics to the most challenging substrate applications.

UNDERSTANDING UV-CURED ADHESIVE PERFORMANCE

According to Baab, the move to UV-cured adhesive technology represented a turning point in balancing performance and sustainability.

“Our goal was to match the strength and reliability of solvent-based adhesives while improving environmental performance and production efficiency,” Baab said.

He explained that the UV process produces a clean, uniform adhesive layer free from imperfections that can occur during solvent evaporation or heat-based drying. By eliminating the need for long gas ovens to dry solvent, the process minimizes airborne contamination and results in a cleaner, more stable bond layer.

Optical Clarity and Print Quality

Baab said that a common misconception is that UV adhesives cannot match solvent clarity. He explained, “In reality, the UV-curing process creates a much cleaner finish because we’re not exposing the adhesive to heat or combustion. There’s no ash, no airborne dust, and nothing that can cloud the surface during production.”

The result is a more uniform adhesive film that maintains optical stability throughout its service life. Because no heat-based drying is required, there is less risk of clouding, ash, or haze that can occur in solvent-cured materials. Nekoosa’s formulation also prevents fogging during wet application and retains clarity even under prolonged exposure to sunlight or heat.

Durability and Reliability

Baab described durability as one of the biggest technological leaps achieved through UV curing. He explained, “UV chemistry lets us create adhesion that not only matches but sometimes surpasses solvent-based systems. We’ve tested adhesion on low-surface-energy plastics, textured walls, concrete, and polished stone, all areas where traditional films struggle.”

UV-cured adhesives also maintain stable performance under environmental stressors such as temperature extremes, humidity, and chemical exposure. These improvements allow print providers to achieve solvent-grade durability in both indoor and outdoor applications.

Ease of Installation and Removal

Baab emphasized that installation performance was a core design consideration.

“We engineered the adhesive for flexibility,” he noted. “It can be applied wet or dry, and installers can choose between a permanent or a high-peel removable version depending on the job.”

The uniform curing process helps the adhesive apply smoothly, resist edge lift, and remove cleanly. The removable configuration detaches from most surfaces within six months, making it suitable for short-term promotions or event graphics that require clean change-outs without residue.

Environmental and Safety Considerations

Sustainability was a key driver behind the move to UV-cured adhesive production. According to Baab, UV-cured adhesives eliminate the need for thermal dryers and significantly reduce energy consumption, cutting emissions by as much as 50% compared with traditional solvent-based processes.

UV-cured adhesive chemistries are formulated without volatile organic compounds (VOCs) or flammable solvents, supporting compliance with OSHA, EPA, and CARB safety and air-quality requirements. As a result, these adhesives offer a safer manufacturing and handling profile relative to solvent-based systems.

Although UV curing occurs during manufacturing rather than on site, the process produces a stable adhesive that does not emit solvents or fumes during installation or use. Unlike solvent-based systems that rely on solvent

evaporation after application, UV-cured adhesives are fully cured during manufacturing, eliminating post-installation emissions. This makes UV-cured adhesives particularly well suited for sensitive environments where indoor air quality and safety are critical.

While UV curing primarily affects how the adhesive is manufactured, it also plays a meaningful role in end-use performance. The UV-cured process creates a uniform, fully cured adhesive layer that contributes to consistent adhesion, optical clarity, and environmental durability across applications. Once cured during production, the adhesive functions as a conventional pressure-sensitive system during installation and use.

Overall Performance Benefits

As Baab summarized, “UV curing gave us a way to deliver the durability customers expect from solvent adhesives without the environmental or operational downsides. It’s cleaner, more consistent, and more sustainable — and it performs across the full range of surfaces print providers encounter every day.”

UV-curing technology represents a significant advancement in adhesive manufacturing and performance, combining the reliability of solvent systems with the cleaner, safer, and more sustainable processes. For sign and display graphic printers, these innovations translate into clearer graphics, greater installation efficiency, and dependable adhesion across a wider range of applications.

WHY UV-CURED ADHESIVES CHANGE THE EQUATION

Longtime industry analyst and digital print expert Timothy Mitchell describes UV-cured adhesive technology as “a true game-changer — a breakthrough that improves cost, safety, performance, and reliability all at once.”

Mitchell views UV-cured adhesive technology as one of the most consequential shifts he’s encountered in decades. He argues that the industry’s long reliance on solvent-based adhesives has created operational friction that many print providers have simply learned to tolerate, rather than solve.

“Printers have been wrestling with solvent adhesives for years,” Mitchell explained. “They work, but they create headaches, including manufacturing complexity, installation mess, safety issues, and inconsistency. When you evaluate UV-cured adhesive against real-world performance, production, and environmental criteria, it checks almost every box.”

From Mitchell’s perspective, what distinguishes UV-cured adhesive platforms like NextBond is not a single performance attribute, but the cumulative advantage across manufacturing, installation, durability, and sustainability.

He points out that solvent systems persist largely in part because of historical momentum and sunk investment, not because they represent the most efficient or flexible solution available today.

“When I evaluate a technology,” Mitchell said, “I look at cost, reliability, ease of manufacturing, safety, environmental impact, and performance. It’s rare to see something that scores nine out of ten. UV-cured adhesive comes very close to doing that.”

Mitchell also emphasizes that adoption barriers are often cultural rather than technical, particularly in application segments like vehicle wraps, where installers are deeply accustomed to specific adhesive behaviors.

He also sees installer simplicity as a quiet advantage. Easier, more forgiving application reduces dependence on highly specialized labor and lowers the risk of rework, an increasingly important factor as shops face workforce challenges.

“A lot of resistance in this industry isn’t about whether a material works,” Mitchell explained. “It’s about familiarity. Installers know how their solvent adhesive behaves, so switching feels risky. But fleet graphics, decals, signage, and wall and window applications represent a far larger market than cast wrap vinyl alone.”

In his view, UV-cured adhesives are especially well positioned for growth in decals, labels, promotional graphics, and high-handling applications, segments where durability, clean removal, and consistent performance matter more than extreme conformability. That’s where adoption is already pulling the technology forward.

Mitchell says it was this rare alignment of benefits that gave him confidence to be outspoken. “When something [solvent-based adhesives] falls that far behind on the checklist of performance, safety, and sustainability considerations,” he said, “it’s hard to argue the status quo makes sense long-term.”

He also highlights sustainability as an underappreciated competitive advantage. Mitchell said, “Removing solvent from the workflow isn’t just a regulatory or environmental win, it fundamentally changes manufacturing. Less energy, fewer defects, safer handling. That’s not incremental improvement; that’s a different approach.”

While Mitchell acknowledges that early generations of any new technology face limits, he believes UV-cured adhesives are following a familiar innovation curve similar to UV LED and UVgel printing, where rapid iteration drives expanding applicability.

He said, “If you look at where UV printing started versus where it is now, the trajectory is obvious. UV-cured adhesive is at the beginning of that same curve.”

REAL-WORLD APPLICATIONS

NextBond’s performance has been validated across conditions where solvent adhesives previously dominated. Print providers have used NextBond for everything from outdoor retail and stadium graphics to promotional products exposed to moisture, sunlight, temperature swings, and frequent handling. In each case, the material has delivered the combination of strong adhesion, clean removal, and installation reliability that shops previously relied on solvent-based films to achieve.

The following examples illustrate how NextBond performs across some of the most challenging environments and substrates.

Proofpoint: Craft Signs

A compelling example of NextBond’s performance comes from Craft Signs and Specialty Printing, Fort Worth, Texas. Craft Signs used a product in the NextBond High-Bond Opaque family to produce custom graphics for Bison Coolers, a premium American cooler brand. These graphics are applied to textured, low-energy polyethylene cooler lids and front faces — surfaces that are notoriously difficult for adhesives.

Figure 1: NextBond Applications



Craft Signs combines NextBond High-Bond Opaque, a matte, opaque white premium vinyl, with a 3-mil matte calendared overlaminate to produce full-color graphics for Bison Coolers. The graphics are printed on a Canon Colorado 1650, laminated, and then cut to shape for application on the cooler lids and faces.

“The color surface is polyethylene. Nothing wants to stick to it,” Seth Austin, operating partner of Craft Signs, explained. “We applied both our previous material and the NextBond product, let them sit for a few days, then literally tried to rip them off. NextBond performed better, it took more force to remove the graphic and it didn’t leave a residue.”

Prior to switching to NextBond, Craft Signs used a different high-tack adhesive product but experienced challenges related to employee skin sensitivity and supply-chain volatility.

“We had one operator who would break out every time they handled it,” Austin noted. “NextBond eliminated that issue, and the fact that it’s made in the U.S. has made pricing and supply more stable for us.”

When Craft Signs transitioned the application to NextBond, its goals were improved adhesion, more predictable sourcing, and a cleaner production experience. After extensive in-house and customer-driven testing — including real-world durability trials such as transporting coolers in pickup trucks — NextBond outperformed the previously used material in both adhesion strength and ease of application.

Using NextBond, Craft Signs prints and laminates the graphics in-house and delivers pre-cut pieces to Bison for final application. Since making the switch, the company reports no product failures. “We run these jobs almost daily,” Austin said. “We’ve done up to 800 cooler lids in a day, and I haven’t had one come back.”

Craft Signs has since expanded its use of NextBond into other applications, including industrial labels, hard-hat decals, and HVAC stickers, projects where durability and reliable surface bonding are essential.

“If we already have the laminator running for Bison, we can add other jobs onto the same roll,” Austin explained. “It saves time and helps with pricing.”

According to Austin, one unexpected advantage of NextBond has been the clean, optically clear adhesive, which is particularly important when Bison customers need to replace or update graphics.

“The old material left behind a gray adhesive that looked messy,” Austin said. “NextBond peels cleanly, and that matters when you’re working with a \$250 cooler.”

Figure 2: Graphic Printed on NextBond on Bison Cooler



Austin also pointed to the partnership between Craft Signs, Nekoosa, and its media distributor as a contributing factor to operational consistency. Local stock availability has enabled Craft Signs to maintain fast turnaround times and meet customer service-level agreements (SLAs), even when orders arrive on short notice.

“It’s a trusted product,” Austin noted. “That reliability allows us to be more aggressive with pricing because we know it will perform the first time.”

Case in Point: One Adhesive, Every Climate

A leading U.S. wide-format print service provider, which requested anonymity, operates multiple production sites across the country and faced challenges producing graphics for outdoor stadium environments.

The company required a reliable, cost-effective, domestically sourced adhesive film that could perform consistently across varied climates and installation conditions.

Projects demanded materials capable of withstanding extreme and unpredictable weather, including heat, humidity, cold, and moisture, while maintaining secure adhesion to metal framing systems. In addition, the printer managed frequent sign change-outs tied to event schedules, creating a need for an adhesive that could apply smoothly, remove cleanly, and perform predictably across regions.

After evaluating multiple adhesive technologies, the company selected a UV-cured adhesive film from Nekoosa’s NextBond line. The material offered durability comparable to solvent-based films while providing sustainability and sourcing advantages associated with UV-cured production. According to the printer, the film delivered consistent adhesion and clean removability in demanding outdoor environments, while also enabling faster turnaround times and simplified material procurement through a domestic supply chain.

According to the print provider, the result was greater operational consistency, reduced material waste, and improved cost control, supported by an adhesive technology that performed reliably across multiple climates. Since its adoption, NextBond High-Bond Opaque has been deployed in a wide range of outdoor environments.

In one additional application, a mounting film using NextBond adhesive was used for convenience store window graphics across a national retail chain, maintaining adhesion and removability despite ongoing exposure to wind, rain, and UV light.

In another instance, NextBond graphics were applied to the side of a water ski jump ramp, fully exposed to sun and water. The graphics remained intact and performed as expected throughout the entire season.

Real-World Durability Example

Another real-world example (Figure 3) compares NextBond Premium Vinyl with permanent adhesive to a popular competitive cast vinyl. The graphics were installed in a city in the southern United States that experienced severe winter storms, with temperatures dropping to as low as 6°F.

Despite the extreme conditions, NextBond Premium Vinyl maintained strong adhesion and overall graphic integrity, while the competitive cast vinyl showed visible performance issues. In the comparison image, the competitive cast vinyl appears on the top, while NextBond Premium Vinyl is shown on the bottom.

This example highlights the ability of NextBond Premium Vinyl to withstand harsh environmental conditions while maintaining reliable performance.

WHAT IT MEANS FOR PRINT PROVIDERS

For sign and display graphic printers, UV-cured adhesive technology offers a broader performance range and greater reliability in challenging applications. It enables installations on surfaces and in conditions that previously limited production — rough textures, low temperatures, or rapid change-outs — while maintaining environmental compliance and cost efficiency.

By reducing edge lift, peeling, and rework, print providers gain greater confidence in their materials and achieve consistent visual results. The technology's compatibility with multiple substrates and climates expands application flexibility without increasing production complexity.

CONCLUSION

NextBond represents a meaningful advancement in sign and display materials, uniting high-end adhesion performance with cleaner, more efficient, and more sustainable production. It allows printers to take on installations that were previously difficult or unpredictable, whether due to surface texture, temperature, or environmental conditions, while maintaining consistent results and a streamlined workflow.

For print service providers, this shift is more than an upgrade in adhesive chemistry; it is an operational advantage. With fewer failures, reduced rework, and broader substrate compatibility, shops can operate with greater confidence and efficiency. And because NextBond is competitively priced relative to traditional solvent-based solutions, printers gain performance without sacrificing margins.

By pairing installation reliability with a safer, VOC-free manufacturing process, NextBond positions UV-cured adhesives as a new standard for the industry, one that gives print providers the flexibility to meet evolving customer demands while operating more responsibly and sustainably.

Figure 3: Real-world Durability Comparison



Following winter storm conditions (6°F): Competitive cast vinyl (top) vs. NextBond Premium Vinyl (bottom).



