Reduce environmental impact and accelerate your workflow with unparalleled speed and performance

Mimaki JFX600-2513

Mimaki's UV-LED technology cures ink instantly without heat, dramatically cutting energy consumption compared to power hungry traditional ultra-violet mercury vapour curing systems. By printing direct-to-substrate, eliminate waste from intermediate films, adhesives and release liners, boosting both your sustainability and your bottom line.

Transitioning from traditional self-adhesive vinyl (SAV) application to a direct-to-substrate Wide Format UV Printing eliminates multiple petroleum-based layers and consumable waste streams. The Mimaki JFX600-2513 direct UV printing workflow reduces up to 60-70% material waste by weight and completely removes chemical-heavy, non-recyclable release liners from the production cycle. Moreover direct-to-substrate UV printing drastically reduces manufacturing time by eliminating multiple manual production steps, preventing thousands of square meters of non-recyclable material from entering landfill.

The Environmental Challenge of Self-adhesive Vinyl

Self-adhesive vinyl poses a significant environmental challenge primarily because it is constructed from polyvinyl chloride (PVC) and petroleum-based adhesives, which do not biodegrade and are exceedingly difficult to recycle. The production and disposal of PVC release highly toxic, chlorine-based chemicals and carcinogens - such as dioxins and phthalates. Additionally, the multi-layer composition of the material, which combines the vinyl face film, migrating plasticizers, and the adhesive backing, contaminates standard recycling streams, causing most discarded vinyl to end up in landfills or incinerators, where it contributes to long-term microplastic pollution and environmental contamination.

Producing large-scale signage using traditional vinyl graphics requires printing on large self-adhesive vinyl rolls (SAV), in some cases applying a protective laminate, and mounting it to a substrate surface. Every square meter of SAV requires an equal amount of silicone-impregnated release liner, which also invariably ends up in landfill.

Approximate Calculations: 100 Corflute Signs

Consider a standard job printing 100 corflute sheets, each measuring 900 X 1200mm (approx. 1.08m² per board):

- **Total Graphic Area:** 100 X sheets X 1.08 = 108 m²
- **Total Material Required:** 108m² finished signage requires 108m² of printable SAV plus an equal quantity of release liner. (Total 216m²)
- **Landfill Waste Generated:** 216m²of total SAV vinyl and backing waste is produced in this example.
- **Weight of Waste:** Standard 50µm - 100 µm SAV roll paired with a standard backing liner weighs approximately 0.2 to 0.25kg per m². This job example generates **21.6 to 27kg of non-recyclable polymer and silicone waste** per 100 boards.

The Mimaki JFX600 UV Printing Environmental Benefits

- **Zero Transfer Waste:** Printing directly onto the substrate, there is no requirement for an intermediate SAV and the silicon impregnated backing liner it is paired with.
- **100% Landfill Waste Eliminated:** No self-adhesive vinyl and release liner waste is sent to landfill.
- **Up to 50% Energy Saving:** compared to traditional UV mercury vapor curing systems. This massive reduction in power usage is driven by three main factors: no standby/warm-up time, higher electrical conversion efficiency, and lower cooling requirements.
- **Lower Environmental Footprint:** UV-curable inks contain no volatile organic compounds (VOC's) eliminating harmful chemicals from the work environment compared to equivalent solvent inkjet printing.
- **Reduced overall ink volume:** is required to produce compared to an equivalent solvent based ink.

Additional Benefits of Mimaki JFX600 Direct-to-Substrate UV Inkjet Printing

- **Faster Turnaround:** Eliminates the need to wait for solvent prints to gas out, manual lamination, and error-prone vinyl mounting.
- **Operational Savings:** Saves substantial operator time and consumable costs as purchasing rolls of self-adhesive vinyl or application tape is no longer a requirement.

Annual Landfill Diversion Calculations

Assuming a standard production volume of **1,000 corflute sheets** per year, each measuring 900 x 1200mm (1.08m² per sheet):

- **Total Graphic Area Printed:** 1,000 sheets x 1.08 m² = 1,080 m² per year.
- **Material Diverted from Landfill: 2,160m²** of total polymer and release liner material. This consists of 1,080 m² of self-adhesive vinyl and 1,080 m² of silicone-impregnated paper release liner.
- **Physical Space Saved:** 2,160 m² of material is roughly equivalent to covering **more than 8 tennis courts** worth of non-biodegradable waste.
- **Total Weight Diverted:** Based on a standard combined weight of 0.2kg to 0.25kg per m², **216kg to 270kg** of dense plastic and silicone waste will be eliminated from entering landfill every year.

Long-Term Environmental Impact

Silicone-impregnated paper liners and PVC-based self-adhesive vinyls are incredibly difficult to separate and recycle and remain in landfill for hundreds of years.

Switching to direct UV printing means a mid-sized print shop can successfully divert **over a quarter of a tonne of permanent waste** annually for every 1,000 boards produced.

Direct-to-substrate UV printing generates a significantly lower carbon footprint than alternative solvent-based printing, primarily because it eliminates the manufacturing, transport, and disposal emissions of self-adhesive vinyl (SAV) and its paired silicone release liner. While UV printers use electricity to power an LED curing array, solvent systems require extensive energy for thermal drying fans and extraction ventilation to manage hazardous gas emissions.

The direct greenhouse gas (GHG) and carbon footprint comparison across the life cycle of both technologies shows distinct differences:

1. Raw Materials and Supply Chain (Scope 3 Emissions)

The largest carbon differentiator is not the liquid ink itself, but the **media carrier required** by the printing process.

- **Solvent-Based Printing:** Requires printing onto a flexible plastic roll (usually PVC) which is then mounted onto a rigid sheet. PVC manufacturing is highly carbon-intensive, and the silicone-impregnated release liner doubles the material footprint.
- **UV Printing:** Eliminates the intermediate PVC film entirely. The ink is applied directly to the substrate, eliminating the manufacturing and shipping emissions of thousands of square meters of vinyl rolls per year.

2. Operational Energy and Curing (Scope 2 Emissions)

How the inks dry or cure impacts the electricity consumption of a printing business.

- **Solvent-Based Printing:** Dries through **thermal evaporation**. The printer uses high-wattage heating elements to bake off the liquid carrier. Furthermore, because solvent inks emit heavy Volatile Organic Compounds (VOCs), the site must run continuous extraction fans and ventilation systems to keep air safe, compounding daily power usage.
- **UV Printing:** Cures instantly via photopolymerisation triggered by UV-LED array. Modern UV-LED arrays use a fraction of the power required by solvent heaters or traditional mercury vapour UV curing systems, generate almost no heat, and feature instant on/off states that eliminate energy draw during standby mode.

3. Volatile Organic Compounds (VOCs) and Air Quality

- **Solvent-Based Printing:** Up to 50–70% of a traditional solvent ink's volume evaporates into the atmosphere during drying. These evaporated petroleum distillates are a direct source of localized pollution and require 24 to 48 hours of room-temperature "outgassing" before the graphic can be safely handled or laminated. Even newer eco-solvent inks still rely on chemical evaporation to dry.
- **UV Printing:** Features **near-zero VOC emissions**. UV inks are 100% solid fluids consisting of monomers and oligomers. When exposed to UV light, they instantly cross-link into a solid film with no evaporative loss and zero chemical outgassing.

At-a-Glance Comparison

Environmental Indicator	Solvent-Based System + SAV	Direct-to-Substrate UV System
Primary Drying Mechanism	Heat evaporation & fan drying	Instant UV-LED light curing
VOC Air Emissions	High (Requires dedicated ventilation)	Near-Zero (GREENGUARD certified)
Ancillary Material Waste	High (PVC vinyl liner + application tape)	**None** (Prints straight to board)
Post-Print Processing	Required (24hr outgas + mechanical lamination)	**None** (Immediately ready to handle/ship)
Total Carbon Footprint	**High** (Driven by PVC production and heating energy)	**Low** (Driven by efficient LED electricity)