



# Liquid-to-powder conversion, done right

Environmentally sound investment pays big dividends

Link 51 Ltd., Brierley Hill, United Kingdom | The Whittan Group Company

*Performance by design*

 **Nordson**

# Environmentally sound investment pays big dividends for Link 51

Switching from liquid to powder coating with dense-phase technology improves operating efficiency and environmental friendliness at Link 51.



Converting from liquid paint to powder coating did not happen overnight for Link 51 – the UK’s leading supplier of storage, pallet racking and shelving solutions. Thanks to the high line density at their shelving plant in Brierley Hill, England, an electrostatic liquid paint system with rotary atomizers delivered high paint application efficiency and finish quality their customers liked. Yet, the system had seen better days, required hours of weekly maintenance, and created environmental concerns.

“Going away from liquid paint with the associated VOC emissions and the need for overspray and sludge disposal was simply the right, environmentally-friendly move for us.” – says Christopher Walker, Operations Director Whittan Group.

Link 51 designs and manufactures a full range of storage and shelving solutions which help users improve their work environment. From pallet racks for warehouses, to mobile shelving, to lockers and multi-tier storage systems for hospitals, warehouses, schools, gyms and a broad range of other facilities.

In 1951, Joe Kinnear and his son Peter combined ingeniously designed slotted steel angles with matching clamping plates to form an extremely stable and versatile configurable shelving system. They founded “The Handy Angle Company” which, since 1966 operates under the “Link 51” brand name. Today Link 51 is a part of Whittan Storage Systems Ltd. – one of the largest manufacturers of steel storage products in the United Kingdom, operating with several market-leading companies and processing 1,000 tons of steel each week.

To stay in the premier league of surface technology, Link 51 Shelving plant has recently installed a specially-designed Nordson powder coating booth equipped with advanced dense-phase spray systems. “The nature of our product is such that it allows us to load the line quite densely, with minimum gaps between the products. Because of this, the old liquid system delivered a rather high application efficiency and material utilization”, said Christopher

Walker, “however, each day we came to work smelling solvent in the air. Although all cleaning and disposal procedures were closely followed, we have a high level of environmental awareness and it was time to do the right thing – convert to a more environmentally friendly finishing method.”

“In 2015, our sister-plant, Link Lockers, installed a new Nordson spray system with dense-phase pumps and significantly improved their powder usage”, explains Tom Clayton, the Powder Coating Line Manager and a member of the project team. “It was clear that we had to get away from liquid and convert”. “First we defined our goals,” recalls Christopher Walker, “and agreed that if we were to improve the paint system, it would need to deliver not only environmental benefits but also improve our operating efficiency and finish quality”.

After Link 51 joined the Whittan Group in 2017, the move from liquid to powder became a priority project. In early 2018, Link 51 began a search for a powder coating system tailored to their production needs. “We were used to our liquid system applying 25 micron of coating. One of the concerns with powder was the ability to match that thickness consistently, without daily fine-tuning, and to reduce the overall applied coating and operating costs”, recalls Peter Charles, Engineering and Maintenance Manager at Link 51, who also led the upgrade of the Link Lockers’ line to Nordson technology back in 2015.

## The targets for the new system were set quite high

- 4 m tall products with a line speed of up to 3,5 m/min
- Highly efficient powder application
- Consistent and uniform 25 microns of coating thickness
- Full automatic coverage of the shelving corners
- Fast color change for flexible production
- Clean, environmentally-friendly work place

Once the specifications were defined, the team started the supplier selection. “We knew our requirements were challenging, so we were looking for a supplier with demonstrated abilities to design a system to match our needs and reliably support our production.” Says Lyndon Woodfield, Sr. Team Leader, Manufacturing, who has extensive powder coating experience with Link 51’s old line.



High line density and application efficiency combine to deliver unmatched powder utilization and operating efficiency.

Link 51 team knew about the positive experience at their two sister-plants, Lockers and Pallet Racking, which were using the new dense-phase powder delivery technology from Nordson. So, the team headed to the suburbs of Dusseldorf, to experience the new spray systems first-hand at the Nordson demonstration center. "It's nice to test the equipment with our products and powder." Says Tom Clayton. "Since I was to operate the new system, having a chance to work with it without the pressure of running production was important."

"A few days of testing at Nordson helped us gain confidence in the attainability of our goals. Their solution was easy to work with and was proven to apply highly controlled coating thickness with no operator intervention. Process control was important for our production efficiency." Recalls Christopher Walker. "Additionally, Nordson offered a special booth allowing Tom to clean it from the top down using convenient, high-level openings with platforms. That made good sense to us." Because of the close team work, demonstrated abilities, and the special booth solution, Nordson was awarded the order for Link 51's new powder coating system with the target to install in late December 2018 and start of production on January 6<sup>th</sup> – just 3 weeks later.



Clean, environmentally friendly operating conditions.

The new system features a custom-engineered, 6,5 m tall ColorMax<sup>®</sup> booth with a Spectrum<sup>®</sup> HD powder feed center and advanced controls. The booth is designed to provide reliable powder containment while also ensuring soft airflow in the spray area. Special high-level openings with platforms enable operators to clean the booth walls from the top down. This way, no powder is blown in the direction of the conveyor opening against the booth airflow. The automatic floor cleaning system keeps the powder in the booth to an absolute minimum.

The high line density combines with the efficient powder application resulting in minimum overspray. Any airborne powder is efficiently recycled through a twin-cyclone system and screened through an ultrasonic sieve prior to being returned to the fully enclosed feed center. The new system also delivers on the fast, contamination-free color change. "The step-by-step color change instruction on the main controller and many of the color change tasks being fully automated, makes my work much easier" – confirms Tom Clayton.



Intuitive controls simplify operator work and guide color change.

"Those were intense weeks." Recalls Lyndon Woodfield. "In only one week we had to take out the old system, fill the pit, seal the floor and have the area ready for Nordson's installation team. A large booth with 20 automatic guns had to be ready for production just 2 weeks later".

### Startup 4 days ahead of schedule

All involved worked like clockwork. From demolition to installation to startup, Link 51 and Nordson teams worked double-shifts. On January 2<sup>nd</sup>, 4 days ahead of schedule, the first batch of powder coated shelves came off the line and everyone could breathe a sigh of relief. "A couple of weeks prior to the start of the installation, our team spent 3 days at Nordson in Germany learning to work with the equipment. We passed the learning curve at high speed while at Nordson. On day one we were ready to hit the ground running and run full production." – remembers Woodfield.

### The new system operation

Since commissioning of the powder coating plant, Link 51 team took full ownership of the process. With the support from the local Nordson personnel, the applied coating and application efficiency were perfected over the first few weeks of operation. "We have a new local sales and service team in UK which is focused on delivering 2<sup>nd</sup> to none support to our customers", says Paul Drysdale, Sales and Service Manager, Nordson (U.K.). "Our task is much easier and more rewarding when working with a customer like Link 51, who understand their production needs deeply, and embrace technology to reach their goals."

Peter Charles, the Engineering and Maintenance Manager testifies: "Prior to the conversion to powder, we identified several areas of improvements. For example, the liquid paint pots had to be stirred 24/7 requiring us to run our air compressor non-stop. Now, the compressor is running only during the 8-hour production shift. This alone saves us £ 2,000-3,000 per month.



Soft spray from the Encore HD spray guns ensures full coverage in corners and recesses.

Additionally, about 2,500 liters of water had to be treated and discharged to waste every 6 months. None of that any more.” Significant gains are also evident in finish quality and rework rates. “We worked diligently to minimize rework on our liquid system,” recalls Lyndon Woodfield, “yet, paint runs, solvent boils, resprays were part of our daily life. All of these issues are eliminated with the conversion to powder.”

Additionally, the liquid system required 3-4 hours of service and maintenance each week. In the 9 months of production on the new powder coating system – zero maintenance or service downtime. “Our maintenance team hasn’t been called to the new system once,” confirms Peter Charles. Lyndon Woodfield, who has many years of experience managing the Link 51 old powder coating line recalls: “We are used to changing venturis inside the pumps every 3-4 weeks while tweaking our pump settings weekly to keep the desired coating thickness. None of this on the new system. No adjustment as there is no wear parts inside the Nordson dense-phase pumps, which affect the powder output.”

#### Thin-film powders demand process control

In order to achieve the targets on the applied coating cost per square meter of the coated surface, Link 51 had to work with specially formulated thin-film powder, capable of achieving the correct coating opacity at films as low as 18 microns. Thin-film powder coatings have been available for some time, and appeal to many powder coaters. Although they often more expensive than traditional powders, they can result in significant applied coating savings allowing powder coaters to achieve product coverage at applied thicknesses significantly lower than those with traditional powder coating materials.

However, to fully benefit from using thin-film powder coatings, the application system must have a high degree of process control. Unfortunately, with traditional venturi-pump powder coating systems, maintaining the coating thickness at a stable 25 microns requires frequent adjustment of the settings due to progressive wear of the venturi inserts inside each pump. Rarely can a powder coating system operator fine-tune a traditional system with such precision and consistency. Due to this, many coaters who trial thin-film powders with a venturi-based powder coating system, observe that they pay more per Kilogram for their powder without being able to realize the savings of a thinner film, actually increasing their applied coating cost.

The combination of the high line density, excellent powder application efficiency, and the use of thin-film powders allowed Link 51 Shelving to half their applied coating cost. “We used to coat about 15 m<sup>2</sup> of metal per liter of liquid paint, yielding an applied cost of £0.47/m<sup>2</sup>. Today, we achieve the same 15 m<sup>2</sup> of coverage but with only one kilogram of powder. This brings our applied coating cost to £0.23/m<sup>2</sup>. That’s a 50 % cost reduction!” – confirms Peter Charles.

After the first 9 months of operation, the positive results achieved by Link 51 include:

- 50 % reduction in the applied material cost
- Operating, disposal, and environmental compliance cost reduction
- 70 % reduction in rework and quality costs
- Increased production capacity due to zero downtime for maintenance
- High color change flexibility with less than 15 min color change time on a 6.5 m tall booth
- Zero consumption of replacement parts
- Clean, environmentally-friendly operating conditions
- Expected 14-month return on investment

From its inception back in 2015, the overall project took several years to implement. “The good news is that we got the latest equipment and technology. Plus, the new local Nordson team is supporting us every step of the way with their powder application expertise. Everybody worked hard and smart on this project and the results are fully reflective of this”, summarizes Walker. “We can definitely say that moving from liquid to powder coating was an excellent investment for Link 51. Our high expectations for a quick payback and numerous operating benefits have been fully met or exceeded.”



#### Nordson Industrial Coating Systems

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