



An interior fit out for the retail sector manufactured and powder coated by Fit Out (London, UK).

FOCUS ON TECHNOLOGY



SPECIAL ISSUE ON ARCHITECTURE & DESIGN

Fit Out's green revolution: achieving carbon neutrality through zero emission pre-treatment and powder coating

Alessia Venturi, **ipcm**®

Fit Out, a leading UK interior fit-out contractor, is committed to becoming a carbon-neutral enterprise by 2050. To achieve this goal, the company has integrated sustainability into its operations, including a move to in-house powder coating with Toran 3® technology developed by Chemtec. This multi-metal pretreatment process eliminates water, waste, and energy consumption, offering both environmental and economic benefits. The use of Toran 3® allows Fit Out to refurbish up to 75% of old fixtures, promoting a circular economy.

“Our aim is to become a carbon neutral enterprise by 2050 at the latest”. With this statement, Steve McWeeney, Managing Director Fit Out (UK) Ltd explains the sustainability program of its company.

The UK has an important role to play in leading global efforts in the transition to net zero by 2050. As the impacts of climate change become increasingly clear, the urgency to stay within 1.5°C of global warming, as outlined in the Paris Agreement, is growing. Government, public and private sectors must take bold and progressive action.

Fit Out (London, UK), a leading interior fit out contractor and logistics service provider working in the retail, leisure, commercial and residential sectors, recognises that the well-being of the planet is a

shared responsibility. This is why the company has woven sustainability into the very fabric of its values, day-to-day operations, and the choices it makes.

For some time now, Fit Out has embarked on a carbon reduction journey to boost efficiency and to reduce its ecological impact by closely monitoring its sustainability performance and switching to green energy and green technologies.

These include investments in metal fabrication and powder coating, that is a strategic production stage for Fit Out, and a strong focus on the practice of asset refurbishment, which aligns with sustainable development goals by fostering responsible resource management and minimising the environmental burden associated with constant production and disposal.

Fit Out's sustainability strategy aligns with the 17 Sustainable Development Goals (SDGs) set by the United Nations, identifying seven among them that fit best with their impact of its activities to focus on: Good Health and Well Being; Quality Education; Decent Work and Economic Growth; Sustainable Cities and Communities; Industry, Innovation and Infrastructure; Responsible Consumption and Production; Climate Action.

These last three goals, out of the 7 identified, are the foundation of some technological choices made by Fit Out in 2021, when the London-based company decided to bring the powder coating phase of its steel products in-house. The company installed a high energy-efficient powder coating line designed to integrate the Toran 3® innovative and environmentally friendly single-stage pretreatment technology, developed by the Italian company Chemtec (Milan, Italy) and supplied by their UK and Ireland Distributor Metavate Ltd., to prepare metallic surfaces for coating.

"Toran 3® is a pretreatment alternative to phospho-degreasing or passivating processes with no rinsing or degreasing required and no sludge or waste byproducts to dispose of,"

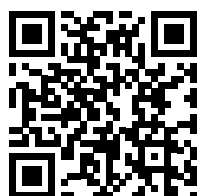


Overview of the powder coating line designed by Eurotherm (Turin, Italy) and installed by PFS Paint Finishing Systems.



Fit Out has embarked on a carbon reduction journey to boost efficiency and to reduce its ecological impact.

Spraying of the Toran 3[®] pre-treatment technology and parts exiting the drying oven.



Scan the code to see the manufacturing and powder coating process



explains Beatrice Turri, Chemtec marketing manager. "It is an anhydrous process, based on high-boiling organic fluids for effective degreasing and immediate protection against oxidation. Since it is applied by spraying at room temperature, energy and water consumption are zero. We can define Toran 3[®] as a carbon-reducing technology because it reduces the carbon footprint of the powder coating process".

The ideal choice, then, for Fit Out to achieve its SDGs regarding climate action, responsible consumption and innovation.

Fit Out – integrated project delivery of interior fit out

Established in 2000, Fit Out (UK) Ltd operates throughout the UK with offices in London – where the company moved in 2007 – and Sheffield. Originally a joinery manufacturer, five years ago the company moved into metal fabrication, manufacturing shelving and all the associated metal work that goes with the shop fitting elements in the retail and commercial industry. Four years ago, Fit Out opted to purchase a powder coating machine, after outsourcing the finishing of its products for over one year. The line was designed with Toran 3[®] pre-treatment technology in mind, and the result was a line with zero emissions: no water, no waste, no air pollution, with usage of green energy produced by the company's full solar PV array with battery storage.

Fit Out's 7,400 m² design, manufacture, finishing and pre-assembly facility in London helps to mitigate storage and delivery restrictions, whilst providing a convenient prototyping space for design development and equipment sign-off.

Fit Out's in-house delivery model provides a streamlined programme, design and manufacturing solution, enabling the project teams to maximise installation efficiency without ever compromising on quality and whilst supporting its clients' net zero ambitions.

"We have extensive experience in the manufacture of high-quality furniture and retail fixtures. Our manufacturing operations transform traditional construction methods into modern processes of component assembly using automation, quality assurance systems, reducing on-site activity, construction waste, and minimising disruption to our client trading operations," Jamie Mason, Commercial Director at Fit Out, states. "We offer a complete manufacturing solution for all types of interior fit out projects, including joinery and metal fabrication. We have invested in the latest pre-treatment and powder coating system, reducing our gas usage by 65% and supporting our clients' asset reuse strategy."

"Sustainability is at the forefront of our business operations, prioritising environmentally conscious practices to ensure a better future for generations to come and as well as prioritising the refurbishment and



re-use of pre-used equipment rather than their replacement. Among our key achievements there are zero waste to landfill, usage of 100% renewable electricity, 10% reduction of diesel consumption, 68% reduction of business travel, 26% reduction in packaging and 65% less gas usage. Our asset refurbishment strategy is cost-effective and sustainable. This approach allows organisations to extend the lifespan of their current investments, reducing the need for large capital expenditures. From a sustainability perspective, asset refurbishment contributes to resource conservation. It minimises the demand for raw materials and energy that would be required to manufacture and powder coat new assets. In a few words, refurbishment promotes a more circular economy."

The finishing: a strategic feature for Fit Out products

"100% of our production is powder coated, except for the portion of stainless-steel products. Most of our clients choose powder coating over stainless steel for

the colours, textures, and effects that powder coatings can offer to complement and strengthen their brand identity or to differentiate the departments inside a single store. In addition, powder coating is cheaper than stainless-steel," explains Jamie Mason.

"The quality of the finishing is key at Fit Out. We are working with clients who have specific colours for their brand and they need that colour to be consistent every time they put a shelf into a supermarket, retail, or contract space across the UK. Colour matching is absolutely crucial as well, because it is connected to brand identity and brand recognition on the market. We had issues with colour matching when we outsourced the powder coating and this was one of the reasons that pushed us to insource the finishing process back in 2021.

The colour we apply on the fixtures must be long-lasting because the lifespan of shelves is quite long: they are repainted every 10 to 15 years on average and during their service life the coating needs to resist chemical attacks, mechanical impact, and scratching deriving from intensive use. Corrosion resistance is



Overview of the powder coating booth supplied by Wagner.



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The powder finish must be long-lasting because the lifespan of shelves is quite long and they must resist chemical attacks, mechanical impact, and scratching deriving from intensive use.

The Powder Centre.

not a key feature, since most of our production is destined to interiors, although refrigerated shelves must withstand cold-chilled environment, with a temperature of 2°C that can produce a more corrosive atmosphere. Toran 3® as a pretreatment ensures the quality level required to our products. The powder coating line was designed with this product in mind as pretreatment technology. We did extensive testing with Metavate Ltd. before choosing this product and we are satisfied with the choice because it proved to be a robust technology."

The finishing process

The powder coating system installed by Fit Out in 2021 and supplied by PFS Paint Finishing Systems, the UK partner of the Italian company Eurotherm, includes:

- ◆ Ecojet tunnel for the application of Chemtec's Toran 3® product
- ◆ Drying tunnel
- ◆ Wagner powder coating booth
- ◆ Curing tunnel
- ◆ Monorail conveyor.

"Most of our fixtures, kits and shelving are in mild steel, only a small part is in aluminium or stainless steel. In any case, the chemical pretreatment is the same for all metals because Toran 3® is a multi-metal technology," continues Alex Hender, Production Manager at Fit Out. "For fixtures that must be refurbished we have a manual grinding prior to the chemical pre-

treatment to remove dust or dried food stuff on them. New kits are pre-treated with Toran 3® only, because they basically have an oil film on their surface due to mechanical working. This oil film needs to be washed-off before powder coating to improve adhesion and to ensure high chemical and mechanical performances of the coating film.

Toran 3® is supplied ready-to-use, sprayed pure at ambient temperature on the parts for 90 seconds. After spraying, parts are allowed to drip for 5 minutes, then get dried in an oven for 8 to 10 minutes at 130 – 140°C. No rinsing is needed and the dripped solution is recycled through the system and re-sprayed, so we do not have any wastewater or sludge from the pre-treatment tunnel.

After drying, the pieces are powder coated in a Wagner application booth and then cured. We have six standard colours and we apply an average of 15-16, including a few special effects, like metallic or leatherette effect, but we can customize anything upon request. The powder coating booth is equipped with a quick colour change system that needs only 10 minutes to switch from a colour to another. All the over sprayed powder is recycled for sustainability and cost-savings."

The reasons behind a green choice

"We chose the Toran 3® as pre-treatment because it is extremely sustainable, efficient and high performance," Alex Hender continues. "It is self-contained, it is applied at ambient temperature so no power is



needed, no water, no wastage, no disposal costs, ease of use."

"We call Chemtec Toran 3® chemical pre-treatment technology "the standard" since it is the easiest to use: you just spray, drip, and dry. One stage, self-contained, no heat required, no drainage, no wastage. And you just keep reusing it, topping it up with fresh product when needed. The only strict requirement is the bath analysis every three months to ensure that the chemical is always performing at its best," interjects Judith Bailey, General Manager at Metavate (Warwick, UK), Chemtec's UK distributor.

"If we compare the Toran 3® technology to the conventional iron-phosphating process, users of the latter must make daily analysis of the bath to ensure a proper and consistent surface pre-treatment while users of Toran 3® can analyse just one sample every three months, which makes life very simple. However, this analysis must be done regularly to have consistent results," Carlo Guidetti, Chemtec's CEO adds. "There is a strong cooperation between Chemtec and Metavate to provide the technical support necessary to our clients in UK. Metavate supplies the in-field service whilst Chemtec do the lab work at our premises in Milan, where we can count on a state-of-the-art laboratory."

"Parts treated with Toran 3® and painted provide chemical, mechanical, and scratch resistance which is very high. Since it uses no water, there is no oxidation of the metal surface and it provides a temporary (up to 6 months) protection from H₂O and O₂. Paint adhesion is high, flexibility of the paint film is excellent and impact resistance is improved. In addition, Toran 3® guarantees high flexibility in the coating line because it not necessary to wait for the product to heat up, even when the line is stopped the pieces do not oxidize. Nor is it necessary to plan shutdown at the end of the day as there will be no flash rust on parts when you turn the line off. The smaller footprint



From the left Alex Hender of Fit Out, Judith Bailey, Jane Eden, and Rachel Stevens of Metavate, Carlo Guidetti and Beatrice Turri of Chemtec.



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means initial investment is reduced by between 30 to 70% less and there are no fixed process costs to amortize," Carlo Guidetti states. "Fit Out is very hot on carbon reduction, climate protection, and sustainability. Nevertheless, clients are also pushing the sustainability agenda. Toran 3® is aligned with our and their net zero targets, whilst Metavate and Chemtec shares with Fit Out the same ethos on sustainability," Jeremy Mason adds.

A robust technology

"Another advantage that the use of Toran 3® has brought us is the ability to achieve the same finish quality even on reworked metal," Jamie Mason concludes. "Before insourcing the powder coating process and introducing the Toran 3® pre-treatment, we were throwing away at least 50% of old fixtures recovered from stores, because they were too damaged, too rusty to be properly coated without prior mechanical surface preparation.

Now we have increased the recovery rate to 75% because Chemtec technology can clean it and proved to be very robust also on rusty surfaces. If we consider that we probably have 1 to 2 million pounds worth of fixtures recovered per year, this a massive advantage." "I would like to add that, although the corrosion resistance of Toran 3® is not its main attribute, it proves to be effective for refrigerated shelving as well, which requires a thousand hours salt spray test. Therefore, it has been a great success for Fit Out to introduce this speciality chemical in our powder coating process." 



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Salt Spray Accelerated Corrosion - Test Report

Report No. : **S73043**

Specification and Test Method : ASTM B117
 Surface Finish : Black powder coat
 Test Specimen Description : Control box lid, mild steel with laser cut edges
 No. of Test Pieces : 1 off (labelled HS2)
 Specimen Performance Requirement : Corrosion creep from scribed X to extend 2mm max.
 Run to failure and record hours; free of red corrosion, coating blistering, exfoliation and flaking.

Test Results

Treatment	Requirement	Exposure (hr)	Test Specimen Condition after Exposure
Black powder coat	Corrosion creep from scribed X to extend 2mm max. Free of red corrosion, coating blistering, exfoliation and flaking.	120	Corrosion creep from scribed cross <2mm and clean and free of corrosion.
		240	No discernable change in condition from that at 120hrs above.
		408	No discernable change in condition from that at 120hrs above.
		840	Corrosion creep from scribed cross <2mm. Other areas appear clean and free of corrosion although excessive run-off corrosion from top edge making accurate assessment of flat surfaces difficult.
		1248	First signs of blistering to the areas around scribed cross with corrosion creep from scribed cross <2mm.
		1512	Further development of blistering with some exfoliation of coating to scribe. Run-off corrosion from top edge now excessive. Removed from test.

Passed to HBS Powder Coating Ltd for final assessment
 Salt solution: 4 – 6% min salt in water conductivity <5 microS/cm

INEOS Enterprises Runcom WPS/H001

Signature.....
 Mark Ricketts
 Managing Director

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Salt Spray Accelerated Corrosion Test Report

Test Report Number : **S56795**

Specification and Test Method : ASTM B117 (latest issue)
 Surface Finish : Toran 3 + yellow paint
 Test Specimen Description : Large "L" shaped bracket, scribed X to one surface (labelled ET6)
 Number of Test Specimens : 1 off
 Specimen Performance Requirement : Free of red corrosion for 1000hrs (interim checks at 250 & 500hrs)
 Corrosion creep from scribed X to extend 2 mm max.

Test Results

Treatment	Requirement	Exposure (hr)	Test Specimen Condition after Exposure
Toran 3 + yellow paint	Free of red corrosion for 1000hrs. Corrosion creep from scribed X to extend max 2 mm	250	No corrosion creep and other areas free of red corrosion.
		500	No corrosion creep and other areas free of red corrosion.
		768	First indication of exfoliation (lifting) of coating to one quadrant of scribed cross. Assessed to be caused by a lack of adhesion due to no evidence of corrosion creep under coating.
		1000	Little change to condition after last check point, corrosion creep <2mm and other areas largely free of red corrosion.

Passed to Environmental Technologies for final assessment
 Salt solution: 50 +/- 5 g/L in water conductivity <5 microS/cm *Amended to operate one salt mist fall-out collection instead of two

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Signature.....
 Mark Ricketts
 Managing Director

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Salt spray accelerated corrosion test reports: comparison between a part with powder coat only and a part pre-treated with Toran 3® + powder coat.