



Paintshop partnership

Working in close partnership with its OEM client, paintshop builder Geico Taikisha has designed and constructed a state-of-the-art paintshop facility for Qoros

Late in 2012 Qoros Automotive – a joint venture between existing Chinese carmaker Chery and Israeli conglomerate Israel Corporation – started operations at its new manufacturing plant at Changshu in Jiangsu province. Its initial aim is to produce sedan and hatchback vehicles at a plant that is deliberately intended to set new standards for environmental efficiency. There will, for instance, be zero emissions of nitrogen and phosphates.

A number of reasons lie behind that objective. One is regulatory – the Jiangsu region is known for having one of the toughest environmental protection regimes in the China. Another is business related – it is a quite deliberate aim of the company to be seen as meeting the highest standards in its production processes in order to provide its products with a ‘premium-level’ market identity and, as such, the challenge of meeting those local standards was very much an incentive rather than a deterrent.

State-of-the-art coatings

Moreover as far as painting is concerned the plant is employing a set of processes which though not new in themselves are not only state-of-the-art individually but also unprecedented in the fact that they have been combined in a

continuous process on a single site. They include a cleaning and thin film pre-treatment based on zirconium oxide rather than phosphating, a waterborne B1:B2 basecoat paint formulation and an innovative system in the paintbooths themselves that greatly reduces the contamination of their physical structure by waste paint.

The basic business strategy underlying the venture is confirmed by Dr Friedrich Major, executive director manufacturing and logistics for Qoros. Dr Major says that right from the start of the venture it was a firm intention to avoid the typical ‘joint venture’ scenario in which individuals from different companies with different corporate cultures work in parallel.

Working to a tight budget

An initial core team of managers and engineers, roughly 20-strong, produced a brief specification document – “just 15 pages” – outlining the type of installation that would meet its requirements. Dr Major adds that the latter included the need to work to a relatively tight budget of just €42m for all the equipment and systems involved though not including the building to house them – a target which he says was “very nearly” achieved. But expanding that document out into a detailed plan and then turning that plan into a real

installation required close cooperation with an appropriate system supplier – as indeed all aspects of the new plant have done. In the event the company that Qoros turned to in order to help define the painting systems that could meet its demands was Italian-based Geico Taikisha.

Working in partnership

Daryush Arabnia, president of Geico Taikisha in China, confirms that initial contact was made back in 2010, and right from the start the relationship between the two was very much, he says, that of a “partnership”. Their shared objective: “To create the most modern paintshop possible.”

Interestingly Arabnia also says that as well as cooperating with Qoros in the specification and design of the painting process, Geico Taikisha also had some input into the design of the vehicles themselves – for instance to indicate where holes could be located to ensure that pre-treatment and ED fluids would drain away properly or where skids carrying the vehicle bodies should be attached. Vehicle design was carried out by Magna Steyr in Austria.

As it now stands the painting process itself begins with the use of the Bonderite TecTalis cleaning and pre-treatment process from Henkel. The two essential components of the process are the use of a de-emulsifying surfactant package for initial cleaning and then the application of a zirconium oxide thin-film pre-treatment instead of traditional phosphating. Claimed benefits include obviation or significant reduction of nickel and nitrogen as well as phosphate, and a reduction in the number of process steps from seven to five.

Antonio Zaza, key account manager for the Qoros project, explained the next stage in the painting process which, after a conventional e-coating procedure, is the wet-on-wet B1: B2 waterborne basecoat system from PPG, a major hallmark of which is the complete obviation of any requirement for a primer layer. “We forced them to go in that direction,” Zaza says quite unambiguously. He adds, though, that as with the pre-treatment the efficiencies that the process could provide – “European levels” of performance in terms of VOCs and CO₂ emissions – were the key motivating factors. The preference for waterborne as opposed to solvent-borne painting processes, that has since become a major factor in official Chinese thinking, was not at that time an influence.

Reducing cleaning

Geico Taikisha has also supplied several of its own technologies. Zaza mentions, for instance, the J-Flex conveyor system that is used in the pre-treatment area and the limestone-based Dryspin technology for extracting overspray paint from air extracted from the paintbooths which as the name indicates is a water-free process. But the paintbooths are also the application area for another interesting technique that removes the need for the routine cleaning of the gratings that form their floors.

Zaza explains that the conventional structure of a booth involves the use of perforated gratings as a flooring material. The perforations allow excess paint droplets to be drawn through the gratings by the booth’s extraction system for

the separation and collection of the surplus paint. But the gratings themselves are irrelevant to the painting process and the perforations inevitably become clogged with waste paint, so that they must be periodically removed for off-line cleaning and replaced with fresh grating to allow production to continue.

For the Qoros plant Geico Taikisha devised a system which allows the gratings to slide sideways to a position alongside the booths while robots get on with the job of actually painting the car bodies. This technique was devised specifically for Qoros and the Changshu plant was the first ever application by Geico Taikisha of this approach, though it has subsequently been applied elsewhere.

Push & pull

Daryush Arabnia adds that the fact that Qoros was willing to be the pioneer of the technique confirmed his perception that automotive OEM customers can generally be divided into two categories which he terms, respectively, technology “pushers” and “pullers”. The former, he explains, are major established companies which though always interested in achieving maximum efficiencies usually want to do so through the use of proven technologies. The latter are newer outfits – like Qoros – that are prepared to be the first to adopt innovative, unconventional approaches. “They need to prove themselves and they want to be the first,” he states. So how does all this come together at Changshu?



The limestone-based Dryspin technology for extracting overspray paint from air extracted from the paintbooths, is a water-free process

In terms of energy consumption – very well it would seem. Arabnia says that when Geico Taikisha and Qoros signed the contract for the new facility the target was to achieve a total energy consumption per vehicle for all paint-related processes of 500kWh. But he now informally estimates that the facility is actually achieving 450kWh per vehicle. He also says that the formal commitment between the two as far as CO₂ emissions are concerned was to achieve a target figure of 140kg per vehicle, but that again in actual practice a lower figure is being attained though he is not prepared to hazard an estimate. But right now, he says, the Qoros plant in Changshu represents what Geico Taikisha regards as the benchmark for current industry practice. *