

Hygienic wall and ceiling finishes for major beverage plant in Taiwan

The nature of the brewing and beverage industries imposes specific demands on internal walls and ceilings. Surfaces are typically subjected to extreme conditions such as high humidity, wetness and thermal shock. Production plants are also susceptible to heavy mould growth from the presence of migrant yeasts and sugar particles present in the atmosphere during the brewing process.

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The inherently porous nature of cast-in-situ concrete, renders and even the dense surface of precast elements provide an ideal host environment for the colonisation of mould and bacteria. In beverage plants, where it is essential to maintain walls and ceilings in a hygienic condition, finishes must be smooth, impervious and easy to clean in order to resist attack from micro-organisms.

There are various finishes available on the market for refurbishment or new-build projects offering protection and decoration of concrete surfaces. Plant managers have the choice of products such as ceramic tiles, wall cladding systems, fungicidal paints and specialist hygiene coatings.

To varying degrees, concrete and other mineral substrates are absorbent, and unless an ultra-fine closed finish has been specified, the coating contractor will inevitably be faced with a myriad of minor surface defects. Depending on the constraints pertinent to the site in question, mechanical or water-jetting techniques should be employed to open out blowholes and other imperfections to remove any weak edges. As a general rule, pressure washing is preferred as this prevents dust pollution, as well as producing a damp surface which is ideal for the subsequent application of a proprietary cementitious filler.

Given the demands imposed with regular cleaning cycles, the selection of a suitable surface filler is critical to the success of a hygiene coating application. A poorly considered choice can result in a weak inter-layer, and gypsum-based compounds have been shown to be vulnerable in damp conditions. The best route is with a high-performance, polymer-modified and fibre-reinforced composition based on Portland cement for total compatibility with the parent concrete.

The Monolevel family offers a range of options for pore filling, fairing coat or render applications. The single-component formulations are mixed with water and applied

using hand tools or by simple bag-rubbing. Depending on the circumstances, spray equipment may also be used, but in the main this will only be the case with large-scale projects where an engineering grade of waterproof screed is required. All certified to BS EN 1504-2, Monolevel products cover the spectrum from Class R4 to Class R1.

Effective coatings

In the case of hygiene coatings, there are products on the market that have been independently tested to prove that they offer a complete defence mechanism against mould, bacteria, yeasts and algae. Unlike fungicidal paints, the antimicrobial system incorporated in the coatings does not leach out when the surface is subject to condensation or intense cleaning regimes. This means that the coatings remain effective against micro-organisms throughout their design life.

The seamless finish achieved by hygiene coatings is a distinct advantage in sterile environments, as they allow no hiding place for bacteria and enable much greater ease of cleaning than alternative products incorporating tapes, seams, joints and fixtures.

The latest-generation hygiene coatings prevent the growth of micro-organisms and limit the spread of harmful germs through a combination of encapsulated in-film protectant and silver ions. One such product, Biodex Sheen – a waterborne, antibacterial and antimicrobial hygiene coating – has been used to refurbish 10,000m² of internal walls and ceilings at a beverage plant operated by Taiwan Tobacco & Liquor Corporation, a manufacturer and distributor of beer, wine and tobacco products.

The company operates a total of nine wineries and distilleries and three breweries in Taiwan, as well as cigarette production facilities. It distributes its products through more than 40,000 sales outlets and as the country's largest alcoholic beverage producer sells more than five million cases of beer and wine each year, primarily at home but a number of brands are sold internationally.

Due to the constant presence of migrant yeasts and sugar particles in the atmosphere at the manufacturing plant, the internal wall and ceiling areas around the vats had



Above and below left: Problems with mould growth before the application.



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Surface Preparation



Above: Biodex Sheen applied near the vat areas.

become highly susceptible to mould and yeast growth. A locally manufactured antibacterial coating had previously been applied, but without the sophisticated in-film protectant technology adopted by specialist manufacturers, micro-organisms can thrive as the backbone polymer provides a rich source of nutrient. Following thorough cleaning and preparation, Biodex Sheen was used to provide a total seamless finish with active yet encapsulated protection against the growth of mould, bacteria and yeasts in the areas where the vats are kept and other areas such as the walls and ceilings in the cold store facilities. Although white was chosen for the Taiwan project, the product is available in a range of colours.

The waterborne nature of the product allowed the coating to be rapidly and safely applied by roller and brush without any risk of contamination as it is non-toxic, non-leaching, non-tainting and ultra-low odour. The use of solvent-free materials was a vital consideration when deciding the type of coating to use, as odour contamination of products can potentially have serious, and costly, implications in beverage plants.

Two coatings can be applied in a single working day using standard painting techniques, so disruption is kept to an absolute minimum. Once in service, it is highly resilient and is able to withstand conditions of high humidity and extreme temperature changes from -50 to $+80^{\circ}\text{C}$ without cracking or flaking. The advanced styrene acrylic micro-polymer resin binder crosslinks to afford excellent adhesion, which remains unaffected even when substrate moisture escapes to the atmosphere through the membrane. ■



The exterior of the manufacturing plant.