WASTE WATER PLANT

30 years after the first Alocit coatings were used at this sewage plant to protect concrete on the 200,000 ft^3 buffer and 290,000 ft^3 rainwater settling tanks, Alocit was used again. But not on the originally protected concrete - these areas were tested and found to be in perfect condition - this time it was on vulnerable parts of the screen and grit chamber structures. The plant is mechanical-biological with phosphorous precipitation and anaerobic sludge treatment. Gas produced in the process is used to provide 60% of the facility's power requirements.

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The water-treatment plant is in Konstanz , Germany and is the largest in the area, designed to handle more than 13 million gallons of waste water a day, processing and cleaning at a maximum rate of 860,000 gallons per hour. It is a particularly important processing plant because 50% of the region's waste water is purified at the plant and Lake Constance, where Germany, Austria and Switzerland meet, is one of the cleanest lakes in Europe. Purified water from the plant is discharged into the lake, which supplies over three million people with drinking water.

So, in addition to meeting national waste-water management regulations, the plant also had to meet international discharge guidelines for Lake Constance requiring increased water quality through the reduction of contaminants. This was to be achieved through an extensive repair and modernization program.

Electrowatt Engineering of Zurich, Switzerland, who specialize in the building and renovation of sewage plants, were commissioned to assess the condition of the plant and make recommendations for its repair and upgrade the facilities. The company discovered that, in addition to structural damage in the form of cracks, there was damage to the concrete on older structures where Alocit coatings had not previously been used.

In these structures, corrosion of steel reinforcement caused by moisture penetration of poor quality concrete was made worse by coating failures. Surface protection that should have protected the concrete was unable to withstand the aggressive waste water, exposing and damaging the vulnerable substrate.

Evidence supporting these findings came from laboratory tests based on the penetration depths of the various substances which had damaged the concrete and were part of the overall assessment of the individual structures on the site.

It was decided that repair of vulnerable parts of the screen and gritchamber should include additional protection of the concrete, using a high-performance coating. Because of the company's experience with Alocit on the buffer and rainwater settling tanks - and the fact that the system needed no new treatment, despite more than 27 years of constant use - Alocit was the natural choice. A further factor in deciding to use Alocit was its environmentally friendly composition - it is 100% solvent free - a feature that is important when the environment is such a critical factor.

High-pressure water jets were used to remove failed coatings and damaged concrete. Exposed and corroded rebar had the rust removed and a mineral-based protection applied. As a result, the surface profile of the concrete substrate varied between an average around 60 mil / 3mm to as much as 160 mil / 8mm because of differing concrete quality and damage from chemical attack.

The total DFT for the project was specified as 12 mil/600 microns on the walls and 20 mil/1000 microns on the floors, using the same Alocit coating system that had been used thirty years previously: the primer was Alocit 28.95 and the top coats were Alocit 28.15. All coatings were hand-applied by roller.

The plant continued to operate during the repairs, work areas being protected by bulkheads. Plant manager Herr Schroeder-Rauter, commented, 'We can recommend Alocit without hesitation for all types of waste water environments'.

TEST RESULTS

Throughout the project coatings were regularly tested for quality. Drill cores were taken during the repair process and verified by laboratory testing. During each stage tests were carried out on site, including adhesion tensile tests and dry film thickness tests, all of which provided excellent results. The chart on the left shows that, during adhesion tests, there was only failure in the substrate - the Alocit coating remained secure. The second chart shows a sample of the DFT tests which showed excellent coverage throughout the project.

LOCATION OF SAMPLE	SAMPLE NO	FAILURE @	FAILURE LOCATION
TOP SECTION	BK 6	1.7 N/mm²	Failure Between Mortar And Concrete
	BK 8	2.2 N/mm²	
	BK 10	1.4 N/mm²	
MIDDLE SECTION	BK 14	2.9 N/mm²	Failure Between Mortar And Concrete
	BK 16	2.3 N/mm²	
	BK 18	2.2 N/mm²	
BOTTOM SECTION	BK 24	3.2 N/mm²	Concrete broke away at 20-30mm Depth
	BK 26	3.9 N/mm²	
	BK 28	3.5 N/mm²	

No of Measures	Sample 12	Sample 22	Sample 29
1	0.700	1.180	0.640
2	0.560	1.420	0.580
3	0.660	1.400	0.520
4	0.600	1.400	0.560
5	0.700	1.040	0.660
6	0.800	1.300	0.640
7	0.700	1.220	0.600
8	0.560	1.240	0.680
9	0.620	1.040	0.700
10	0.680	1.220	0.600
11	0.800	1.240	0.860
12	0.760	1.040	0.880
13	0.620	1.060	0.620
14	0.780	1.120	0.920
15	0.680	1.180	0.820
16	0.620	1.220	0.860
17	0.780	1.240	0.720
18	0.860	1.180	0.640
19	0.780	1.340	0.520
20	0.660	1.420	0.660

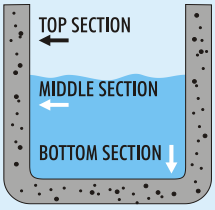
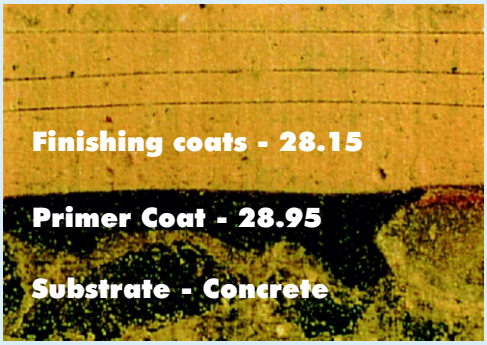


Diagram above indicates the sections referred to in the chart

Right: a magnified section through a core sample clearly shows the four top coats and how the primer penetrates and smooths the substrate.



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