ExcelPlas
MATERIALS TESTING

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

MATERIALS IN WASTEWATER

WE KNOW POLYMERS - WE KNOW TESTING

Wastewater treatment plants handle some of the most corrosive and aggressive liquids and solids known to process engineering. Pipes, tanks, pumps, and all the instrumentation that measures flow, level, pressure, temperature and other parameters are exposed to high concentrations of organic and inorganic compounds, sewage and industrial waste, corrosive chemicals, solids and microbiological organisms of all forms, as well as various acidic gases.

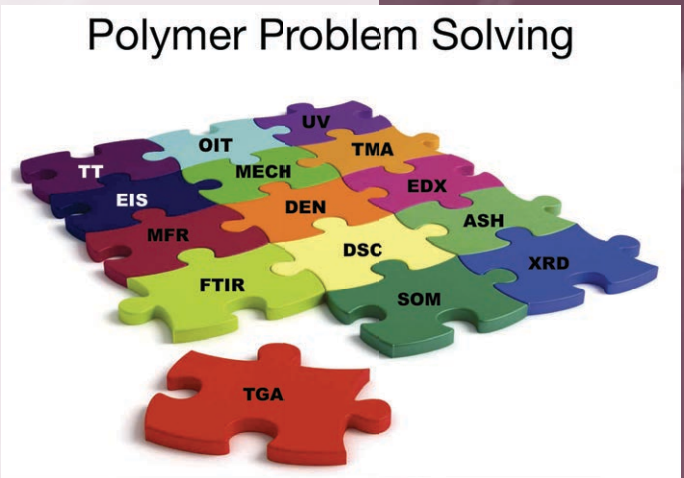
Wastewater produce compounds of acidic character that are aggressive to concrete, steel and polymers. Wastewater treatment plants and infrastructure also contain just about the greatest possible potential for steel pipe and tank damage caused by microbiologically influenced corrosion (MIC). The wide range of different wastewater components, in itself, makes it impossible to tackle the corrosion problems individually.

Organic components of raw sewage are likely to include fats, greases, proteins, surfactants, PFAS, oils, pesticides, phenols and many other aggressive compounds, some of which are likely to react with each other to create new substances. The inorganic components of raw sewage typically include heavy metals, nitrogen, phosphorus, sulphur, acids and a variety of strong alkalis – a veritable 'toxic soup'.

Gases such as hydrogen sulphide, methane, ammonia, oxygen, carbon dioxide and nitrogen are commonly found dissolved in wastewater, among other corrosives. Anaerobic decomposition of organic materials containing sulphur and nitrogen produces odorous compounds such as hydrogen sulphide, amines and volatile fatty acids. Chlorine and ozone, disinfecting agents in the final phase of treatment, add further corrosion threats.

Sulphur-reducing bacteria (SRB), for example, reduce sulphates to sulphites in an anaerobic environment to produce hydrogen sulphide - H2S gas. Other aerobes, most commonly different strains of Thiobacillus, will oxidize the sulphur to sulphuric acid - producing pH values as low as 1.0, and attacking the concrete basins, many polymers and most metals it comes in contact with.

Materials in WWTP are required to resist corrosion, degradation and embrittlement caused by the highly aggressive contaminants in the wastewater stream. The main infrastructure assets owned and operated by water authorities are the pipelines and treatment plants.



The Australian water industry faces many challenges, particularly in the areas of asset management of ageing infrastructure and the required training to support the prevention and remediation of corrosion. The cost attributable to the maintenance and repair of sewage treatment plants is also considerable.

25+
Years in Operation

15+
Qualified Staff

500+
Return Customers

1000+
Failure Analyses

8000+
Laboratory Jobs

The failure of a major pipeline or reservoir could have far reaching consequences. Not only could such an event have immediate catastrophic impacts to the surrounding area, there would also be long term economic impact on water, and possibly power, supplies to cities and towns. Repair and rebuilding costs would also be high.

As most pipelines are buried "out of sight and mind," the water industry has had a reactive approach to maintenance whereby the pipes are run to failure, with individual pipe failures repaired until the failure rate reaches a predetermined level, at which point the entire section of pipeline is replaced. For smaller pipes this is still considered "best practice" for the industry, but for larger critical pipelines a more proactive approach is being adopted.

The economic impact of corrosion and it's degradation of infrastructure and assets is estimated to be 3 to 5 per cent of GDP each year. This represents an annual cost of many billions of dollars to the Australian and New Zealand economies.

The cost of corrosion to the water industry is one area that has been quantified. The effects on water distribution and sewerage collection pipework and infrastructure impacts many areas of the economy and covers a wide ranging list of assets owned and operated by urban and rural water utilities, industry, agricultural and domestic environments.

ExcelPlas provides the following services to the wastewater industry:

- Testing of Wastewater Treatment Pond (WWTP) Liners
- Testing of Wastewater Floating Gas Covers
- Assessing Coatings and Linings for Wastewater
- EIS Testing of Protective Coatings
- Wastewater Chamber for Assessing Protective Coatings
- Cyclic Wetting testing of Materials
- Retained EIS After Immersion Testing of Protective Coatings

The impedance of the coating is related to the nature of the polymer, its density, film thickness, and fillers. EIS has been widely used in the laboratory and field within the protective coatings industry for determining a coating's performance and obtaining quantitative information on coating deterioration.

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When used with immersion tests, EIS analysis acts as a quantitative detector of coating quality.

When interpreting permeation resistance using EIS, the higher and more stable the retained impedance following exposure, the better the long-term permeability resistance and, therefore, the better the long-term coating performance.

EIS control readings are taken before the coating is exposed to the immersion testing and then compared to post-immersion testing impedance to determine if the polymer was permeated or attacked during the test. Any polymer degradation is easily detected by a decrease in the measured impedance.

ExcelPlas leads the way with digital communication with news blasts and news feeds in the industries and sectors in which it operates. eNewsletters and eAlerts are sent to its key customers weekly to be 'front of mind' for testing and analysis needs.

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