

## Technical Bulletin 103

### Why use a corrosion inhibitor and how does it work?

Corrosion is initiated when there is a potential difference between two surfaces (or two areas of one surface) and there is an electrolyte to conduct a current between them. This allows a flow of ions followed by removal of material (corrosion). A corrosion inhibitor works by "passivating" the surface of the material, forming a monolayer on it, which blocks the electrolyte from contacting the surface and conducting a current. In addition the corrosion inhibitor will act as a buffering solution, controlling pH, thus preventing changes of the pH of the electrolyte which would allow faster corrosion. pH should stay between 7.0 and 7.5 to minimise corrosion of materials used in gas turbine construction

Surfactants are partly hydrophilic (water attracting) and partly hydrophobic (water repelling). The balance between these two characteristics determines cleaning ability, emulsification and detergency and is varied by the formulator to suit particular cleaning requirements. This has no connection with corrosion inhibition. In fact a surfactant alone in water will act as a strong electrolyte and will "wet" the surface, initiating corrosion.

ZOK27 contains a surfactant package optimised for removing fouling from gas turbines, and a separate corrosion inhibitor package to control corrosion. Maximum performance is achieved at normal dilution. During the cleaning process the corrosion inhibition package passivates the blade surfaces and will protect them from corrosion afterwards for a minimum of 72 hours. If the engine is not rinsed out, the corrosion protection will last for longer periods depending on the circumstances.

Optimum corrosion protection is achieved by off-line washing with diluted ZOK27 or ZOK27 RTU, followed by an unfired spin on the starter to remove excess wash fluid. Ideally, blanks should be fitted to the air inlet and turbine exhaust. After their removal the engine is ready to start without having to wash out the inhibitor. Even in offshore conditions this method provides corrosion protection for up to three weeks. If the engine is still not needed, another ZOK27 wash will renew the corrosion inhibition for another period.