

Corrosion, Stray DC Voltage and Electrolysis - Comments

We get regular contact with dealers and end users advising that their riser column, submersible motor and other associated parts have 'corrosion'.

From the initial inspection and photo's, there can be minor holes, pitting of surfaces and at times, lines of small holes. Sometimes a hole can penetrate the item wall or shell causing it to fail or is in the process of failing.

This perceived failure of materials can be caused by the water chemical composition and other external affects such as electrical currents from control equipment including drives, incorrectly grounded earth circuits that can combine with the water to form electrolysis on the material surfaces. At some sites, there can be multiple affects happening simultaneously.

Methods to minimise these corrosive actions could include:

- Sacrificial anodes
- Upgrading of materials
- Insulating electric motor bearings
- Better earthing/grounding and
- Eliminating stray DC voltage.

Water aquifers can change over time, so while the water may be suitable for crops and livestock watering, chemically and with additional energizing currents, that water can change, become aggressive and in-turn damage or fail equipment.

Changes in weather patterns, aquifer levels, a new or more bores on neighbouring properties can change local water levels and composition of the chemicals within. Minor changes can start chemical reactions within the aquifer against installed materials. Upgraded local phone lines with bad earthing have been seen to affect pumps and submersible motor life.

Dry or wetter periods can also change the structure of the earth strata levels and how the aquifer interacts within these changed levels, thus changing the electrical conductivity of the surrounding ground.

A higher level of salt when acting with other acidic or alkaline compounds within the water can behave differently if charged with an electrical current, potentially leading to corrosive type pitting on material surfaces.

Electrical type currents such as stray DC voltage, can be initiated from areas such as; poor electrical circuits, bad earthing practices, fence posts/gates, battery chargers, electric fences, dairy sheds, communication and telephone lines, train lines, over head power and transmission lines and property work sheds.

All of these have been shown if not isolated correctly, can cause localised electrical issues to a pump and motor installed and operating in the ground/aquifer.

Stray DC voltages are difficult to eliminate, they can come from many kilometres away at times, not always directly from your own property. To test for DC voltages, you will measure with a DC voltmeter between the motor/pipework ground and the power supply. It is suggested that 4 millivolts or higher is classified as 'stray DC voltage' that has shown to cause fast onset electrolysis. If identified, you will need to eliminate or minimise the effects from its source to prolong equipment life.

For some installations, in the end, the life of the material installed could simply be limited by the water composition.