

TECHNICAL
BULLETIN

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THE SWIMMING POOL AND CHEMICAL MAINTENANCE

In order to keep swimming pool water so that it is safe for swimming, chemicals known as "antimicrobial pesticides" are added to kill bacteria and control algae. Chlorine is the chemical agent performing this task, usually in the form of calcium or sodium hypochlorite; as tablets, granules and sometimes as a liquid.

On average, your typical chlorine or saltwater pool has a free chloride (Cl-) ion concentration of about 1-5 ppm. Conversely, seawater in the world's oceans has a chloride (Cl-) ion concentration by mass of about 19,000 ppm! Consequently, the chloride concentration of typical chlorinated pool water is thousands of times less concentrated than seawater. So the free chloride concentration in pool water is not the main reason for risk of metal corrosion.

CORROSION RISKS IN AN INDOOR SWIMMING POOL ENVIRONMENT

In terms of metal corrosion, one of the major risks in a swimming pool environment comes from the concentrated chemical agents being stored and added in close proximity before effective dilution takes place.

Pool experts generally recommend a pool pH between 7.2 and 7.8, 7.4 being ideal (pH of human tears). However, in their concentrated form, the chemicals added to swimming pools can contain from 12% to 95% chlorine. These are very alkaline and extremely corrosive. For example, in concentrated aqueous solutions; the pH of Sodium Hypochlorite has a pH of around 10 and Calcium Hypochlorite is around pH 12!

Aluminium and its alloys are inherently corrosion resistant to materials in the pH range of 5 – 8. However, strong alkaline and acid substances, beyond this range can degrade and attack the aluminium oxide layer.

As would be expected, the point at which the chlorine chemical is being stored and added, the chlorine concentration is quite high. So all metal items in close proximity to storage and addition of the concentrate are at risk of becoming corroded over time, this even includes grades of stainless steel.

Another important factor affecting the rate of atmospheric corrosion of any metal is the "Time of Wetness" (TOW). This is the amount of time when the relative humidity is greater than 80% at a temperature greater than 0°C. All things being equal, generally, as the "Time of Wetness" increases, so does the rate of atmospheric corrosion. This is why it is important when designing metal fabrications, that there are not areas where water can pond and remain wet for extended periods, irrespective of the local environment.

The fact that that an enclosed swimming pool environment is often wet or humid, result in increased "Time of Wetness". This is an import factor to be considered when specifying metal fabrications & their finish.

Specification for Indoor Pool Constructions

The Anodiser's Association of Australasia recommends "treating an indoor swimming pool environment as a severe environment. We recommend AA25 (25 microns), which is the maximum thickness coating that is commercially available. Even with AA25, the maximum frequency of cleaning should be every 3 to 6 months". The main reason for this relates to increased rate of water and condensate contact in pool environments, not solely for the fact that chloride ions are present.

For this reason, 25 micron anodising or Evershield External/Coastal is the minimum recommended finish.



NOTE

Details contained herewith do not constitute specific advice, merely they are provided as a matter of courtesy and as general information only. You should seek your specialist's advice, to ensure that any information or suggestion meet your specific requirements. Reference should be made to the respective standards for the finish concerned as well as Australian Aluminium Finishing Pty Ltd (AAF) Terms and Conditions of Sale. Latest releases of Australian Standards are available for purchase via the following website; www.standards.com.au

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