

Technical Bulletin



Stainless Steel Selection for Swimming Pool Environments

Swimming pool water may appear to be quite passive to the casual user, but the specifier needs to take adequate precautions to ensure any drainage, fittings and fixtures around the pool are manufactured from the correct materials to prevent corrosion.

Corrosion factors

There are many variable factors in swimming pool environments that contribute towards possible corrosion of drainage components:

- Temperature of the pool water
- pH level of pool water
- Pool water type: saltwater or fresh water
- Chlorination level of pool: dosing from hypochlorite (fresh water) or electrolysis (salt water)
- Pool use regularity
- Proximity of drain to pool: constantly wetted (lapped by the pool), splash zone, change rooms etc.
- If indoors, the temperature of the room, ventilation and humidity

Grades of stainless steel and finishing

There are many grades of stainless steel available, but the most common grades used in swimming pool environments are 304 and 316.

Pickle passivation is a surface finishing process for stainless steel that removes surface impurities introduced during welding and the fabrication process and provides a protective passive oxide film. It is particularly important to apply this process as a minimum requirement in swimming pool applications.

Electropolishing is an additional optional finishing process that provides stainless steel with a natural polished lustre. This process strengthens the passive film and microscopically flattens the surface material, therefore reducing chloride traps, thereby reducing the risk of pitting corrosion. Electropolishing is recommended for pool environments.

Fresh water pools

Typically for public swimming pools, the pool water temperature will be approximately 24°C, pH levels between 7.2 and 7.8 and chlorine levels between 1 and 2 parts per million (ppm). For private swimming pools, the temperature may rise to around 30°C (and higher in hydrotherapy pools).

Chlorine or sodium hypochlorite is often used to disinfect swimming pool water and it is the chlorides contained in these chemicals that will create a corrosive environment – even

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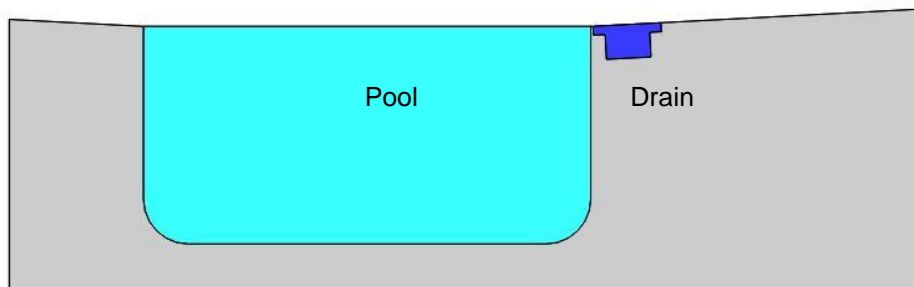
though they are used at very low levels. ACO recommends that drainage products in chlorinated fresh water swimming pool environments be manufactured from pickle passivated 316 grade stainless steel to prevent corrosion. For specific application advice, contact ACO.

Saltwater pools

Saltwater pools are typically more aggressive than chlorine pools. ACO recommends that drainage products in saltwater pool environments be manufactured from grade 316 stainless steel and both pickle passivated and electropolished. For specific application advice, contact ACO.

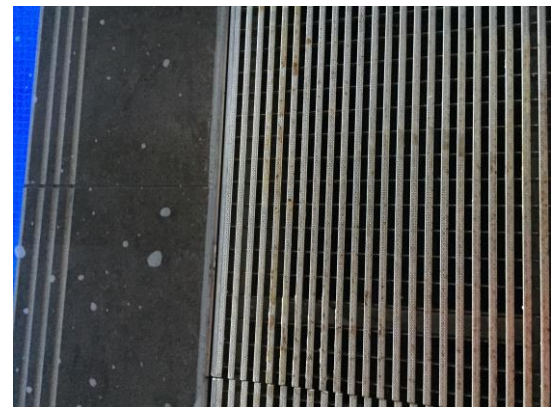
Proximity of drain to pool: material and finishing selection

Applications where the drainage channel is installed against or on a pool's edge often have a lap effect of the grate being in constant contact with the pool water.



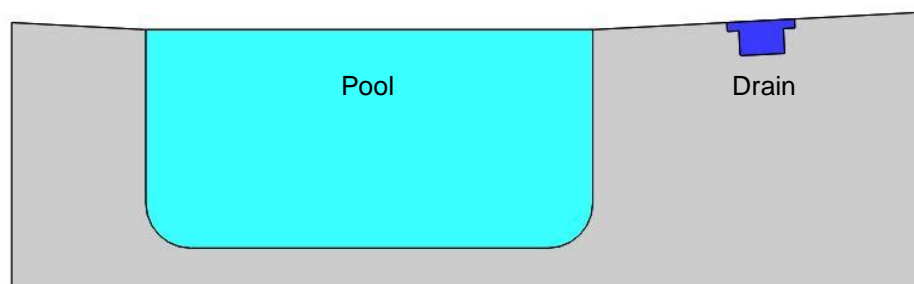
Channel and grate installed on pool edge

Often, the water only laps over half of the grate leaving residual water on the further half of the grate, which can evaporate and become more corrosive as it concentrates. As the grate is not continuously exposed to water, the available oxygen in a partially wetted environment can give rise to an increased risk of pitting corrosion. To avoid this risk, electropolished grade 316 stainless steel should be selected.



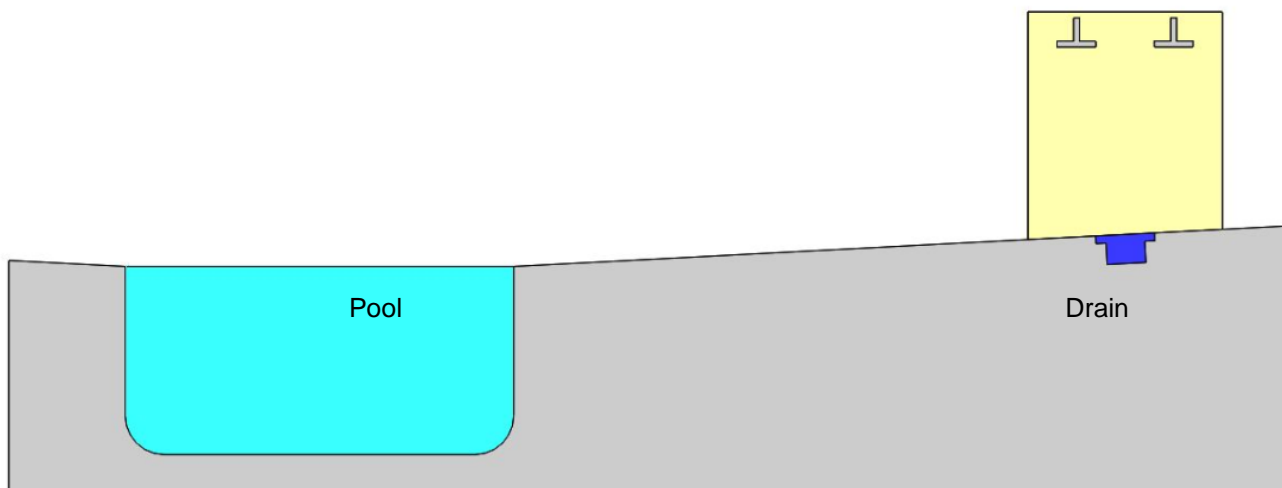
*Constantly wetted
Fig 1*

A drain can also be positioned in areas where it is subject to occasional splash. This too can leave residual water on the grate and channel, which can cause pitting corrosion and brown spots. Pickle passivated and electropolished grade 316 stainless steel is recommended for this application.



*Occasional splash
Fig 2*

Where the drain will be subject to fresh water only and in areas well away from the pool water and pool atmosphere, (for example, change rooms), 304 stainless steel is perfectly adequate.



Drainage in other areas of swimming pool environment Fig 3

Preventing corrosion

Good management of the pool environment is required to minimise corrosion. Swimming pool decks and drainage systems must be washed down daily with fresh water and regularly inspected. Regular and consistent checking of the pools' chemical balance is vital.

The material recommendations in this document are of a general nature only. For specific application advice, please contact ACO.