

A SPECIFIER'S GUIDE TO: CEILING GRIDS ABOVE INDOOR SWIMMING POOLS



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INTRODUCTION

The pool has been an integral part of Australian leisure culture for decades.¹ Its role at the centre of the Australian lifestyle is so entrenched that in 2016, the Australian delegation at the Venice Architecture Biennale presented 'The Pool', an architectural ode to the humble swimming pool. Today, Australia has the highest per capita rate of pool ownership around the world,² and as a nation we continue to treasure the pool as a symbol of our vibrant outdoor culture.

The pool has endured through years of architectural trends by way of adaptation: most recently, in line with the growing popularity of multi-residential apartments and high density hospitality projects, pools and spas have moved indoors and become communal. With the popularisation of indoor pools and spas, designers and builders have become exposed to a host of challenges not previously encountered with outdoor pools. The damp, enclosed conditions accompanying indoor pool and spa areas are unique and complex, and combine to create a harsh environment that requires a multitude of considerations. Designers must carefully consider not only the surface linings within indoor pool environments, but also the systems behind these surfaces.

In this whitepaper, we take a closer look at the ceiling grid supporting the ceiling lining above indoor swimming pools, and equip designers and specifiers with the relevant knowledge and understanding to make appropriate design decisions. Specifically, we examine the five key areas of concern to which designers must pay attention: ventilation, temperature/relative humidity, ceiling construction, trades/maintenance, and chemical treatments.



WHAT IS A CEILING GRID?

A ceiling grid is an integral structural system that allows for the fast and efficient construction of a suspended ceiling. Usually comprised of steel or aluminium, the ceiling grid is suspended from structural support elements – such as a floor slab or roof structure.

The ceiling grid may be exposed or concealed, depending on the aesthetics to be achieved. For concealed grids, the soffit is traditionally lined using plasterboard or other decorative material, all of which must be independently considered for use within the environment of the pool.

Ceiling grids are often used in commercial contexts to provide acoustic control or conceal services mounted on the underside of the structure proper. They are available in a range of dimensions and grid spacings to accommodate panels of varying size and shape.

CONSIDERATIONS WHEN SELECTING A CEILING GRID FOR INDOOR POOL AND SPA ENVIRONMENTS

VENTILATION

In all enclosed spaces, adequate ventilation is imperative to ensure the circulation of fresh, clean air. This is particularly crucial in indoor pool and spa environments, where ventilation is a question not only of comfort, but also of health.

Inadequate ventilation in damp environments provides the ideal breeding ground for mould, bacteria, mildew, and fungi, all of which produce volatile organic compounds (VOCs) that can be toxic to humans and produce foul odours.³

A further cause for concern in poorly ventilated indoor pool environments is the high concentration of chlorine fumes in the air: according to Bluescope Steel, zinc corrosion rates are lowest

in the pH range between 6.5 – 12, but increases rapidly as the environment becomes more acidic or alkaline.⁴ When properly designed, ventilation limits the build-up of chlorides in the pool environment.

As such, it is imperative that ceiling grids above indoor pools facilitate the installation and use of proper ventilation systems. Since such ventilation systems are typically set into the ceiling cavity, the ceiling grid must allow ample space to accommodate these and provide easy access for maintenance, cleaning, and repairs.

The ceiling needs to form a pressure seal throughout, between the ceiling plenum and the pool environment, and a fully ducted ventilation system is required to not only circulate the air but also to vent it to the exterior of the building. At no time should the ceiling plenum be used for return air, and ideally fresh air should be provided to the ceiling plenum to maintain a slight positive pressure.

TEMPERATURE/RELATIVE HUMIDITY

The combination of higher than average ambient temperatures and water vapour makes indoor pool and spa areas very susceptible to condensation. Most conventional ceiling systems are ill-equipped to withstand such harsh environments, and will rot, crack, or stain as the result of moisture accumulation in the ceiling cavity, causing significant cost and structural issues, unless adequate measures are employed to limit the potential for condensation.

In the case of steel ceiling grids, humidity is of particular concern, since condensation can form on the ceiling grid members. This condensation can carry chlorides, which enable the formation of galvanic cells on the zinc-coated steel, thus leading to corrosion.

Ceiling grids selected for use above indoor pool and spa areas must be specially designed and surface treated to withstand ongoing humidity and warm temperatures, and the dew point within the ceiling plenum needs to be maintained to prevent the possibility of condensation forming.

CEILING CONSTRUCTION

Given the above factors, the construction of the ceiling surface itself must be carefully considered. Perforated and permeable ceiling linings are inappropriate for use above indoor pools and spas, as openings will allow moisture to enter the cavity and condense on the ceiling grid members.

Instead, sealed, contiguous surface ceiling linings should be specified and affixed to the ceiling grid to ensure an impervious surface and secure seal. For acoustic management, designers could consider in-ceiling baffles or other acoustic linings that do not rely upon perforations or an exposed, soft surface to absorb sound. To prevent the build up of condensation on structural members, ceiling grids should be used in conjunction with moisture-proof membranes or barriers. The ceiling plenum must also be completely sealed to block the passage of vapour.



TRADES/MAINTENANCE

As noted above, suspended ceilings in many cases conceal important building services such as wiring, pipes, and ducting. For this reason, it is vital that ceilings provide easy, non-destructive access to the ceiling cavity to facilitate ease of maintenance and repairs.

In the case of concealed gridded ceilings, in addition to the ceiling panels being appropriately sealed, they should also be reasonably located in close proximity to the service for which they are providing access, such that maintenance personnel do not have to access the ceiling plenum.

Careful consideration of the ceiling grid at the design stage can minimise the potential for disrupting, perforating, or otherwise compromising the ceiling system in future once the need for repairs or maintenance arises.

CHEMICAL TREATMENTS

Ceiling grids are typically fabricated from steel that has been hot dipped in a coating of zinc or another alloy. This process galvanises the steel, and in most atmospheric conditions is sufficient to protect the grid from corrosion. However, in the context of indoor pool surrounds, treatment of a grid in this manner may not offer sufficient protection against the potential for rust and corrosion.

The same chloramines that pose a health risk to swimmers decompose in condensation to form a solution that causes corrosion upon coming into contact with metal surfaces.⁵ This exacerbates the corrosion rate of zinc-coated steel, which is already hastened by the elevated atmospheric pH level caused by chlorine vapour emanating from indoor pools. Accordingly, where the ceiling grid members are exposed to these ambient conditions, zinc coated steel is not recommended.

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Alongside a diverse range of steel products and systems that includes wall, ceiling, acoustic, and seismic products, Rondo provides a number of design tools and aids to ensure that designers choose the correct product or system for any building application. Thanks to strong in-house design capabilities and expertise gained through years of experience at the forefront of the Australian steel industry, Rondo has outstanding customisation capabilities.

Rondo's team of professional engineers and capable technical sales staff can guide designers and specifiers through the specification process and help tailor a custom solution to meet their specific needs. All Professional Engineers on the Rondo team are fully qualified and highly experienced, and ensure that the most appropriate, fit for purpose solution is provided for every project.

Rondo's extensive catalogue of steel products and systems – combined with their unmatched customer service and customisation capabilities – has made them a leading choice for products across all sectors. Rondo products have brought projects to life in a range of environments including healthcare facilities, educational institutions, offices and commercial spaces, and multi-residential apartments.

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