Maintaining Aesthetic Integrity and Public Safety with Porcelain Stoneware

ROCKSON
HARD SURFACE SOLUTIONS

INTRODUCTION

Throughout history, hard surface finishes in architectural projects have largely consisted of easily-extractable, natural materials - most commonly natural stone and wood. But while these materials were comparatively easy to acquire and fashion for their intended purpose, the limitations of their material properties caused people to explore other options to complete their project hard surfaces.

Use of clay-based tiles in architecture goes back to roughly 4500 BC,[1] when the first confirmed use of tiles by Ancient Egyptians was documented. Other historical evidence shows glazed bricks have been in use since 14,000 BC in ancient Mesopotamia.[2] In these ancient times, these clay-based materials were prized for their superior strength and durability compared with natural stone or wood, and for the decorative finish they provided.[3]

Now, in the 21st Century, designers and specifiers can opt for a huge variety of hard surface materials for their projects - glass, concrete, timber, natural stone and even metals. But not all hard surface materials are created equal - and the real challenge lies in finding one that strikes the right balance between aesthetics, durability and safety. Many common hard surface materials falter when it comes to technical performance, suffering from the effects of moisture, harsh heat or cold (known as freeze / thaw cycles), wear & tear, and other prevalent environmental conditions. This makes them expensive and high-maintenance - undesirable characteristics in any architectural project.

Porcelain stoneware provides an excellent balance between aesthetic and technical performance. It is a versatile, durable hard surface solution that can be tailored to suit almost any visual design requirements from illustrated artistry to metallic, wood and stone finishes. Porcelain stoneware performs better than traditional hard surface materials under harsh environmental conditions and provides better slip-resistance, fire and heat-resistance than most.

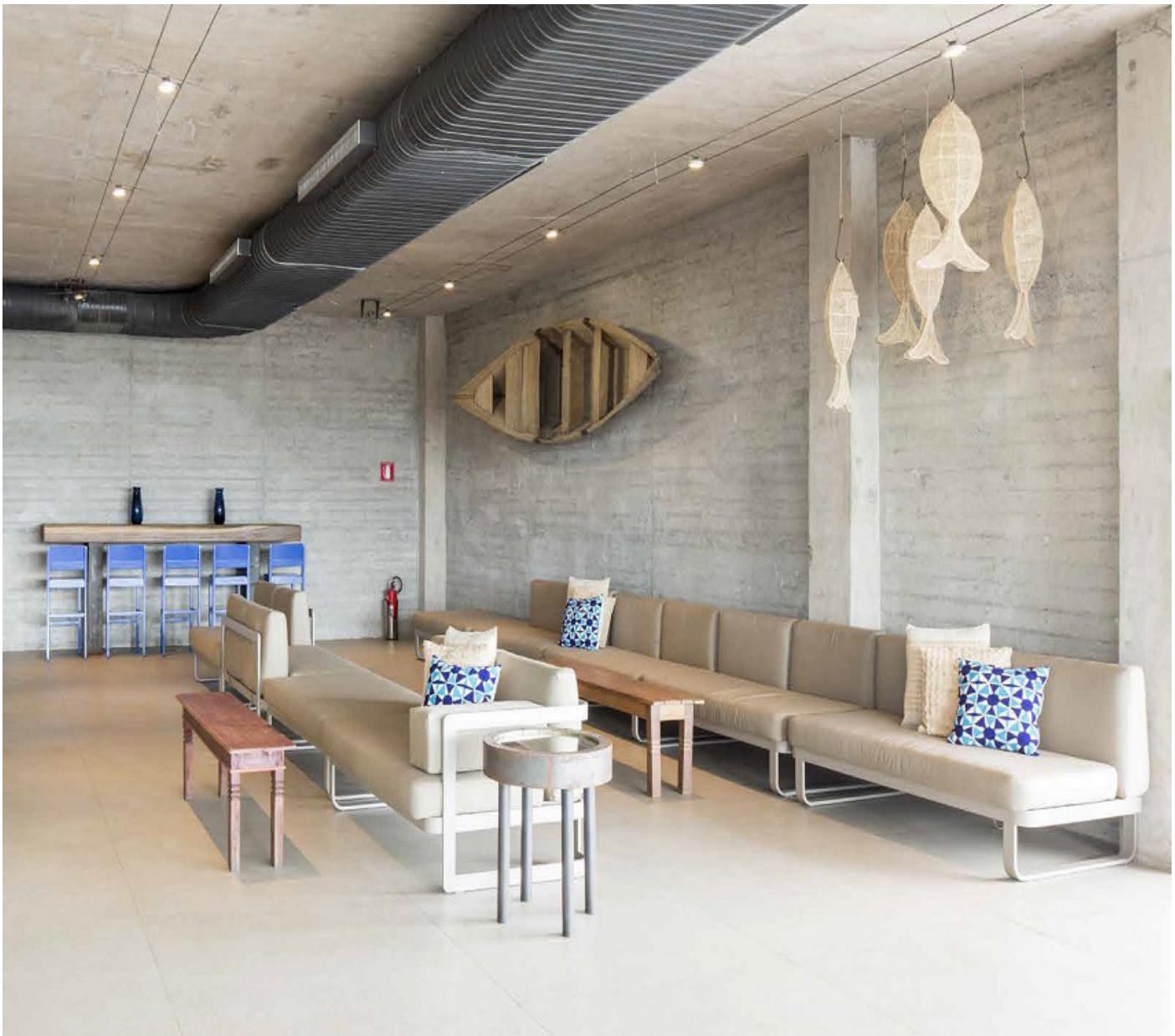
This whitepaper will provide a detailed overview of the benefits for designers and specifiers of using porcelain stoneware as a hard surface solution. It will begin with an examination of how porcelain stoneware is created, its properties and how these provide better technical performance than traditional hard surface finishes. It will then examine the practical benefits of porcelain stoneware in architectural projects.

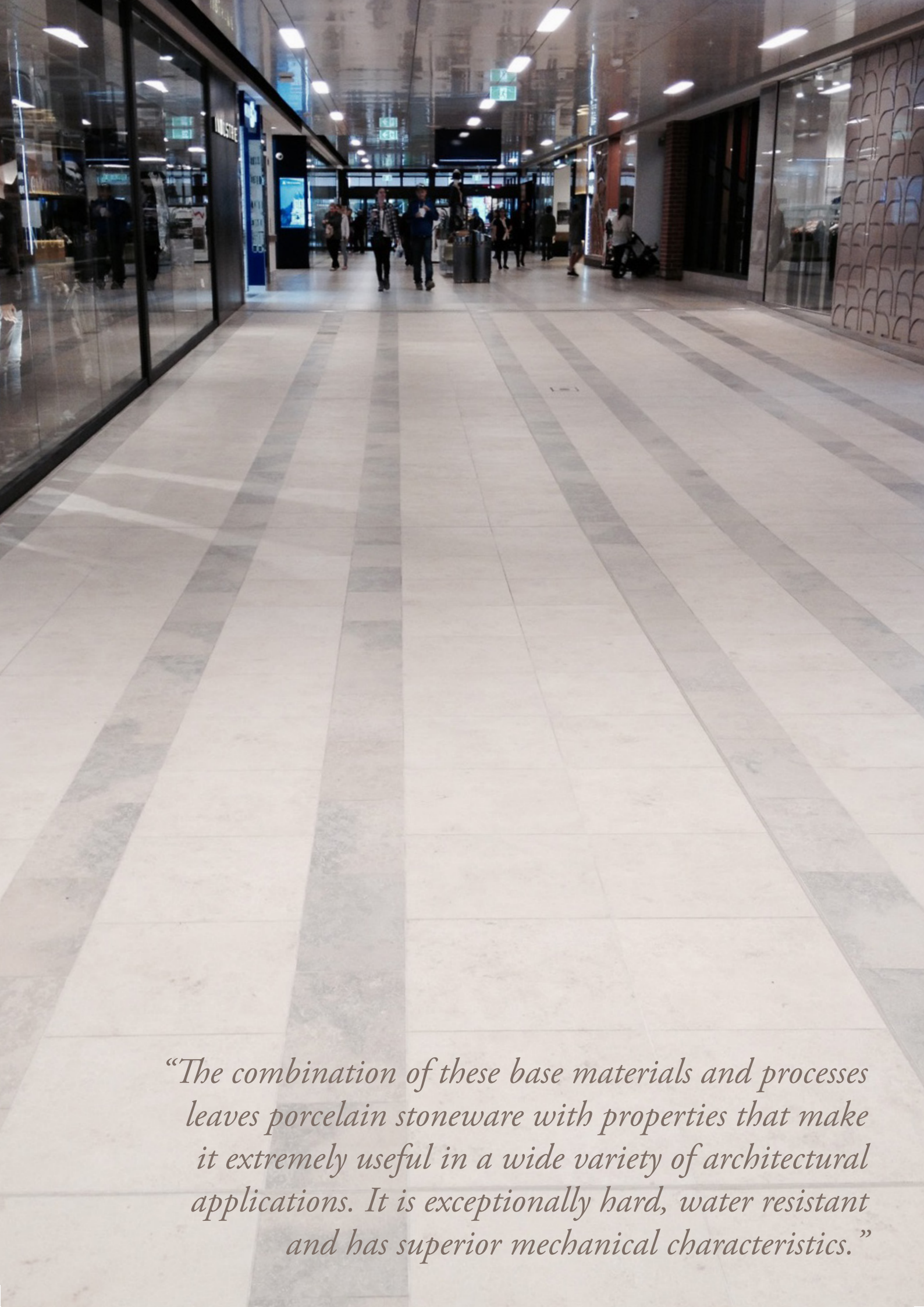
PORCELAIN STONEWARE AS AN IDEAL HARD SURFACE MATERIAL

Porcelain stoneware is the result of fusing a combination of natural raw materials in a controlled environment to form a single material. The precise composition can vary, but the component materials include sand, quartz, clay, kaolin, feldspars and oxides. Kaolin (hydrated aluminium silicate) is a versatile industrial clay that is used for a wide variety of applications from creating high-gloss paper to construction.[4] Feldspars are other silicate minerals with consistent properties such as a Mohs hardness of 6 to 6.5 and a vitreous (glass-like) luster.[5] Porcelain stoneware is kiln-fired at temperatures above 1,230°C which causes a chemical change that closes all porosity and renders the material completely vitrified.[6]

The combination of these base materials and processes leaves porcelain stoneware with properties that make it extremely useful in a wide variety of architectural applications. It is exceptionally hard, water resistant and has superior mechanical characteristics. Other common hard surface materials have drawbacks when it comes to technical performance. Timber, for example, is easily scratched and highly susceptible to varying weather conditions - suffering from bowing and warping due to fluctuations in moisture content from the surrounding environment.[7] Other materials such as metals, concrete and natural stone also display a range of properties that can make them undesirable in certain applications. These include susceptibility to staining, ability to be affected by chemicals, ultraviolet light, frost and mould which can alter their appearance or even render them hazardous to human health. Crucially they may also be slippery when wet, making them unsuitable for use as safe flooring.

Specifiers may be motivated predominantly by aesthetic in choosing their hard surface material, and opt for one over the other purely by how well it fits in with the existing visual design. However, with the technological advancements that have been made in the production of porcelain stoneware, it is possible to produce exact copies of natural stone, concrete, timber and metal, without compromising on technical performance.





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BENEFITS OF PORCELAIN STONEWARE

There are a number of material properties that make porcelain stoneware a versatile and effective hard surface solution.

RESISTANCE & DURABILITY

Porcelain stoneware tiles are virtually non-porous and have a water absorption rate of less than 0.05% and as little as 0.01%.[8] In essence, this makes them waterproof and thus immune to damage from humidity and water grazing, as well as bowing or warping. It also makes them resistant to stains. Porcelain stoneware's exceptional hardness makes it scratch resistant – tiles do not splinter, break or get damaged, making them ideal for floors and walls in applications from residential to high-traffic commercial. Porcelain tiles are UV resistant, making them highly durable and able to maintain their colours, even when exposed to continuous direct sunlight or in contact with any atmospheric agents. They are similarly resistant to frost, and all forms of thermal shock - the surface of the tiles will not change as a results of sharp fluctuations in temperature.

Porcelain stoneware's non-porous and stain resistance make it very easy to clean. In most instances wiping or mopping with a disinfectant will provide satisfactory results. However in circumstances where more rigorous cleaning is required (such as hospitals and commercial kitchens, for example), porcelain tiles still outperform other hard surface materials. They are chemical and acid resistant, meaning they will be undamaged by anything from food to the most aggressive cleaning agents. This means they will remain clean and sanitary without any need for special maintenance.

SAFETY

Porcelain tile surfaces can be made with abrasive surface textures that can increase traction and reduce the risk of slipping. For flooring applications where slip resistance is a defining performance requirement, specifiers should always check compliance with *AS/NZS 3661.2:1994 - Slip resistance of pedestrian surfaces*,[9] and discuss with suppliers if in any doubt as to a product's suitability. Porcelain tiles are also fire resistant (not flammable, reduce the spread of flames, do not burn and do not emit toxic fumes) and heat resistant (they do not change shape or structure at high temperatures). As inert materials fired at temperatures above 1230°C, porcelain tiles are 100% fire-resistant and non-combustible, a fact recognised in C1.10 of the Building Code of Australia.[10]

HEALTH

The surface of porcelain tiles is very dense, meaning that microbes, mites and other germs are unable to become trapped within the structure and can be easily removed through basic, regular cleaning. Similarly, as a kiln-fired ceramic material they do not emit Volatile Organic Compounds (VOCs) which can be emitted by a number of other unglazed building materials. VOCs have been linked to eye, nose and throat irritation, shortness of breath, headaches, fatigue, nausea, dizziness and skin problems.[11] Similarly, they contain no PVC, plastics or petroleum derivatives and no formaldehyde - both substances linked to adverse health effects in humans. Formaldehyde particularly can be present in pressed wood products and is recognised as detrimental to human health by the Australian Government.[12]

SUSTAINABILITY

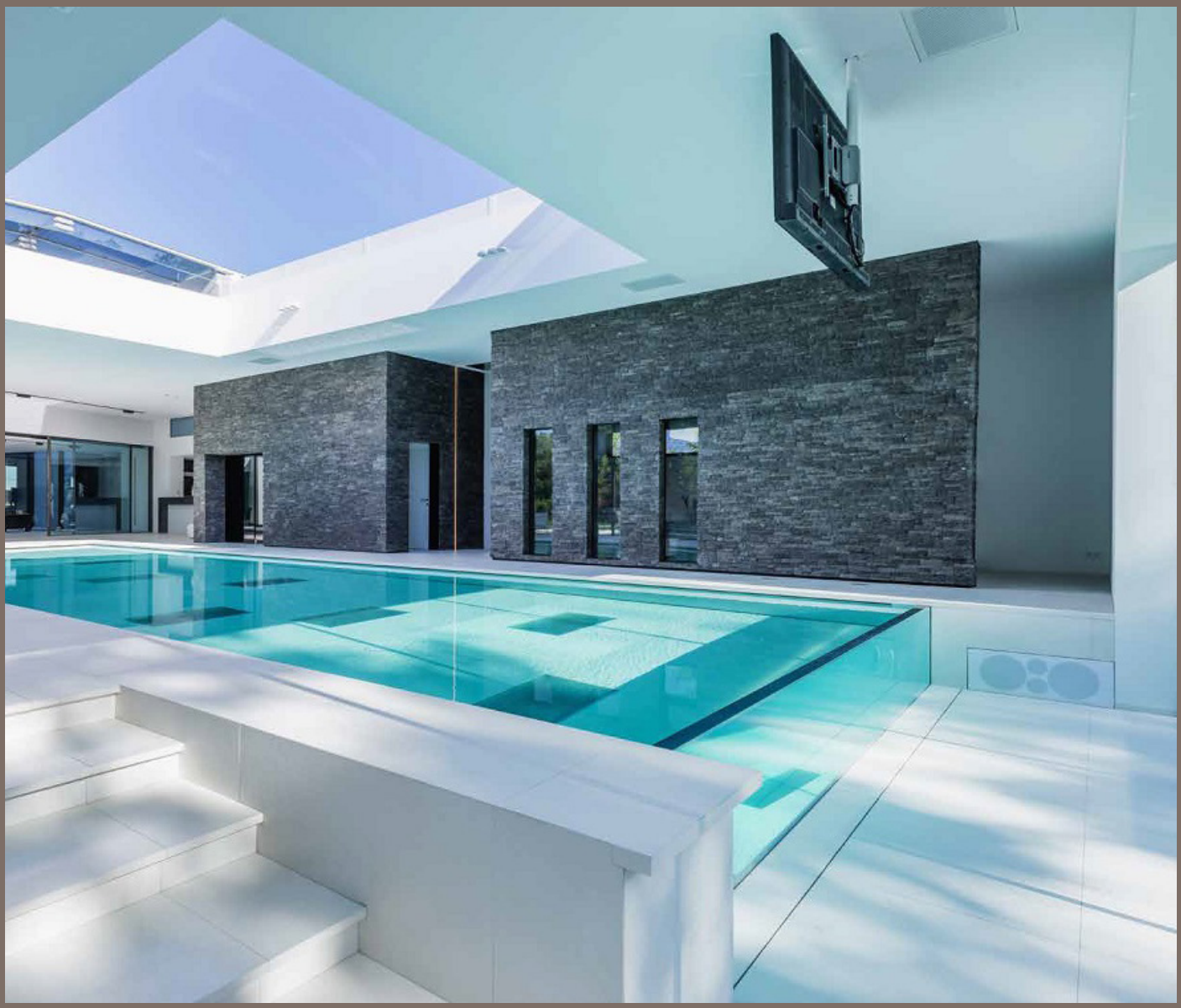
Porcelain tiles have a low environmental impact at all stages of their production – from the use of naturally occurring raw materials to their disposal and recycling. They are frequently fabricated from materials found close to manufacturing facilities, and are fully reusable and recyclable. Due to their high-durability and life-expectancy of up to 50 years, minimising waste and the need for excessive replacement. They are also extremely energy efficient - the high thermal inertia of porcelain tiles moderates the changes in temperature of the room environment, saving energy and reducing bills.

ROCKS ON

For over 20 years, Rocks On has been a leading supplier of porcelain stoneware to the Australian market. Their dedication to quality, luxury and technology, has earned them a positive reputation amongst architects, designers and specifiers.

Rocks On specialises in the creation of tailored solutions for residential and commercial projects, providing detailed advice and precision cutting for custom-designed surfaces. They pride themselves on staying abreast of all new advances in porcelain stoneware in order to provide Australian designers and specifiers with the most innovative, functional and aesthetically pleasing products available worldwide.

Rocks On porcelain tiles focus on providing the highest technical performance while offering a range of stunning and varied finishes to suit any contemporary design - from cements or marbles to authentic-looking woods and artistic creations.



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All information provided correct as of April 2020

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