

## WHAT IS ENGINEERED STONE?

### *What is Engineered Stone?*

Engineered Stone is a mixture or an agglomerate of natural minerals and resin binders. WK Marble & Granite Pty Ltd markets the Engineered Stone under Quantum Quartz® Solid Surfaces®. Quartz engineered (Aggregate) stones combine two major ingredients: a natural mineral and glass, metal and oyster shells (the "filler") and a resin (the "binder"), along with a range of additives. These are combined and then cast in a curing process to produce sheets of engineered stones. Engineered stones are sold under various trade names and vary in quality depending on the type of resin used and the additives used.

### *Fillers*

For Quartz based engineered stones Quartz is used as the major filler. In addition coloured glass, oyster shells and metal are used to enhance the surface features of the stone. The proportion of Quartz used varies from manufacturer to manufacturer and Quantum Quartz® is made using a combination of 93% Quartz, with 7% of resin, recycled coloured glass, oyster shells, colours and binders.

### *Resins*

Resins are used in many high-strength demanding applications. The type of resin that is used in engineered stone can also differ from manufacturer to manufacturer. Some use epoxies or polyesters as well as other proprietary resins. Engineered stone products made with these resins are generally not considered to be thermoformable.

### *Additives*

Quartz based engineered products contain numerous additives. These include pigments, but also a host of additives that improve or enhance chemical and performance properties: UV absorbers, cross-linking agents, stabilizers, and the list goes on. Engineered Stone products continually change its additives with improvements in technology, one important additive which all Engineered stone share is a catalyst. This is the chemical, usually a peroxide, which causes the mixture to harden, or cure.

### *Casting*

The way a solid surface is "cast" is generally a simple one. The resin is mixed with the additives and fillers and then poured into a mould, usually open, sometimes closed (usually closed for shaped products). It is important that no air bubbles are entrapped in the mix, as this would result in voids in the material. This is accomplished in different ways, from simple adjusting of the viscosity of the mix to vibrating casting tables and other more exotic methods.

### *Curing*

Curing means allowing the chemical reactions that form the Engineered stone product to be as close to 100% complete as possible, leaving a stable, inert material with all its performance properties intact. Some Engineered Stones cure by themselves in the open air. Others cure by being bathed in steam or heated in ovens. Many polyester resins require "post-curing" operations, usually a heating-cooling cycle which increases the degree of cure.

### *Colour*

Engineered Stone comes in a variety of colours. Choose a colour that will compliment your décor.

### *Colour Consistency*

A slight colour variation may occur from batch to batch due to the location from which the natural material is quarried. Also, due to the natural quartz composition of Engineered stone, irregularities such as spots or colour particles in the slab may occur.

### *Scratch-Resistance*

Quantum Quartz® is highly resistant to abrasion. With a score of 6 to 7 on the Mohs hardness scale, and the abrasion index of 60+, Quantum Quartz® Solid surfaces is ideal for flooring and countertops including those subject to high traffic or heavy use.

### *Finish*

Quantum Quartz® is available both in honed and highly glossy finish. Honed finish is not generally suited for kitchen or counter tops as it can attract and accumulate dirt. Glossy surfaces can be easily cleaned as compared to honed surface.

### *Water absorption*

Natural and synthetic materials with lower water absorption rates are easier to maintain and more resistant to stains. Quantum Quartz® has an absorption coefficient of 0.03% or more than 15 times better than the minimum required to be considered "impervious". The best rating qualifies the material as "impervious" and it is reached when the coefficient obtained is 0.5% or less.

### *Frost-Free*

Quantum Quartz® is practically immune to freezing and thawing cycles because of its low level of water absorption. As tested per ASTM C-97, Quantum Quartz® has maximum water absorption of 0.03%.

### *Abrasion resistance*

ASTM C-241 tests the wearing resistance capacity of natural stones, ceramic and porcelain materials to the abrasion of foot traffic. Results of 10 qualify the material for normal traffic areas; 12 are required to pass for commercial floors, stair steps and platforms subject to heavy traffic. Quantum Quartz® has an abrasive hardness of 60.

### *Abrasion wearing index*

The capacity of commonly used tiles to resist the abrasion made by dragging heavy objects of different materials is evaluated using Abrasive Wearing Index Tests. The most common results are natural clay ceramic tiles 35 or more and porcelain tiles 100 or more. Quantum Quartz® has an abrasion-wearing index of more than 175 or about double than porcelain tiles.

### *Stain-Proof*

Quantum Quartz® is a non-porous material. Common spills stay on the surface and are easy to clean with regular cleaners leaving no trace of stain on the surface as tested per ASTM C-650. However, Quantum Quartz® is susceptible to nitric and hydrofluoric acids and hydroxides in high concentrations when exposure exceeds 24 hours.

### *Stain resistance*

The inert properties of its natural components (quartz, silica and or granite) together with its fabrication process make polished and semi-gloss finished Quantum Quartz® more resistant to stains than any other competitive material.

### *Chemical Resistance*

Quantum Quartz® is an ideal product for applications where chemicals and/or strong cleaning agents are used. Quantum Quartz® is virtually non-porous; hence it is impervious to most concentrated solutions of industrial chemicals. Listed below are industrial chemicals for which Quantum Quartz® has been tested.

### *Acids*

Quantum Quartz® is not affected by even the strongest solutions of common acids including: Hydrochloric acid, Muriatic acid, Nitric acid, and Sulphuric acid. In concentrated solutions, after exposures of 24 hours, some acids such as nitric acid will slightly discolour the resin used in Quantum Quartz®, though they will not compromise the strength of the material. Hydrofluoric acid spills should be cleaned up immediately because the acid will react with the quartz in Quantum Quartz®.

### *Bases*

The only two known substances to affect Quantum Quartz®'s surface are sodium hydroxide and potassium hydroxide in industrial concentrations. Although these substances will not degrade the structure of the material, over time they will etch Quantum Quartz®'s surface. Concentrations of the above bases in 10% or higher concentrations should be cleaned from Quantum Quartz®'s surface immediately. In household concentrations, such as those found in home drain cleaners, sodium and potassium hydroxide have no effect on Quantum Quartz®.

### *Solvents*

Quantum Quartz® resists a wide range of commercial and industrial solvents. Household cleaners and industrial strength concentrations of solvents (such as Methyl Ethyl Ketone) have shown no effect on Quantum Quartz®. Other solvents that can be safely used in pure concentrations on Quantum Quartz® include: Acetone, Lacquer Thinner, Mineral Spirits Isopropyl Alcohol, Methylene Chloride, and Trichlorethane.

### *Staining Agents*

Quantum Quartz® resists staining agents found in laboratories. Quantum Quartz® is not permanently stained by pure concentrations of Betadine, Potassium Permanganate or Iodine. (These agents permanently stain most solid surfaces and plastics.) Any residual stain of Betadine or Iodine on light-coloured Quantum Quartz® cleans off with household chlorine bleach. Black and dark colours of Quantum Quartz® show no stain from these agents.

### *UV resistance*

The Quantum Quartz® is for indoor use only. When you use them outside you will notice that light colours turn yellow and dark colours will fade. But continued exposure to direct sunlight could alter the colour of the stones.

### *Flame spread and smoke density tests*

Quantum Quartz® tested for Flame spread and smoke density gave a safe flame spread coefficient of 17 by ASTM E-84 and a smoke density coefficients of 196 under "flaming" test and 69 in a "non-flaming" test. Hence these tests confirm that the Quantum Quartz® is safe in diverse residential and commercial construction environment.