

ENGINEERED QUARTZ STONE 2



2 ENGINEERED QUARTZ STONE

Natural stones, especially granite, have been used for flooring and countertop material in high-end homes for its beauty and elegance. However, even though it is very durable, scratch and heat resistant, it has other inherent less desirable characteristics. They are naturally porous and are prone to staining by oils, acids and some cleaning products, especially if they are not properly sealed or resealed periodically. It also contains tiny pits and natural fissures that may appear to be cracks, although these are inherent features. Besides, they are subject to tone variation and it is not easy to achieve smooth transition in the range of shades when it is used in large areas. An alternative to natural stone is engineered quartz stone which is also durable but without the less desirable characteristics of natural stone.

2.1 WHAT IS QUARTZ?

Quartz is a naturally occurring silicate mineral composed of silicon dioxide (SiO_2). It is one of the most common and available minerals on the earth's surface. It ranks 7.0 on MOH (Measurement of Hardness) scale, behind topaz (8.0), sapphire (9.0) and diamond (10.0). Granite is ranked 6 on the scale (Refer to Chapter 1, page 16 for MOH scale range, which is used to gauge the scratch-resistance of a material).



2.2 WHAT IS ENGINEERED QUARTZ STONE?

Quartz exists naturally in clusters and does not form huge stone blocks like granite (which contains 40% - 60% quartz), limestone or other types of rock. This makes it unsuitable for use in its natural state in countertops or other large slab applications. This means that it needs to be converted into another form i.e. engineered stone, to make it usable in such applications.



Engineered quartz stone (also known as reconstituted or re-composed stone) is manufactured from a mix of quartz aggregate chips, a resin binder (typically an unsaturated polyester), pigments and additives. Engineered stone slabs and countertops are available in a wide range of colors, patterns, and even textures. Its texture can be fine or coarse, depending on how it is processed, and can be combined with glass and other reflective materials for a sparkling finish. They are increasingly popular in high-end applications combining the benefits of granite's durability and non-porous nature of quartz.

2.3 MANUFACTURING PROCESS

The manufacturing process begins with selection of raw quartz materials. They are crushed and blended in the ratio of 93 % quartz aggregates to 7% polyester resin and other additives.

The mixture is compacted into slabs by a vacuum and vibration process of approximately 100 seconds at a pressure of about 100 tons. This process minimizes porosity and reduces water absorption. The slabs are then cured in a kiln at a temperature of 85 degree for a period of 30 minutes to attain the essential properties of resistance to stain and impact. The curing process may be accelerated by using ovens or steam. When curing is completed, the slabs are gauged, calibrated, polished and prepared for packing.

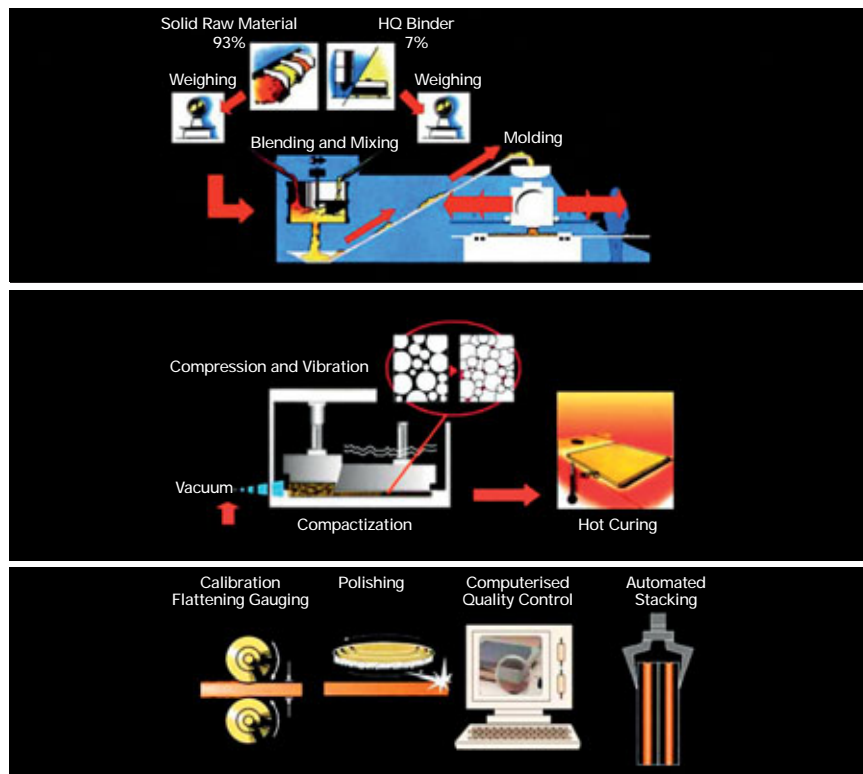


Fig. 2.1 – A typical production cycle of engineered quartz stone.

2.4 TECHNICAL CHARACTERISTICS OF ENGINEERED QUARTZ STONE VS AGGLOMERATED MARBLE

S NO	CHARACTERISTIC	ENGINEERED QUARTZ	AGGLOMERATED MARBLE
1	Density	2.4 to 2.5 g/cm ³	2.4 to 2.5 g/cm ³
2	Water Absorption	0.01 to -0.2%	< 0.20 %
3	Modulus of Rupture	41-58 Mpa	20-35 Mpa
4	Compressive Strength	150-240 Mpa	110-150 Mpa
5	Abrasion Resistance	58-63 (Index)	20-32 (Index)
6	Hardness	6-7 Mohs	3-4 Mohs
7	Acid Resistance	Yes (certain extent)	No

2.5 KEY FEATURES OF ENGINEERED QUARTZ STONE

- As the manufacturing process allows uniformity and consistency in dimension and shade, pre selection effort (also known as dry-lay – a common practice when using natural stones) is minimized. This saves considerable time during construction.
- The high MOH score and better scratch resistance properties make the material suitable for commercial flooring applications where traffic and abrasion factors are high.
- Most patterns of engineered stones resemble natural stone, but with a consistent pattern, texture and color. Thus flooring or countertops have a uniform appearance.
- The hard, non-porous surface retains its polished lustre and does not need sealing treatment on the surface. It can also be cleaned and maintained with normal or soapy water.
- In addition to kitchen countertops, engineered stone products are suitable for shower and tub surrounds, vanity tops and other surfaces in wet areas, unlike porous stones, which can foster bacteria growth. They are therefore ideal for locations such as commercial buildings, canteens, hospital food service areas, etc.
- As they are man-made, these materials can be fabricated in large sizes, resulting in less joints and better aesthetics.



Fig. 2.2 – Most patterns resemble natural stone.



Fig. 2.3 – Resistance to acid and food safe: Suitable for kitchens and wet areas.



Fig. 2.4 – Porosity in natural stones attracts liquid and moisture ingress.



Fig. 2.5 – Non-porous surface does not require sealing in the counter-top.

2.6 LIMITATIONS AND OTHER FACTORS TO CONSIDER WHEN SELECTING ENGINEERED QUARTZ STONE

- Although engineered stone resembles natural stone, it still lacks the uniqueness and beauty found in natural stone e.g. beauty marks, flowing veins, known as “movement” of the stone. From an aesthetic standpoint, engineered quartz countertops may appear artificial.
- The high MOH score gives better hardness and scratch resistance properties. However, once the tiles are installed, they cannot be ground and polished (similar to granite) if there is any lippage or unevenness in the flooring.
- The back-splash at counter tops or sinks cannot be integrated like acrylic materials solid top materials. So back-splash joints are inevitable in the counter-top.



Fig. 2.6 – Sink and back-splash can be integrated in solid surface materials but not when using engineered quartz stone.

- The cost of materials can be higher than natural stone in some cases depending on the variety and supply source.
- Engineered stones are primarily stone particles with a bit of resin and pigment. Not all variety of stones used in manufacture will have a consistent quality. The end product may therefore vary from one batch production to another depending on the raw materials used, mixing ratio of resin, quality of resin and other pigments and type of machinery employed for the production.

2.7 SUMMARY

It is important to understand the characteristics of the materials and match it to the conditions for its intended use. The use of compatible adhesives and grouting, correct method of installation and maintenance are also important. In addition, it is advisable to select samples from different production batches for laboratory tests to ensure their reliability and technical properties before actual installation. Finally, it is always important to consult the manufacturer for detailed information and technical support on the suitability and applicability of the product for the intended use.