

February 11th, 2020

To Whom It May Concern:

High quality products equal long lasting architectural finishes. This is why the market needs to understand the difference between High Density Air Cured Fiber Cement and Cemontisous Auto Claved Fiber Cement Panels. The products that fall under the “Fiber Cement” and “Cemontisous Panels” label are as broad as using tree to describe a Palm or a Giant Sequoia. We must investigate the material properties to understand the glaring difference between the two panels.

Staying with this tree analogy, let’s first discuss the varying material properties that embody a “Cemontisous Panel.” Typically, Auto Claved Panels will have lower percentages of cement and higher concentrations of filler due to the autoclaving process. The filler generally consists of cellulose (wood pulp) and silica. Cellulose and silica pose a significant risk when added to fiber cement panels. Cellulose weakens the panel and makes the panels more susceptible to moisture intrusion, and cellulose at these levels increase the potential for jobsite handling and fabrication issues.

What are the negative effects of the autoclaving process?

- Autoclaving results in a crystal structure in hydrated cement products that is different from that produced at low temperatures (air curing).
- The newly aligned crystal structure is more susceptible to chemical attack by atmospheric CO₂ and vulnerable to moisture intrusion.
- Moisture Movement – One of the sources of tension in installed fiber cement is due to drying shrinkage (i.e. the reduction in dimension with loss of water). More generally, this is known as moisture movement where the expansion with increase in moisture content is also considered. Since it is possible to vary the moisture movement with composition, formulation for low moisture movement is used to minimize the stresses due to restrained dimensional changes in installed products. With autoclaved products, you have a higher moisture movement caused by the effects of carbonation which create internal stresses in the panel.
- Carbonation of the newly aligned matrix (which causes greater moisture movement in the panel) can also cause an autoclaved product to be more susceptible to cracking and failure in service.
- It is very important that the product not be over-heated during the autoclaving process because this can damage the cellulose fibers and cause panel delamination.
- The product is more rigid/brittle than an air cured product.

AIR CURED FIBER CEMENT

What is air curing and why is it beneficial to the creation of High Density Fiber Cement Panels?

Air curing is a process where cement-based products cure naturally. Typically, the full strength of cement-based products can be achieved after 28 days, and 60%-70% strength is achieved after 7 days. Accelerating this curing process through the aid of temperature can induce stresses within the panel for various reasons.

- Creep – Although conventional testing of fiber cement does not usually include creep, creep capability of fiber cement is an important factor in its durability. Fiber cement is subjected to various stresses during normal exposure that place it under tension. Since high creep capability reduces these tensile stresses, it follows that a fiber cement that can creep in response to this tension is better able to last for long periods. Air cured products have a higher creep capability than autoclaved products.
- Stresses associated to moisture movement are limited with air cured products.
- Air cured products have a better resistance to chemical attack.

BENEFITS OF AN ENGINEERED SINGLE SOURCE SOLUTION:

Fiber cement is subject to stresses in addition to environmental stresses/material issues. These are building related stresses.

Examples of these stresses include:

- a) Repetitive Mechanical Stresses – such as direct stresses due to attachment to the building structure from forces such as wind, earthquake, and building vibration.
- b) Restrained expansion and contraction due to thermal cycling.
- c) Restrained expansion and contraction due to wet/dry cycling.

Repetitive mechanical stresses may have direct observable effects such as gradual loosening of the fixings or cracking of the sheet. They also may have more subtle effects such as delamination.

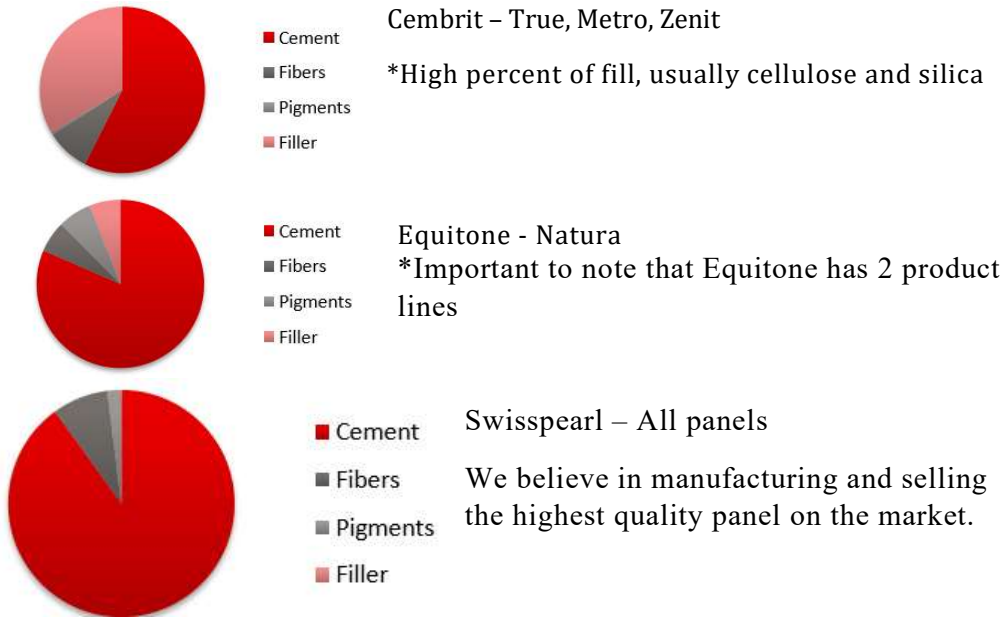
Let's take a look at some of the popular fiber cement panels on the market and what separates High Density Air Cured panels from the Cementitious Auto Claved fiber cement panels.



- Cement
- Fibers
- Pigments
- Filler

Equitone – Tectiva / Linea, Hardie, Nichiha and or most others.

**High percent of fill, usually cellulose and silica



At Swisspearl, we believe in only using the finest building materials available in the market. With less than 5% fill, our panels are the densest in the market at 1.75 g/cm³ and 3.5 lbs/sf.

The importance of density and quality of materials does not stop at the finish. It carries through all testing and performance standards both required and voluntarily performed including but not limited to, DIN 18032 ball impact, SIA 261/1 hail resistance, and EN ISO 354 Sound Absorption.

Density also plays a very large role with color fastness. Swisspearl to date has created over 2,000 custom colors in our color library, giving Swisspearl the largest range of tested colors in the fiber cement panel business. What makes this achievement possible is the high quality of the cement we use. When color is impregnated within the cement it has a much higher UV resistance and life expectancy than poor-quality cement with a high percentage of filler.

In conclusion, understanding the difference between High Density Air Cured Fiber Cement and Cementitious Auto Claved Fiber Cement Panels is key to the success and longevity of your facade projects.

Sincerely,

Harry Harisberger

Country Manager USA and Canada