

HYGIENIC WALL SOLUTIONS featuring **GLASBORD®**



Glasbord® Hygienic Wall Solutions vs. PVC Plank Paneling:



For indoor cultivation facility owners that need to control the spread of moisture, mold and pest contaminants in fire rated buildings, Crane Composites' Hygienic Wall Solution provides enhanced durability, bulk water and air infiltration resistance unlike PVC plank alternatives. This superior solution is comprised of a sealed wall solution, complete with wall panels, steel transitions and urethane sealants. The Glasbord Hygienic Wall Solution is the only interior cladding product to attain both ASTM E331 & E96 certifications for bulk water and vapor transmission resistance.

Managing air flow throughout an indoor cultivation facility is vital to controlling the environment and ensuring healthy plant growth. Implementing a sophisticated ventilation and filtration system greatly improves healthy air flow, however that alone is not enough to fully prevent the presence of mold/mildew or the occasional pest from entering the building. Selecting the proper hygienic wall cladding system also plays an important role in the facility's long-term durability and overall crop yield. These wall solutions limit the amount of air and water that can be carried from one room to another.

Crane Composites' Hygienic Wall Solution with Glasbord FRP, provides a rigid/durable surface that is easy to clean and limits air and water transmission. Trusted by contractors and building owners across the globe, Crane Composites FRP Wall Solutions provide superior performance compared to PVC plank panels, as further described in this technical bulletin.

THERE'S NO BETTER OPTION

The Crane Composites Hygienic Wall Solution delivers superior overall performance versus PVC plank in the following categories:



**BULK WATER
MANAGEMENT**



**VAPOR BARRIER
PROTECTION**



**FIRE RATED WALL
SOLUTION INTEGRITY**



**IMPACT DURABILITY +
CHEMICAL RESISTANCE**

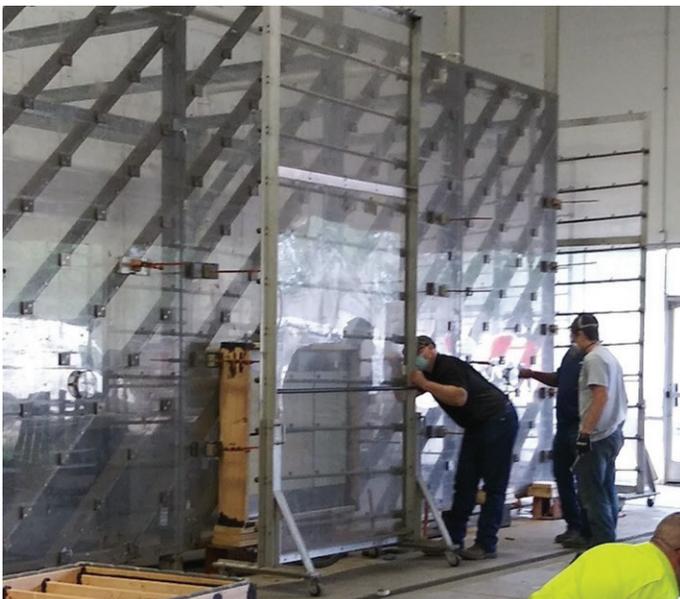


GLASBORD Hygienic Walls Provides Superior Bulk Water Resistance

Cultivators often associate bulk water management with exterior rain screen assemblies or hydroponic systems. However, they should also consider how cultivation facilities manage the performance and water resistance of inner walls as well. Cleaning procedures, wash downs and the overall warm/humid climate present a challenge to interior wall design, requiring owners to properly mitigate water throughout cultivation and post-harvest processing rooms.

ASTM E331 is the official test method for “Water Penetration of Wall Assemblies by Uniform Static Air Pressure Difference”. This test determines the water penetration resistance of building products using a calibrated spray apparatus and applying uniform static pressure to opposite sides of the test specimen. E331 is a pass/fail test, where the presence of a single leak will prevent a successful result.

The apparatus consists of a “spray-rack system”, delivering water to the test specimen at a rate of 15.0 PSF (pounds per square foot). Most generic exterior specifications call for a minimum testing pressure of 6.24 PSF. The Crane Composites Hygienic Wall Solution was tested at the full pressure of 15 PSF, for 15 minutes, therefore demonstrating thorough water resistance.



ASTM E331 WATER PENETRATION TEST WITH CALIBRATED SPRAY RACK SYSTEM @ 15 PSF. CRANE COMPOSITES' HYGIENIC WALL SOLUTION PASSED IN 2021 WITH NO LEAKS OBSERVED.

The Crane Composites Hygienic Wall Solution achieves superior bulk water resistance performance with its sealed system, offering cultivators piece-of-mind that each wall component will be protected from harmful

moisture damage. By treating each seam with a 2-component polyurethane seam-sealant, the Glasbord panels are essentially fused together ensuring a proper air and moisture barrier. To complete the system, Glasbord integrates with a patented stainless-steel wall base profile in Sani-Base™, which contains hem-folds designed specifically to accept FRP wall cladding at the wall base. This creates a “shingled” assembly that prevents water intrusion and air infiltration.

Early in 2021, Crane Composites passed the ASTM E331 standard using both embossed & smooth FRP + seam sealant + Sani-Base™ stainless steel accessories – with zero leaks observed. To the best of our knowledge, no other interior wall cladding system has tested and passed the E331 standard.



E331 TESTING CHAMBER - CRANE COMPOSITES FRP WITH FUSED SEAMS AND STEEL WALL BASE PROVIDES SUPERIOR WATER RESISTANCE IN CULTIVATION AND PROCESSING ROOMS WHERE MOISTURE MANAGEMENT IS CRITICAL.

UNLIKE CRANE COMPOSITES' SYSTEM, PVC PLANK PANELS ARE VULNERABLE TO WATER INFILTRATION

PVC plank panels consist of mainly white, fluted vinyl sheets that interlock with a tongue and groove connection at each edge. This provides protection from moisture across the field of each panel, however the seams are not water proof. Positioned as a low-cost interior wall cladding due to quick installation, manufacturers claim these panels can be installed directly over the structural studs, removing the need for plywood or gypsum substrates. This saves contractors money up-front, however it can put several performance properties at risk during the life of the building – including air/water resistance and wall assembly fire-ratings. Bulk water management can

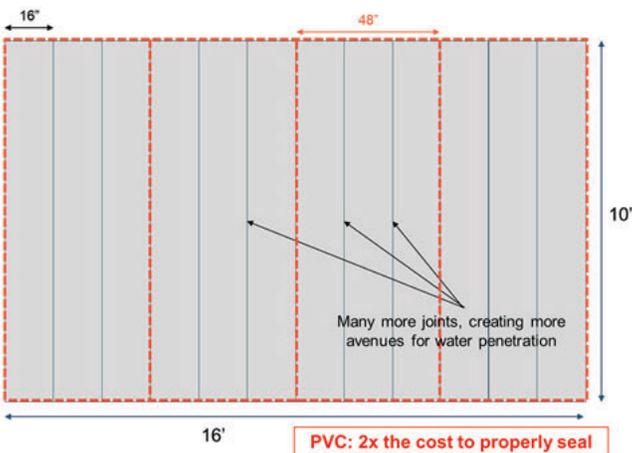
Technical Bulletin

become compromised when installing PVC directly to structural studs because seams are left unsealed with no substrate support. To the best of Crane Composites' knowledge, PVC plank systems are not certified to the ASTM E331 Water Resistance Standard.



PVC PLANK PANELS CONNECT VIA TONGUE AND GROOVE JOINT WHICH LEAVES EACH SEAM UNSEALED, ALLOWING AIR AND VAPOR TO PASS THROUGH UNCONTROLLABLY.

PVC planks are most commonly installed 16" apart, creating numerous vertical seams along the wall – with nothing behind the planks to control moisture. The tongue and groove connections are not airtight, nor are they waterproof – instead they allow both to pass through – and most contractors fail to seal these joints in an effort to further save on the cost of installation.

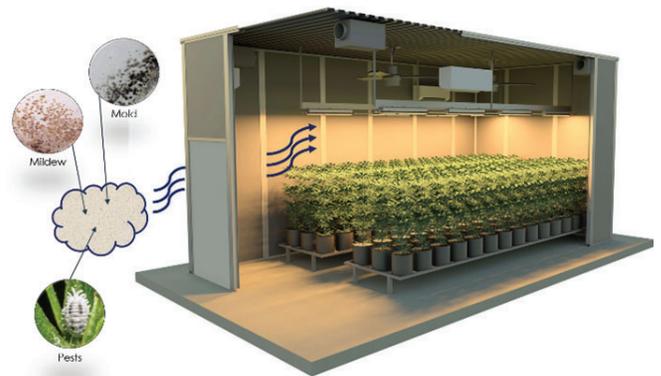


PVC PLANK SYSTEMS (SHOWN ABOVE IN GRAY) HAVE TWICE THE AMOUNT OF SEAMS THAN GLASBORD FRP (AS REPRESENTED BY ORANGE HASH LINES).

For example, a wall area covering 160 square feet has 162 lineal feet of vulnerable seaming with the PVC plank system vs 82 with FRP. This means PVC plank systems have twice the moisture-susceptible joints – all unsealed – versus the sealed solution offered through Crane Composites' Hygienic FRP Wall Solution.

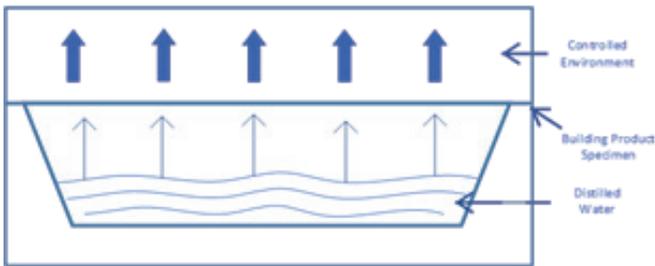
CULTIVATION Facilities Importance of Vapor Barriers

While bulk water management is critical to maintaining the longevity of building components, preventing uncontrolled air & vapor transmission throughout cultivation facilities can have a dramatic impact on crop integrity and yield. When interior wall solution allow air flow to pass from one cultivation room to another, they unintentionally carry a variety of potentially harmful airborne contaminants. Mold, mildew and pests can wreak havoc on precious crops, causing damage and diminished crop yield. The presence of these threats is difficult to prevent completely, however a proper wall system design with a functioning air/vapor barrier can help limit the spread of these contaminants and allow facilities to effectively “quarantine” rooms. When the contamination is isolated, cultivators can address the issue by removing affected plants and cleaning the area without impacting neighboring grow rooms. If airborne contaminants are able to sneak through leaky wall solution, a small problem can become rather large, and plant loss can propagate uncontrollably. This can create extensive plant waste and lost revenue.



IF AIRBORNE CONTAMINATES, PESTS, AND MOLD/MILDEW CAN PASS THROUGH WALL SOLUTION, CROPS CAN BECOME COMPROMISED. THIS CAN CREATE WASTE AND LOST REVENUE.

ASTM offers a method to test the air and vapor transmission rate of a given wall cladding through its “E96 Vapor Transmission of Materials” test. This test method determines the water vapor transmission (WVT) of materials through which the passage of water vapor may be of importance, such as plastic paneling, gypsum and other sheet materials.



EXAMPLE OF THE ASTM E96 TEST BOWL SPECIMEN DEPICTING VAPOR TRANSMISSION OF BUILDING MATERIALS, CROSS-SECTION VIEW FROM THE SIDE.

PUTTING PVC AND GLASBORD FRP SYSTEMS TO THE ASTM E96 TEST

Crane Composites tested PVC plank and Glasbord Hygienic FRP Wall Solution to the E96 standard. Following ASTM parameters, each building product was sealed via liquid silicon gasket to a stainless-steel bowl containing water. A sponge was placed in the bowl to break up tension on the water surface and to prevent splash-up onto the specimen wall. The seam of the product was centered in the middle of the bowl. Each bowl “specimen” was placed in a temperature and humidity-controlled chamber. A control specimen was also added to account for any fluctuations in temperature and humidity. These dummy specimens were sealed to the bowl without the presence of water and the sponge.



LEFT: GLASBORD PRODUCT SPECIMEN PLACED IN THE CLIMATE CONTROLLED TEST CHAMBER WITH URETHANE SEAM SEALANT; RIGHT: PVC PLANK TEST SPECIMEN, UNSEALED.

Utilizing ASTM E96, all building products were tested via the distilled water method. Specimen samples were weighed daily and tracked for weight loss under controlled conditions where temperature was maintained at 87°F±3°F with relative humidity at 70% ±5%. Each building product was tested in triplicate. Weight readings were taken at the same time, daily, at 9:30am ±15min. The temperature and humidity were constantly monitored and recorded daily at time of weighing. Each specimen was tested for a total of 16 days. Weights of

the specimens were adjusted depending on the change in weight of the “dummy” specimen.

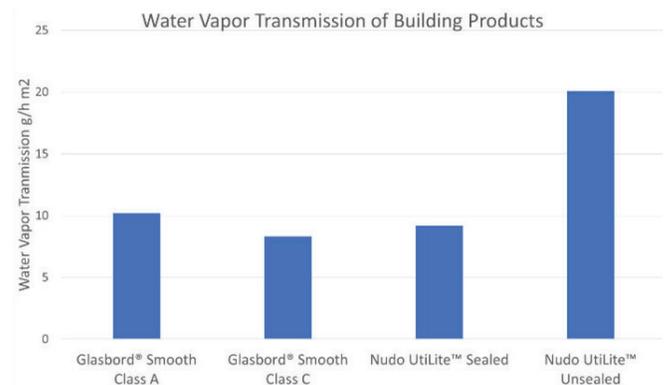
Weight, adjusted by the “dummy”, was plotted against the elapsed time of the study. Considering the test area (A), measured as m², the water vapor transmission (WVT) can be calculated as: $WVT = (G/t)/A$

WVT = Rate of water vapor transmission g/h·m²

G/t = slope of the straight line, g/h

A= test area (cup mouth area), m²

As depicted in the graph below, PVC plank with no sealing between the tongue and groove has double the water vapor transmission rate of the Glasbord Smooth Crane Composites Hygienic System. The lack of a sealed seam creates more avenues for air and vapor to transmit, leaving rooms susceptible to the uncontrolled spread of mold/mildew and pests.



GRAPHIC REPRESENTING OF THE AVERAGE WATER VAPOR TRANSMISSION OF THE TESTED BUILDING PRODUCTS. GLASBORD HAS HALF THE VAPOR TRANSMISSION OF UNSEALED PVC.



FRP Wall Assemblies

Support Integrity of Fire Ratings

Fire ratings provide an important guide to ensuring safety and code compliance for wall solution in buildings. Cultivation and processing facilities often perform unique extraction techniques involving flammable chemicals like ethanol, propane and butane that should be done in a controlled environment. Fire rated walls are commonly required in these processing areas to ensure adequate fire protection for building occupants and workers.

Fire ratings can be misleading. There are several classifications attributed to the components themselves, as well as ratings for full wall assemblies. Interior wall finishes like FRP & PVC are tested as individual components to the ASTM standard E84, the "Standard Test Method for Surface Burning Characteristics of Building Materials". This test method provides surface flame spread and smoke density measurements and is compared to select-grade red oak under controlled fire exposure conditions. The E84 test method introduces a nominal 24-ft (7.32-m) long by 20-in. (508-mm) wide specimen to a controlled fire exposure, adjusted to spread the flame along the entire length of the specimen for 10 minutes. The results yield a measurement for both "flame spread" and "smoke development", and depending on performance in the test, products will achieve a Class A, B or C rating. This test is limited to a single component, in this case an interior wall finish, not the entire wall assembly.

In order to assess the performance of an entire wall solution, building designers typically use UL ratings to ensure safety and code compliance. Fire-rated wall assemblies provide the necessary fire and smoke barriers to create compartmentalization during a fire, safeguarding against the spread of fire and smoke within a building or to-and-from a building. UL helps to ensure that materials, systems and assemblies are designed to meet these requirements by providing third-party certification of their safety and performance. Fire-resistance rated designs are used to achieve code compliant installations where the building codes require hourly rated walls.

UL U419

Interior Partitions - Steel Stud
(Non-Load-Bearing)

Fire Rating	System Thickness	STC
1 hours	4 7/8 in.	48

ASSEMBLY DETAILS

Gypsum Board: 5/8" Thick Gypsum Board (UL Type SCX)

Steel Studs: 3-5/8" Steel Studs, EQ25 (0.018"), Spaced 24" O.C.

Insulation: 3-1/2" Thick Glass Fiber Batt Insulation

Gypsum Board: 5/8" Thick Gypsum Board (UL Type SCX)

AS DETAILED BY USG, MOST 1-HOUR RATED WALLS REQUIRE GYPSUM ON EITHER SIDE OF A STUDDED WALL. STANDARD FRP INSTALLATION IS COMPLEMENTARY TO GYPSUM WALL ASSEMBLIES AND THEIR CORRESPONDING FIRE RATINGS, WITH ENHANCED WATER/VAPOR INTEGRITY AND DURABILITY.

For facilities to achieve a 1-hour UL rated wall system, most traditional designs will use 5/8" Type-X gypsum on either side of the stud cavity. Specially designed gypsum core ingredients help prolong the burn length of the wall system and allow sufficient time for occupants to vacate the building in the event of a fire. Gypsum is still considered the industry standard for fire rated wall assemblies and is the most common substrate used in the commercial construction industry.

Even though gypsum has been proven to prolong the burn time of a wall system, gypsum substrates are often removed during PVC installations in order to achieve cost savings. This can be a major sacrifice for applications that could benefit from and/or require fire rated wall assemblies. PVC alone installed directly to the stud cavity may not qualify as a rated wall system, despite the plank itself achieving a Class A rating with ASTM E84. That test merely assesses the individual plank component, not the entire wall system. Glasbord Hygienic FRP Wall Solution has both Class C and Class A cladding options and is designed to install directly over gypsum substrates. This ensures that both the structural wall assembly and face covering materials are validated UL components of the overall fire rated wall assembly, should it be required by code.



FRP vs. PVC

More Resistant to Impact + Chemical Exposure

Cultivation facilities are busy places with heavy carts, workers and plant materials moving from room to room. This activity across various building components within the facility can cause wear-and-tear and even damage to materials. Moreover, these facilities need to be cleaned with mild detergents and sometimes more aggressive acidic cleansers like sodium hydroxide, acetic acid and hydrochloric peroxide to ensure quality control and avoid costly contamination.

PVC plank panels are more vulnerable to cracking when impacted or stressed, which can lead to contamination and costly repairs. In order to test the impact resistance of a given building material, ASTM utilizes D256 the "Standard Test Method for Determining Izod Pendulum Impact Resistance of Plastics". The pendulum impact test indicates the energy to break standard test specimens of specified size under stipulated parameters measuring pendulum velocity-at-impact. The standard unit of measure for this test is foot-pounds per inch or "ft-lb/in". Under the guidelines of ASTM D256, both Glasbord FRP & PVC planks were tested for Izod Impact, with dramatically different results. Glasbord FRP, when installed over standard 5/8" gypsum (typical fire rated wall), has 7x the impact resistance to that of the PVC Plank.

IZOD IMPACT

GLASBORD FRP OVER 5/8" GYPSUM	NUDO UTILITE 0.04" PVC PLANK PANEL
15.3 ft/lb/in	1.57 ft/lb/in

PER ASTM D256, GLASBORD FRP OVER GYPSUM HAS 10X THE IMPACT RESISTANCE THAN PVC PLANK.

Chemical resistance is also an important factor when considering the longevity and durability of wall solution in cultivation facilities. Crane Composites has conducted extensive chemical compatibility testing on a variety of commonly used cleansers in the cultivation and chem/pharma industries to ensure fit-for-use in these applications. Crane Composites' tests consisted of exposing Glasbord FRP samples to several chemical cleansers for a period of 7 days at 77°F +/- 10°F. Ratings were based on a combination of visual observations and mechanical strength test results.

Glasbord FRP showed EXCELLENT results when exposed to the following chemicals:

CHEMICAL	DILUTION %
Acetic Acid	5%
Ammonium Hydroxide	10%
Citric Acid	10%
Distilled Water	
Hydrochloric Acid	10%
Lactic Acid	10%
Mineral Oil	
Nitric Acid	40%
Potassium Iodide	10%
Sodium Hydroxide	4%
Sulfuric Acid	3%

A result of "Excellent" meant that the panel is "fully suitable for use in most exposure conditions". This means the Glasbord resisted discoloration and any significant degradation of key performance properties listed on the technical data sheet.

PVC plank on the other hand, warns customers of their susceptibility to discoloration and/or degradation. This can have an impact on the product longevity and may result in the need for full replacement.

DO NOT USE: Abrasive cleaners with bleach, cleaners with acid, alkali or sodium hypochlorite. They will damage and permanently discolor the surface. Be sure that bottles, rags or other materials with these cleaners never come in contact with the surface.

PVC WARNS CUSTOMERS AGAINST THE USE OF CERTAIN CHEMICALS, AS THEY CAN CAUSE DAMAGE TO THE PVC PLANK.

Additional results of these internal tests can be found in Technical Document #6230, within Crane Composites' website resource page: cranecomposites.com/resources

ASTM D543-14(2014), Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents, performed by Crane Composites, Inc. Research & Development Lab in Bolingbrook, IL on 3/13/2014.

ISO 2812-1:1993, Determination of Resistance to Liquids, performed by Crane Composites, Inc. Research & Development Lab in Bolingbrook, IL on 3/13/2014.

ASTM D256-10(2018), Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics, performed by Crane Composites, Inc. Research & Development Lab in Bolingbrook, IL on 1/19/2021.

HYGIENIC WALL SOLUTIONS featuring GLASBORD

The Glasbord Hygienic Wall Solution with FRP is the smart choice for interior wall cladding in cultivation facilities. Our sealed FRP system provides superior bulk water management and vapor barrier protection when compared to leaky PVC plank systems. The use of Glasbord in combination with urethane sealant, stainless steel trims and gypsum substrates helps maintain a fire rated wall designation, ensuring code compliance. By specifying the Glasbord Hygienic Wall Solution in your cultivation facility, you ensure the durability and longevity of building components, while also protecting the precious plant life within each room.

complete your **CRANE** hygienic wall + ceiling panel system

Seam Sealant

two-part polyurethane seam sealant

Seam Sealant is an equal-mix, two-component bright white urethane sealant system used to bond and seal a variety of plastics. Use for a seamless Glasbord installation that is easy to clean.



Sani-Base™

seamless wall to floor transitions

Use Sani-Base stainless accessories for innovative moisture mitigation solutions for seamless wall to floor transitions. Our Sani-Base accessories are available in five different profiles to fit your application needs.



Stainless Trims

steel trims for corners and window frames

Stainless steel trim pieces are the answer to having a sanitary, durable and clean transition while providing increased impact resistance and longevity to develop a more aesthetically pleasing finish.



Crane Composites Adhesive

two frp adhesive options

Our Fast Grab and Advanced Polymer adhesive offers professional-strength and is specifically formulated for the installation of FRP panels over most porous surfaces. It offers quick grab and strength development that requires minimal bracing.



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Crane Composites is the manufacturer of Glasbord, Sequentia, Sanigrad II and a variety of other fiberglass reinforced plastic (FRP) composite wall panels. Inspired by the Kemlite tradition, Crane Composites has over 65 years of experience in Commercial Building Products and is a recognized industry leader in FRP applications. The following are trademarks of Crane Composites, Inc. or a related company: Glasbord, Kemlite, Kemply, Surfaseal, Sanigrad, Silhouette Trims and Varietex 7881 | REV 0 | 08.21 (10089)