Frame Materials Types

Module #2C
Product Knowledge Training
Home Center
Frame Material Types

All windows are made from glass and some type of frame. The window frame is the backbone of the window, similar to a picture frame. It usually consists of four sides.

Milgard uses the following materials for our window and patio door frames:

1. **Aluminum** – The first frame material used by Milgard.
2. **Vinyl** – Used to make windows in Europe since the 1950’s. Offered by Milgard since 1989.
3. **Fiberglass** – Offered by Milgard since 1995.
4. **Wood** – A solid wood interior and a strong fiberglass exterior. One of the newest window frame materials.
Frame Material Types

Today’s Aluminum

Milgard’s aluminum windows are very different than those you might remember from a few years ago. We approach aluminum windows as a specific design requirement—not as a low-cost alternative to wood or vinyl.

Aluminum windows can be configured into large combinations because of their rigidity and durability which means additional value and views for our customers. Also while traditional aluminum windows are best suited for milder climates, our complete line of thermal break aluminum windows are used as far north as Alaska. With over 50 years manufacturing aluminum windows, Milgard has the experience to stand behind our Full Lifetime Warranty, including parts and labor. No other aluminum window manufacturer can match us for residential applications.

The aluminum alloy that Milgard uses is referred to as the 6063 Alloy specification. The two most important ingredients added to aluminum are magnesium and silicon which give the alloy its great strength. The more pure the aluminum, the less susceptible it is to corrosion; however our additives also give the material its surface finish, strength, color and other properties.
Frame Material Types

**Milgard Aluminum Product Lines**
Milgard offers two distinct aluminum product lines: Standard and Thermal-Break.

**Standard Aluminum**
- Sealed, mechanically-joined corners stay square and true over years of use - keeping homes dry.
- Clean, narrow sight lines with strength and stability that aluminum can easily provide.
- Milgard SunCoat™ Low-E glass for superior energy savings and protection against fabric fading.
- Milgard Spring Action lock for fingertip-easy opening and enhanced security.
- Industry-leading **Full Lifetime Guarantee**.
- Available in White (location specific), Tan (location-specific), Clear Anodized and Bronze Anodized.

**Thermal Break Aluminum** products from Milgard have all of the same features and benefits as Standard Aluminum as well as:
- Improved thermal rating for higher energy efficiency.
- Milgard Positive Action Locking System™ for fingertip-easy opening and enhanced security.

Note: Thermal Break Aluminum is only available in Clear Anodized or Bronze Anodized. This product is location-specific. Also Standard Aluminum is not available at all Milgard locations.
Two Kinds of Aluminum

**Standard Aluminum Windows**

A “Standard Aluminum” window system refers to a window frame that is made of aluminum throughout. It consists of aluminum on the interior and exterior of the window, with no thermal break in between. These windows work well in hot climates such as Las Vegas and Phoenix.

**Thermal Break Aluminum Windows**

A “Thermal-Break” window system includes thermally broken perimeter frames, HMRs/VMRs and vent panel(s), which greatly reduce transmission of heat through the aluminum. You may also hear the competition use the term, “Thermally Improved” which often refers to a window system where only the perimeter frame or vent frame is thermally broken.

Now here is where it gets confusing; we refer to our Aluminum extrusions as TIE - Thermally Improved Extrusions. However, Milgard's Thermal Break aluminum window is a true thermally broken window system. Our perimeter frame sections and HMR/VMR are completely thermally broken. Our Thermal Break windows have improved thermal ratings for higher energy efficiency so they do well in cooler climates.
Two Kinds of Aluminum

Although aluminum is resistant to corrosion in the form of “rust”, it will degrade or “pit” through oxidation to some extent over time if not protected. The surface must be anodized or painted (you may hear unfinished aluminum called a mill finish).

Anodized Aluminum

Anodizing is a process to protect the surface of the aluminum – when no color is achieved, the material is “clear anodized.” The anodizing process also allows for a color to be applied, usually a brown, dark brown or black (if a bronze color is desired, tin is used). Specialty colors can also be produced, but are susceptible to UV. This is a product that architects love.

Painted Aluminum

We purchase aluminum that is shipped to us already painted, so all we have to do is fabricate our products. Unlike our vinyl and fiberglass components, Milgard does NOT extrude our own aluminum window frames.
Milgard Aluminum & Our Advantage

1. Quality Components
We use the best components to make the best aluminum windows and doors in the industry. All of our hardware is continually updated to give our customers the appearance, strength and durability they want in their windows and doors. Many of our components are exclusive designs, offering performance not to be found anywhere else.

2. SunCoat® Low-E Glass
Because Milgard aluminum windows are a premium window product, we offer SunCoat® Low-E high performance insulating glass standard in all of our windows and doors.

3. Spring Action Locking System
We offer a spring action locking system on sliders and single hung windows so when the window is closed, it is locked. This sleek and secure hardware is available in all window frame colors. An important point for customers is that our window hardware meets or exceeds the toughest forced-entry codes in the nation.

4. Options, Options & More Options
We offer a variety of choices of colors and grids for our aluminum windows. We also offer numerous choices of glass. You will learn more about aluminum windows and all of the choices available to your customers in the Aluminum Module.

5. Full Lifetime Guarantee
All aluminum windows and doors are backed by Milgard's industry-leading Full Lifetime Warranty. If anything ever goes wrong with one of our products in a single-family home, we'll fix it for as long as the original owner lives there. Parts and labor included!
Vinyl Frame Material

Not All Vinyl is Created Equal
Vinyl is made of PVC, or Polyvinyl Chloride (by-products of natural gas and ordinary salt) which was invented in 1913. We're confident that Milgard vinyl profiles are among the best in the world because we control the quality of our technology, talent and equipment in-house. In fact, we own and operate the most advanced vinyl extrusion facility in North America. We have a superior Vinyl compound; we have exceptional engineering; we use the best custom-designed fabrication equipment found the world over; and we test our vinyl products to extremes and beyond!

Milgard Vinyl
The key ingredients that make up vinyl window frames vary substantially among manufacturers. This compound is critical because it determines the long-term characteristics of the window including weather-ability, resistance to impact and how it handles both summer heat and winter chill. Milgard uses the best materials to get the quality profiles we manufacture.
Our Vinyl Frame Material

1. Solid Impact Modifiers
Impact modifiers are an important part of vinyl extrusion, because without them the frames would crack, split and not be able to hold their form. Unlike some of our competition, Milgard uses solid impact modifiers, not liquid "plasticizers" because they:
- Are more effective and stable over time since they are not made with food products.
- Will not evaporate over time like liquid plasticizers.
- Are resistant to impact - they exceed all AAMA standards, even in Arctic climates.

2. Ultra Violet (UV) Inhibitors
Titanium Dioxide (TiO2) is the UV inhibitor that Milgard uses for maximum protection from the sun's UV rays. Because of (TiO2), we can ensure our windows are more resistant to deformation and yellowing. Consider it sunscreen for windows.

3. Color Shifts
Milgard uses (TiO2) and additional pigment additives to protect our vinyl from yellowing or color shifts over time. Without additives, vinyl could not be processed at all. It would be susceptible to UV, a pale yellow color, and would be as brittle as glass. Milgard uses the optimal levels of additives - exceeding these levels wouldn't improve performance further. Our products pass rigorous, on-going tests by AAMA that ensures that any color shifts are so minute that they are virtually undetectable. In fact, if we were to fail this test, we could not label and sell our vinyl windows. This test gives us, and our customers, confidence in the finish of our products over time.
Our Vinyl Frame Material

4. World Class Equipment
All of Milgard’s extrusion equipment is custom designed and built for Milgard in Europe, where vinyl windows have been the standard since the 1950's. Our dies are more consistent and precise than we have found anywhere in the world. Our processing equipment is also engineered to produce uniform heat and pressure to make sure our design quality equals our production quality. Our exacting tolerances for quality mean a smoother and therefore cleaner and cooler window frame which stays looking new for a much longer time than many of our competitor’s vinyl frames.

5. Virgin Vinyl vs. Non-Virgin Vinyl
True “virgin” vinyl could not be made into a window. Many people refer to vinyl that has only been through an extruder one time as “virgin” vinyl. Milgard has learned that an optimal percentage of regrind actually results in a window with better weathering, and increased impact resistance over time. Milgard incorporates this percentage into the profiles we extrude—not to save money, but to make a better window.

It is important to note that we have included compounds and materials into our vinyl with the use of regrind material in mind. We can extrude our premium compounds through 13 cycles of extruding and regrinding before any degradation of the material occurs.
Our Vinyl Frame Material

Facts About Milgard Vinyl

Milgard vinyl profiles exceed AAMA’s stringent requirements for weather resistance, impact resistance and heat reversion. These tests give us—and our customers—the confidence in the finish of our products over time. Milgard uses some of the most progressive tests in the business. You will learn more about that in later modules.

Milgard's Vinyl Window Design

The design of a window determines its overall performance against sagging, rolling, or twisting over time. Milgard's vinyl windows are honeycombed with hollow areas for strength and energy savings. A solid vinyl frame (no hollows) would actually be a lesser performing window. Our balanced design and precise inner wall placement results in a window with more strength. The inner walls of our profiles are designed specifically to:

- Support the weight of the glass.
- “Cancel out” processing stresses.
- Create hollows with isolative 'dead air' space for energy efficiency.
- Allow maximum air flow within the window*.

*Most people look to the exterior surface of the window when considering energy efficiency. But much of a window’s performance has to do with the currents of air that flow through the interior of the window frame and out through the weeps. We use a sophisticated computer simulation to calculate the optimal inner wall placement and hollow configuration for energy efficiency. More webbing does not necessarily mean better energy efficiency.
Milgard Fiberglass

1. Milgard pultrudes its own fiberglass to control overall quality.
2. Fiberglass is strong and stable. Strength is similar to aluminum.
3. Fiberglass is waterproof.
4. Corrosion resistance: Salt water and salt air can’t pit, corrode, or rust fiberglass.
5. Extremely low expansion and contraction rates through temperature changes (about that of glass), which mean less stress on the glazing unit.
6. Low thermal conductivity with similar energy performance to vinyl and wood.
7. New Pultrusion technology has allowed more complex shapes like window and door frames, rather than simple shapes.
8. 100% memory; when flexed fiberglass returns completely to the original shape.
9. Paintable with good paint adhesion.
Fiberglass Products
Milgard offers the Ultra™ Series, fiberglass inside and out.

The Ultra™ Series comes standard with a white painted interior surface.
Wood Frame Material

Milgard Wood

Wood has always been praised for its beauty and natural insulating properties inside the home--but presented real challenges in terms of durability on the exterior.

With Essence Series®, Milgard combines the best of both worlds. A durable fiberglass exterior stands strong to protect a solid wood interior against the elements for lasting beauty and exceptional performance.

Milgard offers 3 wood interior option ready for paint or stain

- Pine
- Clear Vertical Grain Douglas Fir
- Primed Pine