

Customizing doors to meet specific needs isn't a new concept, but the difference is, today, virtually every door is custom made to an owner's exact specifications. These include the type of core, facing material, finish color and functionality, right down to every last detail of the hardware preps, vision kits and glass to be installed. Pictured are sliding barn doors with glass on an exposed rail system.



# THE CUSTOMIZATION OF DOORS

**A Centuries-Old Standard** By Merle E. Visser



## By definition, a door is “a usually swinging or sliding barrier by which an entry is closed and opened.” *(Merriam-Webster)*

**Mankind has relied on doors, in one form or another, since the beginning of our existence.** They have evolved over time to meet our needs, from the simplest animal skin hanging over an opening to a modern-day biocontainment closure. History tells us that doors have been customized to fit our needs for as long as doors have existed.

So, what is customization? If you look at it in its simplest form, you could say that going from an animal skin—which kept the cold out but not the wolf—to a predator-resistant door made of woven sticks and vines, we customized a door.

Before the days of mass production, most doors were custom-made for each opening and/or application. Advancements in equipment and technology made the making of doors much more cost effective, and the door industry followed the lead of Henry Ford’s iconic paraphrased slogan, “You can have any color as long as it’s black.” For the wood door industry, this translated into more standardized door sizes and designs.

Prior to the 20th century, the norm for wood doors in commercial buildings, such as schools, hospitals and office buildings, was stile and rail doors mostly made from white pine. The abundance of white pine forests and rivers to transport logs in Northeastern Wisconsin made the region a prime location for sash and door manufacturers. So much so, in fact, that half the doors produced in the United States came from Wisconsin. By the late 1800s, Paine Lumber Company in Oshkosh, Wisc., was the nation’s largest door producer.

The company’s leaders soon realized that the white pine forests within cost-effective transportation distance were rapidly being depleted and they wouldn’t be able to compete with western manufacturers. With that as motivation, they started researching new concepts for door production. They quickly realized that although the readily available white pine was gone, plenty of hardwood that had been previously viewed as having little value was in ample supply. The challenge was to produce hardwood doors that could compete in price with the white pine.



A pair of doors with full light cutout and exit device is finished in a custom stain color.

### New Era in Wood Door Production

To combat the pricing issue, Paine Lumber introduced stile and rail doors with veneered panels. The first doors were made with birch veneer and went over well with the public. The cost savings came from being able to use low-grade lumber to produce the internal cores for the panels of the doors. This greatly reduced the amount of good clear lumber required to produce a door and, instead, used lumber that had been previously considered of little value and often discarded. The doors also proved more stable, with fewer issues related

to expansion and contraction because of environmental changes.

Thanks to Paine's innovative design, the company quickly became the largest door producer in the world, with documented production numbers in 1927 of over 20,000 doors per day from raw log to finished product.

As Paine's success with the veneered panel product grew, its executives started to look for more ways to use the veneer concept. Their research led them to a company in France, Société le Rezo, that had developed a flush, hollow-core door for ocean liners. The door was constructed with a wooden honeycomb system and was not only

**These customized sliding barn doors in an office setting have another aesthetics feature with frosted glass.**

lightweight but also extremely stable.

### **Flush Wood Door a Trendsetter**

In 1935, Paine purchased the American rights to Rezo's patent for its hollow core door design and started production. Just like the veneered panel for the stile and rail door, the flush door design took off and quickly evolved into solid-core offerings as well. The introduction of the flush veneered door also greatly increased affordable options for different species of wood, not only domestically grown but also imported from other parts of the world.

Initially, flush wood doors were available with only two core types – the hollow core or solid staved lumber core. As the demand for fire-rated doors increased, so did the demand for more aesthetically pleasing fire doors to replace the traditional metal ones. To meet this demand, doors had to be customized with fire-resistant cores and other fire-retardant components. The first fire-rated wood doors were introduced in the late 1940s.

With the introduction of particleboard in the 1950s, wood door manufacturers quickly adapted it to their production. It was not only a cost savings over staved lumber core, it was more stable. As the market demands have changed over the years, wood door manufacturers have continued to customize their offerings to satisfy designers' desires for aesthetics while incorporating functional features, such as lead-lined, acoustical and bullet-resistant doors.

### **Regulations on Customized Doors**

Factory customization goes much further than just adding new door facing and core types.

In the mid-1980s, fire-labeling underwriters UL and WHI no longer allowed doors to have fire labels applied to them unless the machining and final sizing of the doors was performed in

a licensed facility. Prior to that, doors were commonly shipped to distribution centers as stock-sized slab doors that were then sized and machined in the field by the installer.

The decision to require licensed shops to perform machining operations was driven by two factors. First, the doors had to be sized and machined exactly as tested by the certifying agency. The carpenters in the field lacked this knowledge and couldn't be monitored. Second, they often didn't have the proper tools for machining the doors, which could result in door failure during a fire because of imprecise hardware preps. This means licensed shops must be periodically inspected by the labeling agencies to insure they have the correct processes, trained



An advertisement for Lockers.com. The top left features the logo 'lockers.com' with '1-800-LOCKERS' below it. The top right features the word 'Lockers' in a large, blue, stylized font. The main image shows three scenes: a woman in blue lockers, a man in red lockers, and a woman in white lockers. At the bottom, it says 'Call Regarding Our Dealer Program!' in blue and red, followed by '1-800-562-5377 or Visit us On-line at Lockers.Com' in red. The bottom right corner has the 'SALSBUURY' logo with '1 21 22 23 24 25 26 27 28 29 30 31 32' and 'People Committed to Quality Since 1936'.

**Top:** Particleboard core for a wood door after stiles and rails are applied. With the introduction of particleboard in the 1950s, wood door manufacturers quickly adapted it to their production. It was not only a cost savings over staved lumber core, it was more stable.

**Bottom:** As market demands have changed over the years, wood door manufacturers have continued to customize their offerings to satisfy designers' desires for aesthetics while incorporating functional features, such as lead-lined, acoustical and bullet-resistant doors. Pictured is a bullet-resistant door with a light and metal vision frame. Bullet-resistant doors are available in three protection levels -1, 2 and 3.



personnel and equipment in place. Because the manufacturers for wood doors were already licensed by the labeling agencies to build the doors, it was a natural transition for them to become the main source to final fit and machine them as well.

### **In the Hands of Manufacturers**

Why go to this level of customization at the manufacturing level?

**Cost effectiveness** – A manufacturer's ability to machine, finish, install glass and complete a door in an assembly-line type process is far more cost effective than completing these operations in the field.

**Expertise** – Manufacturers have highly trained, detail-oriented professionals who coordinate every aspect of the doors for each order, ensuring that hardware preps, light cutouts, sizing and other essential features comply with all labeling and warranty requirements.

**Controlled environment** – Unlike a job site, manufacturers produce and further process doors in controlled environments. This is especially critical when it comes to finishing doors. Climate control, proper sanding and dust-free environments are critical to achieving a finely finished product.

**Warranty** – A manufacturer can only warrant what they provide or do to the door. As customization at the manufacturing level increases, so does the extent of what the manufacturer warrants. In the past, this would be a common scenario to install a custom door:

- A carpenter in the field machines the doors
- The carpenter or a separate installer hangs the door in the

A customized wood door with a triangular light cutout awaits shipment. Light cutouts come in a variety of shapes and sizes.

- opening with hinges only
- A painter finishes the door while hanging
- A glazer installs the glass in openings with vision kits
- An installer comes back and installs the balance of the hardware

The result is multiple trades and people handling the doors over a period of days to weeks. Although wood doors are strong and durable, they are a wood product and, therefore, susceptible to environmental changes when exposed to the uncontrolled conditions typical of buildings under construction. Couple that with multiple



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**Top: The customization of a door starts at the core. Pictured is an assortment of particleboard core and structural composite lumber core before production.**

**Bottom: Hardware is machined in preparation for exit device installation.**



trades working on the doors or passing through them for an extended period before the building is completed, and the odds for some sort of damage is greatly increased.

When these tasks are completed at the factory, there is no need for the doors to be on site prior to the building being under climate control. They should actually arrive after most of the interior finish work has been completed. Architectural-grade wood doors truly are pieces of furniture and should be handled as such. When the manufacturer machines, finishes and glazes the door, they not only warranty the door, they also warranty the finish, hardware preps and anything they install on it. That way, the building owner has only one company to look to if an issue does develop with the door over time.

### Doors Made to Precision

Customizing doors to meet specific needs isn't a new concept, even to the point of automation. Historians tell us the Greek scholar Heron of Alexandria created the earliest known automatic door in the first century A.D. The first foot-sensor-activated automatic door was made in China during the reign of Emperor Yang of Sui (r. 604–618), who had one installed for his royal library.

The difference is, today, virtually every door is custom made to an owner's exact specifications. These include the type of core, facing material, finish color and functionality, right down to every last detail of the hardware preps, vision kits and glass to be installed, among other features. Doors are then numbered per opening to match the architectural drawings.

Customization today is just the latest standard in an ancient industry. ■



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