

This article, made mostly for mahjong tiles still works and was found at <http://www.sloperama.com/majexchange/id.html>

Bakelite -- Bakelite is the most common material used in older American-made plastic Mah Jongg tiles. It was the first truly synthetic plastic and was developed and patented by Leo Baekeland in 1907. It was made from a mixture of phenol (carbolic acid) and formaldehyde. It is a *thermoset* plastic -- once it has been formed and molded with heat and pressure, it cannot be melted down again. Most Bakelite tiles are a yellow-orange in color (some would say "butterscotch"), but other colors are known, especially in two-tone tiles. The tiles are opaque, very dense and usually have fairly sharp edges. Bakelite wasn't widely used to make mah-jongg sets in the 1920s, when mah-jongg was a craze (see [FAQ 11](#)). Bakelite became most widely used during the 1930s, when the Great Depression created a need for cheap manufacturing materials.

TEST 1: Many collectors "test" for Bakelite by rubbing the side or back of a tile with a q-tip dipped in Dow Scrubbing Bubbles. This produces a yellow to orange-brown coloring on the Q-tip, regardless of the color of the tile (or tray). This reaction does not occur with later vinyl-based plastics or with celluloid, however some collectors do not consider this test definitive.

TEST 2: Bakelite tiles will produce a carbolic acid smell when heated by very hot water or possibly vigorous rubbing with the finger. Use caution to avoid damaging the material -- do not wet or rub the painted side of the tile.

[Click here to learn more about the plastics used in mah-jongg tiles!](#)

And you can learn more about bakelite and catalin at <http://www.deco-echoes.com/bakelite.html>. (Thanks to Ron Cooper for the link.) And for info on the history of bakelite, see <http://www.mbzponton.org/valueadded/maintenance/bakelitehist.htm>.



Classic Bakelite tiles

Catalin -- Catalin is another phenol-formaldehyde plastic developed as a competitor to Bakelite. Since it is chemically virtually identical to Bakelite, the tests for Bakelite will produce similar results, although most people find it barely causes a stain using the

"scrubbing bubbles test". Some collectors say that Catalin tiles are more rounded from a difference in the molding process, while Bakelite tiles are sharper-edged. Some collectors also say that Catalin tends to be more translucent (at least less opaque) than Bakelite. Sets which contain Catalin tiles include those by Cardinal and A&L Mfg., or may have a Royal Depth Control (RDC) Catalin label in the box.

[Click here to learn more about the plastics used in mah-jongg tiles!](#)

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Catalin Tiles

Celluloid -- Celluloid was the one of the first man-made plastics, having been developed by John Hyatt in the 1860's. It was made from cellulose (usually from cotton shirt manufacturing waste) and camphor. It was developed as a direct substitute for ivory and tortoiseshell. Early celluloid was extremely flammable and burned with the smell of camphor and nitric acid. We have seen some tiles that are reputed to be celluloid, but have not been able to verify them**. It is unlikely that many Mah Jongg tiles were made from celluloid, since it was more expensive to produce than the other plastics by the time Mah Jongg tiles were being mass manufactured.

TEST: Celluloid should give off a camphor smell when heated by very hot water or by rubbing vigorously with the finger, but care should be taken not to damage the material.

** Tom adds: I *have* seen a set in which the tiles looked like the one pictured here. The distinct grain of "French Ivory" was evident. I did not attempt to discern a camphor smell, however.

[Click here to see the "Is It Ivory" checklist!](#)

[Click here to learn more about the plastics used in mah-jongg tiles!](#)



A celluloid tile. Notice the fine vertical lines, created to make the tiles look like ivory -- which is why celluloid of this type was referred to as "French Ivory" -- but the grain is too regular to be ivory.

Bone -- Bone is by far the most common material used in antique Chinese Mah Jongg sets, and it is usually dove-tailed with bamboo. [Tom adds: Most bone mah-jongg tiles are made from cow shin bone, but it is possible that bone of other animals may have been used as well. We don't have any definitive information on how to distinguish cow bone from elephant bone or any other kind of bone, at present. It's likely that it's illegal to import items made of elephant bone - see the alert below.] Bone is often mistaken for ivory. Bone tiles will usually show somewhere, even if only a few tiles, the Haversian system found only in bone. This is the remnants of the vascular system of the bone structure, and usually shows up as small pores, often darkened with decayed organic material. The Haversian system may also show up as streaks on the tiles. Ivory does not have this system, so any indication of the Haversian system is a strong indication of bone. If in doubt, assume the sets are bone, not ivory. There is a good economic reason for this, as well: when these sets were made in the 1920s and 1930s in China, China was in dire economic straits in its ongoing conflict with Japan. It is very doubtful that ivory could have been afforded or imported during that time.

TEST: Visually look for signs of the Haversian system in ALL of the tiles of the set -- in high grade bone sets, this may be difficult to find and using a 10x hand lens is helpful.

If you have questions about cleaning or restoring bone tiles, [see FAQ 7o](#).

FISH BONE: A lot of newer modern sets, especially those coming from Shanghai, are made of pulverised fishbone, reconstituted and pressed together.


COLOUR: because the bone is presumably bleached in the process, the tiles are extremely (pristine) white, with of course: no evidence of Haversian system. The actual paint used in the symbols on modern (fishbone) sets are usually much brighter, bordering on gaudy, garish colours.

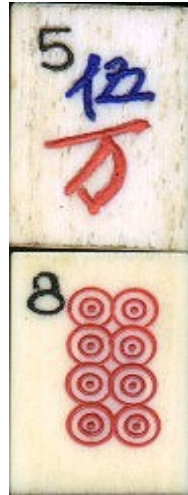
SHAPE: because they are reconstituted (rather than carved from solid bone), they are very uniform in shape with very flat, even surfaces, without signs of filing/sanding and the dovetails are very uniform in shape and size. Fishbone tiles also have very sharp edges which sometimes show very fine chipping of the edges.

CARVING: Unlike older tiles, carved from solid pieces of bone, modern tiles are increasingly "carved" (engraved) with modern, presumably electric, tools. Such engravings show very rounded curves. Older carvings were chiseled or gouged and rounded corners tended to be angular, as a result of being done with two or more 'strokes'.

Thanks to Peter Gallagher for adding the above information to Sandy's tremendously useful FAQ. -- Tom.

[Click here to see the "Is It Ivory" checklist!](#)

 NOTE: Be advised that some countries (like the United States) prohibit the importation of ivory items (or any items made from endangered species like elephants). Although it is legal to sell ivory items that entered the U.S. before the ban, it is illegal to import them. So if you live in the United States, don't buy any ivory or elephant bone items from any other country! Cow bone, walrus ivory, and mammoth ivory should be okay to import ([eBay](#) has a guide about what items should not be imported).



Top tile showing Haversian system w/ streaking. Bottom tile from same set, showing no Haversian system. If you see a straight grain and/or pores on any of the tiles in a set, they are BONE. Note also older-style "crak" character typical of antique tiles from the 1920s. [See FAQ 7e.](#)



Two tiles from a fishbone set. These new fishbone sets use the later style of "crak" character (shown), and often have Singapore-style flower tiles such as cat, rat, rich man, pot of gold, fisherman, fish (not shown) and Chinese "100 Uses" jokers (shown).

Ivory -- Some collectors feel that there are very few, if any, true ivory Mah Jongg sets in this country. Ivory is best identified by an expert, but there are some indicators of true ivory. Ivory has a visual "depth" not seen in bone.

TEST: A visual inspection of ivory under strong light will usually reveal some of the tusk structure. The most definitive pattern is described as looking like "stacked chevrons" or a "cross-hatch" pattern somewhere in the tile (often at the edges), barely seen as the tile is turned in strong light. Other patterns are wavy (indicating the layers of the tusk).

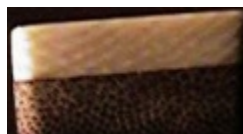
TEST 2: From the "Antiques Road Show"-- If you see the curvy/wavy pearlescent grain from one direction, then rotate the piece 90 degrees, you will NOT be able to see the grain. (That's what makes it pearlescent.) The appraiser considered this definitive, but I haven't tried it. [Tom says: I have, and I can confirm that this is an accurate indication of ivory. The wavy pearlescent grain and cross-hatching are called "Schreger lines," after Bernhard Schreger, who described them in 1800. Do a [google](#) on "Schreger lines" to learn more!]

The so-called "hot pin" test and drilling a tile to smell "like a dentist drilling" are NOT accurate. Bone will produce essentially the same results as ivory. (Tom says: do NOT drill your tiles or try to jab them with hot pins! You can tell if they're ivory by purely visual means!)

NOTE: This website takes a skeptical view of sellers claiming that they have ivory items for sale. As noted above, ivory mah-jongg sets are rare. They are therefore more valuable than bone or plastic sets.

A parallel would be for someone to offer a "diamond ring" for sale when the ring's stone is actually made of glass. Or for someone to offer "gold coins" when the coins are actually brass alloy (like the Sacagawea dollar). It is perhaps simply a matter of ignorance on the part of the seller, or perhaps the seller is intentionally overstating things to get a better price. Either way, buyer beware. Make sure of what is being offered before you buy.

[Click here to see the "Is It Ivory" checklist!](#)



These are the first ivory tiles that we have identified that are dovetailed with bamboo. They show the curvy grain of ivory on the front and the "stacked chevrons" or cross hatching on the sides. These tiles were verified as ivory by a senior appraiser of orientalia. They are the only ones we know of in the US. If you have pictures of others, please send them to the [Webmaster](#).

*I own a couple of sets of genuine ivory tiles, and I can confirm that the tests described here are accurate.
- Tom*

Wood -- In some less expensive Mah Jongg sets, the tiles were made of solid wood. Types of wood vary, and they may be solid wood or laminated (shown) but visual identification is usually easy. Wood tiles are flat on both sides. These have some value to collectors. The tiles may be carved and painted directly on the wood, or may have paper or plastic stickers on them.



Wooden Tiles

Bamboo -- Also used in less expensive sets, primarily Chinese sets, is solid bamboo. These tiles are cut from bamboo and usually have a curvature to both sides, reflecting the structure of the bamboo. They may be the natural color of bamboo (shown), or they may be painted, generally black with bright designs. Again these are collected more as a curiosity, since they are difficult to play with.



Bamboo Tiles

Composition -- Some American companies (notably Parker Brothers) produced inexpensive sets using composite wood with paper or plastic fronts. When these sets are in "mint" condition, they have value to collectors.



Composition Tiles

Vinyl Plastic -- Modern American sets are made of vinyl plastic and usually white with brightly colored stamp-painted faces. Collectors of older set find these bright tiles somewhat garish. But these may be the only sets that have all 8 jokers (without the need for stickers) for current American-style play.

[Click here to learn more about the plastics used in mah-jongg tiles!](#)



Typical "modern" plastic set being sold today.



Older vinyl plastic two-tone tiles, probably from the 50's

Jade -- Jade sets exist but are somewhat rare. In the examples I have seen pictured, the tiles are entirely made of jade, with the symbols carved into the face, undoubtedly by hand. Expect these to be pricey! We usually think of jade as being green, but I haven't seen any green jade mah-jongg tiles yet. To date, I have only seen them in "black jade" and "white jade" (nephrite).



White jade tiles. [Click the picture for a closer view!](#)



An example of a dark jade tile (from the collection of the same collector who owns the ivory tiles shown above).

Sources:

Meikle, Jeffrey I., *American Plastics, A Cultural History*, Rutgers University Press, 1995

Kelley and Schiffer, *Plastic Jewelry*, Schiffer Publishing, Ltd., 1996.

Rezazadeh, Fred, *Costume Jewelry*, Collectors Books, 1998

And thanks to the several collectors across the country who responded so graciously to my questions and who have sent me pictures. -- Sandy Beach and Tom Sloper

Purple text added by Tom Sloper, 2001-2004.

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